NCJ

NATIONAL CONTEST JOURNAL

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January/February 2004

Volume 32 Number 1

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- A Review of the Ten-Tec Orion
- Getting Started in SO2R
- Trends in VHF Contesting
- Results: January 2003 NAQPs, September 2003 Sprints
- NAQP and Sprint 2004 Rules

Top Photo: **John Devoldere**, **ON4UN**, with his new Ten-Tec Orion. See his review in this issue.

Bottom Photo: Vermont Fall colors frame **NT1Y's** 160-meter four-square and rotating tower with Force 12 80-meter Yagi and stacked M^2 LPDAs.

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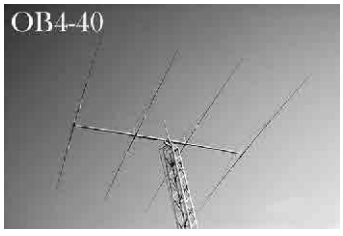

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Editorial

By Carl Luetzelschwab, K9LA

W9XT's 100th Column

This issue marks a milestone for one of our columnists—it includes the one hundredth Contest Tips, Tricks, and Techniques column from Gary, W9XT. He started writing the CTT&T column for *NCJ* in the July/August 1987 issue.

Prior to this, he contributed reprints from the SMC's *Black Hole* newsletter and the Kettle Moraine Radio Amateurs' *Kettle Drums* newsletter. These were the forerunner of the CTT&T column.

Gary has covered a lot of contesting topics over the years. The BONUS CONTENT on the *NCJ* Web site (**www.ncjweb.com**) has the index of all of his CTT&T columns. Check it out. If you're interested in any of the columns, they're all on the *NCJ* CD available from the ARRL.

Thanks, Gary, for all the effort and contributions over the past sixteen and a half years.

WRTC2006

If you already haven't seen it on the various reflectors, it has been officially announced that the next WRTC will be held in Brazil in July 2006. See the announcement elsewhere in this issue.

IARU Rule Change Proposal

In the November/December issue, I ran a short article by Ric, WO4O. He proposed several rule changes to the IARU HF World Championship.

Running WO4O's article in the *NCJ* as a feature makes it look like Ric has the backing of the *NCJ* for these changes. Since the *NCJ* did not research this issue prior to running the article, I just want to make it clear that at the moment the *NCJ* is neutral in this matter.

Additionally, there is a procedure to follow for matters such as these. The starting point would be for the initiator to compose a short concise letter to his ARRL Division Director and his CAC representative. This would formally get things started.

Phone Sprint Complaint

Right after the running of the September Phone Sprint, I received an e-mail from a very angry individual. We chatted on the phone a couple days later, and I found out that this was not the case of a dyed-in-the-wool non-contester complaining about contesters. The individual said he participates in a few contests from time to time. What set him off was the fact that the Phone Sprint "tore up the band" due to the QSY rule. I think we can all agree that the QSY rule, while making the contest more challenging, can also create a big headache for us if we assume we own the band and QSY at will—without regard for other QSOs in progress.

I think Jim, K4MA, the Phone Sprint contest manager, sums it up best in his write-up in this issue. He says "I would just remind everyone that the Sprint rules don't relieve your responsibility to check and ensure that a given frequency is not in use before you start calling CQ."

With Cycle 23 declining and more and more activity moving to 20 meters and lower, let's make sure we don't create a big headache for ourselves.

Errata

In the November/December issue, Figure 1 in K3NA's article Antenna Interactions—Part 3 is the incorrect figure. The correct figure, along with the full color version of Eric's article, is in the BONUS CONTENT on the *NCJ* website.

NCJ

Correspondence

Alan Ames, N2ALE/5
n2ale@arrl.org

I found the November/December article "SO2R—The Easy Way" by J. V. Evans, N3HBX, of interest as I hope to go that direction some day and had an interest in the Array Solutions SO2R box. It was a very informative article.

I do have to take issue with a side comment N3HBX made, however, in saying "it appears that the 160 MHz first-generation Pentium computers were the last to include three ISA type slots." This is only true if you only shop at your local PC outlet. Industrial computers seem to offer a number of options as they make extensive use of ISA slots. They also offer a better MTBF (*Mean Time Between Failures—Ed.*) than the usual PC. These are more typical of the MTBF found in servers, for example. I have two older ITOX motherboards with five ISA slots (plus 1 shared), and they work well with my DVK, RTTY board, and ByteRunner card. The specification sheets are on-line in several locations (**www.itox.com** and **www.kontron.com**). These machines offer processors running as fast as 1.1GHz. Yes, we can get a few more years out of our hardware after all, but the cost of this upgrade may be too much of a tradeoff for some.

73, Alan, N2ALE/5

NCJ

Getting Started in SO2R Contesting

By Scott Nichols, VE1OP

If you have been paying attention to the contesting scene lately, you undoubtedly have noticed the term "SO2R" mentioned quite frequently. Although various forms of it have been around in some shacks for many years, it's only been in the last few years that it's become a popular, widely used, contesting technique.

For those of you still unfamiliar with SO2R, the name pretty much speaks for itself. It refers to a single operator using two radios at the same time. The main radio typically is used as the "run" radio, with the second radio typically used to "search & pounce" when things are slow on the "run" radio's frequency.

Much has been written about most of the various aspects of SO2R. But like all things new, unless you understand the basics it's difficult to get much out of advanced articles. So after acquiring a second contesting radio for my own shack last spring, I decided to dig into this SO2R phenomenon a little and see what the story was and answer *why* would I want to do this and *how* would I go about it? Well, the why part is easy, higher scores and more fun. The how part gets a little more complicated.

The first thing you should understand about SO2R is that it's an acquired skill. It takes plenty of practice and patience to get it right. Used effectively, it will increase your scores. Used ineffectively, it can hurt your scores. It is not for everyone. In fact, many contesters have told me that after trying it out, they have gone back to the one radio route or only use SO2R on a limited basis. For anyone considering implementing SO2R, I would strongly suggest that you visit an existing SO2R station or set up a very simple SO2R station yourself, and try it first.

The second thing about a SO2R station you should know is that it can very easily get complicated and expensive on the hardware end. This of course depends on many factors, and the possible combinations of requirements are endless.

In this article I want to stick more with the hardware issue because, as I found out, even the basics can be a little confusing until you sort it all out. After two weeks of asking questions, sending emails and scouring various web pages, I finally had enough information to make some decisions about what I would need to get started in SO2R. This article is meant to be a brief overview of what others told me, and hopefully it will answer some of the questions you may be wrestling with.

For most SO2R setups, here is what you will need for additional hardware (assuming of course you already have the second radio!):

Band-pass filters for each radio
An antenna switching system
Band decoders for each radio
An SO2R controller

BAND-PASS FILTERS

Unless all of your antennas are physically separated and you never run more than a few watts, you will likely need some band-pass filters to protect Radio B's receiver while transmitting on Radio A. Without them, you run the huge risk of blowing out the receiver in one of your transceivers, especially if you run high power. Of all the issues involved in converting to SO2R, this was the most troublesome to resolve for most of the people I spoke with. Both single-band and multiband filters are available, and for proper protection, you should install a separate filter on each of the radios. Multiband filters are preferable if you need to switch bands often and quickly, and can be made "invisible" if you employ band decoders (more on these later).

The two most popular multiband band-pass filters on the market today are Dunestar's Model 600 Multi Band Remote Switched filter and I.C.E.'s Model 419A Combination filter. A multiband filter will cost between $225 and $400. Keep in mind that band-pass filters can rob you of more than 10 percent of your output power due to insertion loss (approximately 0.5dB), but that's better than a blown receiver.

In addition to filters, you may want to consider a receiver front-end protector. This unit attaches to the receive lines of both radios and gives added protection to the radio's receiver. The unit from I.C.E. is a popular choice.

Coaxial stubs are another commonly used means of reducing intrastation interference and can be switched into the system using the same controls that run the other equipment.

Whatever you do, don't overlook this filtering and receiver protection issue. You can't be too careful here.

ANTENNA SWITCHING

Somehow you will have to devise a system to handle switching your antennas between radios. This can be handled by a manual system, a completely automatic system or a combination of both. The right system for you obviously depends upon the complexity of your antenna farm and your budget.

By far, the most popular choice for most was some sort of six-way switching relay box, which handles six antennas connected to one or two radios or amplifiers. The "Six-Pack" by Array Solutions, the "Six Way Relay Box" by Topten Devices and the "Six Switch" or "Ten Switch" lines by microHAM were the names that came up the most in my research. All received good reviews and will cost you anywhere between $100 and $500. Most of these units have interlocked relays, to prevent both radios from being assigned to the same antenna at the same time. Again, these units can be enhanced by the use of a band decoder to automate the switching process.

Of course, you can get along very well with a couple of simple manual coax switches if you have enough antennas to assign to each radio. This is a little more cumbersome and dangerous, but it will work. The possibilities are endless.

BAND DECODERS

Multiband band-pass filters and the right antenna switches can be controlled automatically with devices called band decoders. These units sense which bands the radios are on and automatically switch the filters and antenna switches accordingly. They not only add convenience and speed, but also an element of safety to the whole process. In the heat of battle, it's easy to mistakenly have the radio on 20 with the amp tuned to 15 while hooked up to the 40 meter dipole. I know—I've done it. Band decoders help eliminate this type of mistakes.

Some of the more popular decoders include units from Array Solutions, Top Ten Devices and microHAM. Prices range from $150 to $300. You should have one on each radio.

SO2R CONTROLLER

This is the unit that takes care of all the audio, microphone, keyer, headphone and other switching between the two radios. Some models are also CW keyers and digital voice keyers. Top Ten's "DX Doubler," the "W5XD MK-1100 Multi Keyer" and ZS4TX's "Super Combo Keyer" are three of the more popular devices on the market. Prices range from $200 to $400. Do you need one? Some say yes, some say no. If you only plan on running CW, you can likely get along without one. For SSB, a controller will be a valuable asset. Many hams have built their own and I think it would be an interesting project for homebrew enthusiasts. Several hams I've talked to have built everything they needed for SO2R from scratch.

Another issue that came up many times was whether or not two computers should be used in a SO2R setup. The general consensus seemed to be no. One computer was all you needed and, in fact, worked better than having two. Most SO2R controllers are designed for use with only one computer. Two computers can also complicate the logging process and will add more keyboards and monitors to your shack, not to mention more cabling to increase the chances of RFI. You will also have to factor in the need for good contesting software that will handle SO2R. Most of the more popular packages today support it, and if they don't support it now, they likely will in the near future.

ANTENNAS

The size and complexity of your antenna farm plays a big role in the effectiveness of your SO2R station. Obviously, the more antennas you have, the better. Dedicated monobanders for each radio is the ultimate, but if you fall into the most common scenario of having, say, one beam and a couple of wires wrapped around every tree in your back yard, you can certainly get along very well. However, a standard tri-band beam with only one feed line is limited to being used on one band at a time. This makes it difficult to run on 15 and S&P on 20 at the same time. A common fix for this problem is the use of a multi band beam that allows a separate feed line for each band. Then you can easily pick and choose which band you want for each radio, without having to resort to a lesser antenna for the second radio.

GIVE IT A SHOT

Keep in mind that all the above hardware is what would likely be required for a full-fledged SO2R setup. It doesn't necessarily have to be so complicated. Try it. Experiment. If you have an old radio kicking around the shack, hook it up to a dedicated multi band dipole, filter both radios and give SO2R a shot. It doesn't have to be fancy to be effective, and it will give you an indication of whether or not it's something you want to invest further in.

I could go on for another ten pages trying to describe some of the other options available, as they are endless. Simple vs. complicated, manual vs. automatic, homebrew vs. store bought, expensive vs. inexpensive. It ultimately comes down to what you want and how much you want to spend.

THE BOTTOM LINE

The majority of hams I spoke with who have traveled the SO2R road said they like it and have enjoyed the benefit of the resulting higher scores and an increased level of fun. Fun, that is, after all the bugs were worked out of the system. Many simply had too much trouble with intrastation interference and have given up on it. Others consider using two radios at the same time as utter lunacy and have dismissed the idea from the start!

I think this project is one that requires five parts planning for every one part of doing. Read all you can find and ask plenty of questions to educate yourself. It worked for me. I found the Internet to have a wealth of information on SO2R, with product descriptions, pictures, prices, suggestions and commentaries. Search the archives of the contest reflectors, as this is a well-talked-about topic nowadays. The list of excellent websites is far too extensive to list here, but if you need help finding them, e-mail me at **snichols@mvosprey.com** and I will try to point you in the right direction.

NCJ

Trends in VHF Contesting

By Kevin Kaufhold, W9GKA

Introduction

Currently, discussions are underway to consider revising the format and rules of the various VHF contests sponsored by the ARRL. Gene Zimmerman, W3ZZ, provided comments on some of the ideas being bandied about in one of his recent "World Above 50 MHz" columns, and Jon Jones has penned a summary of some proposals in a recent *NCJ* VHF Contesting column[1]. An ad hoc committee has even been appointed to review and consider the contest format. Much of the concern revolves around the recent decline in log submissions and operator activity in the major VHF contests. It has been argued that a change in the current contest format or the creation of new VHF contests may promote additional contest activity.

With many contest ideas now floating about, it seems appropriate to review past trends in the VHF contest participation rates. In April and May 2003, I provided comments on these trends to the SMC and VHF contesting e-mail reflectors. This article presents those comments in a more structured format.

The Baby Boom in VHF Contesting

All three of the major VHF contests (January VHF SS, June QSO Party, and September QSO Party) started in the late 1940s. They have deep historical roots dating back to even earlier times. When first developed in 1948, the January VHF Sweepstakes was specifically designed to emulate the HF Sweepstakes that had been underway since the 1930s. The VHF QSO Parties, which started in 1948 for the September contest and 1949 for the June VHF Party, trace their histories back to activity weekends and radio relay events that occurred as early as 1927.

With such a long and distinguished history, historical information is widely available on past contest participation rates. In particular, log submissions in the January VHF SS have been closely watched over the years, due to that contest's extensive interplay with the club competition event. Participation rates in the January VHF SS, as well as the other two "majors," have varied widely over the many years of the contests. As can be seen in Figure 1, a major boom in contest activity initially occurred in the 1950s, peaking in 1961 at 1561 logs entries in the January VHF Sweepstakes[2].

The increase in participation rates in the late 1950s was sudden and dramatic. The commonly held belief at the time was that the increase was the direct result of regulatory and technological changes then impacting VHF activities[3]. In fact, the 1953 granting of Novice operating privileges on 2 meters, as well as the Technician class receiving 6 meter privileges in 1955 and 2 meter privileges in 1959, were cited as the basic causes of operating activity increases. The development of TVI filters on ham radio transmitters and better TV receivers reduced interference problems, and the "TVI lows" of the early 1950s became a thing of the past[4]. The popularity of inexpensive Heath Sixer and Twoer VHF transceivers during this era also has been credited for the explosion of VHF log submissions in the early 1960s[5].

The combined effect of the regulatory and technological changes occurring during the 1950s and into the 1960s produced a veritable explosion of VHF activity. Contest log entries of over 1000 per January VHF SS continuously occurred for a ten year period between 1957 and 1967. Normal operating activity also skyrocketed. Weekly 2 meter AM check-in nets and RACES nets of 50 or more hams were common throughout the metropolitan areas of the US. This time period of VHF activity was so great that it has even been given a name: the "baby boom" of VHF contesting[6].

A Second Surge of Activity

As can be seen in Figure 1, the number of log entries dropped off sharply in the 1970s, dipping to a low in 1975 of somewhat over 500 for the January VHF SS. Club participation also declined to only 21 clubs in the 1975 and 1976 January VHF SS. The drop in contesting activity may have been in part due to the loss of Novice phone operating privileges on 2 meters in 1968, and the loss of all Novice 2 meter privileges by 1972. Also, amplitude modulation of the Heathkit lunchboxes and other AM commercial rigs was becoming outmoded. Weak-signal and EME enthusiasts had by this time extensively developed both SSB and CW equipment and highly sophisticated operating techniques, including specific operating procedures for EME and meteor scatter work. Friction occurred between the weak-signal operators and the AM based crowd, as the two technologies and styles of operation often collided with each other. The strong surge in FM repeaters in the 1970s also came into play, and by the mid 1970s activity levels had sagged within many VHF circles.

By the late 1970s however, the situation reversed. With the introduction of Japanese manufactured multimode rigs, a strong increase in SSB VHF activity occurred. Log entries in the January VHF SS again climbed toward 1000 by 1980. A few years later, the entire VHF community was fundamentally changed by the development of a grid squares location system. Within a short time after their introduction in 1983, grid squares became universally accepted both in the VHF contests and for regular operating. Within very short order, the VUCC award became a favorite pas-

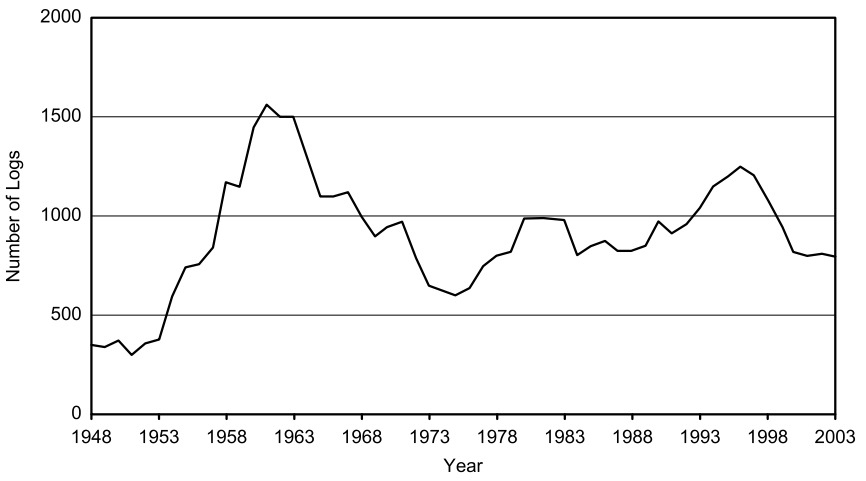


Figure 1

[1]Notes appear on page 8.

time for most VHF operators. The diversification of VHF contests starting in the late 1970s (i.e. the EME, UHF, 10 GHZ; and the Spring Sprints by 1983), and the expansion of the various operating classes (QRP, Rover, Multi-Limited, and SOLP) further added to the changing nature of VHF contesting activity.

This time period of the very early 1980s has been described as a second period of major expansion in VHF contesting activity[7]. This enhanced activity continued for a while, but gradually trailed off later in the decade. The "newness" of the grid squares had worn off by then, and many within the VHF community moved onto other things. For instance, packet activity had been increasing for several years. Experimentation with packet nodes and DX spotting clusters was attracting great interest among VHF oriented hams.

When Figure 1 is more closely reviewed, this second surge in activity level may be more indicative of a gradual return to normalcy rather than being a large and outright "boom." After the territorial turf battles between AM, SSB, CW, and FM modes finally settled down a bit, band activity levels returned to a rather normalized state of existence. In that vein, the participation levels in between the large boom eras of the early 1960s and the mid 1990s (described below) may represent the "norm", while the two booms themselves may be the exceptions to the norm.

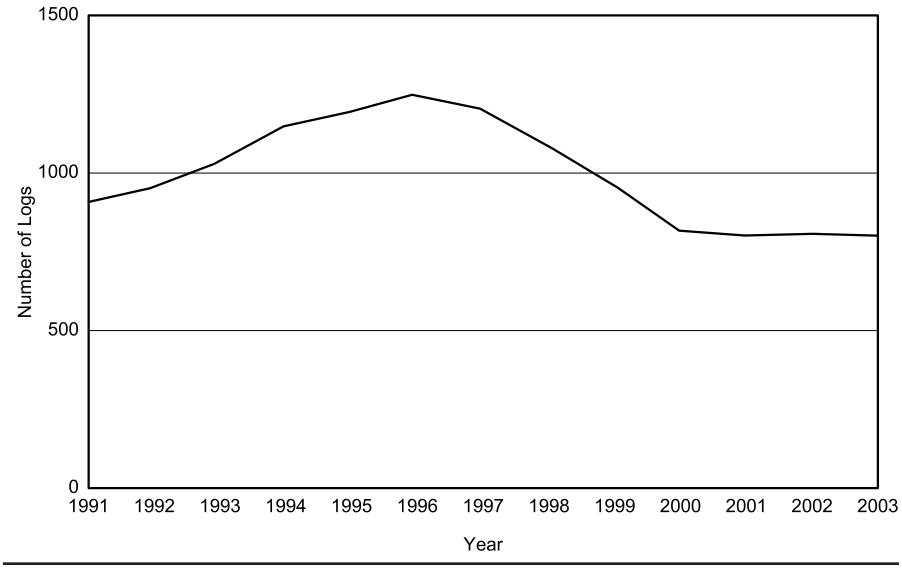


Figure 2

The 1990s Boom and Subsequent Decline

In 1991, the FCC dropped the Morse code requirement for Technicians exclusively operating above 30 MHz. This highly controversial move quickly made a huge impact upon the VHF community. Within the span of a few short years, the ham ranks swelled with over one-third of all amateur radio licensees being VHF only Technicians. Literally overnight, the entryway into ham radio effectively changed from that of Novice to the Technician Plus license. Strides in technology were also vastly changing the nature of VHF operations. Technical advances in phase lock loop technology and increased miniaturization of electronic components allowed for the introduction of compact 100 W, multiband, multimode VHF transceivers. For example, the original ICOM 706 was considered a major breakthrough in HF and VHF equipment capability, and was extraordinarily popular among hams.

Figure 1 amply illustrates the activity levels in the 1990s as one of two great booms in VHF contesting. Figure 2 emphasizes only the second 1990s era boom. As can be seen in Figure 2, the combined effect of the large increase in newly licensed VHF-only hams coupled with technical innovations in radios produced another explosion of VHF operating and contesting activities. The number of log submissions in the January VHF SS skyrocketed from to 1250 in 1996. The other major contests peaked around the same time, too. The June VHF QSO Party increased to 923 log entries in 1996, and the September VHF QSO Party in 1997 hit 753 submissions. This era can now be seen as being a major boom in ham related VHF activities similar to that of the 1960s era Novice/Tech boom.

The most recent downturn in logs may be simply due to the newly minted VHF only Technicians gradually upgrading their licenses to obtain HF operating privileges. This has led to a corresponding drop in VHF related activity, as many Technicians formerly limited to only VHF upgraded to the HF bands. Additionally, the Internet may have also provided an alternative type of technology with which tech-minded individuals could occupy their time. This may have especially been the case when the Internet first became widely available to the general population, starting in the early to mid 1990s. More recently, the Internet seems to be having something of a complimentary effect among Amateur Radio operators who use the Internet to further their radio interests.

Whither We Go from Here?

The quick and dramatic shifts in VHF contest participation levels appear to be largely a function of the combined effects of technological and regulatory changes. Thus, major changes in VHF log entries may be more related to simple demographics than anything else. VHF contest activity may be largely driven by the regulatory and technological environments in which we live. Whenever regulations and/or technology enable more people to use the VHF amateur bands, contest log submissions increase. Whenever regulations become prohibitive in nature (for example, the Novice loss of VHF privileges by the early 1970s), or when alternative technologies open up (for example, FM repeaters in the 1970s, packet in the 1980s, and the Internet in the 1990s), VHF contest activity suffers.

Experimentation with VHF contest rules is nothing new. Indeed, even the use of ad hoc committees has been tried before[8]. Such experimentation has paid off at times—the expansion of the categories as well as the development of the specialty contests had their own roots in VHF contest revisionist efforts. Both the category expansion and the creation of the specialty contests have been generally well received in the VHF community, although even these items have had their own continuing controversies (I am thinking here of the rover scoring rules).

In my estimation, however, there is nothing *per se* wrong with the current state of the VHF Contests. They have survived the test of time, and that says a lot for the current format. In fact, the contests' sheer longevity, while others (such as *CQ* VHF WW / WPX) have had their own ups and downs, is a testament to the League's success at VHF contesting sponsorship over a very long time.

If demographics and technology issues are the root causes of the variations in VHF log submissions, then tink-

ering with the rules will not get to the root of the problem. It may just marginally improve log entries to correct for some obvious problems or perceived inequities. Conversely, contest rule changes may generate unintended negative side effects that are difficult to anticipate ahead of time. This general line of reasoning produces an obvious conclusion: changing the rules will not, by and of itself, generate a corresponding increase in log submissions.

The Continuing Role of the Radio Clubs

I suggest that VHF oriented clubs lie at the heart of the VHF contesting system, and to a large extent, at the very heart of regular VHF operating activity. As a great case in point, the 1976 January VHF Sweepstakes demonstrates just how critical ham radio clubs are to VHF contesting activities. In a cost saving move, that year the ARRL changed *QST* to a larger and standardized size publication. In the League's preparatory efforts to move to the new size, the December 1975 *QST* issue inadvertently left out the 1976 January VHF SS rules. The problem was then compounded the next month, when the very first edition of the new magazine size also left out the contest rules. Upon realizing their own blunder, and with only a very short time to go before the contest was to take place, the League quickly contacted several VHF clubs, including the Pack Rats and the Rochester VHF Group. The clubs then informed their members that the contest was still on. What was the result on this lack of rules announcement in two successive issues of *QST*? Through the efforts of the VHF active clubs, log submissions actually increased over the prior few years, and by a rather impressive 10%![9]

The 1976 January VHF SS example amply illustrates my general premise—if a VHF type of club is active in a local area, contesting as well as routine operating activity is healthy and alive. A core group of amateurs will occupy multiple bands, and they engage in diverse and varied operating activities. With that thought in mind, I have recommended in prior e-mail posts that a concerted effort be undertaken to develop VHF oriented clubs within the major metropolitan statistical areas, and to do so in a proactive manner. By having VHF clubs develop the various metropolitan areas as central hubs of VHF activity, a critical mass can be achieved. Activity breeds more activity, and usage of the VHF bands throughout the surrounding countryside will likewise increase The result will be an elevated level of VHF activity throughout the entire metropolitan area.

Club participation levels have moved in lockstep with the number of individual log submissions. In the early 1960s, at the height of the first boom, 60 clubs entered the January VHF SS. At the height of the 1990s boom, 44 clubs entered the contest. In the last 5 years however, there were only between 27 and 31 clubs participating in the club competition event. And that might provide yet another answer to the reason for the radically shifting log entry numbers. As the VHF clubs come and go, so too does the number of log entries. I feel that both club activity and individual participation rates have both been impacted by the same regulatory and technological changes facing the VHF spectrum. The variance in log entries can also be seen as a basic variance in club participation levels.

Thus, the only real answer to the oft-asked question of "how do we increase VHF contest activity?" has been with us all the time—continued emphasis on VHF oriented clubs and the corresponding VHF activity that these clubs generate. The VHF community has to create the hordes of fresh blood for any further VHF activity to truly occur. The best way in which to do that is to simply, and quite forcefully, push the club format. Any ideas from anyone on how to further stimulate club activity levels on the VHF events would be greatly appreciated and welcomed.

Notes:

[1]G. Zimmerman, W3ZZ, "The World Above 50 MHz," *QST,* April 2003, pp 86-87. J. Jones, "W3ZZ's Contesting Article and Comments", *NCJ,* July/August, 2003, pp 31-32.

[2]Log submission numbers in the graph are estimated in the 1948-1960 period, based on a graph from Tilton's 1960 article, see note 3. The 1961 to 1990 period is estimated from a graph contained in "A Brief History of North American VHF Contesting", *NCJ,"* VHF Contesting!" column, November/December 1990, pp 21-22, written by Emil Pocock, Curt Roseman, and Mike Owen. Numbers from 1991 to the present are taken from the contest results contained in *QST.* I am grateful to Curt Roseman, K9AKS, the co-writer of the 1990 *NCJ* article, for providing me with numerous historical insights regarding VHF activity.

[3]E. Tilton, W1HDQ, the then editor of "The World Above 50 Mc." column, had illustrative comments in two of his columns spread a year apart. See, *QST,* July 1959, pp 76-77; and *QST,* July 1960, pp 66-67. He provided interesting graphs in both columns.

[4]E. Tilton, W1HDQ, *QST,* July 1959, p 76, describes the reduced number of entries in the 1951 January VHF SS of 300 as being the "TVI Low".

[5]C. Roseman, K9AKS, et al, "VHF Contesting," *NCJ*, November/December 1990, p 21.

[6]See note 5, Roseman first coined the term "baby boom of VHF contesting" in referring to era.

[7]See note 5, p 22.

[8]In 1981, an ad hoc committee was created to study the status of the VHF contests existing at that time. See, "VHF Contesting" in the "Operating News" column of John F. Lindholm, W1XX, *QST,* August 1981, p 80.

[9]The League noted the mishap in "Results, 29th ARRL VHF Sweepstakes", *QST*, August 1976, p 80 and 83. In commenting on the lack of contest rules announcements, the League stated: "The 1976 VHF SS proved something else, too; the activity is pretty much self-sustaining." NCJ

The North American Sprint —A Retrospective

By Rusty Epps, W6OAT

A few months ago, I got an e-mail from Tree, N6TR, asking if I'd jot down my recollections of just how the North American Sprint contest came into being. I remembered a few of the facts, but it was when I began digging back through my old 1970s era *NCJ*s that I realized just how much I'd forgotten. What a wonderful flood of memories researching this article has rekindled in my now-failing brain.

It all began in the spring of 1977, just a few days after that year's Dayton Hamvention. I was living and working in San Francisco. The first telephone call came from Tod Olson, KØTO (the *NCJ*'s founding editor, who back then was WØIYP). Tod was in town on a business trip and had the evening free. "Let's have dinner," I said. Hardly had I hung up the telephone before it rang again. This time the caller was Jeff Bouvier, K1AM (back then, K1IU). Jeff had been to Dayton and decided now was the time for him to see the US west coast and Hawaii. He'd just arrived at his San Francisco hotel and was calling to ask about the sights a first time tourist should be sure to see. "Join Tod and me for dinner" was all I had to say and a couple of hours later the three of us were together in a local Chinese eatery. After dinner, we drove around the city a bit to show Jeff some of the sights and ended up at the Cliff House, a famous San Francisco landmark perched atop a cliff overlooking the Pacific Ocean and the entrance to San Francisco Bay. We found our way to a window table in the bar, and with Tod working on margaritas and Jeff and I splitting a carafe of the house's rot-gut Chablis wine, we got down to some serious contest talk.

We covered a myriad of topics that night, but when Tod tossed out the question "What would be the elements of a perfect contest?" he got our attention. We quickly got the attention of our waitress, ordered another round of drinks, and set to work on the answer. "Let's have a short contest," somebody suggested. Yeah, we agreed, after the 24 and 48 hour marathons of the major contests, a short one seemed like a good idea to keep peace within the family and still allow time for doing things other than being on the radio all weekend. We also concluded that the scope of the event should be somewhat limited geographically so that an entrant wouldn't be required to have a massive antenna array just to have reasonable signal strength at the other end of the QSO. Thus gelled the concept of a four-hour sprint emphasizing North American participation.

We wanted the contest exchange to comply with both the letter and spirit of amateur radio rules, so we decided to include the sending of both stations' call signs. Besides, we reasoned, requiring full call signs would lessen the likelihood of mistakenly thinking that the other station is working you when he's actually working somebody else. A serial number seemed like a good idea because that's something which really does have to be copied – it can't be found stored away in a database somewhere. What about RST? Nah… "everybody just sends 599 anyway so why bother." And since we wanted some sort of multiplier to help inject an element of strategy into one's operating plan, we opted for state, province or country.

We debated a bit before deciding to include the operator's name as part of the exchange. I remember telling Tod and Jeff that I'd worked some contest stations for years and yet still had no idea what their names were. By having them "volunteer" their name as part of the exchange, I could avoid the embarrassment of having to ask something which I really should know already. We concurred that this rule might give a slight advantage to folks having short names, so our final compromise was to let the operator sign *any* name he chose, but risk becoming known by a different name if he elected to use a short pseudonym. I chuckle every time I work K4PQL and think how my old pal "Howie" now has become almost universally known as "Al."

We wanted a contest that placed a premium on operator skill. Thus arose the idea of the diabolical "QSY Rule". This rule forces everybody to move around the band rather than being able to camp out on a single frequency calling CQ for the entire contest (as many of the mega-stations were wont to do). I've often been asked how we thought up the QSY Rule, and I wish we could claim credit for being so creative. Unfortunately, we can't. We have to give credit for this rule to the Germans who used it in their DARC Christmas Contest. Klaus, DJ6RX described the ancestor of the Rule in a letter published in the May '75 *NCJ*.

Finally, we thought it would be fun to include a team competition as part of the contest. Up until that time, team competitions pretty much were limited to members of one contest club competing against members of other contest clubs. We realized this left out a large number of contesters who happened to live in areas outside the geographical limits of the major clubs. So the Sprint teams were opened to any collection of individuals—whether members of a club or not—who formally declared themselves to be a team and who registered a team roster at least 24 hours before the start of the contest. Remember, back in those days there was no such thing as e-mail, so the only way to register a team was via snail mail. Once the team captain dropped his roster in the mailbox the team was cast in concrete; there was no way to make last minute substitutions.

Tod, Jeff and I all admit to being CW aficionados, so we limited the initial Sprints to CW-only events. We knew phone sprints would come eventually, but we left it to others to organize them. It never occurred to us that someday there might also be RTTY Sprints!

The first-ever North American Sprint was held on September 11, 1977. Although similar to today's Sprints, there nonetheless were some significant rules differences. It occurred two hours later in the evening (from 0200Z until 0600Z); it covered four bands (20, 40, 80 and 160 meters); you had to send sequential serial numbers beginning with number 1 on each band; it had three separate entry categories (single op, multi-single and multi-multi); multipliers were not only American states, Canadian provinces and North American countries but they also included any other DXCC country and teams consisted of up to 15 members.

That first Sprint garnered 90 logs. When the smoke settled, Tom, N6BT, was the single-op victor with 231 QSOs and a multiplier of 44 for a total score of 10,164 points. Frank, WAØCWV, had teamed up with Bill, NØXX, to activate WØZLN as a multi-multi that netted 267 contacts and 46 mults for a total of 12,282 points. There were no multi-single entries. The W2GD led team of "Independent Contesters" collected 14 scores totaling 104,100 points to easily dominate the team competition. Nobody found the VT, ID, WY, WV, ND, SD, VE6 or VE8 multipliers.

The October, 1977 issue of the *NCJ* included a questionnaire asking for critiques about the Sprint and its rules. Based upon the responses to that questionnaire, the contest period was ad-

vanced by two hours to become 0000Z until 0400Z; the multi-single and multi-multi categories were eliminated (thus enshrining WØZLN as the Sprint's only multi-op entry); DXCC countries outside North America were eliminated as multipliers; 160 meters was eliminated as a contest band (thereby ensuring N6TV's place in Sprint history as being the only top-ten entrant ever to have made contacts on that band—Bob made two top band QSOs in that first Sprint); separate band serial numbers were eliminated in favor of a single set of numbers; and the maximum number of members allowed on a team was reduced to ten. So far as I know, these are the only Sprint rules changes ever made, and for the last twenty-five years entrants have been able to directly compare their results from one year to the next since they all have followed the same rules.

Tod, Jeff and I never dreamed back in 1977 that the little competition we were sketching out on the back of a Cliff House napkin would catch on the way it did and would become known as "the contesters' contest". I can say with certainty, though, that all three of us today take great pride in having been a part of Sprint history. NCJ

Antenna Interactions—Part 4 Cleaning Up Stacked Yagis with Current Tapers

Eric L. Scace K3NA[1]

Reviewing Progress to Date

Part 1 introduced meta-tools that give more comprehensive maps and statistics about antenna radiation patterns.[2]

Part 2 applied those meta-tools to twisted stacked Yagis with the antennas pointing in different directions and identified some problem situations that contesters may encounter.[3]

Part 3 examined self interactions of unused antennas within a stack, applying a new meta-tool to compare complete sky hemisphere patterns. Examples of siting problems in the design of a contesting station antenna farm were given but siting issues were not fully explored.[4]

Logically the next step is to explore the limits of siting antenna systems on the same band in order to develop some simple rules about where to locate and point antennas. In order to do that, we need to choose some design criteria for impairment.

For these articles, three criteria were used to identify impairments:

A decrease in median gain towards the target sector by more than a specified threshold. Locating another antenna so that a stack's signal strength towards its target becomes reduced certainly seems undesirable.

A decline in the minimum gain within the target sector by more than a specified threshold. Even if the median gain towards the target were maintained, introducing holes in the pattern would also be undesirable.

Introduction of sidelobes in non-targeted directions that exceed a threshold. The creation of sidelobes typically robs gain from the target and increases the exposure to QRN and QRM from non-targeted directions.

Before plowing forward to model impairments, we should start with a clean antenna pattern. Stacked Yagi systems used by most contesters actually don't deliver their full potential performance. Almost all of these systems are designed to feed approximately equal currents to each antenna, either in phase or (occasionally) 180° out of phase. But, by using *different* currents—a process often referred to as "current tapering" by antenna engineers – significant reductions in unwanted sidelobes can be achieved. This article introduces current tapering as a Yagi stack design technique.

General Linear Phased Array Design

Mathematical methods for the design of linear arrays of identical antennas have been available for some time.[5] The simplest linear phased arrays use identical spacing, with 1/2 λ spacing producing the cleanest patterns and sharpest main lobes. Linear phased array pattern synthesis may also use:

Non-uniform element currents to reduce sidelobes.

Staggered phasing to steer the main beam off the direction that is orthogonal to the line of the array, with some tradeoffs such as increased sidelobes.

Depopulation techniques, larger spacing, or non-uniform spacing to reduce the number of elements in a very large array containing many elements, typically trading off some combination of decreased pattern gain, increased main lobe width, increased sidelobes, or decreased frequency coverage.

A stacked Yagi system may be considered a very small linear phased array, in which each "element" is one Yagi, and with the array turned vertically and placed adjacent to an imperfect reflecting surface (the ground). The following characteristics of a stacked Yagi array have implications for applying traditional linear array pattern synthesis methods:

Non-uniform driving currents may reduce sidelobes. Examples will be given here.

Staggered phasing techniques cannot be applied very effectively to stacked Yagis. The presence of the imperfect reflecting surface eliminates the ability to steer beams through staggered phasing, except for the degenerate case of 180° phase shifts. One may smear out a beam vertically through staggered phasing, but one pays a significant penalty in reduced gain and increased sidelobes.

An increase in vertical spacing beyond 1/2 λ, such as the 3/4 λ spacing commonly used in contesters' stacks, can increase gain, but the pattern deteriorates because of increased sidelobes.

Contest station Yagi arrays don't have enough antennas to benefit from depopulation techniques.

The use of parasitic Yagi antennas as "elements" in a linear phased array somewhat limits the ability to remove all sidelobes and achieve maximum gain into the target zone. The currents in the parasitic directors and reflectors cannot be as easily constrained as in an array containing only driven elements.

Lastly, the parasitic nature of Yagis and the imperfect reflection from ground render the mathematical pattern synthesis tools unusable. We are forced to optimize stack performance through modeling and semiautomatic tweaking methods. Let's see what can be done. As usual, this article with all figures in color and all software meta-tools is available at ***www.ncjweb.com****.*

Current Tapering a Two Yagi Stack

Figure 1 shows a typical contesting stack of two Yagis, mounted 1 1/2 λ and 3/4 λ above ground, and fed in phase with equal currents. To allow comparison with results in other parts of this series, the models here all continue to use the 20 meter, 6 element, 48 foot boom OWA Yagis in use at K4JA, with "good ground" characteristics (5 mS/m, σ=13). The stack, at a location near Washington DC, points towards Europe. The target zone covers azimuth and elevation angles typically used to reach Europe on 20 meters throughout the solar cycle.

Now tweak the drive current of the top Yagi. Currents will be specified relative to the bottom Yagi; i.e., the bottom Yagi always has a relative current of 1.00 at a phase angle of 0°. A reduction of top Yagi drive current to about 0.81 yields the pattern in Figure 2. Figure 3 shows the difference between the two patterns.

The sidelobe just above the main beam has been reduced by 9 dB. The median gain in the target zone has increased trivially by 0.1 dB. More importantly, the weakest part of the coverage

in the target zone has been boosted by 2.8 dB. The two large sidelobes, towards the rear and towards the zenith, have not been improved.

The zenith lobe occurs because of the heights of the Yagis. Energy radiated straight down from the bottom Yagi at 3/4 λ reflects off the ground and undergoes a phase reversal, returning back up to the antenna and having covered a distance of 1 1/2 λ. Because of the phase reversal, it is now in phase with energy radiating up from the Yagi. To eliminate the zenith lobe requires mounting the Yagis at a multiple of 1/2 λ above the ground.

Reposition the Yagis at 1 λ and 1/2 λ heights and start without current tapering. Figure 4 reveals the zenith lobe, as expected, has been fully cancelled. The rear lobe is also dramatically reduced, in many areas by more than 15 dB and a welcome relief from QRN and QRM! Table 1 lists comparative pattern statistics. Even though the stack's main lobe extends into elevation angles above the target sector, the median gain to the target is about the same as a current tapered stack at the higher heights of Figure 2. The weakest gain in the target sector has shifted to the bottom of the target.

Current tapering this low stack will reduce the sidelobes even further. But as the drive current to the top antenna is reduced, the main lobe continues to expand upward in elevation and its peak gain starts to drop ever so slightly. Table 1 shows the incremental decline in median gain into the target zone as top antenna current is reduced by 10% increments to 0.90, 0.81 and finally 0.73. Figure 7 illustrates this last case, showing the lobes above 45° elevation have been reduced 15 dB or more. Only two small spots in the upper half of the sky see a signal of –15 dBi (more than 30 dB below the main beam). For this system the amount of current taper is not very critical. All these low height, current tapered two Yagi stacks, although not quite perfectly aimed into the target sector, have very clean patterns.

Since the main lobe of this low stack has an elevation angle a bit higher than desired, one wonders if raising the stack to the next multiple of 1/2 λ would bring the main lobe back down into the target zone. Experienced stack Yagi system designers will not be surprised by Figure 8. The main lobe of this equal currents stack has split in the middle. Figure 9 and Table 1 show the gory details.

Conclusions About the Two Yagi Stacks, Pattern Synthesis and Current Tapering:

Yagi stacks must be mounted at multiples of ½λ in order to cancel the zenith sidelobe. These mounting heights also significantly reduce radiation in the rear quadrants.

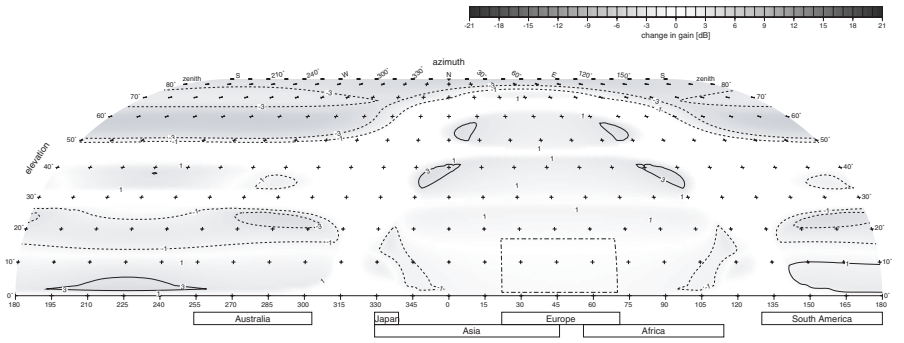
A low two Yagi stack at 1 λ and 1/2 λ height illuminates the target sector the same as, and a dB or two in the corners better than, a two Yagi stack at the more traditional 1 1/2 λ and 3/4 λ.

This low two Yagi stack, even without current tapering, has substantially reduced sidelobes compared to the traditional two Yagi stack.

Current tapering the low stack reduces high elevation angle sidelobes, moving that energy into the more useful lower elevation angles.

Current tapering provides a superior two Yagi stack on a tower one-third shorter in height than traditional two Yagi stack implementations commonly found today.

As many earlier stack studies have shown[6], installing a two Yagi stack too high causes the main beam to be split. The upper half of the split main beam



Part 3 Figure 1 (bottom) corrected—Difference in gain between a two Yagi stack (50 and 100 ft, equal current) and a three-Yagi stack (50, 100, 150 feet) in which the top antenna is open-circuited. The presence of the additional Yagi at 150 feet, even with zero current at the feed-point, introduces some variations in the pattern. No operationally significant change occurs in the target zone, but parasitic interactions change the minor lobes by -6 to +4 dB.

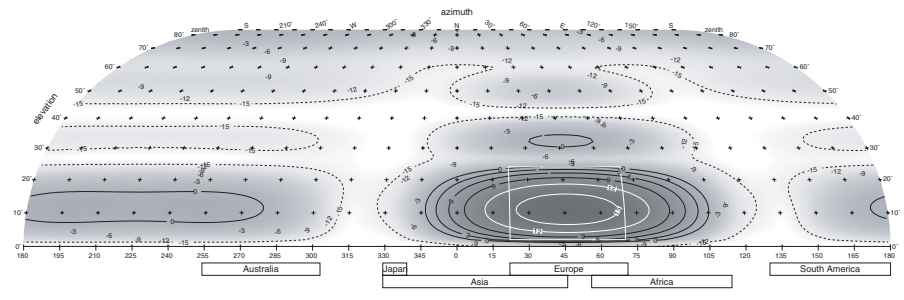


Figure 1—Typical contesting stack of two Yagis mounted 1 1/2 λ and 3/4 λ above good ground and fed with equal currents in phase.

Table 1

Comparison of equal current and current tapered two Yagi stacks at various heights. Gains and currents presented to hundredths to show trends. Current is relative to bottom antenna. Gain in dBi.

Height λ	Current	Target Sector Gain			Non Target		
top	*bot*	*top*	*median*	*max*	*min @ el*	*median*	*Figure*
1½	¾	1.00	+13.44	+16.74	+0.18 @ 23°	-10.27	Figure 1
		0.81	+13.53	+16.59	+2.77 @ 23°	-10.91	Figure 2
1—	½	1.00	+13.57	+15.76	+1.84 @ 2°	-14.94	Figure 4
		0.90	+13.51	+15.67	+1.63 @ 2°	below -15	Figure 5
		0.81	+13.44	+15.55	+1.38 @ 2°	below -15	Figure 6
		0.73	+13.34	+15.41	+1.12 @ 2°	below -15	Figure 7
1½	1—	1.00	+13.24	+16.99	-6.38 @ 23°	below –15	Figure 8
		0.90	+13.33	+16.95	-6.92 @ 23°	below –15	—
		0.81	+13.35	+16.89	-5.73 @ 23°	-14.97	—
		0.66	+13.37	+16.70	-2.03 @ 23°	-13.73	Figure 9
		0.53	+13.29	+16.47	+1.03 @ 23°	-12.66	—

cannot be suppressed through current tapering.

Current Tapering a Three Yagi Stack

Building on the low two Yagi stack, consider a short three Yagi stack mounted at 1 1/2 λ, 1 λ and 1/2 λ above ground. Figure 10 shows this system fed with equal currents. No zenith sidelobe exists and the rear half of the sky hemisphere contains quite minor lobes with the worst at about –6 dBi. Above the main beam is a secondary beam centered on 51° elevation. Can current tapering reduce these extraneous lobes?

Table 2 shows pattern statistics for fifteen current tapered three Yagi stacks. All of these designs are excellent systems, with perhaps the 0.53 (top) 1.10 (middle) combination in Figure 14 the quietest of the group. The table and figures demonstrate that the tapered current values are not highly critical. Very good results occur with currents within ±10% on the middle Yagi. If one were to err, an error on the low side would be slightly preferable. The top Yagi's current can vary between –10% and +20% of 0.53 without difficulty.

The current tapered three Yagi stack fits on the same tower as the non tapered, two Yagi stack at 1 1/2 λ and 3/4 λ with which we started. Figure 16 highlights the changes:

The median gain into the whole of the target sector is about the same, just 0.1 dB higher in the short three Yagi stack, which is not operationally significant.

The target zone receives a more uniform signal. In particular, gain at elevations from 15 to 24° has increased from 1.0 to 8.8 dB.

The main beam has been narrowed. At the edges of the main beam, about ±60° in azimuth from the boresight and well outside the target sector, gain has been trimmed by as much as 10 dB.

The rear lobes have been significantly reduced by as much as 15 dB. The worst lobe in the rear quadrant is about –6 dBi, about 18 dB below the peak gain.

All radiation above 30° has been vastly reduced. 61% of the total sky has gain at or below -15 dBi. Gain at elevations above 37° is below –21 dBi (except for an area above the main beam, which is below –15 dBi).

This short stack is a much quieter receiving antenna. QRN and QRM from directions outside the target zone are reduced, making it easier to hear stations from the target.

Figure 17 shows the pattern of a more typical, taller three Yagi stack at 2 1/4 λ, 1 1/2 λ and 3/4 λ height. The taller stack concentrates more energy at the lower elevation angles typically used for band openings, so Table 3 shows pattern statistics for a target sector with elevation ranging between 1 and 17°. The first line of the table shows the short, current tapered stack. The next line is the tall stack with equal currents. It's not surprising to see that the tall stack is a little louder into the lower angle target zone (0.6 dB increase in median gain) and covers the very low 1° elevation angle more effectively.

Figure 18 is the same tall three Yagi stack with current tapering. An exploration of various current tapers showed that only the top antenna needed to be adjusted to yield the cleanest pattern

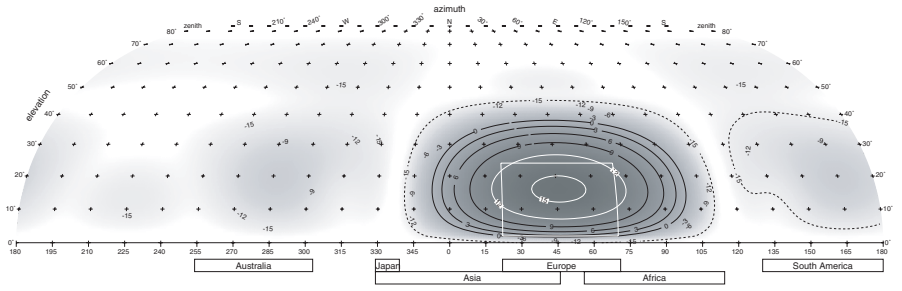


Figure 6— Two Yagi stack mounted at 1 λ and 1/2 λ with top antenna current tapered to 0.81 for reduction of signals above 45° elevation.

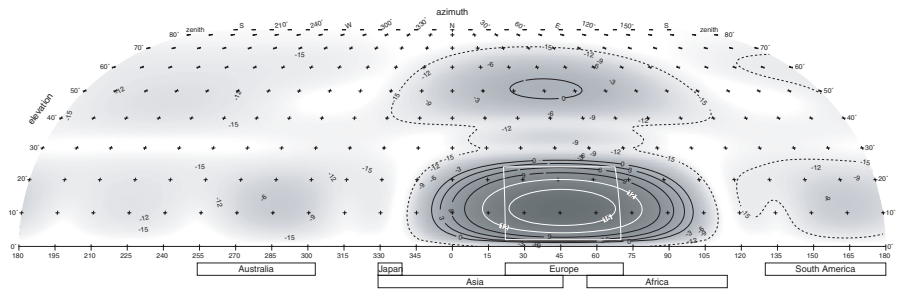


Figure 10—Three Yagi stack mounted 1 1/2 λ, 1 λ and 1/2 λ, fed in phase with equal currents.

Table 2

Comparison of equal current and current tapered three Yagi stacks. Gains and currents presented to hundredths to show trends. Current is relative to bottom antenna. Gain in dBi. For comparison, the first line is a typical two Yagi stack without current tapering. The second line is the best current tapered low two Yagi stack from Table 1.

Height λ			Current			Target Sector Gain			Non Target
top	*mid*	*bot*	*top*	*mid*	*median*	*max*	*min @ el*	*median*	*Figure*
1½		¾	1.00		+13.44	+16.74	+0.18 @ 23°	-10.27	Figure 1
1—		½	0.90		+13.51	+15.67	+1.63 @ 2°	below -15	Figure 5
1½	1—	½	1.00	1.00	+14.05	+17.20	+3.93 @ 23°	-14.15	Figure 10
			0.73	1.10	+14.07	+16.97	+5.02 @ 2°	below –15	—
				1.21	+14.08	+16.96	+4.94 @ 2°	below –15	Figure 11
				1.33	+14.08	+16.93	+4.85 @ 2°	below –15	—
			0.66	1.10	+14.06	+16.88	+4.80 @ 2°	below –15	—
				1.21	+14.04	+16.87	+4.72 @ 2°	below –15	Figure 12
				1.33	+14.05	+16.84	+4.62 @ 2°	below –15	—
			0.59	1.00	+14.02	+16.78	+4.60 @ 2°	below –15	—
				1.10	+14.06	+16.78	+4.55 @ 2°	below –15	Figure 13
				1.21	+14.05	+16.77	+4.47 @ 2°	below –15	—
			0.53	1.00	+14.00	+16.68	+4.36 @ 2°	below –15	—
				1.10	+14.02	+16.68	+4.31 @ 2°	below –15	Figure 14
				1.21	+13.99	+16.67	+4.24 @ 2°	below –15	—
			0.47	0.90	+13.89	+16.53	+4.12 @ 2°	below –15	—
				1.00	+13.91	+16.56	+4.09 @ 2°	below –15	Figure 15
				1.10	+13.91	+16.57	+4.05 @ 2°	below –15	—

available for these mounting heights. Target sector coverage is improved somewhat and high angle sidelobes (except for the zenith) are reduced as much as 15 dB. Unfortunately, nothing can be done with the weak zenith lobe of –6 dBi, nor with the extensive rear lobe at +3 dBi. The short stack's rear lobe is 15 to 18 dB lower than this tall stack.

To see how far performance could be pushed, I tapered currents on a four Yagi stack mounted at 2 λ (top), 1 1/2 λ (high), 1 λ (middle) and 1/2 λ (bottom). Table 4 and Figure 20 to Figure 24 summarize the results. Despite the slightly shorter overall height, the best of the current tapered four Yagi stacks show advantages compared to the current tapered tall three Yagi stack:

Increased median gain of 0.6 dB across the entire target zone.

Higher peak gain of 0.5 dB, with the main beam centered in the target.

Rear quadrant lobes all reduced to below –5 dBi, an improvement of up to 19 dB.

Gains below –15 dBi across two-thirds of the sky hemisphere.

Current taper tolerances are pretty relaxed. Variations of ±10% or even more do not introduce significant variations in these patterns.

Depending on the current taper chosen, some unavoidable minor grating lobes appear above the main beam and above the target zone. I would probably choose the symmetrical current taper of about 1.0 (top), 1.8, 1.8, 1.0 (bottom) as a slight favorite. Its grating lobes are at 0 dBi (18 dB below the main beam peak) and –15 dBi (33 dB below peak gain). The worst rear lobes are –5 dBi (23 dB below peak gain) and the entire rear quadrant above 20° elevation is less than –15 dBi, a very quiet antenna.

Although I haven't tried it yet, I suspect that replacing the six element OWA Yagis in this stack with five or even four element Yagis would continue to provide excellent results.

Optimizing Current Taper

Since each band and station location has a different description of target zones (e.g., elevation angles can be different), it's worth explaining how I chose these current tapers. I changed current levels in steps of ±10% times the previous level; i.e., in the sequence 0.28, 0.31, 0.35, ... 0.81, 0.90, 1.00, 1.10, 1.21, ... 1.95 and 2.14. When initially searching for clean patterns jumps of ±20% worked fine.

Optimizing the current taper for a two Yagi stack is straightforward; only one parameter (top Yagi current) can be tweaked. Striving for the largest percentage of sky below –15 dBi seems to work fine in zeroing in on a clean pattern with good target zone performance. The cleanest patterns did not coincide with the patterns with largest median gain to the target sector, but were within a fraction of a dB.

Three Yagi stacks have two current parameters to tweak. Tweaking for maximum sky below –15 dBi worked well again as initial guidance. To work systematically and keep track of comparative results, I used an optimizing table; an example is in Table 5. The table is a two dimensional matrix with top antenna current varying across the columns and current for the next lower antenna varying down the rows. As each pattern was calculated, the percentage of sky below –15 dBi was entered at the intersection of the proper row and column. The best two or three patterns in each row, column, and diagonal (from upper left to lower right) were compared to their neighbors. In comparing, I weighted median gain and percentage of sky below –15 dBi about equally. For very similar cases I also considered the worst gain within the target zone and overall pattern cleanliness (minimizing minor lobes).

In practice, the fastest convergence on good results occurred when moving within the matrix from an initial guess di-

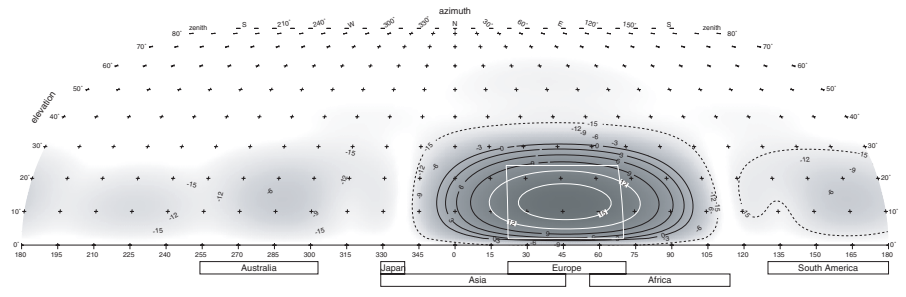


Figure 14—Three Yagi stack mounted 1 1/2 λ, 1 λ and 1/2 λ with 0.53 (top) and 1.10 (middle) current tapering. Gain at any elevation above 38° is below –18 dBi. Outside the main lobe this stack is extremely quiet.

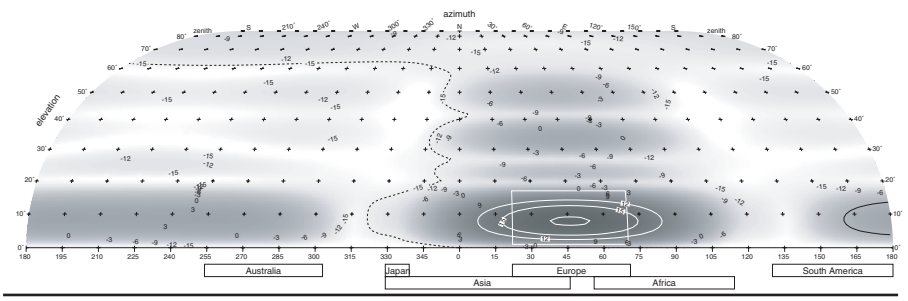


Figure 17—A typical three Yagi stack mounted at 2 1/4 λ, 1 1/2 λ and 3/4 λ without current tapering. Target zone redefined to focus on lower elevation angles associated with band openings and closings: 1

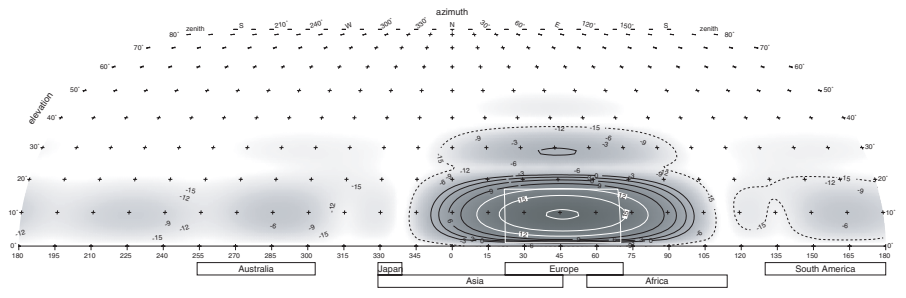


Figure 23—Four Yagi stack mounted at 2 λ, 1 1/2 λ, 1 λ and 1/2 λ with a symmetrical current taper of 1.00 (top), 1.77, 1.77 and 1.00 (bottom). The target sector peak and minimum gains increase slightly, but the grating lobe above the main beam grows +6 dB. Overall the non targeted areas remain very quiet.

agonally along the upper left-lower right direction to find a local best case, and then checked horizontally (and then vertically) for improvements. As each pair of neighboring patterns was compared, I marked an arrow pointed to the preferred pattern. When a group of arrows all pointed to the same pattern, optimization was done. With an educated guess for a starting point, about ten patterns were needed to finalize the optimization. It took two to three minutes to prepare the NEC input, run NEC4 and process the results with the meta-tools for each pattern.

For the four Yagi stack optimization I picked a value for the second antenna from the bottom. The two dimensional optimization matrix then governed the tweaking of currents for the top and second from top antennas. The best result was saved for a final beauty pageant. I built five such matrices, for five different currents in the next-to-lowest Yagi. The best pattern from each matrix is listed in Table 4 and shown in Figure 20 through Figure 24. Although this procedure was occasionally tedious, the coding and testing of an automatic optimizer would have taken much longer.

Further investigations

We've just cracked the door open on applying meta-tools and current tapering to stacks; there are many further areas to explore. For example, at this point I don't know if the same current tapers remain optimum when the type of Yagi inside the stack is changed.

This article hasn't covered feed systems for current tapering. The techniques for designing suitable current feed systems are identical to those applied to phased vertical arrays.[7]

Further improvements to stacked Yagi arrays might be achieved by re-optimizing the design of the Yagi used inside the array. Many past optimization efforts tweak the design of a single Yagi in isolation. The outputs of the meta-tools developed for this series of articles can be used to drive the tweaking of Yagi design for improved uniform performance of the complete stack across the band.

Having characterized some very clean stacked arrays, in the next part of this series we will return to siting issues.

Corrections

Unfortunately I gave the publisher the wrong monochrome map for the bottom half of Part 3 Figure 1, prompting a batch of emails from puzzled readers. The correct map is printed here and available (in color) on the *NCJ* website **www.ncjweb.com**. Also available is an updated AEGBin.awk meta-tool file which corrects a minor labeling error in the pattern statistics shown on the website's color maps. An updated NOUTrim.awk meta-tool includes the calculation of percent sky with gain below the gain floor.

Notes:

[1]K3NA@arrl.net

[2]E. Scace, K3NA; "Antenna Interactions—Part 1: Stop Squinting! Get the Big Picture," *National Contest Journal*, 2003 Jul/Aug, pp 19-23.

[3] E. Scace, K3NA; "Antenna Interactions—Part 2: Twisting Stacks," *National Contest Journal*, 2003 Aug/Sep, pp 3-8.

[4] E. Scace, K3NA; "Antenna Interactions—Part 3: When Good Aluminum Goes Bad," *National Contest Journal*, 2003 Oct/Nov, pp 20-23.

[5]See, for example, Hansen, R. C. *Phased Array Antennas,* John Wiley & Sons, 1998, chapters 2 through 4.

[6]F. Donavan, W3LPL, and J. Brosnahan, WØUN; *Unofficial Proceedings of … 1992 [Dayton] Antenna Forum,* LTA, New Bedford PA, 1992, pp 1-53.

[7]J. Devoldere, ON4UN; *Low-Band DXing 3rd edition;* ARRL, Newington CT USA, 1999. This contains a good summary of these techniques and extensive references to more detailed explanations. The 4th edition is in preparation.

Table 3

Comparison of short and tall three Yagi stacks. The target sector has been shortened to 1-17° elevation since taller stacks typically are used during band openings and closings on 20 meters from the USA mid-Atlantic region.

Height λ			Current			Target Sector Gain			Non target	
top	*mid*	*bot*	*top*	*mid*	*median*	*max*	*min @ el*		*median*	*Figure*
1½	1—	½	0.53	1.10	+14.42	+16.68	+0.02 @	1°	below –15	Figure 14
2¼	1½	¾	1.00	1.00	+14.82	+18.24	+3.41 @	16°	-13.02	Figure 17
			0.43	1.00	+14.86	+17.58	+4.05 @	1°	below -15	Figure 18

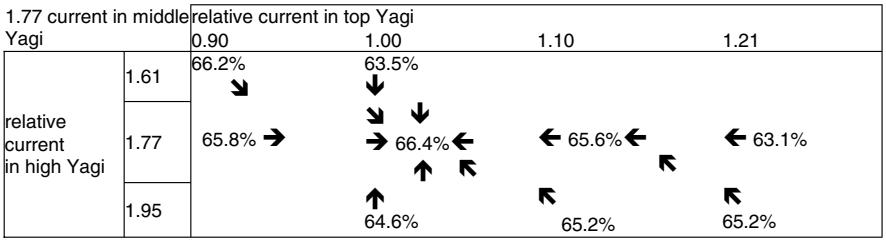


Table 4—Comparison of tall three Yagi stack (first row, with current taper) and slightly shorter four Yagi stacks with various current taper schemes. The target sector includes elevations of 1-17°. The median gain in the non target area of the sky was below –15 dBi for each stack.

Table 5

Two dimension optimizing matrix for the top two Yagis of a four Yagi stack. Currents are relative to 1.00 for the bottom Yagi of the stack. For this matrix the "middle Yagi" (second from bottom) was set to a relative current of 1.77. Arrows show the preferred pattern for each comparison pairing. Matrix cell entry is percent of sky below –15 dBi. While this statistic was helpful in locating good patterns, the evaluation of pattern pairs also considered median, peak and minimum gain to the target sector and attempted to minimize any minor lobes without significant sacrifice in target sector gain.

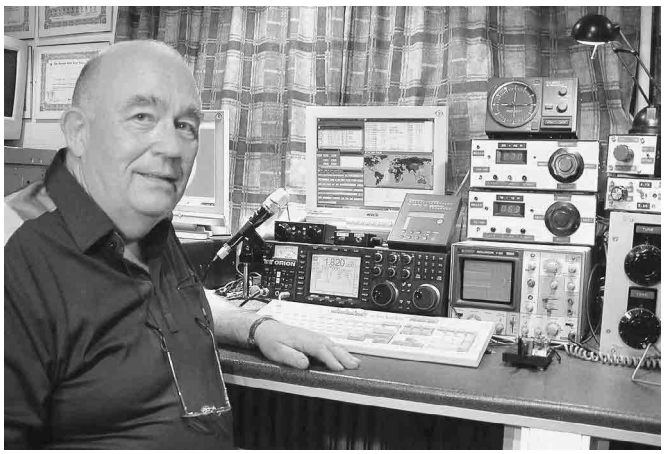
Height λ		Current		Target Sector Gain				Non target	sky ≤-15dBi		
top	*hi*	*mid*	*bot*	*top*	*high*	*mid*	*median*	*max @ el*	*min @ el*		*Figure*
2¼		1½	¾	0.43		1.00	+14.86	+17.58 8°	+4.05 1°	53.5%	Figure 18
2—	1½	1—	½	0.43	1.00	1.33	+15.25	+17.68 10°	+2.63 1°	67.2%	Figure 20
				0.59	1.21	1.46	+15.35	+17.89 9°	+3.14 1°	67.1%	Figure 21
				0.81	1.46	1.61	+15.47	+18.11 9°	+3.61 1°	66.9%	Figure 22
				1.00	1.77	1.77	+15.47	+18.21 9°	+3.86 1°	66.4%	Figure 23
				1.10	1.95	1.95	+15.47	+18.22 9°	+3.89 1°	65.9%	Figure 24

My Ten-Tec Orion

John Devoldere, ON4UN

Looks

I first saw a prototype of the Orion at the 2002 HamCom in Dallas. I liked the looks. When I saw the specs I liked the radio even better. I picked up my new Orion in mid-June 2003. My first impression has not changed—clean layout, knobs and controls positioned just where they should be, good-sized tuning knobs with a good feel. In a couple of words, "It all fits my hands and fingers." It does not have the look of mass consumer electronic gadgets. This is a sober and very functional radio, which is what I like.



The author with his new Orion.

Software Updates and Response

Maybe the greatest innovation included with the Orion is the concept of a top-notch radio with firmware updates via the Internet. This makes it possible to provide continuous and free of charge improvements. That's the technology of today. It also made it possible for Ten-Tec to release a product early in 2003 that perhaps was not 100% complete, but at the same time avoided making us eager contesters and DXers wait another six months for the radio. It also is undoubtedly the best way for Ten-Tec to get live feedback from the field. Some (very few) people seem to complain that Ten-Tec is regularly improving the Orion. Those who don't like this idea may be better off waiting a little longer until all the wrinkles have been ironed out and all sensible suggestions of customers have been incorporated. I decided to go ahead and get one of the earlier Orions and thus become a part of the improvement process. Contacts with Ten-Tec have been excellent. Jack, K4JU, Doug, KF6DX, Gary, AC4DL, and Scott, W4PA, were all very responsive to my comments, suggestions and even complaints!

Response to my suggestions was swift, and in a matter of weeks a great number of the suggestions I made were implemented. I was happy to be an informal Beta tester for their firmware updates, and I spent many hours trying to make things go wrong. At the end, the software became so solid I had difficulty making anything go wrong! I've heard of a few people who did not like the concept of firmware updates; they obviously do not understand the power of this advanced concept. My reaction—let the firmware upgrades come, I know each time it marks a further improvement to the product.

Some ergonomic shortcomings, mainly in the radio control software that were part of the first few firmware releases, have all been taken care of. I did not return my Orion for these shortcomings. I decided to be part of the ongoing improvement process for this product, and add my inputs. This way the final Orion has a little bit of myself in it!

The Manual

The original manual was not great (I am polite), but that's now been taken care of. Since September 22 anyone can download the latest manual from the Ten-Tec Website. Scott, W4PA, took care of that. The manual covers just about every aspect of the radio. Of course, the radio is so flexible there are literally hundreds of ways you can set it up to do exactly what you want it to do. I assume that users on the Ten-Tec reflector will make lots of these configurations available. As indicated in the manual, the Orion is indeed a substantially different radio from what we have known so far. It is no secret that the first thing that attracted me is the excellent dynamic range particularly at very close signal spacing, which should be a real asset for low band DXing and contesting. Ten-Tec implemented the DXers' and contesters' wishes that were published in the 3rd edition of my *Low Band DXing* book[1]. Many manufacturers seemed to ignore the inputs from DXers and contesters until recently.

Testing Basic Specs at W8JI

After I picked up my unit in the US in early June, I drove to the home of Tom, W8JI, and we tested the dynamic range and sensitivity (MDS) in his well-equipped lab. What we found was within measurement error of what Ten-Tec publishes. In other words—excellent! We also had a really close look at the transmitted CW waveform, and it is excellent as well. Now at least and at last I can be on CW without having to fear someone calling me with a "you have key clicks" comment.

I have been playing with the Orion in a few contests, where it gets really crowded, especially on 40 meters. Amazing—in between signals, the band sounds quiet. No blurps, beeps and other alien weak signals that sometimes sound like CW using a different code. What you hear is what's really there! The narrow front-end filters really do their job. My radio has got all of them.

The AGC Issue

The use of the AGC (with the programmable settings) requires a good understanding of how the radio works. Of course Ten-Tec could have left out the programmable settings, and could have fixed us up with just three or four "fixed" standard settings. After discussing this at great length, Ten-Tec decided to make all settings programmable, a sign of confidence that Ten-Tec trusts that their customers will take the time to understand the radio and use its capabilities to the fullest extent!

Ten-Tec has a section in their latest manual explaining how to set the AGC variables (also available on their Web site). Make sure you study this and fully understand it before starting to play around with changing the three variables involved.

We have read on various reflectors that in the beginning some hams started experimenting with the AGC without knowing what they were doing and were disappointed. They fooled themselves, I am afraid. I must admit it's easy to be fooled, as the lowest setting of the AGG threshold does not, as a rule, give you the best sensitivity! I found that approximately 2.0 to 3.0 μV is a good starting

point to experiment. It's not because you hear more noise at 0.4 μV that you have a better S/N ratio! On the same issue of sensitivity: I have done hundreds of A/B tests between my old radio (the most popular brand with low-band DXers and contesters) and the Orion (at the same time, not with 1 or 2 weeks in between!) and I have never found the Orion not to hear a weak CW signal that I could hear on the "old radio" on any band. To the contrary! I was listening to CW signals, not to carriers (I'm not really interested in "working" steady carriers or broadcast harmonics).

Bandwidth

One of the great assets of the Orion is the continuously variable IF bandwidth. If the band is not too crowded or if there is not too much QRN you may want to use 800 or 1000 Hz bandwidth on CW. Otherwise you can crank it down all the way to 250 or 150 Hz. Great thing is that at 150 Hz bandwidth there still is not a trace of ringing. Noise content in such a small bandwidth becomes very low, but you must be tuned right on the spot! On SSB it is a joy sometimes to listen to good audio with 3 or 4 kHz bandwidth. Sounds much like AM. With the PBT you can really adjust everything until it just sounds right. Flexible, smooth and easy. The measured bandwidths and resulting shape factors are shown in Table 1.

Although the shape factor at narrow bandwidths may not look spectacular, I have found this set-up, with which CW ringing is totally absent, to be the smoothest and most efficient way of obtaining the most suitable selectivity for every individual situation. Ten-Tec has informed me that they will change the display so that the narrowest bandwidth displays 150 and not 100 Hz.

Noise Reduction

The digital noise reduction function works extremely well, a dramatic change from what I had experienced in my previous radio.

Notch Filters

Another nice feature is that we have two notch filters available—a DSP automatic notch for carriers on SSB, and a manually adjusted notch filter (both notch frequency and bandwidth are adjustable) for use in CW! Yes, a notch can sometimes be very handy on CW, too.

Panoramic Stereo Receiver

The Panoramic Stereo receive feature is great fun. If using stereo phones, signals move from one side through center to the other side in your headphones as you tune across the band. This helps reduce fatigue when working long hours on CW. It should also be useful in quickly working multiple callers in a pileup.

Using the Orion on CW

The Orion is a real joy to use when transmitting CW providing a beautiful waveform and good keying characteristics. With the continuously variable bandwidth down to 150 Hz, it is also a real delight on receive. The built-in keyer works very well, and the legendary Ten-Tec fast break-in (QSK) works as well as ever.

W8JI found out, and I can confirm this, that for weak signal CW reception especially in presence of noise (QRN) it seems best to select the roofing filter manually to 250 Hz and then set the DSP bandwidth in the range of 500 to 800 Hz.

Using the Orion on SSB

I have been receiving nothing but excellent audio reports on SSB, even from the experts on 14,178 kHz! The fact that you can adjust almost anything in software makes it possible to obtain good audio with a very wide range of microphones. Digital audio enhancement is provided, allowing adjustment of the "transmit filter" bandwidth from 1000 Hz (yes!) to 3900 Hz. The low end roll off can be set to start between 50 and 300 Hz, for example. If you have it set all wrong the audio can indeed sound bad, but once you find the proper settings success is guaranteed. Ten-Tec has published a list of settings for the most common microphones in the manual. I think it would be good if they added the Heil HC-4 and HC-5 elements, as well as the Heil Pro Goldline microphone.

Using the Orion on FSK

The Orion has true *frequency* shift keying (FSK) capabilities, not the dual audio tone arrangement found on many rigs. In FSK mode reception, the tones are automatically set for the high tones set. RTTY copy is flawless with bandwidths down to 150 Hz!

PSK31

If you are a PSK fan, you can look at 5 kHz of FSK signals, or narrow the bandwidth down to 150 Hz, and just have one signal going to your sound card. If you narrow the bandwidth down to 150 Hz, you will also *hear* the PSK signal. I've heard people saying that with PSK31 we can work signals we cannot hear at all. This is not quite true, because the sound card uses a very narrow bandwidth. If we use the Orion's similar bandwidth we can definitely hear the PSK signals.

Receive Audio

The sound from the (large) built-in speaker is much better than from any other transceiver I have had. There is plenty of volume as well. The headphone audio works very well, even with low sensitivity headphones.

The second receiver

The Orion has two receivers that sound identical (not like in another two-radio transceiver I had where one radio sounded like the *good* one and the other like the *cheaper* one). The second receiver uses exactly the same DSP IF. The only differences between the main receiver and the secondary receiver are that the secondary does not have the narrow roofing filters, and that the second has a higher first IF frequency to make general coverage reception feasible.

The Ten-Tec manual suggests that diversity reception is possible with the Orion. It is not really what I call true diversity reception. True diversity reception, in my opinion, is only possible if both receivers are phase locked and the phase delay through both receivers is nearly identical. This is not the case in the Orion. Listen to the same signal through both receivers using the same VFO, and you hear the warble (flutter, rapid fading) caused by the phase difference. This warble is always there and to me this makes real diversity reception impossible. This does not mean that under certain circumstances you may not find a benefit in using different antennas on the 2 receivers on (almost) the same frequency. While Ten-Tec doesn't claim that both receivers are phase locked, they think that there are advantages when using a vertical and horizontal antenna or two horizontal antennas separated by at least a wavelength with the Orion using two radios in a single audio amplifier. They claim

Table 1

Nominal BW (Hz)	*-6dB BW (Hz)*	*-60dB BW (Hz)*	*Shape factor*
100	150	440	2.9:1
250	240	470	1.95:1
500	510	820	1.6:1
1000	980	1160	1.2:1
1600	1580	1880	1.2:1
2400	2300	2650	1.151
3000	2930	3270	1.12:1
4000	3960	4280	1.08:1

that some of their customers have found this form of diversity with non phase-locked receivers useful.

Two Transmitter Outputs

With two transmitter outputs, you can almost configure the Orion as a two-radio contest station using two amplifiers. This does not mean that the Orion has two transmitters, you transmit either to output A or to output B. The Orion has two band-data output connectors, one corresponding to each output connector, and this make it possible to have automatic antenna and amplifier switching. Two TX-EN lines (one for each output) can be used to inhibit the transmitter in full QSK or also when using a complex antenna switching system where such an RX-inhibit line is used to prevent transmitting on the wrong antenna or while antennas are being switched.

Firmware Upgrades

Upgrading firmware takes less than five minutes. The new upgrades are announced on **www.rfsquared.com**. You download a small program (*update.exe*) from this site into a directory on the PC controlling the Orion. The Orion, connecting to your PC via a serial port, will not only take care of the communication with your contesting or logging program, it will also talk to the Ten-Tec flash update utility program (*Update.exe*). When a new firmware update is available, save it in the same directory where you saved *update.exe*. Follow the instructions in the manual, and in a few minutes you have a new, latest model Orion! Great feeling!

Suggestions and Shortcomings

On the negative side: the voice memory keyer is much too slow in saving to memory (not useful at all in a contest).

I also would like to see the possibility of different external T/R delays for SSB and CW. Now you can set one delay for output A (going to amplifier A) and another one for output B (going to amplifier B). Having separately adjustable delays for SSB and CW should only be a minor software change, I would think.

It would also be nice if the user could, from his PC, upload *his* frequency, mode and bandwidth definitions as a one-time task, without having to control the radio from a PC on a permanent basis. An operator could then just enter a frequency from the Orion keyboard and it would select the corresponding standard bandwidth, based on his stored frequency, mode and bandwidth table. We understand this cannot be a standard definition since band-planning differs in different IARU regions, and even with individual operators' preference.

I know that Ten-Tec has considered these wishes, and that not all of them can be on the top of their priority change list at the same time. I also know they do listen to their customers and try to learn from them to make a better product. Wise strategy! By the time you read this, some of these "wishes" are very likely to have become true. Bill, W4ZV, eminent top-band DXer, worded it very well on the Internet: "*KUDOS to Ten-Tec for LISTENING to actual users! Japanese manufacturers must surely be watching the success Elecraft and Ten-Tec are having by incorporating real time user feedback into their products. If they don't soon start doing the same, I believe they will all be history in a few years*."

Even as I write the final lines of this report I think I have found one or two very minor control software glitches, which I know Ten-Tec will correct in one of their next firmware upgrades. It's great not having to be worried about such issues, as the people are there at Ten-Tec to solve them and the system is in place to provide every customer with the solution almost in real time. This is what I always dreamed about!

Learning Curve

In the beginning you may undoubtedly feel a little lost in the programming screens, although they are laid out in a very logical way, and are easy to understand. Thankfully they show real words, no cryptic code needs to be deciphered! But there are so *many* things you can adjust. This will go away after a few weeks, and you will soon feel like a king on his throne being able to control just about all the issues of this wonderful radio.

Hardware

When you open the Orion, your first reaction will likely be: is that all? It indeed looks like an almost empty box. No inch thick bundles of wires, just a few (mostly coaxial) cables. The rest of the interconnections are done by the backplane into which all the boards plug. I always jokingly say that I can pack my sandwiches and my shoes inside the Orion, and it would still accommodate more. Another nice thing is its weight: 20 lbs (9 kg). Required power is 13.8 V at 25 A. There is no built-in power supply.

Conclusion

I have always dreamed of the ideal low-band DX and contest machine, and I must say that Ten Tec has come very close to my wildest dreams. Congratulations to Ten-Tec for a wonderful product and for excellent service and customer care. The way Ten-Tec tries to satisfy the wishes of its customers is more than exemplary. The Orion transceiver clearly scores very near maximum on whatever scale you can imagine. My order for a second Orion for a two-radio contesting station is out and I can't wait to get it! I will be proud to have a two radio contesting station with what seem to me to be the best radios on the market at this time. Keep in mind that the sunspot cycle is on its way down. As a result the low bands will become more and more appealing. The Orion may well make the difference.

The Orion in Europe

As of early October 2003, the Orion cannot be sold in the EC market, since it has no CE label as yet. I have been informed that the certification procedure is now underway and it will soon be fully legal to buy, possess and operate an Orion in the EC countries. I understand that the CE-certification may be a fact well before the end of this year, so potential European customers can put the Orion on their Christmas shopping list. NCJ

ARRL DX Contest Single Band W/VE Winners

The ARRL International DX Contests are just around the corner—February 21 and 22 for CW and March 6 and 7 for SSB. If you're in W/VE land and are contemplating a serious single band entry, the following data may help you make a decision on which band to go for. Whatever that may be, good luck!

W/VE Single Band Winners—ARRL DX CW

	160 Meters				80 Meters				40 Meters				20 Meters				15 Meters				10 Meters			
	Call & State		Qs & Mults		Call & State		Qs & Mults		Call & State		Qs & Mults		Call & State		Qs & Mults		Call & State		Qs & Mults		Call & State		Qs & Mults	
1980	W8LRL	WV	41	21	N4AR	KY	205	60	W5UN	TX	527	77	K3TW	MD	727	90	K6LL	AZ	901	78	N4WW	FL	741	93
1981	N4IN	FL	31	23	W1ZM	CT	234	71	W5UN	TX	710	77	K5IY	TX	1076	107	K1RM	CT	1200	85	W0ZV	CO	1067	83
1982	N4WW	FL	44	25	W1ZM	CT	254	64	W6XX	CA	655	63	K1KI	CT	864	111	K6LL	AZ	1002	84	N4ZZ	TN	732	77
1983	W8LRL	WV	60	35	K1PT	MA	383	73	NA5R	TX	604	75	K8NA	MI	498	80	W0ZV	CO	750	82	WB4TDH	FL	206	56
1984	W1RR	NH	50	32	W1FV	MA	320	64	W2YV	NY	796	100	K3UA	PA	931	108	WB4TDH	FL	643	88	W1WEF	CT	359	76
1985	W1RR	NH	139	60	W1FV	MA	640	77	N4PN	GA	993	96	N2AA	NJ	1199	94	K2EK	NY	635	87	WA7KLK	AZ	18	13
1986	K5UR	AR	100	50	W1FV	MA	454	74	N6QR	CA	795	76	K2VV	NY	1813	115	K3RV	VA	439	82	KR1R	MA	17	8
1987	K1ZM	NY	115	48	W1FV	MA	728	69	K4XS	FL	810	80	K1RM	CT	1123	100	W5VX	TX	362	72	K9LA	TX	51	20
1988	K1ZM	NY	122	60	W6RJ	CA	346	68	K2EK	NY	1102	96	K2VV	NY	1564	103	K1RM	CT	961	92	N4BP	FL	179	45
1989	K1ZM	NY	88	35	W1FV	MA	551	70	KB0G	KS	910	84	N2AA	NJ	1944	103	K2VV	NY	1769	105	K1RM	CT	1530	98
1990	W1NG	CT	60	34	W1FV	MA	521	81	WO0G	MO	790	97	K4VX	MO	1075	104	WN4KKN	TX	964	104	K1ZM	NY	631	108
1991	W1NG	CT	107	46	W1FV	MA	729	78	K1ZM	NY	1312	102	W1RR	NH	1597	101	WO0G	MO	1548	103	KR0Y	TX	1410	100
1992	K5UR	AR	64	43	WE3C	PA	307	68	K8PO	MA	1110	102	K1TO	CT	1814	112	K2VV	NY	1529	115	W0UN	CO	1563	115
1993	W1FJH	NH	97	47	W1FV	MA	746	77	W6XX	CA	994	103	KT3Y	VA	1515	109	K0LUZ	FL	1413	111	K5MR	TX	421	98
1994	K1ZM	NY	85	50	W1MK	MA	472	80	K8PO	MA	1075	100	W3USS	DC	568	92	N4CT	TN	565	87	WS1M	MA	118	48
1995	W4MYA	VA	154	58	W1MK	MA	928	89	W3GH	PA	793	99	K2SS	CT	1516	112	W5VX	TX	839	91	K9OM	IL	73	35
1996	K1ZM	MA	303	63	W1MK	MA	905	79	N7DD	AZ	1014	92	K1RM	CT	1450	103	K9BGL	IL	151	52	W6KFV	CA	31	8
1997	K1ZM	NY	268	70	W1MK	MA	1021	90	N7DD	AZ	1182	110	N8II	WV	1674	110	N5LT	TX	301	68	W5AJ	TX	34	16
1998	W4ZV	NC	200	71	W1MK	MA	1018	90	AD6DO	CA	1006	94	W0UN	CO	1573	105	K5TR	TX	1100	104	K4JYO	AL	97	41
1999	WA8GHZ	TX	82	61	W1MK	MA	645	81	K8DX	MI	1012	94	K1TO	FL	1255	103	K2SS/1	CT	1905	106	WC4E	FL	1179	93
2000	K3RR	PA	58	41	W1MK	MA	802	82	K7EM	OR	1264	88	K4XS	FL	1666	115	VE6WQ	AB	2059	113	K1RM	CT	1766	111
2001	WW2Y	NJ	346	61	W1MK	MA	1099	89	K8LV	MI	1161	105	W5WMU	LA	1115	106	N2MF	NY	1778	121	K1ZZ	CT	1778	111
2002	VY2ZM	MAR	600	71	W1MK	MA	1013	85	KT3Y	VA	1334	97	W7WA	WA	1856	106	N2MF	NY	1879	112	W4ZV	NC	2162	108
2003	K4TEA	GA	67	42	W1MK	MA	847	78	N4PN	FL	1034	99	N2MF	NY	1464	115	W4KZ	GA	1486	106	W4ZV	NC	1306	113

W/VE Single Band Winners—ARRL DX SSB

	160 Meters				80 Meters				40 Meters				20 Meters				15 Meters				10 Meters			
	Call & State		Qs & Mults		Call & State		Qs & Mults		Call & State		Qs & Mults		Call & State		Qs & Mults		Call & State		Qs & Mults		Call & State		Qs & Mults	
1980	W4PZV	FL	29	24	WA4SVO	FL	92	55	wa7zlc	WA	354	56	K9DX	IL	1208	123	N7XX	WA	2313	93	VE6WQ	AB	2007	108
1981	W8LRL	WV	24	20	W1CF	MA	188	74	K7UR	WA	408	43	K3KG	GA	918	123	K7RI	WA	2391	106	K1UO	ME	1711	118
1982	WA2SPL	NY	15	11	K1PT	MA	141	65	N5JJ	TX	293	68	K1KI	CT	1498	146	W7RM	WA	2255	103	W0ZV	CO	1910	118
1983	VE1YX	NFL	39	28	KR2N	NY	207	71	N6BV	CA	629	56	N2PP	NY	771	118	W0ZV	CO	1343	102	WA6DBC	CA	1019	66
1984	VE1YX	NFL	92	46	W1FC	MA	272	80	K8NN	IL	178	76	K1UO	ME	1569	134	W0ZV	CO	1342	115	WA6DBC	CA	864	75
1985	K1ZM	NY	84	46	W0MJ	LA	299	87	KM6B	CA	541	53	KS8S	OH	745	105	W5XZ	LA	291	64	WA3EEE	MD	20	5
1986	K1ZM	NY	70	40	K2EK	NY	255	71	NZ5I	TX	191	43	K2VV	NY	1813	115	K3RV	VA	944	115	K4JRB	GA	169	37
1987	K5UR	AR	90	53	W5WMU	LA	168	59	W6AQ	CA	525	45	VO1SA	NFL	1730	124	K6SVL	CA	831	62	KE5FI	TX	189	40
1988	WA4SVO	FL	109	54	N2NT	NJ	330	79	K6NA	CA	682	61	KS1L	CT	1487	127	K4XS	FL	1600	117	K5UR	AR	343	75
1989	K1ZM	NY	50	30	K4HJJ	NC	151	60	KV0Q	CO	416	60	AI7B	OR	731	108	W7EJ	OR	2052	114	K4XS	FL	2117	127
1990	K1ZM	NY	54	34	KA1XN	MA	183	76	K4XS	FL	503	86	W0ZV	CO	1364	133	W7WA	WA	2123	117	K3ZJ/8	VA	1922	126
1991	K1ZM	NY	70	39	K8UR	MA	310	72	WO0G	IL	476	82	KS1L	CT	1334	124	W7WA	WA	2210	122	N1GLG	VT	1645	144
1992	K1ZM	NY	66	33	K1UO	ME	308	62	KC7EM	OR	702	69	KK9A	IL	1649	133	K2SS	CT	2160	140	W0UN	CO	2323	125
1993	WB9Z	IL	54	33	WE3C	PA	325	75	K1UO	ME	503	98	K5MR	TX	930	129	W0UN	CO	2204	133	K4XS	FL	1437	144
1994	K5UR	AR	52	35	K1ZM	NY	483	90	KC7EM	OR	762	78	KS1L	CT	1748	137	K1UO	ME	1273	134	KE5FI	TX	328	73
1995	W0ZV	NC	132	54	KQ3V	PA	429	91	K6NA	CA	804	68	KS1L	CT	1346	121	K3ZJ	WV	793	112	K6SVL	CA	244	57
1996	K1ZM	MA	191	60	KQ3V	PA	566	92	N7DD	AZ	763	86	NI8L	OH	1416	122	K5XI	TX	432	97	KE5FI	TX	104	23
1997	W4ZV	NC	90	46	N1GLG	VT	392	77	N7DD	AZ	665	66	VA3MG	ON	1004	94	W4WA	GA	458	86	W5AJ	TX	100	23
1998	AA1BU	MA	51	38	K1FZ	ME	575	79	N7DD	AZ	748	94	VE6JY	AB	2004	119	N2IC	CO	1446	125	KZ5MM	TX	348	60
1999	AA1BU	MA	61	40	K1FZ	ME	419	84	N5DO	TX	359	63	K4ZW	VA	1084	117	W0UN	CO	1766	121	NA5B	OK	917	110
2000	WW2Y	NJ	81	42	KE1Y	MA	285	68	K4XS	FL	809	101	WA2QNW	NJ	1106	118	K8DX	MI	2830	146	W4ZV	NC	2577	127
2001	WW2Y	NJ	61	38	AA1BU	MA	232	66	K9ES	FL	175	67	W7WA	WA	1493	129	W2FU	NY	1728	118	W4ZV	NC	2264	130
2002	AA4MM	FL	34	27	AA1BU	MA	429	72	K4XS	FL	850	92	N7DD	AZ	1313	124	VE6WQ	AB	2552	136	W4ZV	NC	2205	135
2003	K5RX	TX	51	37	AA1BU	MA	488	83	N4PN	FL	420	88	W7WA	WA	1406	137	N7DD	AZ	1564	121	W5PR	TX	1302	120

NCJ

Extreme Contesting

Mel Crichton, KJ9C

"So what's all that wire hanging in the trees?" My neighbor's kid, whom we know only as *that grungy little kid*, was standing in our yard looking at the HF antennas. I told him I use them for ham radio competitions. "Is that like on *Survivor*? Does somebody get voted out? Do you have to eat bugs?" Realizing that this kid watches way too much TV, I tried to explain contesting, but his eyes glazed over and he started to make a noose out of the coax dangling from the oak tree.

So I invited him to sit in on the phone Sprint that evening. He arrived at the appointed time, Nintendo game jammed in his pocket. He took interest in the PC logging program but lost it when he saw there was no joystick. He grunted as I explained the basics of a Sprint. "Too simple, dude."

After a few minutes of watching me throw my call into the foray, only to be answered by somebody else's call, he started to fidget. Once I made a contact, he perked up for a second as I made yet another contact in just a few seconds. Then I changed frequency and threw my call in again, repeating the sequence. That's when he flipped on his video game. For the next four hours he remained motionless, barely breathing, only fingers and eyeballs moving and the bleep of the game telling me that he was still alive. Realizing that even a phone Sprint provides too little excitement for today's generation, I decided to let him in on "extreme contesting."

"Grungy Little Kid, there *is* one ham radio contesting game that you might like. It's like extreme contesting. Let me tell you about it." So I tried to explain it in terms a computer game and reality TV fan would understand.

This is a contest in which you are the *DX* but there's a *QSY* rule. You can maintain a contact rate only if you move to a different location (QTH) at least once during the contest. If you sit tight, you will work everybody and the contacts dwindle to zero, and you sit there for the next 11 hours calling into the abyss. But the ability to change QTH comes with some penalties.

Moving to a new QTH costs contesting time, and contact rate suffers during the move, so you need to do it as quickly as possible. The move to a new QTH can be delayed by hindrances known as road construction, Sunday school bus, farm equipment, bumpy road, and hopelessly lost. There's an element of road rallying involved, and the ability to do time and distance calculations in your head is a plus. Maps can be called up as needed, with the downside that no contacts can be made while reading the map. Maps usually appear only after dark when there's no light to see landmarks or road signs.

You may choose computer logging to help increase rate and eliminate dupes at the risk of computer battery failure or a common glitch called RFI wiping out the log. The computer's clock may be thrown off every time you key down. If you choose paper logging, there is no risk of computer problems, but rate may suffer and you may need a third hand and night vision. You must also spend hours after the contest typing logs and figuring your score.

When you choose your weapons, you'll get a power allowance. Your targets in the game may use full legal power at a cost of less than 50 cents for the entire contest, with full size antennas on towers of maximum height. You must spend no less than 60 times that amount for gasoline (to QSY) and get only one-tenth their power. But that's OK because you can change your QTH to start a new pileup, assuming you can be heard with low power and ridiculously short antennas. If you choose to run stations using SSB, a game feature called *despair* will reduce contact rates. Your biggest probability of a pileup will be on 80 meters (only after dark) and on 40 and 20 meters, so you will be handicapped with ridiculously short antennas for those bands. Also, if you choose to QSY at too high a speed, a game feature known as *overhanging branch* will damage your antenna. Should you choose to drop the antenna while relocating, your contact rate goes to zero. You may choose to use a short antenna and call CQ on 2 meters while moving, but unless the game is *VHF-something* don't expect an answer.

There will be obstacles in your path. Some are stationary (potholes, fallen trees) and some challenge you to not hit them (dogs, squirrels, chickens, armadillos). Like an aerial combat game, two-ton objects will be hurled at you at breakneck speeds. If your attention should wander at the wrong time in the game, you can collide with one of those objects and be penalized points. The game will shut down due to *road kill* if the object is a Mack or Peterbilt very-high-mass projectile (VHMP). Due to Murphy's Law, probability of a collision increases if you choose to not spend some of your gasoline/power allowance on options called *insurance* and *registration*.

To reduce the probability of road kill, you may add a pilot, at the risk of arguments that will result in lost contacts. The pilot can suddenly go berserk, threaten to kill you or drive off while you are in the restroom at McDonald's. If the pilot looks like your spouse, there's risk of loss of equipment (via divorce) or death (yours) before you can play the next round of the game.

Being stationary helps your contact rate, as the moving handicap no longer applies. The moving handicap includes the hurtling objects and bouncing I mentioned, but also includes static noise from ignition, fuel pump, strip malls, and power lines. However, when not moving, game characters called *curious farmer* or *county sheriff* will unexpectedly stop you in the middle of a run. You must quit the run and spend at least 15 minutes to satisfy them. If your answer is not satisfactory, you must stop collecting contacts and relocate, perhaps to another county. Any chances of resuming the run are zero. Should *Deliverance Brothers* and banjo music appear in the program, you must stop operating immediately and drive faster than their pickup truck can go.

Nature calls are mandatory and require the player to take a break. A coffee can is not an option at 65 miles an hour. However, if you chose to locate on a county road in Illinois or Indiana, you may take a nature call and not lose a contact.

Grunger told me that you might get a sore behind from 12 or 16 hours of playing this game. "But this is a reality game," I replied. "Real people are in it, not computer simulations. It's called mobile contesting. Hundreds of hams are extreme contesters."

"Not very extreme," he replied. "The Deliverance Brothers are kinda like space aliens or terrorists, but you can't blast 'em. And those road hazards are like cliffs and alien spacecraft. But where's the babes in bikinis? And where's the bugs! You gotta eat bugs!"

"Bugs? You want to eat something worse than bugs? As a reward for competing, you get to eat hamfest food. That's ten times worse than bugs." GLK's eyes widened. "I rest my case."

"Pilot, huh? I like that pilot thing. Can I drive?" he said with a strange gleam in his eye. Grungy Little Kid wants to drive for me in a mobile contest! Maybe *after* he gets his driver's license. But he has to supply his own babes in bikinis.

If you'd like to read more about mobile contesting, or you have anecdotes of your own, please contact me. I'd also appreciate reproducible photos of your mobile contesting setup, especially *inside* the vehicle. You can e-mail me at **kj9c@iquest.net**. NCJ

VHF-UHF Contesting!

Jon K. Jones, NØJK
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Big E_s Opening During the October 2003 50 MHz Fall Sprint!

The Southeastern VHF Society sponsors the Fall VHF /UHF Sprints. The 50 MHz Fall Sprint started at 2300 UTC October 25 and ended at 0300 UTC October 26. With the rapid decline of Solar Cycle 23, many VHF Contesters had little hope of any propagation during the 50 MHz Fall Sprint. The solar flux was too low to support F2 at 50 MHz, and October is one of the worst months for sporadic E (E_s). Jay, KØGU, observed, "I didn't plan on doing the sprint as I expected lousy conditions. *Wrong*."

So it was a real surprise to have a large and widespread Es opening in this year's 50 MHz Fall Sprint. See the accompanying map for a sample of the 6 meter E_s QSOs made around 0200 UTC on October 26.

The 6 meter band was open at the start of the sprint with K7BV/1 working W2GFF in Alabama. By 2330 UTC things broke wide open with extensive E_s over the eastern states. Some real DX was worked, with KA9CFD in zone EN40 finding LU3DCA on an E_s to TEP link at 2336 UTC! W9/VE3CDP in EM58 reported working LU3EO in the sprint. Out in Hawaii, NH7RO and KH6SX enjoyed good sprint conditions with an F2 opening to Japan. KH6SX was spotted by JG3LEB at 599 working a big JA pileup on 50.105 at 0031 UTC.

The E_s opening grew in strength and coverage at 0030 UTC Oct. 26. By this time, stations from Utah and Colorado were working the East Coast and Gulf Coast. By 0150 UTC W9/VE3CDP observed "the band wide open from mid-Atlantic through New England and SD, TX and CO." A few minutes later K1TOL in EN44 (Maine) heard KØYW on 50.155 40 over S9 on double hop Es. Lefty had "lotsa 5s" and a few 7s in as well. At 0211 UTC, which appeared to be near the peak of the opening, WØLD in DM79 (Colorado) was working W1, W2, W3, W4, W8 and W9 on 50.185 MHz.

Several of the Colorado 6 meter ops made over 200 QSOs in the sprint! N4LI in EM55 said the signals from the Colorado ops were "massive." Jay, KØGU in DN70 reported 231 QSOs in 91 Grids for a sprint score of 21,021. He had rate of over 90 per hour between 0200 and 0300 UTC. Jay said he "got up from a nap and stumbled into the shack at 2340 UTC. The band was open. Don't know how much I missed. Had over an hour of double hop (E_s) to Florida. My footswitch died and my microphone cable was intermittent but managed to kludge them together while missing little time."

Bruce, KØYW, posted a big score from western Colorado in DM67. "It was great fun in the sprint. I wandered in to check the band … having a feeling that the drop in the K index after the big flare would finally yield some E_s. I operated for a little over 2 hours and logged 247 QSOs in almost 100 grids …. W1, W2, W3, W4, W5, W7, W8, W9, and WØ plus VE3. Signals were not the usual strong Es punctuated by rapid deep QSB. Rather, they were medium strength … S5 to S7 with very slow light QSB." Bruce was very loud in Kansas on short E_s, hitting 60 over S9 at 0205 UTC! Bruce's 6 meter position consists of a Kenwood TS-2000 driving a homebrew 8877 amplifier to either a 24 foot long boom 6 element Yagi at 100 feet or an M_2 2.5 wavelength (52 feet) long 11 element Yagi at 90 feet on a separate tower. He uses $1^5/_8$ inch Heliax feed line for both Yagis.

Like Jay, Bruce and John, I didn't expect much at all for 6 meters for the Fall Sprint. I went out to a dinner engagement with my wife Saturday evening, and arrived back home at 0140 UTC. I turned on the 6 meter radio (an MFJ-9406) and there was Bruce KØYW pegging the meter. I worked W5, W8, W0 and VE3s in the last hour of the sprint. Some pretty short E_s QSOs, like KØGU in DN70 at 460 miles, implying a MUF of over 90 MHz. The E_s opening continued right up to the end of the contest with VE3DSS from FN03 booming into Kansas in the final minutes of the sprint.

The state of Colorado was one of the "places to be" in the sprint. Ops there worked single hop E_s to W5, W9 and WØ, and double hop E_s to W1, W2, W3, and W4. Looks like only the west coast W6s were left out of the great E_s. To get an idea of how good conditions were in this sprint compared to last year, in 2002 W4MW took first place with a score of 2,848. KØYW's score this year is almost 10 times as high. One interesting difference between the VHF Sprints and other HF and VHF contests such as the ARRL VHF QSO Parties is that the Southeast VHF Society Sprints allow all participants to use spotting nets and the Internet Loggers in the contest. From the VHF Sprint rules:

"Use of telephone, packet or Internet methods to coordinate contacts is acceptable, so long as complete exchange of call signs and grids is accomplished on the relevant amateur radio band."

I found it interesting to watch the "DX Summit" and 50 MHz Prop Logger while working the sprint to see what others were working in various parts of the country in real time—and to post some of my contacts. It was also fun to chat with other contestants during the contest when things got slow (which didn't happen often this time). Perhaps an *assisted* category for those wanting to use packet or Internet tools would help boost activity and log submissions in the ARRL VHF contests?

For the rules and contest results for the Fall and Spring Southeast VHF Society VHF Sprints, please see **www.svhfs.org**.

Massive Aurora Openings on 144 and 222 MHz and F2 on 50 MHz

The solar flare Bruce, KØYW, referred to was one of many during the last week of October. Two huge sunspot areas (Regions 486 and 488) traveled across the sun that week and spat out several X–class solar flares. The earth took direct hits from two of the CMEs and from October 29 to 31 had massive aurora openings and F2 between Hawaii and much of the United States and Canada. On October 30 and 31 UTC there was a 5 hour opening on 6 meters from Hawaii to the central USA. Visual aurora was seen in Texas, Arizona and Florida. I observed a nice blue, green, and red auroral display while operating portable out in the Flint Hills around 0100 UTC Oct. 30. Earlier I worked NH7RO, KH6IAA and KH6/K9FD in 10 minutes on 6 meters around 2300 UTC on October 29. I was running about 50 watts and holding my 2 element Yagi up in my left arm while working the radio! The opening on 6 caught me by surprise and I only had the 2 meter Yagi on the mast. WBØDRL in EM18 (Kansas) worked into New England on 2 meter aurora on October 29 and the next day K5CM from EM25 (Oklahoma) worked KC4PX in Florida on 2 Meter aurora! VE2DFO and VE3AX worked NH7RO October 30 on 6 meters via an "auroral E_s" to F2 link. Many, many other great contacts were reported.

The sun rotates every 28 days, so active regions can re-appear again. If they do, there is a possibility of geomagnetic storming and resulting aurora and 50 MHz F2 in the January 2004 VHF Sweepstakes. A good resource for aurora and geomagnetic storm information is **www.spaceweather.com**. NCJ

NCJ Station Profile—NT1Y

Mark Beckwith, N5OT

I'd like to tell you about a contester who has become a really good friend over the years. I promise you, if you're reading this magazine, you have worked this guy's station, probably a lot of times.

His bio shows he was first licensed as WN6NDC 35 years ago. We first met when we were in California together. We both had much longer call signs back then. In the late 1980s, there was a rumor of a guy with a long call sign out in Malibu whom nobody knew about except that he had a bunch of towers and antennas—looked like one tower per band.

Some of you will remember as far back as the 80s. This one-tower-per-band idea only got popular recently. Back then it made you do a double take.

Figure 1—Big Bertha halfway up, installation by Custom Metal Works.

The next thing you know, this guy that hardly anybody recognizes starts showing up at Southern California Contest Club meetings. Word quickly filters around that "he's that guy with all the towers out in Malibu. His call is KC6-something."

This could be called typical of Bill Hein, who has made a career of quietly and unobtrusively sliding into *the big shoes* with a notable absence of fanfare.

The Really Big Shoes

Bill is a guy who works hard at the things he targets, choosing intentionally and wisely. He was first licensed in high school in *the old days.* He chose to set aside crystal rigs and 75 shortwave watts, but not for lack of interest. "I never lost my interest in ham radio through my college and career days—I just didn't have the money or time to stay on the air. I always intended to rejoin the hobby at some point." Bill built a successful career for himself in the music business. Ham radio, like painted wings and giant's rings, made way for other things.

When he arrived on the Southern California contest scene, he was "rejoining the hobby" as he put it. Shortly after, in 1991, Bill and his lovely wife Christine made a move to a ranch in the Four Corners area of Colorado, the stuff of rumors: "I don't know why so many people thought I retired to Colorado. I simply moved there. I arranged my responsibilities so that I could work from my Colorado home office 3 weeks out of each month and work in Los Angeles the other week."

In Colorado, Bill built a memorable multi-multi contest station. It was a state-of-the-art showcase for RTS towers and DX Engineering long-boom Yagis. This is the point in the story when his upgraded call sign, AA6TT, becomes synonymous with first-rate excellence. "I still hold the CQWW zero division record for multi-multi phone and the ARRL DX zero division record for muti-two phone, thanks to excellent operators." To put another recurring rumor to rest once and for all, Bill mentions in soft-spoken style "the Colorado station did *not* cost one million dollars."

"We lived in Colorado until 1996 when work required me to move back to Los Angeles. The ranch and antennas were sold and the towers mothballed. Busy with my job, I was almost entirely off the air again from 1996 through 2001."

In 1998 a number of us "old guard" showed up in Colorado to dismantle that legendary installation. It was a week I will never forget. Personal high point: passing off a 60-foot long 275 pound 8 element 15 meter Yagi to a helicopter at 200 feet. There's a first time for *everything*. I didn't know what adrenaline was before that!

AA6TT becomes NT1Y

"The overwhelming reason that Christine and I moved to Vermont is that we like New England. I was finally able to move to New England full-time because my new job in the DVD business required me to spend time in New York City, a pleasant train ride down from Vermont.

"Ham radio is fun from here, but it's also intensively competitive! If I picked a location solely for contesting, you'd find me on the coast of Maine with a salt water shot to the NE. *When I finally retire*, maybe that's where you'll find me...."

Figure 2—Tuning the Force 12 2 element 80 meter Yagi.

NT1Y Equipment Sidebar

Thanks to Charlie, W1XX. The station is not totally a "by band" operation. However, the things in place today are:

Outside

160 meters:
full-sized 4-square

80 meters:
full-sized 4-square
Force-12 2-element Yagi at 170' (on the RTS)

40 meters:
CAL-AV 2/2 Yagi stack (on the Bertha)

20/15/10 meters:
OptiBeam 16-3 stack (three on the Bertha)
M2 10-30 stacked 8-el log periodics (three on the RTS)
Four element SteppIRs stacked (three down from 90'on a Rohn 55)
Optibeam 16-3 at 55' independently rotatable

Inside

Run station one:
Ten-Tec Orion
Alpha 87A

Run station two:
Yaesu FT-1000D
Alpha 87A

Multiplier station:
Icom IC756Pro

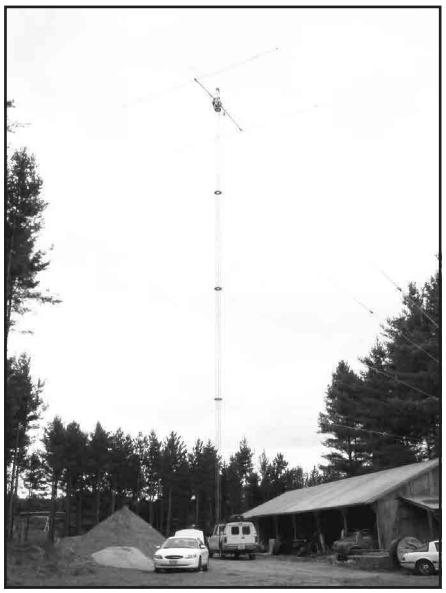


Figure 3—Bolting the Force 12 80 meter Yagi in place at 170' on a Rotating Tower Systems rotating Rohn 55 tower

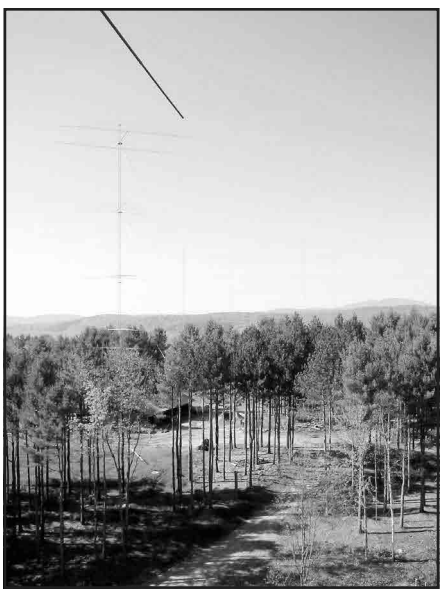


Figure 4—Vermont fall colors frame 160 meter four-square and rotating tower with Force 12 80 meter Yagi and stacked M² LPDAs.

Status Report

In 1998, I asked Bill what his radio plans were in Vermont. He said he would build a large station emphasizing 6 and 160 meters for his personal enjoyment, and that he *might still* do some contesting. "Multi-multi is too much work." You can't argue with that, especially with someone who's been there and done it.

Perhaps one could predict that Bill's contesting "retirement" would last about as long as his previous "retirements" (i.e. *not*). At this point the NT1Y contest station is under construction, once again using state-of-the-art equipment.

"I am QRV from 160 meters through 23 cm, my favorite bands being the 'magic' and 'top' bands. I operate primarily CW. My station currently consists of a 142 foot Big Bertha rotating tower, which weighs over 25,000 pounds. It is supporting stacked Optibeam, M² and Cal-Av Yagis (see Figure 5), a Force 12 280-Ultra full-size 2 element 80 meter Yagi at 170 feet on an RTS rotating tower, and other towers and antennas of varying sizes including a three-stack of four element SteppIR Yagis. I have four-square phased vertical arrays for 160 meters and 80 meters. My rigs include a Ten-Tec Orion, Yaesu FT-1000D and ICOM IC-781 transceivers, Alpha 87A and Lunar-Link amps and lots of gadgetry from Array Solutions."

What started as a plan for a modest station has grown to large proportions. Just this morning I read e-mail from Bill and the gang back there debriefing their maiden multi-two entry in CQ Worldwide. The operators are now debating the pros and cons of designing for multi-single or multi-two.

NT1Y is a major work-in-progress guaranteed to give even the most seasoned hardware addict a—well, it makes me catch my breath, if you know what I mean. I'm due for a visit up there in the spring—maybe we can swing a *hardware addict update* at that time.

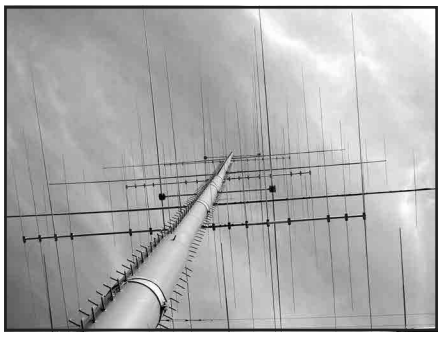


Figure 5—Big Bertha, home to stacked Optibeam tribanders, Cal-Av 40 meter Yagis and M² 6 meter Yagis.

Call for Operators

If this looks like something you'd like to see more of, you might remember Bill put out the call for interested operators some months ago—check the **cq-contest@contesting.com** archives for details. I'd recommend considering it. Bill doesn't do things halfway and NT1Y is making big noise in short order. I may see you there! NCJ

Contesting on a Budget

Paul Shaffenberger, K5AF

Wire and Cable—The Bargains Are Out There

Let me start this column by paying homage to Gary Sutcliffe, W9XT, who is publishing his 100th column in this edition of *NCJ*. This is a truly great accomplishment and is an inspiration to fledgling columnists like myself. Even more impressive is the time that he took from the work on his own column to make a detailed contribution to this column. Thanks Gary and congratulations!

The wire bargains fell into four general categories: rotor cable, coax and hardline, connecting cables and antenna/radial wire.

Turning on a Dime

Seemingly, the most popular way to save money is by using bargain rotor cable. Several readers, including Pete, N4ZR, Rick, N6XI, and Mike, N2MG, described using two or three conductor (with ground) Romex house wire as rotor cable. Typically, this wire can be obtained for less than 10 cents a foot. Mike, N2MG, takes the savings one step further by reducing his wire count from six to five for his Hy-Gain rotator by locating the starting capacitor at the rotator rather than in the control box. He uses a combination of CAT5 cable and Romex for his rotors.

Gary, W9XT, recommends the flat rotor cable, which he finds to be cheaper than regular rotor cable, and it can also be used for other general remote switching applications. Pete, N4ZR, uses CAT3 network cable, which is very cheap and available on-line, for general outdoor remote switching operations.

Appearance is Skin Deep?

The consensus on buying used feed line was simple—coax, no—hardline, yes! Bill, K4XS, summed it up: "Look for bargains at the hamfests…the coax that's for sale, that's junk. I look for the Heliax, with or without ends." Jim George, N3BB, related that cheap coax and coax connectors are false economy. Dave, K6LL, recommends buying new Buryflex, which he considers to be a reasonably priced, low loss and tough cable.

Despite the high price for new hardline, it is often available at bargain prices, with shorter lengths often found for a dollar a foot or less. The expensive part is the connectors, but creative contesters such as W9XT make their own! Several contributors related that they got great bargains on large spools of hardline, often paying no more than they would pay for RG-8X from Radio Shack.

With the seemingly increasing availability of 50 Ω hardline, CATV hardline may be losing some of its appeal. While Gary, W9XT, Pete, N4ZR, and Don, K4ZA, use it extensively at their stations, others are less enamored with it. Bill, K4XS, has been replacing his with 50 ohm Heliax, and Kevin, NF7J, was so frustrated trying to build connectors for his CATV hardline that he's offered to give it away!

Another free, or almost-free, cable is RG-6 TV cable. W9XT puts this to good use by using it for the runs to his Beverages. Low power guys might consider it as a viable feed line (with proper un-uns), as it generally has low loss.

Whatever the coax type, hardline or not, remember that appearances can be deceiving! The total loss in any length of coax, from a ten foot piece to an entire spool, can easily be measured with an antenna analyst. Simply measure the minimum impedance, note the frequency, and divide that by the cable's characteristic impedance (typically 50 Ω). Multiply this figure by 8.69 and you will have the loss in dB at that frequency. After doing this a few times, you can get a good feel as to whether the coax is worth buying or not.

I've tested some rather ugly hanks of coax and found them to be very low loss, despite a dirty, scratched-up jacket. On the other hand, I tied several brand new RG-8X size patch cords together and found their collective loss to be the equivalent of 8 dB per 100 ft at 30 MHz! This testing method works great for testing not only coax, but also twin lead and open feeders.

Bargain Connections

The cost of connecting our radios and peripherals can be considerable, and there were several great suggestions from our contributors on how to save some money. Dave, K6LL, suggests using inexpensive RG-174 for making patch cords and mic cables. For non-critical RCA audio cable applications, he uses stereo patch cables from the 99 Cent Store—two twelve footers for just 99 cents! Jack, W1WEF, uses shielded sound and security cable, inexpensive and available from Home Depot, for many of his in-shack cable needs.

Wire for Ground and Sky

Construction-type electrical wire seems to have become the bargain antenna wire for many contesters. I got to experience firsthand the strength and resilience of Home Depot #10 PVC coated stranded wire at K5RC's QTH during the great windstorm of '03. With winds exceeding 150 mph, Tom's 1000 foot 160 meter delta loop stayed intact, even though one of the lower support masts folded over like a toothpick. The price? A 500 foot spool for $30. Ken, N6RO, uses #12 PVC coated stranded wire from Home Depot for his low-band wire arrays.

Dave, K6LL, buys a 100 foot roll of 14-2 Romex with ground, strips one foot of the outer jacket off, ties the black wire to a tree and starts pulling on the white wire. The result is 100 feet of black, 100 feet of white, and 100 feet of bare wire, all at about 3 cents a foot! Several contributors mentioned finding bargain spools of wire at hamfests for as little as a penny a foot. Sometimes a junkyard or scrap yard can yield some bargains. Rick, NQ4I, bought 3000 feet of #10 solid wire for just $20 at a scrap yard, and this became the radial system for his 80 meter foursquare.

Jim, N3BB, uses #12 coated wire for his beverages because of the deer population around his QTH. For sky wires, a much smaller diameter is often sufficient. I personally use #18 PVC coated wire for my "invisible" antenna farm in a covenant-restricted neighborhood. I've run as much as 400 W into these wires with no problems. Big spools of this wire size often are sold at less than a penny a foot at swap meets and electronics outlets.

We've barely scratched the surface on this topic, but I hope I was able to capture the high points from some very good input. Thanks to W1WEF, N2MG, N3BB, K4WI, K4XS, K4ZA, N4ZR, NQ4I, K5RC, K6LL, N6XI, NF7J and W9XT.

Topic for Mar-Apr issue

I am planning to have a special guest columnist with an interesting perspective on budget contesting. Stay tuned!

NCJ

Contest Tips, Tricks & Techniques

Gary Sutcliffe, W9XT

Wow! This is the 100th installment of CTT&T. It is hard to believe this started over 16 years ago. The reason for the success and length of this column is due to the generous help of our readers. It is amazing that participants in such a competitive hobby are so willing to share their strategies, ideas on equipment and antennas and other tips that they could easily keep to themselves to maintain a competitive advantage.

I have known people in other competitive hobbies who go to great pains to conceal the secrets of their equipment. Perhaps one reason for this not being the case in radio contesting is because to succeed, you need the other guy to succeed as well. A contact aids both parties. If the other guy is not getting his signal out efficiently, you might not hear him, and you will miss his QSO points, and perhaps a new multiplier. If you help him make his contacts shorter and more efficient, you will have more time to make another contact after he works you.

For this special installment, the topic is readers' all time favorite tips.

Getting back to the topic of sharing ideas, K4OJ's tip was to share your ideas with fellow contesters. Jim says that if you know a trick that makes things more fun, share it. Jim also suggests becoming a member of a contest club. It is much more fun swapping stories with contesters. If there is not a contest club in your area, start one.

Another sharing and getting ideas tip comes from K5AF. Paul's favorite tip is to read the *NCJ*. It is a great tip, but you have to forgive Paul's bias. He writes the "Contesting on a Budget" column, one of the first things I look for when my *NCJ* shows up.

K5ZD sent in a number of his favorite tips. Long time readers may remember that Randy was the editor of the *NCJ* when this column first started. Randy's first tip is to send in a log whenever you operate a contest. Certainly with computer logging and e-mail submissions, sending in your log is much easier and less expensive than it used to be.

Another of Randy's tips is to build your station to last. Randy advises that it never pays to take short cuts on anything that might fail during the contest. "Reliability costs more, but it is worth it," says Randy.

Billy, AA4NU, has a step by step process for contest success based on the "right operating attitude".

#1. Have FUN

#2. Help others have FUN

#3. Each time out, improve your skills

#4. Each time out, help others to improve their skills

#5. See #1.

#6. Repeat until desired results are achieved!

Randy, K5ZD, suggests sleeping 90 minutes to make it easier to wake up. People sleep in cycles. If you sleep in complete cycles you will gain more benefit. My understanding is that these cycles tend to be around 45 minutes for most people, which would be two full cycles per Randy's suggestion. You may want to experiment a bit to see what sleep period length works best for you.

Sometimes when you are in S&P mode, you will find a needed multiplier working a CQing station. AAØCY's favorite tip is to go up a few KHz until he finds a clear spot and call CQ. Bob says that the desired station usually gives him a call and this is usually how he picks up the VE2 section in Sweepstakes. A variation of that trick is to actually call the station on the clear frequency.

One key to this trick is knowing which way the desired station is tuning. It is common to start at the low end of the band and tune up. On SSB, AAØCY and Don, K4ZA, suggest you tune based on what sideband you are on. If you are on 20 meters and above where USB is the norm, you should tune up. On the lower bands where LSB is standard, you should tune down. This method allows for faster tuning.

One problem with everyone tuning in the same direction is that you sometimes become synchronized with a bunch of other contesters. You may be getting beat out time after time by the same stations if they are stronger into the target areas. If that happens you might be better off jumping a few kHz past them and continuing your S&P hunt.

NØAX has a simple tip. "You can't win if you're not in the chair." Mel, KJ9C, has a similar, if a bit more graphic, comment: "Stay in the chair, coffee pot by the desk, and a coffee can below."

GW4BLE had a few other tips to keep you functioning for long hours in the operating chair. Steve installed a small refrigerator in his shack so he can always get a cold drink by just turning around. For his cold drinks Steve prefers the fruit drinks in small containers that are meant to be drunk with a straw. Drinking with a straw at the side of your mouth allows you to keep the phone rate up.

Steve prefers a hot cup of tea to help him wake up from his sleep breaks. His wife Mandy boils water right before he gets up so all he has to do is pour the water into a cup and on to the tea bag. Steve jokes that those of us on the western side of the pond will probably substitute coffee for tea.

Ever hear a station calling CQ too fast on a polar path with aurora? The aurora can cause the dits and dahs to smear together and become unintelligible. For some reason a lot of these guys don't answer if you reply at a slower speed. VE7FO has a good trick. Jim calls them at a higher speed than they are sending. This usually gets a "QRZ?" response. He then calls again but at a lower speed. This is repeated, reducing the speed each time, and after a few times they understand that they are sending too fast for conditions.

Bob, AAØCY, has a suggestion for those without a second rig, but who have a rig with dual or sub receivers. You can use the second receiver to tune around while still monitoring your CQ frequency. The split buttons let you jump between frequencies. Bob calls this SO1.5R.

One thing you need a good stock of is ferrite beads, torroids and clamp-ons, according to VE4XT. Pick them up at hamfests whenever you see a good price. They can be a lifesaver when a new RFI problem pops up a few minutes before the start of a contest.

Topic for March/April 2004 (Deadline Jan. 10)

Time spent on supporting contesting

How much time do you spend on contest related activities outside of actual contest operating? How does this compare to actual contest operating time? How is your time split between non-operating activities such as station improvements, reviewing past results, reading the *NCJ* and Internet contest resources, answering contest QSL cards, etc.? How much time do you spend preparing just for the next contest? What other contest related activities do you do? Which ones are most valuable?

Send your comments and suggestions for topics to be covered to **w9xt@qth.com** or by snail mail to me at 3310 Bonnie Lane, Slinger, WI, 53086. Please be sure to get them to me by the deadline. NCJ

RTTY Contesting

John Fleming, WA9ALS

I am pleased that Larry, WØETC, recently agreed to tell us about his NAQP experience at NØNI. A few years ago, Alan, WD9GMK, my son Wesley, KB9YTW, and I did our first-ever M2 with networked computers in the CQWW RTTY contest. During the contest we kept coming across NØNI's *loud* RTTY signal and wondered who in IA had such a great signal. We felt like we were chasing NØNI all during the contest, but we were happily ignorant of what we were up against—only later did we find out!

WØETC Multi-2 JULY 2003 NAQP RTTY

Larry Lindbloom, WØETC

In early July I was anxiously anticipating doing a single op phone only entry in the IARU HF World Championship Contest followed the next weekend by a single op effort in NAQP RTTY. I had been pounding the bushes to find people interested in playing on TCG NAQP RTTY teams and working on a few station improvements/repairs to potentially increase my score in NAQP RTTY.

Sometimes, in spite of our plans, our hopes, and our dreams, life happens to us in ways we had not planned or dreamed. In my case Mother Nature had other plans for me and she made those evident during a thunderstorm late in the afternoon of July 7.

In an instant the lightning came out of nowhere. There were several very loud flashes followed instantaneously by a horrible sound. The lights flickered, went off and came back on. A quick check revealed several tripped circuit breakers and dead telephones. A further check revealed my IC775 powered on in the transmit mode, and it would not switch to receive even with a reset. The IC756 had a dead receiver and no power output. The rotor control boxes were dead, etc, etc. In an instant I knew my Single Operator contesting efforts were over for several months.

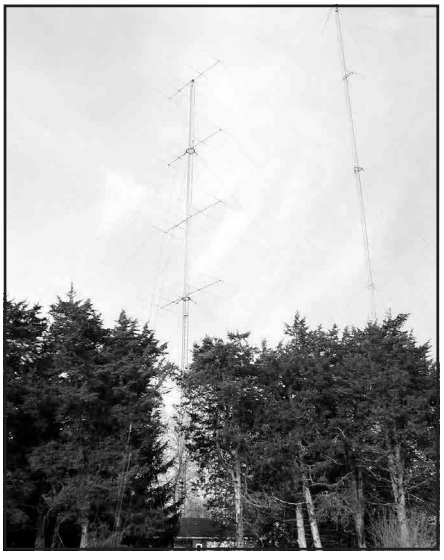
After the above sunk in I decided to call Toni, NØNI, told him what happened, and ask if he needed another operator for his Multi Single in IARU HF. He was sorry to hear of my problems and said he could definitely use another operator. I also asked if Bill, NØAC, was again organizing an M/2 from Toni's station for NAQP RTTY. Toni said he didn't think Bill was going to be available, but we could talk about it during IARU HF.

Bill was not available but Toni and I agreed to give it a try. However, Toni said he had a service call to make that would cause him to leave a few hours before the start of NAQP RTTY, and he would not be back until three or four hours into the contest. Knowing that, I pounded the local bushes for another operator or two. Finally Pat, NØHR, said he might be available for the contest.

On the day of NAQP RTTY I arrived at NØNI three hours before the starting time. Toni already had most of the operating positions configured. So—it was decision time. Decision #1 was which call to use. We settled on mine. The next decision involved the contents of the message buffers. We looked at the ones from last year, modified them to our liking and set them up on all the computers.

Toni left for his service call and I waited for the start of NAQP RTTY and nervously hoped NØHR was going to be there, preferably before the start of the

The 80m 4-Square at NØNI



The 10m stack at NØNI

About NØNI

The NØNI station is situated near Ripey, Iowa. Ripey is a small rural community about 50 miles NW of Des Moines. The station is located on the corner of a 320-acre farm. It is designed as a Multi Single contesting station that primarily focuses on CW and SSB contesting. In truth, due to the antennas and station design it could easily be a Multi-Multi station if enough operators were available. There are mono band stacks on 10, 15, 20, and 40 meters. Several of the stacks are on rotating towers with fixed position antennas also available. Because of the use of StackMatches and StackMasters, the antenna combinations are phenomenal. On 80 there is a 4-square phased array along with a high dipole. On 160 (not included in NAQP RTTY) there is also a 4 square phased array!

The station is situated in the lower lever of the NØNI QTH with a walk-out patio. It is adjacent to a kitchen, dining area, living area with TV, bathroom and bedroom. The station has 6 possible operating positions. All of the rigs are 1000MPs with the exception of one 1000D. For the high power contests there are numerous amplifiers available, including Titans and Alphas. NØNI is a dream station and is the ham radio version of "Field of Dreams!"

Toni, NØNI

Larry, WØETC

A view of the NØNI stacks

The NØNI shack

contest. While waiting I tested the bands and found K4GHM on 15. Mike suggested trying 10 and when I moved there, K4RO was on the frequency and I also copied K4GHM. I considered this promising for some 10 meter Qs.

NØHR arrived about 30 minutes before the start of the contest. I walked him through the station layout and contest buffers. Then it was 1800 and off to the races. We started on 15 and 20 and a while later moved to 10 meters with the other station jumping between 15 and 20. About two hours into the event Toni returned from his service call and we started to alternate operators with two on while one took a break. We continued this pattern until an hour or two before the end of the contest when Pat had to leave. For the rest of the contest Toni and I hit 40 and 80 hard with an occasional check of 20 for a mult.

An hour or so before the end of the contest our score was over 90,000 points, and I believed 100,000 points was possible. I thought that would be a fantastic score as NØAC at NØNI set the Multi Two record in the winter NAQP RTTY with a score of over 108,000 points and I knew we could not break that record. My rationale was that in the SBB and CW NAQPs, winter scores are usually higher than summer scores due to band conditions.

As the final hour of the contest went by the score kept on climbing. To my shock, surprise and joy, by 0600 the score was over 114,000 points. This blew me away as I had no anticipation we could, would or might exceed the record M2 score set at the same station five months earlier. Here is hoping our score holds up during log checking.

All in all the WØETC M/2 operation at NØNI in the July 2003 NAQP RTTY was a last minute decision. The operation occurred only because of unplanned circumstances at my station. I guess this shows sometimes in life bad events can lead to good things. Or, to put it another way, a bad event can be turned into a positive situation if you try. NCJ

North American Sprint CW/SSB/RTTY Rules

(Revised November 11, 2003)

1. Eligibility: Any licensed radio amateur may enter.
2. Object: For North American stations to contact as many licensed radio amateurs as possible. For non-North American stations to contact as many North American stations as possible.
3. Entry Classification: High power, low power (100 W) and QRP (5 W). Single operator only. Use of helpers, packet or spotting nets is not permitted.
4. Contest periods

February/March 2004 Contests

CW: 0000Z-0400Z February 1, 2004 (Sunday of second full weekend in February)
SSB: 0000Z-0400Z February 8, 2004 (Sunday of first full weekend in February)
RTTY: 0000Z-0400Z March 14, 2004 (Sunday of second full weekend in March)

September/October 2004 Contests

CW: 0000Z-0400Z September 12, 2004 (first Sunday following first Monday in September)
SSB: 0000Z-0400Z September 19, 2004 (second Sunday following first Monday in September)
RTTY: 0000Z-0400Z October 10, 2004 (Sunday of second full weekend in October)

These are entirely separate four-hour Sprints. Note that the CW Sprint comes before the SSB Sprint in September, but not in February.
5. Mode: CW only in CW Sprints, SSB only in SSB Sprints, RTTY only in RTTY Sprints.
6. Bands: 80, 40 and 20 meters only. Suggested frequencies are around 3540, 7040 and 14040 kHz on CW; 3850, 7225 and 14275 kHz on Phone; and 3580, 7080 and 14080 kHz on RTTY. The same station may be worked once per band.
Note: For RTTY only, the same station may be worked multiple times provided three contacts separate the contact in both logs, regardless of band.
7. Exchange: To have a valid exchange, you must send all of the following information: the other station's call, your call, your serial number, your name and your location (state, province, or country). You may send this information in any order. For example:

N6TR DE K7GM 154 RICK NC K
K7GM NR 122 TREE OR DE N6TR K

8. Valid Contact: A valid contact consists of a complete, correctly copied and logged two-way exchange between a North American station and another station. Proper logging requires including the time of each contact. Serial numbers must begin with serial number one and be sequential thereafter.
9. North American Station: Defined by the rules of the CQ WW DX Contests. Note that KH6 is not in North America.
10. Scoring: Multiply total valid contacts by the sum of the U.S. states, Canadian provinces and other North American countries to get final score (do not count USA and Canada as countries). KH6 is not counted as a State and is not a North American country (but counts for QSO credit). The eight Canadian multipliers are Maritime (VE1, VE9, VO1, VO2 and VY2), VE2 through VE7, and Yukon-NWT (VY0, VY1 and VE8). Non-North American countries do not count as multipliers, but do count for QSO credit for North American stations.
11. Special QSY Rule: If any station solicits a call (by sending CQ, QRZ?, "going up 5 kHz," or any other means of soliciting a response, including completion of a QSO where the frequency was inherited), they are permitted to work only one station in response to that solicitation. They must thereafter move at least 1 kHz before calling another station, or at least 5 kHz before soliciting other calls. Once a station is required to QSY, that station is not allowed to make another QSO on the vacated frequency until or unless at least one subsequent QSO is made on a new frequency.
12. Additional Rules: Simultaneous transmission on more than one frequency is prohibited. All contacts must be sent and received using means requiring real-time human intervention, detection and initiation. Each operator must use only one call sign during the contest.
13. Reporting: Send CW logs to:

Boring Amateur Radio Club
15125 Bartell Road
Boring, OR 97009 USA
email: **cwsprint@ncjweb.com**
Manual Log Entry:
www.b4h.net/cabforms/sprintcw_cab.php

Send Phone logs to:
Jim Stevens, K4MA
6609 Vardon Ct.
Fuquay-Varina, NC 27526 USA
email: **ssbsprint@ncjweb.com**
Manual Log Entry:
www.b4h.net/cabforms/sprintssb_cab.php

Send RTTY logs to:
Douglas McDuff, W4OX
10380 SW 112th Street
Miami, FL 33176 USA
email: **rttysprint@ncjweb.com**
Manual Log Entry:
www.b4h.net/cabforms/sprintrtty_cab.php

Entries must be received no later than 7 days after the Sprint. All competitive logs (more than 100 QSOs) must be submitted electronically (e-mail, 3.5-inch floppy disk, etc.). The file format for electronic logs for *NCJ*-sponsored contests is Cabrillo. Entrants who do not use computer logging are encouraged to use the log-entry web form, available at the links above, to enter the QSO info from their paper logs.
14. Team Competition: Team competition is limited to a maximum of 10 operators as a single entry unit. Groups having more than ten team members may submit more than one team entry. To qualify as a team entry, the team registration form on the NCJ web site must be completed before the contest starts. Use one of the following links:

CW Team Registration:
www.ncjweb.com/cwsprintteam.html
SSB Team Registration:
www.ncjweb.com/ssbsprintteam.html
RTTY Team Registration:
www.ncjweb.com/rttysprintteam.html

15. Penalties and Disqualification: Contacts with incorrect received information will be removed. Contacts not found in the other station's log will be removed with a one QSO penalty. Entries with score reductions in excess of five percent may be disqualified. Any entry may be disqualified for illegibility, illegal or unethical operation. NCJ

North American QSO Parties (NAQP) CW/SSB/ RTTY Rules

1. Eligibility: Any licensed radio amateur may enter.

2. Object: To work as many North American stations as possible during the contest period.

3. North American Station: Defined by the ARRL DXCC list with the addition of KH6.

Contest periods

January/February 2004 Contests

CW: 1800Z January 10 to 0600Z January 11, 2004 (Second full weekend in January).

SSB: 1800Z January 17 to 0600Z January 18, 2004 (Third full weekend in January).

RTTY: 1800Z February 28 to 0600Z February 29, 2004 (Last full weekend in February).

July/August 2004 Contests

RTTY: 1800Z July 17 to 0600Z July 18, 2004 (Third full weekend in July).

CW: 1800Z August 7 to 0600Z August 8, 2004 (First full weekend in August).

SSB: 1800Z August 21 to 0600Z August 22, 2004 (Third full weekend in August).

5. Entry Classification

a) Single Operator

i) One person performs all transmitting, receiving, spotting, and logging functions as well as equipment and antenna adjustments.

ii) Use of helpers or spotting nets is not permitted.

iii) Only one transmitted signal allowed at a time.

iv) May operate 10 out of the 12 hours of the contest. Off times must be at least 30 minutes in length.

b) Multi-Operator Two-Transmitter

i) More than one person performs transmitting, receiving and logging functions, etc.

ii) A maximum of two transmitted signals at any given time, each on a different band. Both transmitters may work any and all stations.

iii) Shall keep a separate log for each transmitter.

iv) Each transmitter must have at least 10 minutes between band changes.

v) May operate for the entire 12 hours of the contest.

6. Output power must be limited to no more than 100 watts for eligible entries. Use of external amplifiers capable of more than 100 watts output is not allowed. QRP (5 W or less) entries will be recognized in the results.

7. Mode: CW only in CW parties. SSB only in phone parties. RTTY only in RTTY parties.

8. Bands: 160, 80, 40, 20, 15, 10 meters only, except no 160 meters for the RTTY contest. You may work a station once per band. Suggested frequencies are 1815, 3535, 7035, 14035, 21035 and 28035 kHz (35 kHz up from band edge for Novice/Tech) on CW; and 1865, 3850, 7225, 14250, 21300, and 28500 kHz (28450 for Novice/Tech) on SSB. When operating on 160-meters, please respect the DX window of 1830-1840 kHz and keep SSB operations above 1840 kHz.

9. Exchange: Operator name and station location (state, province, or country) for North American stations; operator name only for non-North American stations. If the name sent is changed during the contest, as sometimes happens with multi-operator stations, the name used for each QSO must be clearly identified in the log.

10. Multipliers: U.S. states (including KH6 and KL7), 13 Canadian provinces/territories (British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia, PEI, Newfoundland/Labrador, Yukon, NWT, and Nunavut) and other North American countries. District of Columbia counts as Maryland. Non-North American countries, maritime mobiles and aeronautical mobiles do not count as multipliers, but may be worked for QSO credit.

11. Valid Contact: A valid contact consists of a complete, correctly copied and legibly logged two-way exchange between a North American station and any other station. Proper logging requires including the time in UTC and band for each contact. Regardless of the number of licensed call signs issued to a given operator, one and only one call sign shall be utilized during the contest by that operator.

12. Scoring: Multiply total valid contacts by the sum of the number of multipliers worked on each band.

13. Team Competition: You may wish to form a team with fellow NAQP participants. If so, your team must consist of two to five single operator stations whose individual scores are combined to produce a team score. Although clubs or other groups having more than five members may form multiple teams, there is no distance or meeting requirements for a team entry.

Teams must be registered prior to the start of the contest. Use one of the following on-line forms to register your team:

CW Team Registration:
www.ncjweb.com/cwnaqpteamreg.php.

SSB Team Registration:
www.ncjweb.com/ssbnaqpteamreg.php.

RTTY Team Registration:
www.ncjweb.com/rttynaqpteamreg.php.

These team registration forms automatically provide confirmation of team registration by returned e-mail.

14. Log submission: ***Entries must be postmarked no later than 14 days after the contest to be eligible for awards***. All logs containing more than 100 QSOs must be submitted as an ASCII text file, with one line per QSO, via e-mail (preferable) or on 3.5 inch floppy disk. Cabrillo is the standard format for all NAQP logs. For those participants who use paper logging, please use either the Excel spreadsheet template (available at **www.ncjweb.com/naqplogtemplate.xls**) or the manual log entry web-to-Cabrillo on-line forms available at the links given below to submit your logs. Paper log originals will be accepted from those participants who have no other means of submitting their log. Paper log forms are available on the *NCJ* Web site (**www.ncjweb.com/naqpforms.pdf**) for the convenience of those who log on paper during the contest.

For a Cabrillo-formatted log, submit only the log file. Please confirm that your output power is properly stated in the header portion of the Cabrillo log before submission. LOW indicates the use of 100W or less, while QRP indicates 5 W or less. Submissions that indicate the use of HIGH power will be used as check logs. For a non-Cabrillo log, a proper entry consists of: (1) a summary sheet showing the number of valid contacts and multipliers by band, total contacts and multipliers, total score, team name (if applicable), power output, name, call sign and address of the operator, station call sign and exchange (name and location) sent during the contest; and (2) a complete log, including date and time (in UTC), frequency or band and copied call and exchange for each QSO.

Name your files with your call sign (i.e. yourcall.log). Please do not send binary files produced by a contest logging program (e.g. yourcall.BIN, yourcall.QDF, etc.).

Plaques will be awarded as follows:

Mode	*Category*	*Sponsor*
CW	Single Op, North America	Florida Contest Group
CW	Multi-Op, North America	Texas DX Society
SSB	Single Op, North America	South East Contest Club
SSB	Multi-Op, North America	Tennessee Contest Group
Combined CW/SSB	Single Op, North America	Southern California Contest Club
RTTY	Single Op, North America	ICOM
RTTY	Single Op, DX	ICOM
RTTY	Multi-Op, North America	ICOM
RTTY	Multi-Op, DX	ICOM

Revised: Nov 24,2003

Send CW/SSB logs to:
Bruce Horn, WA7BNM
4225 Farmdale Avenue
Studio City, CA 91604
USA
CW e-mail: **cwnaqp@ncjweb.com**
Manual Log Entry:
www.b4h.net/cabforms/naqpcw_cab.php
SSB e-mail: ssbnaqp@ncjweb.com
Manual Log Entry:
www.b4h.net/cabforms/naqpssb_cab.php
Send RTTY logs to:
Wayne Matlock, K7WM
Rt 2 Box 102
Cibola, AZ 85328
USA
e-mail: **rttynaqp@ncjweb.com**
Manual Log Entry:
www.b4h.net/cabforms/naqprtty_cab.php

15. Disqualifications. Entries with score reductions greater than 5 percent may be disqualified. Any entry may be disqualified for illegibility, illegal or unethical operation. Such disqualification is at the discretion of the contest manager.

16. Awards: Plaques will be awarded for the high score in each of the categories given below, provided there are a minimum of five entries in the category. If a plaque is not sponsored, the winner may purchase it. Certificates of merit will be awarded to the highest scoring entrant with at least 200 QSOs from each state, province, or North American country. Certificates of merit will also be awarded to the overall second and third place finishers in the multi-operator category for each mode.

September 2003 CW Sprint Results

Larry Tyree, N6TR

The 53rd running of the CW Sprint—wow! That's a lot of sprints. That must mean they have been running for more than 25 years now. Did you ever wonder how this whole thing got started? Don't miss the article submitted by the father of the Sprint, Rusty Epps, W6OAT, elsewhere in this issue.

During the past few years, several of us have used e-mail and even post cards to drum up activity in the CW Sprint. One aspect of the Sprint is that it has a provision for 10 person teams. The approach of "Can I put you on my team?" is a particularly effective recruitment tool, and has been responsible for an increase in Sprint participation.

Since moving to New Mexico a few years ago, Phil Goetz, N6ZZ, started organizing groups of Arizona, New Mexico and Oklahoma operators into teams that are called the Azenmokers. Some of the operators get on for the full four hours and others for just long enough to make a few contacts. Code speeds from 20 to 45 WPM are welcome; power levels from 4 to 1500 W have been used; and antennas from stacked Yagis to attic wires have been in the mix.

Phil's recruitment activities for the September Sprint included e-mail to Jan Harden, NØQT. Phil had worked Jan in a few NAQPs, but had never met her. She replied that she had shattered her ankle a few weeks earlier, and was currently cruising around the house in a wheelchair, which wouldn't fit through the door of the radio room. Despite these challenges, she indicated a willingness to get on for a few contacts. This would be Jan's first Sprint. As if she didn't already have enough of a handicap, she runs only 4 watts to a vertical. This is her story as told to her teammates after the contest:

> Yeesh, what I go through for my friends!
>
> Managed to get down the hallway to the radio room. Screamed for Paul to come fold up the wheelchair so he could shove it through the door. Then back in the wheelchair. Couldn't get it in the room because all of the stuff from the closet was sitting out in the middle of the room still. (Our hot water heater is in the closet and the wind blew the pilot light out a couple of days ago.)
>
> So, struggled to get everything put back in place and managed that.
>
> Roll on over to the radio desk, can't get in the allotted space with this darn wheelchair. So sort of angled myself (mangled myself is more like it) in there and had to crunch up my legs under the chair. Great, getting set to go.
>
> Turn on the station—no computer—completely dead. Rats (more about those in a minute). Screamed for Paul again. Rolled back over to the doorway and pointed him towards the backroom-from-hell door. He cringed, but opened the door.
>
> I pointed out my other notebook computer ... on the stack near the ceiling, with about 20 other boxes in front of it. After a few breath-taking moments, he brought me the other computer.
>
> Tear down the old one—hmmm little mouse presents all over the back of the desk—screamed for Paul to bring the Clorox wipes so I could clean that all up. Okay, going good.
>
> Got the other computer set up, plugged in and turned on. Darn, forgot that I'd taken all the radio software off of it to put on the now dead computer. Rolled back over to the doorway and screamed for Paul.
>
> Folded up the chair, back into the hallway and out to the kitchen where my other computer is. Got the latest edition of TR-Log off the computer onto a disk and headed back down the hall —screamed for Paul—anyway, back into the radio room.
>
> Installed the software on the notebook computer and fired it up. Darn, everything is all scrunched together and I can't make heads or tails of it.
>
> Restart the computer several times, holding down the delete key, trying to get into the configuration screen. No luck. Dig the manual out of the box. Ha, get into set up and set screen to "expanded" mode.
>
> Fire it all up again—hey! It's working! I've got sound, lights and everything—except my Bencher paddles aren't working—Remember the little "presents"? Yep, that little creature had gnawed through the cord on the Bencher.
>
> Screamed for Paul—in the closet that I'd so neatly put back in place, in the second box from the bottom of course, was my other set of paddles!
>
> Fired everything up again—I got sound, I got lights, I got dits and dahs! Perfect!
>
> Tune up and dial in a frequency—holy cow! Who are these people with the 600 wpm? I've never done the sprint before. Okay, searching for somebody around 25-30 wpm. Of course, even at 600 wpm I recognize N6TR's call but never did work him.
>
> Okay, we're smoking now—we got lights, we got action, we got lots of stations on the air, we got— thunder and lightning! Crossing my fingers and hoping that the old Butternut doesn't get zapped—again!
>
> Doing okay, up to 20 Qs—take a little breather—uh oh, ankle starts hurting. Looked down, my knee was the size of a watermelon from having my legs scrunched up underneath the chair. Rats again!
>
> Managed to eek out 5 more Q's for a total of 25 QSOs and 19 mults. A whopping score of 475! Gads. Better go get this leg up in the air before it gets worse. Shut everything off—screamed for Paul.
>
> Hope I've earned my keep just from the heroic effort.

QRP Power Top Ten

Jan's score was enough to make the Top Ten QRP box at #9. We had 11 QRP entries this time, so AE5P is the first person to submit a QRP log and not make the QRP box in CW Sprint history. Pat Collins, N8VW, had the top QRP score with an impressive total of 180 QSOs. One of Jan's teammates, WD7Z, came in second, with another teammate, K5IID, coming in third. Not sure how someone in West Virginia ended up on that team. NB1B, W7TM, W5KDJ, N6WG, N4BP and KIØII also made the box. It is great to see the growth in QRP activity in this contest.

Low Power Top Ten

Competition was fierce in the low power category with 10 excellent scores from highly respected operators. The top two low power stations once again fought it out for the top score, and unlike February, Larry Schimelpfenig, K7SV, finished ahead of Danny, K7SS, operating at K7RI. Close on their heels were K1HT and K9PG operating at K9AA. NAØN, K7NZ, N6MJ, K4AMC, NØAX and ex-QRP sprint champion KG5U combined to create the most competitive top ten box ever.

High Power Top Ten

Think making 400 plus QSOs was a one-time event? Bill Fisher, W4AN at K4AAA, pushed his QSO record up from 402 to 404 QSOs to claim his third consecutive CW Sprint victory with a new record score to boot. It seems that Bill has figured this contest out and the in-

creased activity is playing right into his hand. Second place went to Pat, N9RV, who was chased by Scott, W4PA. In the next group of finishers we find AG9A, N6TR and N5RZ operating at the growing K5TR super station, K5GN operating at W5KU and even a couple of northeastern stations snuck in: K1KI and N2NT followed by N6RT operating at W6EEN. N2NT had a very impressive QSO total of 394 QSOs, but his dismal multiplier total nearly cost him a top ten finish. It would appear that all of the stations in the top ten used two radios except K1KI, who only had two band changes.

Golden Logs

Thanks to all who submitted "golden logs"—no score reductions. Note that Randy, K5ZD, was at the top of the golden log heap with 370 QSOs—but ironically he just missed the Top Ten Scores listing.

Team Competition

The Dead Lizards walked away with the top team score followed closely by Southern Sprint Coalition #1. Four "traditional" clubs followed, the YCCC, the NCCC, the SCCC and the NCC. All in all, there were 26 teams registered. We all owe those who worked to put together these teams a big *thank you* since this really helps to increase activity.

Records

Despite the new 7-day log submission deadline, we had a record of 209 logs received. This eclipsed the mark established last February. As previously mentioned, W4AN set a new QSO record with 404 QSOs and a new score record. K1KI broke his own record for CT, and K1EA traveled to Vermont to set a new record there from the station of KK1L. N4AF, W4OC and W4PA all pushed up their previous records for North and South Carolina and Tennessee. K3LR beat out N5OT's Oklahoma record from last February and AG9A and N9RV improved their records for Illinois and Indiana. Bill Straw, WBØO, traveled a few miles north to set a new VE4 record.

A new record was set with 17 golden logs. Congratulations to those of you who ended up with no score reductions during the log checking process. Once again, all logs were fully checked for

Top 10	Scores	Band Changes	QSOs Lost	00Z	01Z	02Z	03Z
K4AAA	21816	232	4	115	95	95	99
N9RV	20617	191	2	112	89	85	103
W4PA	20043	154	1	118	89	89	97
AG9A	18980	119	1	94	83	82	106
N6TR	18950	85	3	104	92	85	98
K5TR	18615	142	3	105	89	83	88
K5GN	18497	96	2	99	81	76	93
K1KI	18450	2	6	95	85	94	95
N2NT	18124	168	3	121	89	84	101
W6EEN	17800	66	3	93	88	85	90

Records Updated for September 2003.

QTH	Date	Call	QSO	Mult	Score
CO	Feb-2003	N2IC	389	52	20,228
IA	Sep-2000	NØNI (AG9A)	331	43	15,093
KS	Sep-1982	KØVBU	231	42	9,702
MN	Feb-2003	KØSR	308	50	15,400
MO	Sep-1996	K4VX/Ø (WX3N)	332	46	15,272
ND	Feb-2002	WBØO	318	47	14,946
NE	Feb-1991	KVØI	204	34	6,936
SD	Feb-2003	WDØT	347	47	16,309
CT	Sep-2003	K1KI	369	50	18,450
MA	Feb-2003	K5ZD	365	54	19,710
ME	Sep-1988	K1KI	218	41	8,938
NH	Feb-2003	K1DG	331	50	16,550
RI	Feb-2002	KI1G	310	47	14,570
VT	Sep-2003	K1EA	271	46	12,466
NJ	Feb-2003	N2NT	380	51	19,380
NY	Feb-2002	K2UA	321	50	16,050
DE	Sep-1989	KN5H/3	272	46	12,512
MD	Sep-1989	W3LPL	310	47	14,570
PA	Feb-2003	AA3B	320	50	16,000
AL	Feb-2000	K4NO	273	47	12,831
FL	Feb-2003	N2NL	357	55	19,635
GA	Sep-2003	K4AAA (W4AN)	404	54	21,816
KY	Sep-1998	K4LT	281	44	12,364
NC	Sep-2003	N4AF	342	49	16,758
SC	Sep-2003	W4OC	298	46	13,708
TN	Sep-2003	W4PA	393	51	20,043
VA	Sep-1989	K7SV	300	52	15,600
AR	Feb-2000	K5GO	278	50	13,900
LA	Feb-1995	W5WMU (K5GA)	306	48	14,688
MS	Feb-2000	WQ5L	317	49	15,533
NM	Feb-2003	N6ZZ	351	52	18,252
OK	Sep-2003	K3LR	352	48	16,896
TX	Feb-2000	N5TJ	381	52	19,812
CA	Feb-2003	W6EEN (N6RT)	378	54	20,412
AK	Feb-2000	KL9A	202	47	9,494
AZ	Feb-2000	K6LL	364	50	18,200
ID	Feb-2003	W7UQ (KL9A)	283	46	13,018
MT	Feb-1998	K7BG	273	43	11,739
NV	Feb-2000	K7BV	290	50	14,500
OR	Feb-2003	N6TR	393	52	20,436
UT	Sep-1991	K6XO	263	44	11,572
WA	Feb-2003	K7RI (K7SS)	297	53	15,741
WY	Sep-1999	K7KU (N2IC)	312	48	14,976
MI	Feb-2003	N8EA	331	52	17,212
OH	Feb-2003	K8MR	309	52	16,068
WV	Feb-2002	N4ZR	286	48	13,728
IL	Sep-2003	AG9A	362	52	18,980
IN	Sep-2003	N9RV	389	53	20,617
WI	Feb-2000	K9AA (K9PG)	302	55	16,610
VE1	Sep-2000	VE9DX (K5NZ)	183	40	7,320
VE2	Sep-1988	VE2ZP	214	41	8,774
VE3	Feb-2000	VE3EJ	270	50	13,500
VE4	Sep-2003	VE4/WBØO	266	45	11,970
VE5	Feb-2003	VE5SF	237	49	11,613
VE6	Feb-2000	VE6EX	228	43	9,804
VE7	Feb-2000	VA7RR	316	48	15,168
VY1/VE8	Feb-2000	VY1JA	36	22	792
4U1	Feb-1985	4U1UN (W2TO)	70	23	1,610
8P	Sep-2002	8P9JG (N5KO)	277	42	11,634
C6	Feb-1999	C6AKP	21	14	294
HH	Sep-1996	HH2AW	139	33	4,587
HI	Feb-1991	HI8DMX	40	19	2,430
HP	Feb-2000	HP1AC	64	30	1,920
KP4	Feb-2002	NP4Z	106	37	3,922
TG	Sep-2001	TG9/N5KO	150	42	6,300
V4	Feb-1996	V4ØZ (AA7VB)	54	23	1,242
VP2E	Feb-1996	VP2E/KJ4HN	68	30	2,040
VP9	Feb-1985	W6OAT/VP9	202	31	6,262
XE	Sep-1990	XE2XA (WN4KKN)	305	47	14,335
ZF	Sep-1992	ZF2KI (K1KI)	251	49	12,299
9A	Sep-2000	9A6XX	29	19	551
CT	Sep-1998	CT1BOH	225	40	9,000
EA8	Feb-1994	EA1AK/EA8	36	21	756
F	Sep-1990	F/N6TR	196	38	7,448
G	Feb-2002	G4BUO	160	40	6,400
HC8	Feb-2000	HC8N (N5KO)	271	52	14,092
I	Sep-1998	IKØHBN	100	35	3,500
JA	Feb-1991	7J1AAI	13	9	117
KH6	Sep-1981	KH6NO	121	30	3,630
LU	Feb-2003	LU1FAM	92	35	3,220
LY	Sep-2000	LY4AA	163	38	6,194
OH	Sep-1998	OH1NOA	56	22	1,232
PY	Sep-1980	PY8ZPJ	29	14	406
UA9	Feb-2000	RUØSN	15	13	195
UN	Sep-2000	UP6F	13	10	130
VK	Sep-1994	VK5GN (N6AA)	48	22	1,056
ZD8	Sep-1990	ZD8Z (N6TJ)	228	43	9,804
ZS	Feb-2000	ZS1ESC (N6AA)	51	18	918

Highest multiplier	Feb-2000	55	K9AA (K9PG)
Highest QSO total	Feb-2003	402	K4AAA (W4AN)
Highest score	Feb-2003	21,306	K4AAA (W4AN)
Highest team score	Feb-2002	163,373	SCCC #1
Highest Low Power	Feb-2003	15,741	K7RI (K7SS)
Highest QRP Power	Feb-2002	10,800	K7RI (K7SS)
Logs received	Sep-2003	209	
Number golden logs	Sep-2003	17	
Number logs >=300	Feb-2003	52	

accuracy. A report on how your log was scored can be received via return e-mail to **tree@kkn.net**.

Mark you calendars now for the next CW Sprint on February 15 UTC from 0000:00.00Z to 0400:00.00Z. Don't forget the 7-day log submission deadline.

Soapbox

Portable operation, waiting for new house to be built. FT100D to 30L-1, TH3JR on AB-677 porta tower. Had difficulty drumming up enthusiasm. Most CW ops still in shock over ITU decision. 73—K3MD. Can't believe I worked VY1 and VE9, but missed AZ and MD!—K5ZD. Really blew it when I went to 20 meters. Finally gave up on the dipoles and parked the quad, but rate hurt. Missed a lot of mults.—KJ9C. First time over 300 Qs!—KM3T. Conditions were pretty good - a nice kickoff to contest season since the summer has been pretty blah.—NØAX.

This sounded more like the Feb version. Great fun. Good turnout and low noise. Thanks, Howie—N4AF. Was only able to jump in for the last hour and was immediately met with a bunch of "wrkd B4"s—a sure sign N4GN and/or N4GI were active. Enjoyed it despite the dummy load of an antenna I'm using.—N4GG. I sure wish all the contesters would learn my name. It got extremely tiresome to send *Arnie* over and over again!—N6HC. First attempt at SO2R in Sprint was nearly a bust. Chickened out and used it only as a rapid band change facility. Failed even to meet my February score that was made at a smaller, simpler station. Got off to an unusually slow start on 20. Was activity down?—N6XI.

No computer, shack a mess; easy to quit early; nice to be called by VY1JA!—N9JF. Great contest but very fast. Lot of new folks this time. Props were very good for a change. C Ya'll on the next one.—W5KDJ. Always a lot of fun. I sure was rusty this time.—W6MVW. I am too old for this SO2R stuff. Somebody please lobotomize me!—W6UE. Watched the US Open Women's Single Tennis Championship and gave my new SO2R set up a trial run at the end of the test.—WO4O. First Sprint ever using low power.—K4AMC. Great activity and lots of mults. Thanks W4AN for the teams.—K4RO

Started the contest with one radio on 20 meters, the other on 40 meters. Just before 0300 I finally noticed why the rate had fallen so badly on 40 meters. I was only running about 80 W. The amp was dark—never turned it on—I'm such a lid. Here's to February!—K5GN. Thanks to Geo III for allowing me to operate his fine station. The most intense competition there is. The beer always tastes better after this contest! Thanks to everyone for the QSO's.—K5TR. And I used to say mults in the sprint were serendipitous!—K6LA

Poor planning, poor preparation—more challenging that way!—K6NA. I had terrible power line noise, so I struggled on 20 meters for a long time. I finally went to 40 meters for some fun before heading out to the airport.—K6UFO. There is no other contest where getting pummeled can be so much fun!—K7NV. Talk about fun. Super condx and lots of participation in my favorite contest. What more can one ask for? Well I could ask that my old friend Danny, K7SS, doesn't beat me by one multiplier again! I had the beam north of west quite a bit of the time looking for our Canadian friends and a KL7. Maybe I'd have worked the XF4 on at least one band if I pointed it further south once in a while! Then I'd probably have missed KL7WV or VY1JA! Bring on the next one!—K7SV

First time in a sprint; Started out rough on 20 meters and had a logger problem and things got worse, so I started over on 40 and 80 and I had relaxed enough—KB5NJD. Very limited time due to other commitments.—KI7Y. Started late and somewhat tipsy, but had a blast and surpassed my expectations for such a late start.—KT1V. The sprint is a great contest!

TOP 10 QSOs		TOP 10 QRP	
K4AAA	404	N8VW	6300
N2NT	394	WD7Z	5577
W4PA	393	K5IID	4862
N9RV	389	NB1B	3531
N6TR	379	W8TM	3500
K5ZD	370	W5KDJ	2639
K1KI	369	N6WG	1440
K5TR	365	N4BP	1400
AG9A	365	NØQT	432
K9NW	359	KIØII	140

TOP 10 MULTS		TOP 10 GOLDEN	
K4AAA	54	K5ZD	370
K6LA	54	AA3B	331
N9RV	53	N5OT	325
K5GN	53	K8CC	322
AG9A	52	K5WA	302
K8CC	52	K6NA	300
W4PA	51	K1HT	294
K5TR	51	N2GC	279
K4NNN	51	W7UQ	249
N6MJ	51	K4MX	242

TOP 10 Low Pwr		TOP 10 Band Changes	
K7SV	14700	K4AAA	232
K7RI	14350	N9RV	191
K1HT	14112	N2NT	168
K9AA	13920	W4PA	154
NA0N	13536	K5TR	142
K8NZ	13110	W9RE	141
N6MJ	13056	AG9A	119
K4AMC	12690	AA3B	115
NØAX	12624	K3NA	106
KG5U	12604	K5GN	96

TEAM SCORES

Dead Lizards		*NCCC #1*	
N9RV	20617	N6TV	17040
AG9A	18980	N6XI	14100
K9NW	17232	N6RO	13818
W9RE	14355	K2KW	13350
K9ZO	13938	K6XX	12690
K9AA	13920	W6RGG	12510
K9AY	12925	K7NV	12060
N9CK	12852	NI6T	11468
KJ9C	11880	N6PN	9495
KA9FOX	10040	N6ZFO	8323
	146739		124854

Southern Sprint Coalition (SSC) #1		*YCCC #1*	
K4AAA	21816	K1KI	18450
W4PA	20043	K5ZD	17760
N4AF	16758	K1DG	15600
K4BAI	15180	W1WEF	15582
K7SV	14700	KM3T	14310
K4RO	14674	K1HT	14112
W9WI	14429	N2GC	13950
K4NNN	13821	K3NA	10290
W4OC	13708	KT1V	3200
	145129		123254

5. *SCCC #1* (W6EEN,K6LA,N6AA,W6UE,K6NA,W6TK,XF1K,K6ZH,N6TW,K6XT) 116344
6. *NCC* (N2NT,K3LR,K2UA,K8MR,W2RQ,K8NZ,N4KK,N3RA,KL7WV) 108132
7. *NBFA5 #2* (K5TR,K5GN,N5TJ,K5GA,WQ5L,N5AW,KC5FU,KB5NJD) 96835
8. *Azenmokers* (N6ZZ,N2IC,N5OT,K5KA,K5YAA,WD7Z,K5IID,K5CM,W7YS, NØQT) 90521
9. *NCCC #2* (W7RN,AJ6V,W6NL,W6OAT,W0YK,K6LRN,W6YL,AD6TF,ND2T, K6DGW) 86175
10. *SSC #2* (N4OGW,KØLUZ,K4MX,KO7X,K4IQJ,W1MO,K4QPL,NF4A,N4GI, KØEJ) 86145
11. *Austin Powers* (W5KFT,K5WA,N3BB,KG5U,N5DO,NT5TU,N5XU,W5ZL) 85665
12. *SSC #3* (K5KG,W4AU,AA4GA,KZ5D,W4NZ,KU8E,WJ9B) 80677
13. *Corner Pocket Contesters* (N6TR,K7RI,NØAX,W7UQ,K7BG,KI7Y) 68794
14. *FRC* (N2NC,AA3B,K3WW,K2PS,K3MD,N9GG) 65907
15. *YCCC #2* (KI1G,K1EA,K2SX,K2KQ,K1EBY) 53995
16. *Team CCO* (VE3JM,VE3KZ,VA3NR,VE3KP,VE3IAY,VE3FU,VE3RZ,VE3DZ) 53341
17. *SMC* (KØOU,WT9U,WI9WI,N9JF) 37295
18. *MRRC* (K8CC,K9TM,N8VW,AD8P,KT8X) 37222
19. *GCC* (WØETT,NØKE,NØSXX,KØUK,KIØII) 25412
20. *MWA* (NAØN,K4IU,KTØR) 23848
21. *NBFA5 #1* (N5PO,NO5W,W5DDX,KE5C,AE5P) 21182
22. *SCCC #2* (N6HC,W6MVW,K6EY,W6KY) 18144
23. *SSC #4* (K4LQ,K4WW) 7394
24. *NCCC #3* (K6UFO,N6WG) 3557
25. *Procrastinators* (N4BP,VA7ST) 1865
26. *NBFA5 #3* (WM5R) 6

Guest Op List

W5KFT (K5PI); W6UE (W4EF); K5TR (N5RZ); KL7WV (W3YQ); N4AO (WC4E); N5XU (AA5BT at N5XU); N5ZK (W5ASP); W6EEN (N6RT); W6YL (W6CT); W7RN (K5RC); W8KW (W8UE); K7RI (K7SS); N4KK (K9VV at K4FAU); XF1K (XE1NTT); KC5FU (K5MR); K9AA (K9PG at K9QVB); W7UQ (KL9A)

I felt like a deer caught in the headlights for the first 30 minutes—pretty hectic. But—as the contest went on I really started enjoying it. I should have been better prepared and I should have changed to the low bands earlier. I was afraid no one would hear me on my little 88 foot dipole when I switched to 40/80 but I ended up with my best QSO rate of the night on 40 and then never made it to 80! Well—wait till next time!—NØSXX.

Yikes - and duh!—N5XU. How could I have missed the easy Vermont multiplier? K1EA owes me, big time.—N6TV. Nice to finally work a decent multiplier.—N9RV. Just when you begin to have the feeling that you are getting the hang of this contesting game along comes the sprint to provide a good dose of reality. I've still got a long way to go! But what a fun trip to even get in the sprint game with a lot of really good CW ops (did someone say CW was dying?), good activity, and from STX some good conditions last night. And when I turned off the YL's Ionic Breeze Machine—boy did the bands get quiet! "Its a sprint honey and only four hours long!" I took a cue from W4AN's posting and started out on 40 which seemed to be a good move since, with 50 watts and a low dipole, I tend to get beat up pretty badly in the initial 20 meter bedlam and if I start on 20 and then move with everyone else to 40 I'm Texas roadkill again on that band. So that paid off and I was able to post my best score ever but still shy of my goal of 200. I haven't done a detailed analysis but it seems like my biggest problem is that the ratio of follow-on QSOs to S&P QSOs was subpar—will have to work on that. Look for me again in the next one and all of the CW events in between. I hope to work some of you in the upcoming Texas QSO Party September 27-28 when you can chase some 'dillos across most of the 254 Lone Star counties. Check out the Website at **www.w5nc.org** for details. Thanks to everyone for the Q's.—73, Chuck.—NO5W.

First time trying the Sprint—love it—had to get into the groove, but then okay. Think I would have done better with an 80 meter antenna. Only worked 20 meters and 40 meters.—VE3RZ. Hope to make full four hours someday! 73 Wayne.—WØZP. Radios and antennas worked fine—the operator needs refurbishing!—W4NZ. First Sprint—unique contest. Will try again when I can commit the whole four hours. Prior commitment precluded that this time around.—W5ZL. Rig Elecraft K1, 4 W up ladder line to an inverted vee.—W8TM. My second sprint attempt and first QRP. QRP is tough in this contest but I improved from my first attempt.—WD7Z.

I'm not exactly a fast code operator, and my copying skills have never really gotten beyond about 16-18 WPM, but George, K5TR, was so insistent about getting me on for the contest (about the least appropriate contest possible for my skills) and joining one of his teams, that I had to get on. I operated portable, using the ICOM IC-706MkIIG in my car, with a 20 meter Hamstick, a Super CMOS 4 keyer, and Bencher paddles, from Colorado Bend State Park in San Saba County. The camping trip was the main goal for the weekend, so I could only spare an hour or so to get on the radio. Every QSO I made I made by calling CQ at a speed I could copy. As usual for me in CW contests, I got very, very few answers. My operation almost didn't happen, as the paddles were dropped onto rocks and the cable came between the paddle base and a rock, cutting clean through the dit line. I didn't really have much in the way of troubleshooting tools with me except for a pocket knife, but I discovered that if you bent the cable with the cut at the inside of a sharp bend, you could get contact, so a twist tie from the hamburger bun bag saved the day!—WM5R.

Had just 45 minutes to participate without time even to push up the mast. Never quite got into the rhythm but still enjoyed the little bit of time I had for it. Twenty meters played long, forty meters was watery, and eighty meters was crud for me.—K6OWL. Many thanks to my host KK1L.—K1EA. All three bands were in good shape, but 40 seemed to have less activity than usual around the middle of the contest. Somehow I managed to get through the whole four hours without working N6TR (and a few others with sizable QSO totals). I wasn't trying to, honest! It was great to hear a number of newcomers getting their feet wet.—K1HT

What could go wrong, did. Birds busted the 40. Computer crashed *Writelog,* so I logged with *Notepad*—Hey, try it sometime, it really sux! Forgot to note band changes in *Notepad*, so I'll lose a few Q's. Plus, at the start, I didn't have a clue what the fellows were sending to me. That's what this is for, right? Practice! 73, Art.—K6XT. What a hoot! Intense big bang out of the sprint! Thanks to TR and MA for running 'em, and to all the guys who did so before, and to K7RI for the seat. One of these day gonna learn SO2R and try for the fast lane. See you all next time!—K7RI. Computer died right before the contest started, lost the first half hour.—KA9FOX. Always fun to say hello to our friends scattered around the country. Nice to hear folks sending at something less than infinity wpm. 73, Fred.—N4KK. Long time contester but first sprint. It's definitely a different contest!—N5AW. Thanks to W5GN for the use of his station. First SO1R contest for me in a long time!—N5TJ.

Short time in the contest due to no time to prepare and a bollixed primary radio. In spite of trying to find all the ops who were gunning for the top, it is amazing how many I never heard to give the Delaware multiplier. Better luck to them and me on the next outing.—N8NA. Operated from NX5M. First time in Sprint with high power, first time from a station that has outside antennas, my third Sprint. Had to send way too many fills on my call and name, hope that more people will begin to recognize me in the next Sprint. Great contest, and still lots to learn. I wish this contest was more often, seems like there's plenty of activity and plenty of people mention that six months is too long to wait for the next sprint fix.—NT5TU.

My thanks to Hector, XE2K, and Ray, N6VR, for inviting me on their IOTA expedition and allowing me to operate the Sprint. What a very different environment for operating the Sprint! I am used to being at home or Caltech. Instead I was in a beach tent with mesh sides sitting in front of an ingenious camping table, and a view of Ensenada across 15 miles of water. Add the drone of a generator and the sporadic voice of a fellow operator working 15 meter phone and the picture is complete. Oh. yes, it was also hot that afternoon. I was pleased with the result, the multipliers coming in without much effort on my part. I know I missed VE2FU who may have heard me but QRM prevented making a QSO. Kansas was heard but never when I could initiate a QSO. What were the others I could have worked? This was lots of fun, work, sweat, and push. I love the Sprint!—XF1K

No rotor, no 40 meter antenna, 80 meter antenna tuned for SSB, but had fun anyway. Nice to participate.—KC5FU. Great fun, great ops! Operated from our sailboat at the dock in Wilson, NY near Lake Ontario. Will try the Sprint more often. Tony.—K2NV. Always a great contest! Glad to be back after missing February. Missed a lot of mults this time, like many others. Activity was great from many areas of the US and Canada, but some of the regulars were missing.—K2UA. Oh so close to 300—congrats to K7RI and K7SV for breaking 300 Qs.—K9AA. FB time as usual!—K9NW.

I'll probably never be a sprinter. I'm satisfied to hand out a few QSOs and the mult.—NØAC. Lots of fun. Look forward to the next one. First time I was able to spend more than a few minutes. Heaven only knows how good the log is. Be gentle!—N3RA. QRP always tough in this test. Thanks for the Qs.—NB1B. Lotta problems, but still the *bestest* contest! 73 de Sponge "Bob."—W7UQ. Mults sure eluded me this time!—W9RE.

Scores

Call	Name	QTH	20	40	80	QSO	Mlt	Score	Team
K1KI	TOM	CT	153	132	84	369	50	18450	YCCC #1
K5ZD	RANDY	MA	148	139	83	370	48	17760	YCCC #1
K1DG	DOUG	NH	133	132	60	325	48	15600	YCCC #1
W1WEF	JACK	CT	120	115	83	318	49	15582	YCCC #1
KM3T	STEVE	NH	115	122	81	318	45	14310	YCCC #1
K1HT	*DAVE	MA	125	110	59	294	48	14112	YCCC #1
KI1G	RICK	RI	113	112	68	293	45	13185	YCCC #2
K1EA	KEN	VT	117	81	73	271	46	12466	YCCC #2
K3NA	ERIC	MA	89	115	41	245	42	10290	YCCC #1
K1EBY	*KIM	CT	77	74	41	192	39	7488	YCCC #2
NB1B	**DJ	MA	75	29	3	107	33	3531	
KT1V	TED	NH	20	42	38	100	32	3200	YCCC #1
W1EBI	*GEORGE	MA	4	16	5	25	14	350	
NT1N	*CAT	CT	3	13	0	16	5	80	
N2NT	ANDY	NJ	142	170	82	394	46	18124	NCC
N2NC	JOHN	NJ	129	136	85	350	46	16100	FRC
K2UA	RUS	NY	91	137	96	324	47	15228	NCC
W2RQ	BILL	NJ	104	133	87	324	45	14580	NCC
N2GC	MIKE	NY	92	102	85	279	50	13950	YCCC #1
K2SX	DENNIS	NY	79	92	78	249	44	10956	YCCC #2
K2PS	*PETE	NJ	111	66	57	234	45	10530	FRC
K2KQ	*DON	NY	100	85	40	225	44	9900	YCCC #2
K2NV	*TONY	NY	27	54	0	81	30	2430	
W5KI	*STEVE	NJ	14	7	0	21	13	273	
AA3B	BUD	PA	121	154	56	331	48	15888	FRC
K3WW	CHAS	PA	113	120	72	305	44	13420	FRC
W1NN	*HAL	PA	87	83	59	229	46	10534	
K3MD	DOC	PA	82	75	59	216	44	9504	FRC
N8NA	*KARL	DE	0	42	55	97	31	3007	
N9GG	*BOB	DE	30	1	0	31	15	465	FRC
K4AAA	BILL	GA	146	170	88	404	54	21816	SSC #1
W4PA	SCOTT	TN	134	163	96	393	51	20043	SSC #1
N4AF	AL	NC	98	129	115	342	49	16758	SSC #1
K5KG	GEO	FL	135	120	61	316	49	15484	SSC #3
K4BAI	JOHN	GA	116	115	99	330	46	15180	SSC #1
K7SV	*LARRY	VA	101	138	61	300	49	14700	SSC #1
K4RO	KIRK	TN	78	143	98	319	46	14674	SSC #1
W9WI	DOUG	TN	78	140	89	307	47	14429	SSC #1
K4NNN	OJ	FL	143	128	0	271	51	13821	SSC #1
W4OC	DON	SC	108	107	83	298	46	13708	SSC #1
N4AO	JEFF	FL	107	102	54	263	49	12887	
K4AMC	*JIM	TN	77	127	66	270	47	12690	
W4AU	JOHN	VA	94	115	53	262	48	12576	SSC #3
AA4GA	LEE	GA	85	106	64	255	49	12495	SSC #3
K0LUZ	*RED	FL	118	132	0	250	47	11750	SSC #2
W4NZ	TED	TN	70	101	67	238	45	10710	SSC #3
K4MX	*JERI	VA	62	105	75	242	44	10648	SSC #2
KU8E	*JEFF	GA	93	90	62	245	42	10290	SSC #3
K4IQJ	*DICK	AL	70	89	60	219	44	9636	SSC #2
W1MO	NORM	FL	91	89	22	202	45	9090	SSC #2
NJ4M	*RON	FL	110	54	39	203	44	8932	
N4KK	ED	FL	99	68	45	212	41	8692	NCC
K4QPL	*JIM	NC	70	73	57	200	40	8000	SSC #2
WJ9B	WIL	NC	42	96	40	178	43	7654	SSC #3
K4LQ	FRED	FL	75	60	33	168	37	6216	SSC #4
NF4A	*CHARLIE	FL	75	57	13	145	39	5655	SSC #2
N4GI	BLAKE	FL	65	74	35	174	32	5568	SSC #2
AK5E	*VAN	GA	54	59	14	127	35	4445	
AE4Y	*KENT	GA	38	53	0	91	31	2821	
K0EJ	*MARK	TN	10	45	19	74	29	2146	SSC #2
N4GG	*HAL	GA	0	26	39	65	28	1820	
WO4O	*RIC	TN	11	34	19	64	27	1728	
N4BP	**BOB	FL	50	0	0	50	28	1400	Procrast
K4WW	*BO	KY	36	17	9	62	19	1178	SSC #4
K5TR	GEO	TX	157	133	75	365	51	18615	NBFA5 #2
K5GN	DAVE	TX	174	118	57	349	53	18497	NBFA5 #2
N5TJ	JEFF	TX	130	140	87	357	49	17493	NBFA5 #2
K3LR	TIM	OK	131	133	88	352	48	16896	NCC
N6ZZ	PHIL	NM	140	143	62	345	48	16560	Azenmokers
K5GA	BILL	TX	134	116	86	336	46	15456	NBFA5 #2
W5KFT	ROB	TX	125	117	67	309	50	15450	Austin Powers
N2IC	STEVE	NM	144	141	48	333	46	15318	Azenmokers
N5OT	MARK	OK	104	148	73	325	46	14950	Azenmokers
K5WA	BOB	TX	124	110	68	302	49	14798	Austin Powers
N3BB	JIM	TX	127	102	79	308	48	14784	Austin Powers
K5KA	KEN	OK	105	124	79	308	48	14784	Azenmokers
K5YAA	JERRY	OK	102	120	87	309	47	14523	Azenmokers
N4OGW	TOR	MS	103	116	78	297	46	13662	SSC #2
KG5U	*DALE	TX	105	104	65	274	46	12604	Austin Powers
KZ5D	ART	LA	117	80	47	244	47	11468	SSC #3
N5DO	*DAVE	Tx	86	109	40	235	45	10575	Austin Powers
N5PO	*LEE	Tx	105	85	38	228	45	10260	NBFA5 #1
WQ5L	RAY	Ms	124	104	0	228	45	10260	NBFA5 #2
N5AW	*MARV	TX	89	93	51	233	44	10252	NBFA5 #2
NT5TU	DENNIS	TX	108	68	47	223	42	9366	Austin Powers
N5ZK	JOE	TX	112	74	0	186	41	7626	
N5XU	LID	TX	77	61	29	167	38	6346	Austin Powers
NO5W	*CHUCK	TX	61	74	34	169	33	5577	NBFA5 #1
WD7Z	**DAVE	NM	58	69	16	143	39	5577	Azenmokers
KC5FU	BUBBA	TX	63	0	61	124	36	4464	NBFA5 #2
W5DDX	*BO	LA	34	55	32	121	34	4114	NBFA5 #1
N5CHA	*TODD	TX	69	31	3	103	38	3914	
W5KDJ	**WAYNE	TX	55	36	0	91	29	2639	
KB5NJD	*JOHN	TX	0	34	28	62	29	1798	NBFA5 #2
K5CM	*CONNIE	OK	27	44	0	71	25	1775	Azenmokers
W5ZL	*GARY	TX	33	11	23	67	26	1742	Austin Powers
KE5C	*JOHN	TX	31	16	0	47	26	1222	NBFA5 #1
NØQT	**JAN	NM	24	0	0	24	18	432	Azenmokers
AE5P	**ARMY	TX	3	0	0	3	3	9	NBFA5 #1
WM5R	*KEN	TX	3	0	0	3	2	6	NBFA5 #3
W6EEN	DOUG	CA	146	133	77	356	50	17800	SCCC #1
K6LA	KEN	CA	166	111	45	322	54	17388	SCCC #1
N6TV	BOB	CA	152	135	68	355	48	17040	NCCC #1
N6AA	DICK	CA	148	135	41	324	50	16200	SCCC #1

Call	Name	QTH	20	40	80	QSO	Mlt	Score	Team
W6UE	MIKE	CA	127	115	46	288	50	14400	SCCC #1
K6NA	GLEN	CA	144	89	67	300	48	14400	SCCC #1
N6XI	RICK	CA	126	114	60	300	47	14100	NCCC #1
N6RO	KEN	CA	117	111	54	282	49	13818	NCCC #1
K2KW	KENNY	CA	107	104	56	267	50	13350	NCCC #1
N6MJ	*DAN	CA	184	72	0	256	51	13056	
N6NT	BRUCE	CA	141	78	58	277	47	13019	
K6XX	BOB	CA	125	93	52	270	47	12690	NCCC #1
W6RGG	BOB	CA	109	110	59	278	45	12510	NCCC #1
AJ6V	ED	CA	107	104	45	256	47	12032	NCCC #2
W6TK	DICK	CA	106	92	51	249	48	11952	SCCC #1
NI6T	GARRY	CA	128	80	36	244	47	11468	NCCC #1
W6NL	DAVE	CA	115	89	44	248	45	11160	NCCC #2
W6OAT	RUSTY	CA	128	98	21	247	45	11115	NCCC #2
K6ZH	*JIM	CA	91	119	5	215	48	10320	SCCC #1
W0YK	ED	CA	99	79	45	223	44	9812	NCCC #2
N6PN	MATT	CA	76	102	33	211	45	9495	NCCC #1
K6RC	DAVE	CA	92	93	20	205	46	9430	
K6LRN	DICK	CA	108	62	30	200	43	8600	NCCC #2
W6YL	SCOTT	CA	123	57	0	180	47	8460	NCCC #2
N6HC	*ARNIE	CA	113	55	6	174	48	8352	SCCC #2
N6ZFO	*BILL	CA	92	95	16	203	41	8323	NCCC #1
AD6TF	*JIM	CA	70	34	22	126	38	4788	NCCC #2
ND2T	*TOM	CA	68	43	21	132	34	4488	NCCC #2
K6III	JERRY	CA	89	15	0	104	40	4160	
W6MVW	DICK	CA	100	0	0	100	41	4100	SCCC #2
K6EY	*BECKY	CA	64	48	6	118	34	4012	SCCC #2
K6DGW	*FRED	CA	46	37	13	96	29	2784	NCCC #2
N6PE	*RICK	CA	48	20	12	80	32	2560	
K6UFO	*MORK	CA	53	20	0	73	29	2117	NCCC #3
W6KY	*ART	CA	16	44	10	70	24	1680	SCCC #2
N6TW	LARRY	CA	37	17	10	64	26	1664	SCCC #1
N6WG	**BOB	CA	31	20	9	60	24	1440	NCCC #3
K6XT	*AC	CA	20	0	27	47	23	1081	SCCC #1
K6OWL	*MARK	CA	11	11	1	23	13	299	
N6TR	TREE	OR	159	149	71	379	50	18950	Corner Pocket Contes
K7RI	*DAN	WA	161	86	40	287	50	14350	Corner Pocket Contes
W7RN	TOM	NV	115	94	55	264	49	12936	NCCC #2
NØAX	*ED	WA	123	102	38	263	48	12624	Corner Pocket Contes
K7NV	KURT	NV	114	105	49	268	45	12060	NCCC #1
W2VJN	GEO	OR	91	96	62	249	48	11952	
W7UQ	*BOB	ID	135	94	20	249	44	10956	Corner Pocket Contes
K7BG	*MATT	MT	112	107	29	248	43	10664	Corner Pocket Contes
KO7X	*AL	WY	85	133	4	222	45	9990	SSC #2
K7WA	*JIM	WA	55	53	2	110	36	3960	
KH6SH	JOHN	UT	59	53	8	120	31	3720	
KL7WV	TIM	AK	62	9	0	71	26	1846	NCC
W7YS	*BILL	AZ	18	42	0	60	29	1740	Azenmokers
KI7Y	*JIM	OR	39	9	2	50	25	1250	Corner Pocket Contes
N7WA	*DINK	WA	0	29	11	40	18	720	
WS7L	CARL	OR	30	0	0	30	18	540	
K8CC	DAVE	MI	100	123	99	322	52	16744	MRRC
K8MR	JIM	OH	123	116	73	312	48	14976	NCC
K8NZ	*RON	OH	93	114	78	285	46	13110	NCC
K9TM	TIM	OH	56	97	58	211	44	9284	MRRC
W8KW	*TED	MI	70	80	64	214	40	8560	
N8VW	**PAT	OH	57	77	46	180	35	6300	MRRC
K8JQ	STEVE	WV	44	78	43	165	37	6105	
W8WTS	*JIM	OH	58	68	20	146	37	5402	
K5IID	**TOM	WV	49	52	42	143	34	4862	Azenmokers
N3RA	*SCOTT	OH	34	43	40	117	40	4680	NCC
AD8P	*BILL	OH	30	50	38	118	34	4012	MRRC
W8TM	**PAUL	OH	0	100	0	100	35	3500	
KT8X	TOM	MI	24	18	0	42	21	882	MRRC
N9RV	PAT	In	134	168	87	389	53	20617	Dead Lizards
AG9A	MARK	IL	130	162	73	365	52	18980	Dead Lizards
K9NW	MIKE	In	99	152	108	359	48	17232	Dead Lizards
W9RE	MIKE	In	106	131	82	319	45	14355	Dead Lizards
K9ZO	ED	Il	104	124	75	303	46	13938	Dead Lizards
K9AA	*PAUL	Il	112	119	59	290	48	13920	Dead Lizards
K9BGL	KARL	Il	95	127	52	274	48	13152	
K9AY	GARY	Wi	90	116	69	275	47	12925	Dead Lizards
N9CK	STEVE	Wi	91	134	81	306	42	12852	Dead Lizards
KJ9C	*MEL	In	76	108	80	264	45	11880	Dead Lizards
WT9U	*JIM	In	62	125	64	251	46	11546	SMC
WI9WI	JIM	Wi	99	86	70	255	43	10965	SMC
KA9FOX	SCOTT	Wi	71	94	86	251	40	10040	Dead Lizards
K9QVB	*JOHN	Wi	99	65	0	164	39	6396	
N9JF	*POGO	Il	39	29	0	68	28	1904	SMC
NA0N	*PAT	Mn	112	125	51	288	47	13536	MWA
KØOU	STEVE	Mo	100	112	68	280	46	12880	SMC
W0ETT	*KEN	Co	78	106	21	205	46	9430	GCC
NØKE	PHIL	Co	112	50	22	184	38	6992	GCC
NØSXX	*GARY	Co	90	69	0	159	40	6360	GCC
K4IU	*FRED	Mn	61	53	49	163	39	6357	MWA
WØZP	WAYNE	Co	35	125	0	160	39	6240	
KT0R	*DAVE	Mn	49	58	6	113	35	3955	MWA
W0UY	*TOM	Ks	55	47	2	104	34	3536	
KØUK	*BILL	Co	47	30	6	83	30	2490	GCC
NØAC	*BILL	Ia	27	33	0	60	34	2040	
KIØII	**RON	Co	10	4	0	14	10	140	GCC
WØTY	*TONY	Mo	12	0	0	12	8	96	
VE4/WB0O		BILL	vE4	136	130	0	266	45	11970
VE3JM	*VLAD	vE3	99	75	56	230	45	10350	Team CCO
VE5SF	*SAM	vE5	113	94	12	219	44	9636	
VE3KZ	BOB	vE3	71	75	57	203	43	8729	Team CCO
VA3NR	CHRIS	vE3	38	105	44	187	43	8041	Team CCO
VE3KP	*KEN	vE3	73	58	44	175	41	7175	Team CCO
VE3IAY	*RICH	vE3	57	71	39	167	39	6513	Team CCO
VE3FU	CHRIS	vE3	57	65	40	162	37	5994	Team CCO
VE3RZ	*TONY	vE3	51	99	0	150	37	5550	Team CCO
VA3ATT	*JIM	vE3	16	0	39	55	24	1320	
VE3DZ	*YURI	vE3	0	7	36	43	23	989	Team CCO
VA7ST	*BUD	vE7	29	2	0	31	15	465	Procrastinators
XF1K	*REX	XE	113	85	39	237	47	11139	SCCC #1

Results, September 2003 Phone Sprint

By Jim Stevens, K4MA
ssbsprint@ncjweb.com

The forty-second Phone Sprint generated 110 logs from 36 different areas. Scores were slightly higher than the prior September Phone Sprint, mainly due to more multipliers being available. The number of QSOs by the Top Ten scores was similar to last September's, but 48 multipliers led the way last September while this time around 48 just made the bottom of the Top 10 multiplier list.

High Power

K7SS operating at K7RI easily notched his sixth SSB Sprint High Power victory. This victory moves Danny into a tie with VA7RR for second most SSB Sprint wins. They are just one win behind K6LL's record seven wins. Danny did an excellent job of continuing to return to 20 meters to troll for casual operators handing out very low QSO numbers. This strategy along with his high multiplier total enabled his easy win. Finishing in an unusual tie for second were K4XS and WDØT. This was WDØT's highest finish ever in SSB Sprint. Congratulations Todd, just one more spot to go to notch that first victory. Rounding out the Top Ten in order are: KW8N, K9PG (at K9XD), W9RE, KA9FOX, W7WA,

TOP 10	*SCORES*	*BAND CHANGES*	*QSOs LOST*	*00Z*	*01Z*	*02Z*	*03Z*
K7RI	16960	7	4	98	79	66	77
K4XS	15688	14	1	86	75	61	74
WDØT	15688	5	1	93	78	61	64
KW8N	15657	104	6	92	72	56	87
K9PG	15120	62	2	108	77	67	63
W9RE	15024	53	6	94	84	77	59
KA9FOX	14250	5	5	91	68	62	65
W7WA	14100	6	2	76	72	61	73
K6LA	13300	37	4	79	60	63	65
W5TM	12716	2	5	83	79	57	71

TOP 10 QSOS

K7RI	320
K9PG	315
W9RE	313
KW8N	307
K4XS	296
WDØT	296
W5TM	289
KA9FOX	285
W7WA	282
K5TR	269

TOP 10 MULTS

K7RI	53
K4XS	53
WDØT	53
ND8DX	52
KW8N	51
KA9FOX	50
W7WA	50
K6LA	50
W6YX	49
W9RE	48
K9PG	48

TOP 10 Low Pwr

N5DO	9504
K7SV	9073
KØ7X	8730
WØETT	8256
NI6T	8188
VE5SF	8120
N6ZFO	7134
W4NZ	7000
NØSXX	6320
N2IC	6031

TOP 10 QRP

N8VW	6888
K5IID	3131
KC5R	2790
KU5B	1403

GOLDEN LOGS (> 100 QSOS)

W6YX	255
NX9T	250
N8VW	164
N4CW	145
K9MI	140

TOP 10 Band Changes

KW8N	104
K9PG	62
W9RE	53
WE9V	42
K6LA	37
N5DO	26
KTØR	24
K5IID	18
W6FRH	16
W6TK	15

September 2003 Phone Sprint Commentary by Bob Hayes, KW8N

As is probably apparent, the phone sprint is one of my favorite contests and it is nice to see how interest and participation in it has grown in recent years. Much of this has been the result of promotion by local or regional clubs, as can be noted by geographical pockets of increased activity. But many Sprint participants missed NY. Hey, what's up with that! Hello, can't we get someone to stir up a little interest over there?

Circumstances over the last few years have limited my participation in the main event contests. It sure is nice to be able to go max out in a contest that does not require a full weekend and sleep deprivation in order to be competitive. Of course a good score in every contest takes a combination of skill and station, but the consensus of most contesters is that of all the contests, the ratio of importance between skill and station is highest in the Sprints.

The popularity of the 40 meter start here in the Northeast US has certainly helped bridge some of the geographical scoring disparity that had typically characterized the Sprints. The ease and efficiency of working a good number of very loud stations (and loud on both sides of the QSO) with little QRM (especially the foreign broadcast type) is a great way to start off (although, based on the results, it still seems that multipliers are a little harder to come by in this geographical area than most others). Recently I have failed to take a good look to the Northwest late on 20 meters and have missed available KL7 and VE8 mults.

Since my early days in ham radio I have enjoyed playing around with antennas. Unfortunately I sometimes find myself doing last minute antenna work that is really of limited benefit and results in diminishing returns. Resting up and getting mentally prepared or practicing (especially since I am not on the air much at other times) would have been a much more effective way to spend my time. It's one thing to get back into running a pileup efficiently. It's quite another to regain proficiency in the two radio Sprint style of operation. I could have gotten off to a much better start if I were better prepared to operate. K9PG and W9RE got big early leads; I didn't catch up until the very end. This year I didn't have a choice, though, as the thrust bearing on the top 20 meter beam was frozen up and required greasing and rocking to free it up. Also broken wires on 80 meter antennas as the result of a spring ice storm needed to finally be repaired. Usually in September these things would have been worked out for the CW Sprint the weekend before, but I had other commitments this year on the CW evening. So it was the all too typical "work on antennas the afternoon before the Sprint" routine again.

I also enjoy the nature of the Sprint interaction. A meaningful exchange (not automatically determinable), the ability to have some idea of how you are doing (the QSO number) and think of how many names of operators we have learned and remembered as a result of our Sprint QSOs. I was certainly confused this time though as some operators changed names during the contest. The "team" competition aspect adds another level of fun and camaraderie.

I have received many "well then I guess you're my number 1" only to find the same station later in the Sprint giving out numbers of 30 or higher. And some of these even come back and participate the next time. So, if you are reading this and are one who has typically shied away from the phone sprint, give it a try. And if you are someone who does operate it, try to stir up some additional interest. Think of the increase in activity if everyone who turned in a score this time got one other station to get on next time? K9PG is especially to be commended for his success in "promoting" the phone sprint.

CU in February Sprint es 73 de KW8N

K6LA and W5TM (W5AO).

Low Power

Winning the low power category for the first time was N5DO. Dave had the highest LP QSO total, and the second highest multiplier total. Finishing second was K7SV, Larry. Yours truly has had the honor of operating with Larry a couple of times in the last year at K4JA, and let me assure you that Larry just flat knows how to put QSOs in the log. Making his first appearance in the SSB Sprint Low Power Top Ten was KO7X from his new QTH in Wyoming. I'm sure everyone was glad to get that multiplier in the log.

The rest of the Low Power Top Ten are: WØETT, NI6T, VE5SF, N6ZFO, W4NZ, NØSXX and N2IC. Also of note is that VE5SF extended his lead for most Low Power Top Tens. Sam has now finished in the Low Power Top Ten 12 out of 19 times.

QRP

N8VW won the QRP category for the first time. The remaining QRP scores in order are: K5IID, KC5R, and KU5B.

Golden Logs

W6YX, NX9T, N8VW, N4CW, and K9MI all submitted Golden Logs (no score reductions). Congratulations! If you want a copy of your log checking report, please send an e-mail to **ssbsprint@ncjweb.com**.

Records

The only new high power area record was WDØT extending his South Dakota record. New low power area records are: KK1KW in New Hampshire, W2EQ in New Jersey, N2IC in New Mexico, KO7X in Wyoming, VE7BC in British Columbia, and XE1NW in Mexico. New QRP records were established by: N8VW in Ohio and KU5B in Texas. The Phone Sprint records have been updated on the *NCJ* Web. Check them out at **www.ncjweb.com/ssbsprintrecords.php**.

Teams

In the team competition, Dead Lizards CAN Talk picked up yet another win and second went to the Mad River Radio Club. Third and fourth place teams were NCCC #1 and SCCC Last Minute.

Notes

See the sidebar for some interesting thoughts about SSB Sprint from Bob Hayes, KW8N, one of the greatest SSB Sprinters of all time. Let me echo a comment made by Bob: A number of logs that were submitted changed the name they were sending during the course of contest. Please don't do this! It makes log checking very difficult and can actually cause some other contesters to get dinged for an incorrect name. Whatever name you start with, please use it throughout the contest.

Finally there were more than the usual frequency "disagreements" in this SSB Sprint. These issues were partially caused by the fact that the SSB Sprint somehow fell on the same weekend as the WAE SSB Contest. Because of that, 40 meters in particular was worse than normal. I would just remind everyone that the Sprint rules don't relieve your responsibility to check and ensure that a given frequency is not in use before you start calling CQ.

The February 2004 Phone Sprint will be held at 0000Z on February 8 (February 7 local time). Get on and join us in the fun!

Soapbox

First Sprint in many years! This contest was a lot of fun.—K2UT. This was my second phone sprint, and I felt like I got off to a much better start than I did in February, but that feeling only lasted for forty-five minutes or so.—K5TR (WM5R). Glad to help a few guys out with the MA mult.—K5ZD. Got to try new IC756 PRO II—worked very well. Don't know how you 300+ QSO folks do it! Good Job—K6NR. What can I say? One running low power can't finesse his/her way around the high power boys on fone like one can on CW.—K7SV. Continues to be the most intense contest I'll ever experience!—K9JS. Got off to a great start, all down hill after the first hour. 80 meters was a killer! I remember why I was running LP on 80, forgot to push the 80 meter amp switch!—K9PG (@K9XD).

I missed this one last year due to my appendix rupturing (yeah, I know, weak excuse). Now I'm wondering which hurt more, the appendix or suffering through this contest. Seemed activity was down, I got beat out a lot more than normal, had way too many unanswered CQs, 20 meter conditions were just downright funky, WAE confusion and QRM, and just never seemed to keep any sort of rhythm going. Sprint still rules!—KA9FOX. My first Sprint ever! Lots of fun, once I got the hang of it.—KE6QR. Always a great contest!—KTØR. Thanks to all who put up with my weird name.—KU5B. Operating low power with poor antennas was, er..., interesting!—N2IC. Unexpected RF feedback in the transmit audio forced me into the low power category. I think it's Murphy's way of punishing me for doing poorly on CW.—W4NZ. Mults are sure a score killer for me!—W9RE.

More fun than one should have with their clothes on.....oops wrong contest (Now I am curious what is the contest that is more fun than one should have with their clothes on?—Ed).—WN6K. I wanted to operate full time, however, my car was stolen one hour before the contest. I had to go to four different police offices in the city to report the robbery. I had the chance to operate for only one hour. It was a nice distraction from my problem. I must have sounded somewhat stressed during the exchanges, now you know why. (I did confirm with Guillermo that he recovered the car. Please join us next time and hopefully you won't have any such problems—*Ed*).—XE1NW

TEAM SCORES

1. Dead Lizards CAN Talk	
WDØT	15688
K9PG	15120
W9RE	15024
KA9FOX	14250
WE9V	12549
K9ZO	12098
KØOU	10534
K9BGL	10191
WI9WI	9135
K9JS	8385
	122974

2. Mad River Radio Club	
KW8N	15657
ND8DX	11492
K9NW	7480
N8VW	6888
K8MR	5187
KT8X	3605
K5IID	3131
K8KHZ	2139
	55579

3. NCCC#1	
W6YX	12495
K6LRN	8428
NI6T	8188
N6ZFO	7134
WK6I	5977
W6FRH	5304
AD6TF	1508
KJ6RA	1180
K6UFO	1175
W6ZZZ	728
	52117

4. SCCC Last Minute	
K6LA	13300
W6TK	11340
K6EY	4644
WA6BOB	2697
WA7BNM	1856
	33837

5. Westerners (KO7X,WØETT,KØUK,NØSXX) 30962

6. Team Longneck (NT5TU,N6MJ,N4GI,N9YM,KU5B,KB1IPK,K3ASK) 23363

7. SMC (NX9T,N9KT,K9MI,N9RV) 23121

8. MWA (KTØR,WGØM) 13804

9. TCG 1 (W4NZ,K4BP) 10528

10. Avaya Lincroft ARC (W2EQ,W2MN,W2DAD,W2JZ) 7277

11. Go FRC! (K2UT) .....

Call	Name	QTH	20	40	80	QSO	Mult	Score	Team
KK1L	RON	VT	85	80	49	214	43	9202	
N4CW	BERT	ME	78	41	26	145	41	5945	
K5ZD	RANDY	MA	17	52	30	99	35	3465	
KK1KW	*FRED	NH	84	1	0	85	34	2890	
KB1IPK	*BUD	CT	13	25	0	38	19	722	Team Longneck
K1GU	NED	MA	1	0	0	1	1		
W2EQ	*TOM	NJ	51	29	27	107	35	3745	Avaya Lincroft ARC
K2UT	*BOB	NJ	65	2	33	100	36	3600	Go FRC!
N2NC	*JOHN	NJ	40	0	0	40	22	880	
W2DAD	*STEVE	NJ	23	9	0	32	17	544	Avaya Lincroft ARC
W2JZ	*JOHN	NJ	7	8	5	20	1	3	260 Avaya Lincroft ARC
K1RH	ROB	MD	69	16	42	127	41	5207	
K3SV	*BILL	PA	48	37	16	101	31	3131	
K3ASK	*BUD	MD	10	2	0	12	11	132	Team Longneck
K4XS	BILL	FL	161	84	51	296	53	15688	
NX9T	JEFF	NC	93	98	59	250	45	11250	SMC
WD4K (K0EJ)	MARK	TN	88	102	61	251	42	10542	
K7SV	*LARRY	VA	74	82	55	211	43	9073	
W4NF	JACK	VA	76	67	56	199	45	8955	
K4BAI	JOHN	GA	98	69	18	185	42	7770	
W4NZ	*TED	TN	63	58	54	175	40	7000	TCG 1
NF4A	*CHARLIE	FL	46	53	52	51	34	5134	
NA4BW	*BRIAN	GA	37	56	43	136	36	4896	
KT4Q	*STEVE	GA	74	26	29	129	37	4773	
WY4Y (N4EIL)	NEIL	GA	50	31	26	107	41	4387	
N4GI	*BUD	FL	43	38	31	112	32	3584	Team Longneck
K4BP	JEFF	TN	51	47	0	98	36	3528	TCG 1
KG4UHP	*JOE	VA	7	0	0	27	16	432	
W5TM (W5AO)	DAVE	OK	124	96	69	289	44	12716	
K5TR (WM5R)	KEN	TX	134	82	53	269	44	11836	
NT5TU (@NX5M)	BUD	TX	94	82	52	228	44	10032	Team Longneck
K5XR (W5ASP)	JOE	TX	98	74	52	224	43	9632	
N5DO	*DAVE	TX	92	82	42	216	44	9504	
K5AM	MARK	NM	94	76	39	209	41	8569	
N2IC	*STEVE	NM	96	67	0	163	37	6031	
KE5OG	*BILL	TX	74	23	0	97	37	3589	
KC5R	**AL	LA	44	30	16	90	31	2790	
W2MN	*TOM	TX	66	10	12	88	31	2728	Avaya Lincroft ARC
K5PI	ROBERT	TX	12	39	0	51	28	1428	
KU5B	**KUB	TX	40	21	0	61	23	1403	Team Longneck
WA5AU	*WALT	TX	21	4	0	25	14	350	
N3BB	JIM	TX	3	5	0	8	8	64	
K6LA	KEN	CA	135	77	54	266	50	13300	SCCC Last Minute
W6YX (N6DE)	BILL	CA	118	80	57	255	49	12495	NCCC#1
W6TK	DICK	CA	121	76	55	252	45	11340	SCCC Last Minute
W6NL	DAVE	CA	96	85	59	240	45	10800	
K6NR	DANA	CA	87	82	58	227	44	9988	
K6LRN	DICK	CA	86	61	49	196	43	8428	NCCC#1
NI6T	*GARRY	CA	90	48	40	178	46	8188	NCCC#1
N6ZFO	*BILL	CA	89	54	31	174	41	7134	NCCC#1
WK6I	JEFF	CA	88	30	21	39	43	5977	NCCC#1
W6FRH	BOB	CA	66	43	7	136	39	5304	NCCC#1
W6IXP	TOM	CA	43	58	38	139	38	5282	
WN6K	*PAUL	CA	59	58	10	127	38	4826	
N6MJ	*DAN	CA	83	27	0	110	43	4730	Team Longneck

Call	Name	QTH	20	40	80	QSO	Mult	Score	Team
K6EY	*BECKY	CA	53	49	27	129	36	4644	SCCC Last Minute
ND6S	*RAY	CA	61	27	22	110	36	3960	
WA6BOB	*BOB	CA	21	45	27	93	29	2697	SCCC Last Minute
K6III	JERRY	CA	8	47	31	86	25	2150	
KE6QR	*GARY	CA	36	16	15	67	30	2010	
W4EF	MIKE	CA	62	0	0	62	32	1984	
WA7BNM	*BRUCE	CA	0	64	0	64	29	1856	SCCC Last Minute
AD6TF	*JIM	CA	42	16	0	58	26	1508	NCCC#1
KJ6RA	*RICH	CA	13	27	19	59	20	1180	NCCC#1
K6UFO	*MORK	CA	33	3	1	47	25	1175	NCCC#1
W6ZZZ	*MARK	CA	5	29	18	52	14	728	NCCC#1
K6CSL	BERT	CA	13	15	5	33	17	561	
W6AB	*AVERY	CA	23	2	0	25	16	400	
W6OAT	*RUSTY	CA	0	0	27	27	11	297	
K7RI (K7SS)	DAN	WA	222	70	28	320	53	16960	
W7WA	DAN	WA	205	54	23	282	50	14100	
KO7X	*ALAN	WY	78	96	20	194	45	8730	Westerners
N9ADG	*BRIAN	WA	74	31	37	142	38	5396	
KI7Y	*JIM	OR	66	60	12	138	38	5244	
K7NV	*KURT	NV	18	32	38	88	27	2376	
KW8N	BOB	OH	106	127	74	307	51	15657	Mad River Radio Club
ND8DX	ED	OH	66	88	67	221	52	11492	Mad River Radio Club
N8VW	**PAT	OH	40	82	42	164	42	6888	Mad River Radio Club
K8MR	*JIM	OH	39	52	42	133	39	5187	Mad River Radio Club
KT8X	DENNIS	MI	68	35	0	103	35	3605	Mad River Radio Club
K5IID	**TOM	WV	30	45	26	101	31	3131	Mad River Radio Club
K8KHZ	*SEAN	MI	40	29	0	69	31	2139	Mad River Radio Club
K9PG (K9XD)	PAUL	IL	108	134	73	315	48	15120	Dead Lizards CAN Talk
W9RE	MIKE	IN	113	118	82	313	48	15024	Dead Lizards CAN Talk
KA9FOX	SCOTT	WI	107	90	88	285	50	14250	Dead Lizards CAN Talk
WE9V	CHAD	WI	101	105	61	267	47	12549	Dead Lizards CAN Talk
K9ZO	ED	IL	106	91	66	263	46	12098	Dead Lizards CAN Talk
K9BGL	KARL	IL	82	84	71	237	43	10191	Dead Lizards CAN Talk
WI9WI	JIM	WI	61	85	57	203	45	9135	Dead Lizards CAN Talk
K9JS	JOHN	IL	73	75	47	195	43	8385	Dead Lizards CAN Talk
K9NW	MIKE	IN	119	36	15	70	44	7480	Mad River Radio Club
N9KT	*DAVID	IN	45	56	43	144	37	5328	SMC
K9MI	*MIKE	IN	42	62	36	140	35	4900	SMC
N9YM	*BUD	IN	19	50	23	92	30	2760	Team Longneck
N9RV	PAT	IN	0	6	47	53	31	1643	SMC
WD0T	TODD	SD	127	100	69	296	53	15688	Dead Lizards CAN Talk
K0OU	STEVE	MO	97	84	48	229	46	10534	Dead Lizards CAN Talk
KT0R	DAVE	MN	84	98	51	233	44	10252	MWA
W0ETT	*KEN	CO	115	53	24	192	43	8256	Westerners
K0UK	BILL	CO	107	67	0	174	44	7656	Westerners
N0SXX	*GARY	CO	95	40	23	158	40	6320	Westerners
AE9B	*TOM	MO	69	49	0	118	39	4602	
WG0M	*MIKE	MN	52	44	0	96	37	3552	MWA
K0MPH	*ROGER	MN	42	17	11	70	29	2030	
K0HW	*JIM	SD	35	8	20	63	28	1764	
VE5SF	*SAM	VE5	94	78	31	203	40	8120	
VA3NR	CHRIS	VE3	40	75	46	161	41	6601	
VE7FO	*JIM	VE7	64	35	24	123	38	4674	
VE3FU	*CHRIS	VE3	30	17	7	54	28	1512	
VA7DP	*DOUG	VE7	4	0	0	4	4	16	
XE1NW	*BILL	XE	9	3	0	12	11	132	

* Low Power
** QRP

Results, January 2003 NAQP CW Contest

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What a finish! N9RV nosed out N2IC by less than 200 points to take first place in the single-op category in an NAQP contest that was so competitive that some who broke the 300k barrier didn't place in the top ten. The battle for third place was even closer with N6MJ squeaking by W4AN by less than 100 points. N6RT operated W6EEN to fifth place, while W4PA took sixth. N2NL, N2NC and W9RE finished seventh, eighth and ninth, respectively, with W9RE having the second highest multiplier total, but not enough QSOs to move up in the standings. N6TR took tenth while using the K7RAT call.

In the multi-two category, the W5NN Texas crew took first place with superior QSO and multiplier totals over the K5KA Oklahoma group. K5GO took third to complete the five-land dominance of this category.

Fueled by three scores over 300k, the Southern California Contest Club #1 team grabbed first place in the team competition by a little more than 100k points over the Tennessee Contest Group Team 1, while the SMC #1 team took third.

A complete summary of NAQP CW contest records will be published in the next issue of the NCJ.

Single Op Top Ten Breakdowns

Call	*Score*	*QSOs*	*Mults*	*160*	*80*	*40*	*20*	*15*	*10*	*Team*
N9RV	367, 812	1202	306	182/42	241/51	231/52	238/57	141/54	169/50	SMC #1
N2IC	367,628	1259	292	122/40	170/51	175/51	352/51	266/53	174/46	GMCC #1
N6MJ	360,873	1191	303	56/34	145/47	238/55	261/55	244/57	247/55	SCCC #1
W4AN	360,774	1179	306	126/43	203/50	323/55	308/56	125/51	94/51	SECC #1
W6EEN (N6RT)	351,345	1191	295	50/27	160/47	290/56	220/57	236/58	235/50	SCCC #1
W4PA	347,745	1195	291	150/38	232/51	295/54	231/52	157/52	130/44	TCG #1
N2NL	340,466	1162	293	68/30	132/43	271/52	271/55	258/60	162/53	FCG #1
N2NC	320,682	1102	291	98/36	183/46	238/52	275/55	196/55	112/47	FRC Dom
W9RE	318,115	1043	305	163/48	224/51	215/52	152/51	140/56	149/47	SMC #1
K7RA (N6TR)	316, 128	1184	267	27/15	136/41	212/53	245/50	289/55	275/53	Boring

Multi-Two Breakdowns

Call	*Score*	*QSOs*	*Mults*	*160*	*80*	*40*	*20*	*15*	*10*
W5NN	595,296	1872	318	142/38	326/55	441/57	400/57	370/57	193/54
K5KA	537,862	1781	302	225/47	344/53	400/54	388/55	288/50	136/43
K5GO	504,192	1616	312	207/44	343/57	324/56	305/52	267/55	170/48

Single Operator Scores

Call	*Score*	*QSOs*	*Mults*	*QTH*	*Team*
N1XS(K1EBY)	152,856	772	198	CT	
K1AM	140,499	699	201	RI	
NY1S	139,128	682	204	ME	
K5ZD	77,504	448	173	MA	
W1TO	55,748	362	154	MA	
K1GU	49,420	353	140	MA	
W0BR	40,468	302	134	CT	
AB1BX	23,560	2238	99	RI	
KZ1M	8154	151	54	MA	
K1YA	2523	87	29	MA	
K1HJ*	864	36	24	MA	
N2NC	320,682	1102	291	NJ	FRC Domestic
K2SX	102,060	540	189	NY	Order of Boiled Owls
K2LE	84,836	508	167	NY	Order of Boiled Owls
KC2KEU	76,000	475	160	NJ	
WB2DVU	67,816	392	173	NY	
N2CU	44,551	299	149	NY	
N2UN	23,490	290	81	NY	Order of Boiled Owls
N2GC	17,845	215	83	NY	
KD2HE	8330	170	49	NY	
WA2VQV	6314	154	41	NJ	
WB2ART	1305	45	29	NY	
K3MM	271,695	921	295	MD	PVRC One
AA3B	266,220	1020	261	PA	
K3WW	214,555	913	235	PA	FRC Domestic
N8NA	153,908	706	218	DE	
K2YWE	143,376	696	206	MD	PVRC One
WA3HAE	130,950	675	194	PA	PaQP'ers
WA3SES	125,208	666	188	PA	PaQP'ers
AD8J	119,592	604	198	PA	PaQP'ers
N4GG	113,735	529	215	MD	
K3WWP*	72,358	506	143	PA	
N3SD	55,020	420	131	PA	NCC #1
NE3H	34,040	296	115	PA	
W3IQ	28,749	259	111	PA	NCC #1
KB3IEO	27, 489	231	119	PA	
AA0CY	23,912	244	98	PA	
N3NZ	16,617	191	87	PA	
N3FR	16,353	237	69	PA	PaQP'ers
W1NN	8700	116	75	PA	PaQP'ers
WA3AAN	4089	87	47	PA	
W4AN	360,774	1179	306	GA	SECC #1
W4PA	347,745	1195	291	TN	TCG Team 1
N2NL	340,466	1162	293	FL	FCG #1
K4RO	277,168	1019	272	TN	TCG Team 1
K4WX	270,884	1124	241	TN	TCG Team 1
KØEJ	260,096	1016	256	TN	TCG Team 1
N4GN	252,450	990	255	KY	KCG
W9WI	252,007	973	259	TN	TCG Team 1
K4NO	246,984	1004	246	AL	SECC #1
K1KY	236,032	922	256	TN	TCG Team 2
N4AF	231,250	925	250	NC	PVRC One
K7SV	230, 910	895	258	VA	PVRC One
K4OJ	212,992	832	256	FL	FCG #1
K4FXN	212,224	829	256	KY	KCG
N4CW	204,848	826	248	NC	PVRC One
W4OC	199,791	843	237	SC	SECC #1
K4MM(W4IX)	193,963	847	229	FL	FCG #2
K4AMC	188,832	843	224	TN	TCG Team 5
K5KG	176,596	742	238	FL	FCG #1
K4BAI	174,876	741	236	GA	SECC #1
W4AU	170,144	818	208	VA	TCG Team 3
K4LTA	168,084	812	207	TN	TCG Team 2
N4BP	163,400	817	200	FL	FCG #4
NO4S(K9OM)	161,665	745	217	FL	FCG #3
W4NZ	158,200	791	200	TN	TCG Team 3
NR3X(N4PY)	153,470	745	206	NC	PVRC Two
K4QPL	152,559	737	207	NC	PVRC Two
K4MA	148,720	715	208	NC	TCG Team 3
KU8E	147,084	721	204	GA	SECC #1
W3BP	144,320	704	205	VA	PVRC Two
N4IR	136,116	684	199	TN	TCG Team 3
N4IG	128,068	634	202	FL	FCG #2
W4NTI	118,188	603	196	AL	Alabama CG
K1UM	100,975	577	175	FL	FCG #3
W4SAA	97,801	523	187	FL	FCG #2
NE4S	80,884	554	146	GA	SECC #2
KA8OKH	79,040	494	160	KY	KCG
NY4N	73,513	451	163	TN	TCG Team 4
N4NTO	65,116	446	146	NC	
NS4T	63,896	392	163	SC	SECC #2
KA9EKJ	60,605	391	155	AL	SECC #2
K3CQ	56,840	406	140	TN	TCG Team 4
W4HZD	56,260	388	145	TN	TCG Team 7
KE4OAR	55,350	369	150	TN	TCG Team 5
K4ORD	54,872	361	152	VA	
K4GMH	54,404	406	134	VA	

Call	Score	QSOs	Mults	QTH	Team
W4ATL	53,841	393	137	GA	SECC #2
K2UFT	51,480	360	143	GA	SECC #3
NY4T	46,761	327	143	TN	TCG Team 4
W4ZW	42,706	326	131	FL	FCG #4
K4BEV	39,057	277	141	TN	TCG Team 4
K4BX*	35,518	301	118	TN	
W4TYU	34,629	291	119	TN	TCG Team 5
K4PB	31,440	240	131	FL	FCG #5
WB6BWZ*	28,635	249	115	GA	SECC #2
K4GA	25,615	235	109	GA	SECC #3
NA4W(K4WI)	21,800	200	109	AL	Alabama CG
K4IQJ	20,928	192	109	AL	SECC #4
N4DW	20,188	206	98	TN	
N4LF	19,278	189	102	FL	
K4BAM()	13,950	150	93	KY	
NA4K	13,861	167	83	TN	TCG Team 4
N4PSE	13,230	147	90	FL	
VE3XD/W4	12,480	160	78	FL	
WM4Q	12,212	142	86	TN	TCG Team 6
NJ4M(WD4AHZ)	11,122	166	67	FL	FCG #4
W4BCG	10,773	133	81	TN	TCG Team 7
W4RK	9,750	150	65	TN	TCG Team 5
AA4LR	8,432	136	62	GA	SECC #3
AF4OX	6,600	110	60	SC	
K4LW	6,264	108	58	FL	FCG #2
NF4A	6,156	114	54	FL	FCG #1
N4GI	3,825	75	51	FL	
KØCOP	2,788	68	41	SC	
KA6R	2,090	55	38	FL	
N3BF	2,046	62	33	VA	
KN4Y	1,980	66	30	FL	FCG #4
AA4GA	1,508	52	29	GA	SECC #4
K3MZ	875	35	25	VA	
W4OGG	858	39	22	TN	
N8IK	735	35	21	VA	
K9ES	551	29	19	FL	FCG #3
WB4HUX	35	7	5	AL	
N5RZ	315,524	1111	284	TX	NTCC #1
N6ZZ	292,866	1101	266	NM	Azenmokers 1
N5YA(N5UM)	284,672	1112	256	TX	
N3BB	264,384	918	288	TX	Austin Powers
AD5Q	214,110	915	234	TX	NTCC #1
N5OT	211,735	901	235	OK	Azenmokers 2
KM5G	201,828	834	242	AR	Ozark CC
W5WMU	187,980	780	241	LA	
WØUO	182,497	841	217	TX	NTCC #1
N4OGW	178,766	791	226	MS	
N5QQ	173,342	767	226	TX	
W5FO	171,080	728	235	TX	NTCC #1
W5XX	168,664	727	232	MS	Team Mississippi
WA7LNW	164,775	845	195	NM	Azenmokers 2
W5UE	163,850	725	226	MS	Team Mississippi
N5UL	162,108	711	228	NM	Azenmokers 1
W5KFT(K5PI)	160,176	752	213	TX	Austin Powers
WQ5L	156,403	689	227	MS	Team Mississippi
N5RG	155,980	709	220	TX	NTCC #1
K1NT	151,298	707	214	TX	
K5TR(KE5C)	146,328	728	201	TX	Austin Powers
KG5U*	125,244	639	196	TX	TDXS
K5TT	116,472	552	211	OK	Azenmokers 1
K5XR(W5ASP)	82,460	589	140	TX	TDXS
K5WAF	77,096	419	184	TX	
KB5NJD	71,643	429	167	TX	
K5CM	71,476	428	167	OK	Azenmokers 2
W5MK	59,829	407	147	AR	Ozark CC
N5CHA	56,712	408	139	TX	
WD7Z	54,945	407	135	NM	
KØCIE	52,311	371	141	OK	Azenmokers 1
KJ5WX	39,200	280	140	AR	
NI5F	39,040	305	128	MS	
KB5IXI	36,162	287	126	MS	Team Mississippi
K5XK	31,527	279	113	AR	Ozark CC
W5TZN	24,465	233	105	OK	
K5ACO	21,079	197	107	AR	
K5UV	19,305	195	99	OK	
K5PI	8,100	150	54	TX	
K5SA	3,486	83	42	MS	Team Mississippi
AA5AU	540	27	20	LA	
KA5BAY	64	8	8	OK	
N6MJ(@W6KP)	360,873	1191	303	CA	SCCC #1
W6EEN(N6RT)	351,345	1191	295	CA	SCCC #1
N6RO	299,460	1085	276	CA	NCCC #1
K6LA	276,353	1067	259	CA	SCCC #1
W6YX(W6LD)	268,233	1113	241	CA	
K2KW	263,655	945	279	CA	NCCC #1
N6NF	257,090	1094	235	CA	
K6AM	214,638	862	249	CA	SCCC #1
WØYK	182,931	843	217	CA	NCCC #1
K6CTA	179,242	826	217	CA	NCCC #2
WN6K	155,034	783	198	CA	SCCC #2
W6TK	148,176	686	216	CA	
K6NR	143,444	658	218	CA	SCCC #2
AD6E	137,685	685	201	CA	NCCC #2
W6OAT	134,800	674	200	CA	
N3ZZ	129,090	662	195	CA	NCCC #2
K6RB	116,021	641	181	CA	

Call	Score	QSOs	Mults	QTH	Team
W6RGG	115,620	615	188	CA	
K6RIM	113,692	661	172	CA	
W6KY	101,840	536	190	CA	SCCC #2
W6OA	101,010	546	185	CA	Livermore ARK
K6DGW	85,225	487	175	CA	NCCC #3
W6YL(W6CT)	84,194	473	178	CA	
W7SW	54,386	383	142	CA	
W6GPM	43,952	328	134	CA	Livermore ARK
K6OWL	33,480	270	124	CA	
KG6CMS	32,886	261	126	CA	
K6ENT	31,680	264	120	CA	NCCC #3
WA6BFW	30,504	246	124	CA	
AD6TF	30,393	307	99	CA	
WA6PX	27,346	226	121	CA	NCCC #3
KE6QR	26,180	220	119	CA	
K7JJ	22,944	239	96	CA	
N6EM	22,848	192	119	CA	
W6SJ	18,334	206	89	CA	
K6III	16,530	145	114	CA	
ND2T	14,507	163	89	CA	
WB6ETY	14,104	164	86	CA	Livermore ARK
K6MI	12,870	143	90	CA	
K6UFO	12,558	161	78	CA	
K6CSL	12,450	150	83	CA	
W6MVW	9,472	128	74	CA	
K6EY	8,436	114	74	CA	
KE6ZSN	8,400	120	70	CA	
AE6IS	8,103	111	73	CA	Livermore ARK
KI6IV	8,050	115	70	CA	
KE6JAC	6,834	102	67	CA	NCCC #3
KI6OY	5,415	95	57	CA	Livermore ARK
WA6BOB	4,033	109	37	CA	
K6LDX	2,652	68	39	CA	
NM6E	1,519	49	31	CA	NCCC #3
KA6MAL	1,457	47	31	CA	
WA7BNM	1,372	49	28	CA	
K7RAT(N6TR)	316,128	1184	267	OR	Boring ARC
K6LL	308,352	1168	264	AZ	SCCC #1
W7TTT(K5RC)	268,060	1031	260	NV	NCCC #1
W7GG	246,634	971	254	OR	TCG Team 2
NØAX	230,580	915	252	WA	Boring ARC
K7NV	198,816	872	228	NV	NCCC #1
N7OU	191,653	917	209	OR	
W7ZR	180,096	896	201	AZ	
WC7CW	172,530	810	213	MT	
N7LOX	167,618	802	209	WA	
N7WA	163,313	829	197	WA	
W7OM	150,643	757	199	WA	
KI7Y	145,036	718	202	OR	
K4XU	128,444	652	197	OR	
K7AW(K5ZM)	116,206	599	194	OR	
K8IA	94,308	542	174	AZ	
KY7M	83,312	508	164	AZ	Azenmokers 1
W0ETT	54,800	400	137	WY	GMCC #1
N7FO	50,840	328	155	AZ	Azenmokers 2
N7ZN	47,742	327	146	ID	
NG7Z	43,703	319	137	WA	
W6RLL	36,584	269	136	AZ	
W7WW	36,279	261	139	AZ	
WA7YAZ	28,340	260	109	UT	
W7BX	18,042	186	97	OR	
W7YS	13,965	147	95	AZ	
AL1G	9,715	145	67	KL7	
K7ZS	4,472	86	52	OR	
N7MAL	3,680	80	46	AZ	
W7AJK	1,440	48	30	WY	
WG7Y	374	22	17	WY	
W8MJ	236,410	1006	235	MI	MRRC #1
N9AG	195,804	756	259	OH	TCG Team 2
N8EA	169,344	756	224	MI	MRRC #3
N8BJQ	163,982	742	221	OH	TCG Team 2
NZ8O(N5TU)	159,975	711	225	MI	
W8CAR	153,120	696	220	OH	NCC #1
WA8WV	142,676	673	212	WV	
K5IID	141,918	654	217	WV	MRRC #1
K8MR	138,774	606	229	OH	MRRC #4
NU8Z	136,552	676	202	MI	MRRC #1
K8IR	126,630	630	201	MI	
AF8A	109,048	634	172	OH	MRRC #1
W8GN	107,322	577	186	OH	NCC #1
KT8X	104,213	529	197	MI	MRRC #4
W8KIC	102,030	570	179	OH	NCC #1
K8JQ	80,652	517	156	WV	
N8II	78,165	405	193	WV	PVRC Two
K8CC	68,400	400	171	MI	MRRC #3
WB8RTJ*	55,726	374	149	OH	
ND8DX	50,895	351	145	OH	MRRC #3
AD8P	40,468	302	134	OH	MRRC #4
K8CV*	31,624	268	118	MI	
W8UE	30,564	283	108	MI	
KB8TYJ	28,792	236	122	MI	
W8XY	27,864	258	108	OH	Hall of Fame Contest Group
W8VE	26,307	237	111	OH	Hall of Fame Contest Group
N8OH	24,128	208	116	OH	Hall of Fame Contest Group
K8NZ	22,018	218	101	OH	NCC #2
KK8D	21,879	221	99	OH	Hall of Fame Contest Group

Call	Score	QSOs	Mults	QTH	Team
KC8LTL*	21,600	216	100	MI	
N8PW	20,000	200	100	OH	Hall of Fame Contest Group
KQ8J(WX3M)*	18,879	203	93	MI	MRRC #4
N5NW	18,240	190	96	OH	TCG Team 6
K8AAX	15,725	185	85	MI	MRRC #2
K3JT	15,040	188	80	WV	
NX8C	14,536	158	92	MI	MRRC #2
K8KFJ	10,800	144	75	WV	
W8RU	3,969	81	49	MI	MRRC #2
K8VFR	1,275	51	25	MI	
N9RV	367,812	1202	306	IN	SMC #1
W9RE	318,115	1043	305	IN	SMC #1
K9PG(@WB9Z)	297,290	959	310	IL	SMC #1
N9CK	263,592	1046	252	WI	SMC #1
WE9V	262,680	995	264	WI	SMC Wisconsin
N9FH	225,594	906	249	WI	SMC Wisconsin
K9NW	213,928	884	242	IN	MRRC #1
N9JF	187,066	773	242	IL	WA9TPQ Memorial-2
KJ9C	179,070	762	235	IN	SMC #3
K9MA	178,294	746	239	WI	
WA9IRV	176,579	799	221	WI	SMC Wisconsin
K9BGL	160,608	717	224	IL	
K9MMS	150,975	671	225	IL	WA9TPQ Memorial-1
N9NE	150,570	717	210	WI	SMC #3
WT9U	149,995	655	229	IN	SMC #1
K5OT	140,070	690	203	WI	SMC Wisconsin
K9ZO(K9YO)	139,605	681	205	IL	
KG9X	130,968	612	214	IL	
W9UR	122,996	634	194	IN	WA9TPQ Memorial-1
W9IU	108,885	595	183	IN	SMC #3
WA1UJU	105,764	548	193	WI	SMC Wisconsin
K9LU	100,214	563	178	IL	WA9TPQ Memorial-1
K9IG	94,844	524	181	IN	
K9WX	87,824	499	176	IN	SMC #2
W9LO	85,943	601	143	WI	SMC #3
W9WUU	81,844	518	158	WI	SMC #5
N9BOR	77,655	501	155	IL	WA9TPQ Memorial -3
KX9DX	67,196	428	157	IL	SMC #3
K9WA	66,120	435	152	IL	Green River Valley ARS #2
N9XX	64,437	457	141	WI	SMC #4
WX9U	48,580	347	140	IL	
K9AY	46,650	311	150	WI	SMC #4
K9JE	46,224	321	144	IL	WA9TPQ Memorial-1
K9JWI	38,437	323	119	IN	
K9LA	34,452	297	116	IN	
W9YS	25,308	228	111	IL	WA9TPQ Memorial-3
K9IJ	21,114	207	102	IL	WA9TPQ Memorial-3
AA9NF	19,306	197	98	IL	
AH6EZ/W9	19,012	196	97	IL	WA9TPQ Memorial-2
WC9C	17,381	191	91	IN	
KB9YSI	15,925	175	91	IL	WA9TPQ Memorial-2
K9MI	10,005	145	69	IN	SMC #4
AK9F	9,956	131	76	IL	SMC #5
W9AX	9,271	127	73	IL	WA9TPQ Memorial-1
K9UQN	7,854	119	66	IL	
W9CC	6,868	101	68	IN	
N9SDT	2,457	63	39	IL	
N9GUN	1,972	58	34	IL	WA9TPQ Memorial-3
AI9L	1,750	50	35	IL	SMC #5
N9KO	1,316	47	28	IL	WA9TPQ Memorial-3
W9HLY	1,272	53	24	IN	
N2IC	367,628	1259	292	CO	GMCC #1
K0SR	272,085	1067	255	MN	MWA #1
N0AV	236,108	881	268	IA	SMC #2
KU1CW	230,880	962	240	MO	KCDXC #1
WB0O	224,640	936	240	ND	
NA0N	217,389	933	233	MN	MWA #1
KT0R	208,069	893	233	MN	MWA #2
K0OB	200,291	923	217	MN	MWA #1
K0AD	192,000	800	240	MN	MWA #2
N9CO	188,727	817	231	CO	SMC #2
K0BJ	174,284	748	233	KS	KCDXC #1
K0OU	171,986	761	226	MO	SMC #2
KM0O	168,204	786	214	MN	MWA #2
K0FX	160,175	745	215	CO	GMCC #3
K0VBU	158,110	815	194	KS	KCDXC #1
N4VI	155,800	760	205	CO	GMCC #2
K0WA	133,292	709	188	KS	
N0FP	121,056	624	194	MN	MWA #2
N0SXX	120,506	677	178	CO	GMCC #2
K7RE	114,660	637	180	SD	
W0UY	107,835	553	195	KS	SMC #2
N0UR*	102,588	618	166	MN	
KJ0G	100,167	519	193	CO	GMCC #1
K0MPH	95,568	543	176	MN	MWA #3
N0HF	91,350	525	174	CO	GMCC #2
KE0FT	73,752	439	168	IA	Green River Valley ARS #1
N0BUI	71,371	479	149	MN	MWA #3
K0UK(KB0QAA)	71,050	490	145	CO	GMCC #3
AE9B	71,012	433	164	MO	KCDXC #2
KI0F	65,440	409	160	MN	MWA #4
AC0W	54,096	368	147	MN	MWA #2
K0RAY(N0PKX)	53,997	439	123	MO	
WA0IYY	50,055	355	141	MO	SMC #5
K8FC	49,818	361	138	CO	GMCC #3

Call	Score	QSOs	Mults	QTH	Team
K4IU	41,850	310	135	MN	
K0JPL	38,216	281	136	MO	
NN0G	35,332	292	121	CO	GMCC #1
N0EO(AA0AW)	30,821	259	119	MN	
KN0V	29,400	245	120	MN	MWA #3
W8TM*	28,050	330	85	NE	
AA0MZ	27,840	232	120	KS	KCDXC #1
K0XM	26,280	219	120	KS	KCDXC #1
AE0Q	19,623	211	93	CO	GMCC #2
KI0II*	18,128	176	103	CO	GMCC #3
KI7WO	17,978	202	89	MO	KCDXC #2
W0ETC	11,703	141	83	IA	TCG Team 7
WG0M	11,470	155	74	MN	MWA #4
KC0IOX	10,281	149	69	SD	
N0SG	7,581	133	57	CO	GMCC #3
WN8P	5,980	130	46	KS	
K9IUA*	3,105	69	45	IA	Green River Valley ARS #2
WBØTRA	2,700	60	45	MN	MWA #4
VE3EJ	277,764	948	293	ON	Boring ARC
VE5SF	184,671	867	213	SK	
VE1OP	180,544	868	208	NS	
VE5ZX	172,508	854	202	SK	
VE4VV	167,904	792	212	MB	MWA #1
VE3KZ	153,272	644	238	ON	CCO #1
VE2AWR	140,015	683	205	QC	
VE3KP	125,000	625	200	ON	CCO #1
VE3IAY	112,000	640	175	ON	CCO #1
VE3STT	99,009	513	193	ON	CCO #1
VA3NR	72,345	455	159	ON	CCO #1
VE7NI	65,052	417	156	BC	
VE7ASK	61,388	412	149	BC	
VA7LC	53,550	425	126	BC	
VE3GLO	52,984	358	148	ON	
VE9DX*	39,564	314	126	NB	
VO1HP	34,688	271	128	LAB	
VE7IN	31,232	244	128	BC	
VE3NE	31,104	288	108	ON	
VE2EXR	30,240	270	112	QC	
VE3NWA	21,141	261	81	ON	
VE3WZ*	18,228	186	98	ON	
VE3NBJ	17,040	240	71	ON	
VE4YU	14,448	168	86	MB	
VA3XRZ	10,716	141	76	ON	
VE3GSI	5,202	102	51	ON	
VE3WO	4,708	107	44	ON	
VA3IX	4,187	79	53	ON	
VE3AGC	3,750	75	50	ON	
VE3CR	2,479	67	37	ON	
VE2KRM	108	12	9	QC	
TG9/N0AT	73,005	465	157	TG	
LW5EE	3,666	78	47	DX	

* Indicates QRP entry

Multi-Two Scores

Call	Score	QSOs	Mults	QTH
W5NN	595,296	1872	318	TX
(NO5W, N1LN, K5GA, K5NZ)				
K5KA	537,862	1781	302	OK
(K5YAA, W5TM, K5KA)				
K5GO	504,192	1616	312	AR
(N5OE, N5DX, K5GO)				
N0NI	459,644	1522	302	IA
(N0AC, N0NI, WO0V)				
N9KI	390,321	1399	279	WI
(K0SN, W9YQ)				
W1SRG	76,858	463	166	MA
(AG1C, K1RDD)				
KC7EQW	3,174	69	46	CA
(WB7RHT, WB6CGJ)				

Check Logs: K0IR, K3FH, K9QVB, KD5CMN, KF3CV, N6TW, UZ7U, VE7FO, W6IXP, KC0W

Top Ten Combined Single Operator Scores for January 2003 NAQPs

Dan, N6MJ, won the combined CW/SSB NAQP competition with his third place CW and first place SSB finishes. N6RT and N6NF took second and third places, respectively. Congratulations to all of these great ops!

Operator	CW Points	SSB Points	Total Points
N6MJ	491	500	991
N6RT	478	435	913
N6NF	349	449	798
K6LL	419	368	787
K5RC	364	409	774
K9PG	404	363	767
K4WX	368	397	765
K3MM	369	383	752
WE9V	357	329	686
W9RE	432	148	581

Team Scores

1. SCCC #1		*2. TCG Team 1*		*3. SMC #1*	
N6MJ	360,873	W4PA	347,745	N9RV	367,812
W6EEN	351,345	K4RO	277,168	W9RE	318,115
K6LL	308,352	K4WX	270,884	K9PG	297,290
K6LA	276,353	KØEJ	260,096	N9CK	263,592
K6AM	214,638	W9WI	252,007	WT9U	149,995
Total	1,511,561	Total	1,407,900	Total	1,396,804

4. NCCC #1 (N6RO, W7TTT, K2KW, K7NV, WØYK) 1,212,922
5. SECC #1 (W4AN, K4NO, W4OC, K4BAI, KU8E) 1, 129,509
6. PVRC One (K3MM, N4AF, K7SV, N4CW, K2YWE) 1,082,079
7. NTCC #1 (N5RZ, AD5Q, WØUO, W5FO, N5RG) 1,039,191
8. TCG Team 2 (W7GG, K1KY, N9AG, K4LTA, N8BJQ) 1,010,536
9. SMC Wisconsin (WE9V, N9FH, WA9IRV, K5OT, WA1UJU) 910,687
10. MWA #1 (KØSR, NAØN, KØOB, VE4VV) 857,669

11. Mad River Radio Club #1 (W8MJ, K9NW, K5IID, NU8Z, AF8A) 837,856
12. Boring Amateur Radio Club (K7RAT, VE3EJ, NØAX) 824,472
13. SMC #2 (NØAV, N9CO, KØOU, WØUY, K9WX) 792,480
14. MWA #2 (KTØR, KØAD, KMØO, NØFP, ACØW) 743,425
15. Florida Contest Group #1 (N2NL, K4OJ, K5KG, NF4A) 736,210
16. Azenmokers 1 (N6ZZ, N5UL, K5TT, KY7M, KØCIE) 707,069
17. KCDXC #1 (KU1CW, KØBJ, KØVBU, AAØMZ, KØXM) 617,394
18. TCG Team 3 (W4AU, W4NZ, K4MA, N4IR) 613,180
19. SMC #3 (KJ9C, N9NE, W9IU, W9LO, KX9DX) 591,664
20. Austin Powers (N3BB, W5KFT, K5TR) 570,888

21. CCO #1 (VE3KZ, VE3KP, VE3IAY, VE3STT, VA3NR) 561,626
22. GMCC #1 (N2IC, KJØG, WØETT, NNØG) 557,927
23. Kentucky Contest Group (KCG)(N4GN, K4FXN, KA8OKH) 543,714
24. FRC Domestic (N2NC, K3WW) 535,237
25. Team Mississippi (W5XX, W5UE, WQ5L, KB5IXI, K5SA) . 528,565
26. PVRC Two (NR3X, K4QPL, W3BP, N8II) 528,514
27. Azenmokers 2 (N5OT, WA7LNW, K5CM, N7FO) 498,826
28. North Coast Contesters #1 (W8CAR, W8GN, W8KIC, N3SD, W3IQ) 446,241
29. NCCC #2 (K6CTA, AD6E, N3ZZ) 446,017
30. WA9TPQ Memorial-1 (K9MMS, W9UR, K9LU, K9JE, W9AX) 429,680

31. Florida Contest Group #2 (K4MM, N4IG, W4SAA, K4LW) 426,096
32. PaQP'ers (WA3HAE, WA3SES, AD8J, N3FR, W1NN) 400,803
33. SCCC #2 (WN6K, K6NR, W6KY) 400,318
34. GMCC #2 (N4VI, NØSXX, NØHF, AEØQ) 387,279
35. GMCC #3 (KØFX, KØUK, K8FC, KIØII, NØSG) 306,752
36. Mad River Radio Club #4 (K8MR, KT8X, AD8P, KQ8J) 302,334
37. Ozark CC (KM5G, W5MK, K5XK) 293,184
38. Mad River Radio Club #3 (N8EA, K8CC, ND8DX) 288,639
39. TCG Team 5 (K4AMC, KE4OAR, W4TYU, W4RK) 288,561
40. SECC #2 (NE4S, NS4T, KA9EKJ, W4ATL, WB6BWZ) 287,861

41. Florida Contest Group #3 (NO4S, K1UM, K9ES) 263, 191
42. TCG Team 4 (NY4N, K3CQ, NY4T, K4BEV, NA4K) 230,032
43. WA9TPQ Memorial-2 (N9JF, AH6EZ/W9, KB9YSI) 222,003
44. Florida Contest Group #4 (N4BP, W4ZW, NJ4M, KN4Y) .. 219,208
45. Order of Boiled Owls (K2SX, K2LE, N2UN) 210,386
46. TDXS (KG5U, K5XR) 207,704
47. MWA #3 (KØMPH, NØBUI, KNØV) 196,339
48. Livermore ARK (W6OA, W6GPM, WB6ETY, AE6IS, KI6OY) 172,584
49. NCCC #3 (K6DGW, K6ENT, WA6PX, KE6JAC, NM6E) 152,604
50. SMC #5 (W9WUU, WAØIYY, AK9F, AI9L) 143,605

51. Alabama Contest Group (W4NTI, NA4W) 139,988
52. WA9TPQ Memorial-3 (N9BOR, W9YS, K9IJ, N9GUN, N9KO) 127,365
53. SMC #4 (N9XX, K9AY, K9MI) 121,092
54. Hall of Fame Contest Group (W8XY, W8VE, N8OH, KK8D, N8PW) 120,178
55. KCDXC #2 (AE9B, KI7WO) 88,990
56. SECC #3 (K2UFT, K4GA, AA4LR) 85,527
57. MWA #4 (KIØF, WGØM, WBØTRA) 79,610
58. TCG Team 7 (W4HZD, WØETC, W4BCG) 78,736
59. Green River Valley ARS #2 (K9WA, K9IUA) 69,225
60. Mad River Radio Club #2 (K8AAX, NX8C, W8RU) 34, 230

61. TCG Team 6 (N5NW, WM4Q) 30,452
62. SECC #4 (K4IQJ, AA4GA) 22,436

CONTEST CALENDAR

Compiled by Bruce Horn, WA7BNM

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

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

January 2004

UBA-SWARL 365 Day Contest	0000Z, Jan 1 to 2400Z, Dec 31
AGB NYSB Contest	0000Z-0100Z, Jan 1
SARTG New Year RTTY Contest	0800Z-1100Z, Jan 1
AGCW Happy New Year Contest	0900Z-1200Z, Jan 1
ARRL RTTY Roundup	1800Z, Jan 3 to 2400Z, Jan 4
Kid's Day Contest	1800Z-2400Z, Jan 3
EUCW 160m Contest	2000Z-2300Z, Jan 3 and 0400Z-0700Z, Jan 4
Hunting Lions in the Air	0000Z, Jan 10 to 2400Z, Jan 11
East Asia 160/80 DX Contest	0900Z, Jan 10 to 2200Z, Jan 11
UK DX Contest, SSB	1200Z, Jan 10 to 1200Z, Jan 11
Midwinter Contest, CW	1400Z-2000Z, Jan 10
North American QSO Party, CW	1800Z, Jan 10 to 0600Z, Jan 11
NRAU-Baltic Contest, CW	0530Z-0730Z, Jan 11
NRAU-Baltic Contest, SSB	0800Z-1000Z, Jan 11
Midwinter Contest, Phone	0800Z-1400Z, Jan 11
DARC 10-Meter Contest	0900Z-1059Z, Jan 11
070 Club PSKFest	0000Z-2400Z, Jan 17
LZ Open Contest, CW	1200Z-2000Z, Jan 17
MI QRP January CW Contest	1200Z, Jan 17 to 2359Z, Jan 18
Hungarian DX Contest	1200Z, Jan 17 to 1200Z, Jan 18
North American QSO Party, SSB	1800Z, Jan 17 to 0600Z, Jan 18
ARRL January VHF Sweepstakes	1900Z, Jan 17 to 0400Z, Jan 19
CQ 160-Meter Contest, CW	0000Z, Jan 24 to 2359Z, Jan 25
REF Contest, CW	0600Z, Jan 24 to 1800Z, Jan 25
BARTG RTTY Sprint	1200Z, Jan 24 to 1200Z, Jan 25
UBA DX Contest, SSB	1300Z, Jan 31 to 1300Z, Feb 1
WSJT 6-Meter Mileage Marathon	0000Z, Jan 31 to 2400Z, Feb 8

February 2004

North American Sprint, CW	0000Z-0400Z, Feb 1
Vermont QSO Party	0000Z, Feb 7 to 2400Z, Feb 8
New Hampshire QSO Party	0000Z, Feb 7 to 2400Z, Feb 8
10-10 Inter. Winter Contest, SSB	0001Z, Feb 7 to 2400Z, Feb 8
Minnesota QSO Party	1400Z-2359Z, Feb 7
Delaware QSO Party	1700Z, Feb 7 to 0500Z, Feb 8 and 1300Z, Feb 8 to 0100Z, Feb 9
Mexico RTTY International Contest	1800Z, Feb 7 to 2400Z, Feb 8
North American Sprint, Phone	0000Z-0400Z, Feb 8
CQ/RJ WW RTTY WPX Contest	0000Z, Feb 14 to 2400Z, Feb 15
Asia-Pacific Sprint, CW	1100Z-1300Z, Feb 14
Dutch PACC Contest	1200Z, Feb 14 to 1200Z, Feb 15
YL-OM Contest, CW	1400Z, Feb 14 to 0200Z, Feb 16
FISTS Winter Sprint	1700Z-2100Z, Feb 14
OMISS QSO Party	1700Z, Feb 14 to 0500Z, Feb 15
RSGB 1.8 Mhz Contest, CW	2100Z, Feb 14 to 0100Z, Feb 15
QRP ARCI Winter Fireside SSB Sprint	2000Z-2400Z, Feb 15
ARRL School Club Roundup	1300Z, Feb 16 to 0100Z, Feb 21
ARRL Inter. DX Contest, CW	0000Z, Feb 21 to 2400Z, Feb 22
YL-ISSB QSO Party, CW	0000Z, Feb 21 to 2400Z, Feb 22
YL-OM Contest, SSB	1400Z, Feb 21 to 0200Z, Feb 23
CQ 160-Meter Contest, SSB	0000Z, Feb 28 to 2359Z, Feb 29
REF Contest, SSB	0600Z, Feb 28 to 1800Z, Feb 29
UBA DX Contest, CW	1300Z, Feb 28 to 1300Z, Feb 29
Mississippi QSO Party	1500Z, Feb 28 to 0300Z, Feb 29
FYBO Winter QRP Field Day	1600Z-2400Z, Feb 28
North American QSO Party, RTTY	1800Z, Feb 28 to 0600Z, Feb 29
High Speed Club CW Contest	0900Z-1100Z, Feb 29 and 1500Z-1700Z, Feb 29
North Carolina QSO Party	1700Z, Feb 29 to 0300Z, Mar 1

Results, January 2003 NAQP SSB Contest

Bruce Horn, WA7BNM
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Recently, it seems that every January NAQP SSB results starts out with the same sentence: "N6MJ once again breaks 400k and takes first place." This contest was no different. Fellow Californian, N6NF, took second, while N6RT took third operating W6EEN's station. That's an all-California top three. K5RC, using the W7TTT call, was fourth from nearby Nevada. K4WX was fifth and the top score from somewhere other than the West Coast. K4XS took most multiplier honors from Florida, but didn't have enough QSOs to do better than sixth. K3MM was seventh with a strong multiplier total, while K7RI and K9PG took ninth and tenth, respectively. Once again, it took a score of more than 300k to make the Top Ten.

Like N6MJ in single-op, the K9NS guys seem to have the multi-two category wired from Illinois. They easily outdistanced their closest competitor by almost 200k points to take first place. NX5M took second from Texas by staying 20k plus points ahead of W6YX in California.

In the team competition, the Southern California Contest Club #1 team took first place with three of its five members placing in the top ten of the single op competition. The Tennessee Contest Group #1 team was second, while SMC #1 took third.

A complete summary of NAQP SSB contest records will be published in the next issue of the NCJ.

WA9TPQ Memorial Teams in the January 2003 NAQP Contests

Gary Hornbuckle, K9MMS

In December 2002, Bill Erickson, WA9TPQ, passed away at the age of 50. He died very unexpectedly about a day and a half after having a stroke.

Bill was very active in the local radio club, the Fox River Radio League (FRRL). He previously held several offices in the club—including being a past president. For years, Bill enjoyed participating in various radio contests, and he was also a member of the Society of Midwest Contesters. For several years, Bill wrote a monthly column "CQ Contest!" in the FRRL newsletter, the *Arc Over,* promoting radio contesting.

In memory of Bill, WA9TPQ Memorial teams were formed among members of the Fox River Radio League and the Society of Midwest Contesters for both the CW and SSB NAQPs in January 2003. I organized that effort following the initial idea by John Dunker, W9UR. For the CW NAQP, three WA9TPQ Memorial teams were formed. For the SSB NAQP, five WA9TPQ Memorial teams were formed. Members of these teams sent "Bill" for their name in the contest exchanges. In addition, various other members of the Society of Midwest Contesters also used the name "Bill."

After the NAQPs, several team members mentioned that during the contests, they received comments from other stations worked that nearly everyone in Illinois seemed to be named "Bill."

Team Scores

1. SCCC #1	*2.*	*Tennessee Contest Group #1*		*3. SMC #1*	
N6MJ	417,703	K4WX	331,854	K9PG	303,028
W6EEN	375,102	W5TM	291,984	WE9V	274,744
K6LL	307,200	VE5SF	252,436	KG9X	155,498
K6RO	233,260	K4MA	181,600	W9RE	123,993
K6AM	177,216	K4RO	159,797	W9IU	111,492
Total	1,498,879	Total	1,217,671	Total	968,755

4. Team SO1R (K7RI,N7GYD,N7LOX,W7OM) 937,647
5. PVRC ONE (K3MM,NX9T,W4NF,K7SV,K4HA) 864,614
6. NCCC#1 (W7TTT,WX5S,K6LRN,K6EP,K6DGW) 793,126
7. Tennessee Contest Group #2 (K7AW, KØEJ,NY4T,KE4OAR,WØETC) 637,252
8. MWA #1 (KTØR,AC0W, KØMPH,VE4VV) 629,938
9. Mad River Radio Club #1 (ND8DX,WZ8P,N8KM,NY1S,K5IID) 583,127
10. Florida Contest Group #1 (K4XS,WC4E,KK4TA,NF4A) 571,242

11. KCDXC #1 (KØOU,NØAG, KØXM,AAØMZ) 482,133
12. SCCC #2 (N6KI,AA6PW,N6ED) 434,363
13. Connecticut Radio Society #1 (NA1QP,KK1L,W1JQ,N1MD) 426,646
14. WA9TPQ Memorial-1 (K9ZO,K9MMS,K9LU,K9JE) 417,637
15. South East Contest Club #1 (W4ATL,N2XD,NS4T,AA4LR) 397,788
16. SMC #2 (KX9DX,K9MI,WA1UJU,K9WX) 395,521
17. GMCC Horsethief Pass (WØLSD,N4VI) 349,652
18. MWA #3 (KØOB,NØAT,WA2HFI,AAØAW,WGØM) 342,450
19. SCCC #3 (K6LA,W6KK,K6EY,N6TW,K6ZCL,WA7BNM) 308,663
20. Tennessee Contest Group #3 (NA4K,K4BEV,AF4QB,K4LTA,K4BP) 307,137

21. South East Contest Club #2 (NE4S,K4BAI,KU8E,WB6BWZ) 298,976
22. MWA #2 (K4IU,WB0TRA, KØSV,WØRK) 270,954
23. GMCC Wagon Wheel Gap (NØSXX, KØGAS,NNØG,NØSG) 264,569
24. Bay Area Wireless Assn (KE9S,K8IR) 258,309
25. SMC #4 (NØAV,K5OT,AA9RT,W9LYA) 206,946
26. PaQP'ers (N3FR,AD8J) 183,951
27. Mad River Radio Club #2 (NU8Z,K8UP,K8MR,AD8P) 167,822
28. WA9TPQ Memorial-3 (KC9UM,AH6EZ/W9,W9CEO,W9AN) 166,216
29. Mad River Radio Club #3 (KT8X,KW8W,AF8A,K9NW) 135,919
30. GMCC Windy Saddle Pass (WØTM,KIØII,ABØMV) 132,371

31. Team VE9 (VE9MY,VE9WH,VE9IM,VE9GLF,VE9SAB) 129,288
32. CTRI Contest Group (KS1J,KB1LN) 103,944
33. Tennessee Contest Group #6 (WN4M,N5NW,W4RK,W4BCG,KE4KMG) 100,237
34. SMC #3 (KC9ARR,W9LO,WA9IRV) 98,710
35. Colony Mountain Contest Club (K5RPD,W5RZ) 96,602
36. KCDXC #2 (KØVBU,KI7WO) 88,967
37. NCC #1 (N8AA,N3RA,K8NZ) 75,550
38. Order of Boiled Owls (KS2G,K2DO) 68,726
39. Livermore ARK (W6OA,KI6OY,WB6ETY,AE6IS) 63,811
40. Tennessee Contest Group #5 (W4TDB,K4OOO,KC4URW) 63,464

41. Hall of Fame Contest Group (N8OH,KK8D,W8XY) 61,029
42. Tennessee Contest Group #4 (WA4JA,K4AMC,N4JN) 58,243
43. Connecticut Radio Society #2 (WW3K,N2EAB) 35,310
44. WA9TPQ Memorial-2 (NA9A,W1AW,WØHED,N9HED,KB9YSI) 31,299
45. WA9TPQ Memorial-5 (W9AYJ,KD9XP) 10,379
46. South East Contest Club #3 (WB4SQ,K4GA) 8,376
47. WA9TPQ Memorial-4 (W9CZA,KB9UJB,AB9CH) 3,790

Single Op Top Ten Breakdowns

Call	*Score*	*QSOs*	*Mults*	*160*	*80*	*40*	*20*	*15*	*10*	*Team*
N6MJ	417,703	1651	253	20/7	59/28	200/46	527/62	403/56	442/54	SCCC #1
N6NF	375,102	1603	234	23/8	81/27	285/49	411/54	400/50	403/46	
W6EEN (N6RT)	363,500	1454	250	11/5	84/34	268/53	283/56	390/55	418/47	SCCC #1
W7TTT (K5RC)	342,044	1468	233	7/4	97/27	213/49	459/56	374/53	318/44	NCCC #1
K4WX	331,854	1349	246	119/30	297/48	299/52	320/50	173/37	141/29	TCG #1
K4XS	326,898	1143	286	42/23	115/52	279/56	314/57	284/55	109/43	FCG #1
K3MM	319,788	1134	282	95/35	148/43	255/55	296/57	189/51	151/41	PVRC 1
K6LL	307,200	1280	240	9/6	59/24	190/46	359/58	297/57	366/49	SCCC #1
K7RI	305,201	1381	221	9/5	43/20	131/41	368/56	413/54	417/45	SO1R
K9PG	303,028	1067	284	128/40	251/53	223/56	166/54	183/47	116/34	SMC #1

Multi-Two Breakdowns

Call	*Score*	*QSOs*	*Mults*	*160*	*80*	*40*	*20*	*15*	*10*
K9NS	808,033	2549	317	234/46	420/56	534/57	666/63	310/52	385/43
NX5M	622,442	2239	278	70/22	154/38	423/55	658/59	577/59	357/45
W6YX	601,818	2254	267	22/11	126/32	306/51	516/61	571/57	713/55

Single Operator Scores

Call	*Score*	*QSOs*	*Mults*	*QTH*	*Team*
NA1QP	157,334	811	194	CT	CRS 1
KK1L	150,902	766	197	VT	CRS 1
W1JQ	112,030	659	170	CT	CRS 1
KS1J	100,152	642	156	RI	CTRI CG
NY1S	80,997	551	147	ME	MRRC #1
WW3K	29,088	288	101	CT	CRS 2
N1BCL	28,527	257	111	VT	
W3TB	27,456	264	104	CT	
WB1Z	27,250	250	109	MA	
W1AMF	20,972	196	107	CT	
K1HT	13,992	159	88	MA	
W1AW(W9GIG)	9,240	165	56	CT	WA9TPQ Memorial-2
AB1BX	8,496	144	59	RI	
N1MD	6,380	110	58	CT	CRS 1
KB1LN	3,792	79	48	RI	CTRI CG
K1HJ*	3,024	72	42	MA	
K5ZD	2,706	66	41	MA	
K1GU	195	15	13	MA	
N2NC	107,579	601	179	NJ	
K2LV	103,428	663	156	NY	
N2CU	93,612	538	174	NY	
KS2G	54,000	450	120	NY	Order of Boiled Owls
W2KA	31,065	285	109	NY	
N2MH	16,281	201	81	NJ	
NY6DX	14,800	185	80	NY	
K2DO	14,726	199	74	NY	Order of Boiled Owls
W2QOB	8,448	132	64	NJ	
K3MYR	7,375	125	59	NJ	
N2EA	6,222	102	61	NY	CRS 2
KD2HE	5,456	124	44	NY	
N2LQQ	4,324	94	46	NY	
KC2HZW	1,593	59	27	NY	
K2PH	1,008	42	24	NY	
K3MM	319,788	1134	282	MD	PVRC ONE
N3FR	105,544	668	158	PA	PaQP'ers
AD8J	78,407	487	161	PA	PaQP'ers
W4ZE	59,040	410	144	PA	
N8NA	56,980	407	140	DE	
W3LL	56,000	400	140	MD	
NA3V	39,125	313	125	PA	
AK3E	30,789	311	99	MD	
NE3H	30,602	286	107	PA	
N3GXY*	13,213	181	73	PA	
K3WW	12,062	163	74	PA	
KD3DAE	10,200	170	60	MD	
N4GG	4,900	100	49	MD	
K4MUT	3,696	77	48	MD	
KB3HFZ	1,176	49	24	PA	
K3ASK	828	36	23	MD	
AA0CY	588	28	21	PA	
KF3BN	560	35	16	MD	
AB9CH	228	19	12	PA	WA9TPQ Memorial-4
K4WX	331,854	1349	246	TN	TCG #1
K4XS	326,898	1143	286	FL	FCG #1
WC4E	181,800	909	200	FL	FCG #1
K4MA	181,600	908	200	NC	TCG #1
NX9T	172,992	816	212	NC	PVRC ONE
W4NF	163,418	809	202	VA	PVRC ONE
K7SV	161,056	719	224	VA	PVRC ONE
K4RO	159,797	803	199	TN	TCG #1
K0EJ	151,438	746	203	TN	TCG #2
NE4S	143,745	777	185	GA	SECC #2
NY4T	134,064	784	171	TN	TCG #2
W4WTB	130,025	743	175	NC	
W4ATL	124,666	751	166	GA	SECC #1
KY4AA(K9GX)	119,316	652	183	KY	
NA4K	118,620	659	180	TN	TCG #3
N2XD	113,212	682	166	SC	SECC #1
KE4OAR	102,371	613	167	TN	TCG #2
NS4T	100,980	561	180	SC	SECC #1
K4BEV	82,170	498	165	TN	TCG #3
K4BAI	79,182	498	159	GA	SECC #2
K1UM	70,179	447	157	FL	FCG #1
NA4BW	67,200	480	140	GA	
KU8E	60,741	397	153	GA	SECC #2
AF4QB	59,898	402	149	TN	TCG #3
AA4LR	58,930	415	142	GA	SECC #1
KK4TA	57,190	430	133	FL	FCG #1
WN4M	49,077	369	133	TN	TCG #6
K4HA	47,360	370	128	NC	PVRC ONE
W0YR	39,905	347	115	VA	
W4TDB	36,905	305	121	TN	TCG #5
K4LTA	36,225	315	115	TN	TCG #3
KK4RV	30,284	268	113	NC	
WA4JA	29,998	283	106	TN	TCG #4
K4PB	28,560	238	120	FL	
N4GI	28,449	327	87	FL	FCG #2
K4AMC	25,632	267	96	TN	TCG #4
K4ZR(K2SC)	24,200	275	88	AL	
K4OOO	22,869	231	99	TN	TCG #5
K5EEE	18,984	226	84	FL	
K4DGW	18,564	221	84	VA	
W3BP	17,751	183	97	VA	
VE3XD/W4	17,458	203	86	FL	
W4NZ	17,280	180	96	TN	
KG4NYV	16,632	198	84	SC	
W4NTI	16,517	199	83	AL	Alabama CG
K4WW	15,600	200	78	KY	
WB6BWZ*	15,308	172	89	GA	SECC #2
W4RK	13,300	190	70	TN	TCG #6
W4BCG	10,360	140	74	TN	TCG #6
K4BP	10,224	144	71	TN	TCG #3
KM4H	9,744	112	87	TN	
N4ZDL	9,394	154	61	VA	
W9WI	9,246	138	67	TN	TCG #7
W3GHU	8,908	131	68	VA	
K8OSF	8,591	121	71	FL	
K4QPL	8,470	121	70	NC	
WB4SQ	7,872	123	64	GA	SECC #3
N4NTO	7,564	122	62	NC	
WA4OSD	6,136	104	59	TN	
KG4OJT	5,656	101	56	VA	
K9ES	5,390	98	55	FL	
NF4A	5,353	101	53	FL	FCG #1
KE4KMG	5,280	110	48	TN	TCG #6
KG4OCJ	4,998	102	49	KY	
W4OGG	4,240	80	53	TN	
K3MZ	4,212	78	54	VA	
KC4URW	3,690	82	45	TN	TCG #5

Call	Score	QSOs	Mults	QTH	Team
N8IK	3,680	80	46	VA	
N4DW	3,321	81	41	TN	
K4LW	3,040	80	38	FL	
N3BF	2,628	73	36	VA	PVRC TWO
N4JN	2,613	67	39	TN	TCG #4
N4JED	1,728	64	27	VA	
KG4TUL	1,530	45	34	GA	
W4JIK	627	33	19	NC	
K4GA	504	24	21	GA	SECC #3
KG4MWO	414	23	18	FL	
WD4NIT	322	23	14	GA	
W5TM	291,984	1264	231	OK	TCG #1
WA7LNW	257,670	1227	210	NM	
W5KFT(K5PI)	229,731	1049	219	TX	
W5WMU	219,190	953	230	LA	
K5UTD(K5AEA)	166,440	876	190	TX	
K5YAA	161,190	810	199	OK	
W5MK	88,164	558	158	AR	
K5RPD	77,000	500	154	AR	Colony Mtn CC
N5DUW	62,320	410	152	TX	
K5WAF	41,580	308	135	TX	
N3BUO	37,723	317	119	TX	
W5TZN	37,050	285	130	OK	
W5CX	30,690	279	110	TX	
K5KA	29,264	248	118	OK	
KA5BAY	25,190	229	110	OK	
K0CIE	24,768	258	96	OK	
K5ACO	22,473	227	99	AR	
NI5F	21,808	232	94	MS	
KC5R	21,483	231	93	LA	
KE5OG	20,952	216	97	TX	
W5RZ	19,602	198	99	AR	Colony Mtn CC
KD5LNO	7,680	128	60	TX	
KJ5RP	5,814	102	57	TX	
WQ5L	5,775	105	55	MS	
KD5TMF	5,311	113	47	TX	
N5PA	5,133	87	59	MS	
KD5MUY	3,249	57	57	OK	
K5LAN	3,240	72	45	TX	
N5UL	1,536	48	32	NM	
K5WW	1,400	56	25	TX	
N6MJ	417,703	1651	253	CA	SCCC #1
N6NF	375,102	1603	234	CA	
W6EEN(N6RT)	363,500	1454	250	CA	SCCC #1
K6RO	233,260	1070	218	CA	SCCC #1
WX5S(@N6RO)	215,264	992	217	CA	NCCC#1
N6KI	197,585	919	215	CA	SCCC #2
AA6PW	187,302	1007	186	CA	SCCC #2
K6AM	177,216	852	208	CA	SCCC #1
K6LA	136,864	728	188	CA	SCCC #3
KE6ZSN	117,793	697	169	CA	
W6KK	102,765	663	155	CA	SCCC #3
K6LRN	102,200	584	175	CA	NCCC#1
KA6MAL	94,690	557	170	CA	
K6EP	88,110	534	165	CA	NCCC#1
WX6V	55,640	428	130	CA	
WA6BFW	54,810	378	145	CA	
N6ED	49,476	399	124	CA	SCCC #2
NN6DX(W1PR)	47,600	350	136	CA	
ND2T	47,320	364	130	CA	
N6EM	46,746	318	147	CA	
K6DGW	45,508	367	124	CA	NCCC#1
K6EY	41,658	318	131	CA	SCCC #3
W6OA	41,561	299	139	CA	Livermore ARK
AE6Y	34,347	321	107	CA	
KG6ENA	27,520	320	86	CA	
AK6DV	19,548	181	108	CA	
KI6OY	19,488	203	96	CA	Livermore ARK
N6TW	15,936	166	96	CA	SCCC #3
KK6F	15,312	176	87	CA	
K6OWL	13,692	163	84	CA	
K7JJ	13,440	160	84	CA	
WB6NFO	11,280	141	80	CA	
K6ENT	9,432	131	72	CA	
W7SW	7,626	123	62	CA	
K6BBQ	7,410	114	65	CA	
K6ZCL	7,030	190	37	CA	SCCC #3
K6NA	6,608	118	56	CA	
W6RKC	6,510	105	62	CA	
K6CTA	5,376	96	56	CA	
K6CSL	5,115	93	55	CA	
W6ZZZ	4,732	91	52	CA	NCCC#2
WA7BNM	4,410	126	35	CA	SCCC #3
KE6JAC	3,268	76	43	CA	
W6ISO	2,925	65	45	CA	
WA4FIB	2,795	65	43	CA	
WB6ETY	2,240	56	40	CA	Livermore ARK
W6MVW	2,090	55	38	CA	
AH6RC	946	43	22	HI	
K6PDQ	540	27	20	CA	
AE6IS	522	29	18	CA	Livermore ARK
K6LDX	88	11	8	CA	
NC6P	49	7	7	CA	
W7TTT(K5RC)	342,044	1468	233	NV	NCCC#1
K6LL	307,200	1280	240	AZ	SCCC #1
K7RI	305,201	1381	221	WA	Team SO1R
N7GYD	270,946	1226	221	WA	Team SO1R
W7ZR	236,980	1156	205	AZ	
N7LOX	188,748	963	196	WA	Team SO1R
W7OM	172,752	944	183	WA	Team SO1R
K7AW(K5ZM)	154,519	809	191	OR	TCG #2
WG7Y	127,737	747	171	WY	
K7ZS	123,003	711	173	OR	
WS7V	102,555	645	159	WA	
K8IA	94,208	512	184	AZ	
NC7M	93,547	673	139	OR	
WA7YAZ	78,125	625	125	UT	
AC7AF	77,480	596	130	WY	
KW7N	64,779	453	143	ID	
KI7Y	54,526	398	137	OR	
W6RLL	44,799	327	137	AZ	
W0ETT/M(W0ETT)	42,224	377	112	WY	
K7RAT(N6TR)	40,635	315	129	OR	
AL1G	39,856	424	94	KL7	
K7WM	26,680	232	115	AZ	
K7ZO	9,516	156	61	ID	
W7GTO	5,974	103	58	WA	
KY7M	4,796	109	44	AZ	
K7BG	2,520	60	42	MT	
KN5H	1,862	49	38	AZ	
WA7HYD	1,311	57	23	WA	
N7PWZ	936	36	26	AZ	
K7MH	253	23	11	WA	
ND8DX	185,500	875	212	OH	MRRC #1
WZ8P	144,000	800	180	OH	MRRC #1
NU8Z	127,967	707	181	MI	MRRC #2
WA8WV	119,520	664	180	WV	
KT8X	112,850	610	185	MI	MRRC #3
N8KM	95,205	577	165	OH	MRRC #1
K8IR	93,330	510	183	MI	Bay Area WirelessAssn
K5IID	77,425	475	163	WV	MRRC #1
N8AA	59,850	399	150	OH	NCC #1
N8OH	50,274	399	126	OH	Hall of Fame CG
AA8YI	26,136	264	99	MI	
K8UP	24,794	253	98	MI	MRRC #2
W8XF	23,859	241	99	WV	
KZ8E	23,067	233	99	WV	
W8KNO	22,800	240	95	OH	
N5NW	22,220	220	101	OH	TCG-6
WV8T	19,364	206	94	WV	
K5ZG	16,864	248	68	OH	
KO8HIO(K8ZT)*	14,260	155	92	OH	
KB8TYJ	14,091	183	77	MI	2 Wild and Crazy Guys
K8MR	13,114	166	79	OH	MRRC #2
KK8D	10,656	148	72	OH	Hall of Fame CG
N8HC	10,138	137	74	OH	
KW8W	9,983	149	67	OH	MRRC #3
AF8A	9,396	162	58	OH	MRRC #3
N3RA	9,088	128	71	OH	NCC #1
K8NZ	6,612	114	58	OH	NCC #1
K9TM	6,201	117	53	MI	
WB8AEV	5,336	92	58	MI	
KC8RAN	4,136	88	47	OH	
K9NW	3,690	90	41	OH	MRRC #3
W8CAR	3,164	113	28	OH	NCC #2
AD8P	1,947	59	33	OH	MRRC #2
W8UE	1,848	66	28	MI	
W8XY	99	11	9	OH	Hall of Fame CG
KC8LTL*	90	10	9	MI	
WE9V	274,744	1126	244	WI	SMC #1
K9ZO(K9YO)	196,128	908	216	IL	WA9TPQ Memorial-1
K9BGL	192,933	873	221	IL	
KE9S	164,979	797	207	WI	Bay Area Wireless Assn
KX9DX	163,510	830	197	IL	SMC #2
KG9X	155,498	766	203	IL	SMC #1
N9KI(K0SN)	150,490	745	202	WI	
K9MI	132,102	738	179	IN	SMC #2
W9RE	123,993	599	207	IN	SMC #1
N9NE	119,035	665	179	WI	
W9IU	111,492	652	171	IN	SMC #1
K9MMS	101,775	575	177	IL	WA9TPQ Memorial-1
WT9U	85,772	523	164	IN	
K5OT	73,298	547	134	WI	SMC #4
KC9UM	72,850	470	155	IL	WA9TPQ Memorial-3
AH6EZ/W9	71,568	497	144	IL	WA9TPQ Memorial-3
N9NT	63,315	469	135	IL	
WA1UJU	62,271	407	153	WI	SMC #2

Call	Score	QSOs	Mults	QTH	Team
K9LU	61,480	424	145	IL	WA9TPQ Memorial-1
K9JE	58,254	399	146	IL	WA9TPQ Memorial-1
KC9ARR	45,890	353	130	IL	SMC #3
AA9RT	41,296	356	116	IL	SMC #4
K9WX	37,638	306	123	IN	SMC #2
K2AAW	37,631	311	121	IL	
W9LO	26,606	251	106	WI	SMC #3
WA9IRV	26,214	257	102	WI	SMC #3
W9CEO	20,736	216	96	IL	WA9TPQ Memorial-3
K9MV	15,960	190	84	IN	
NA9A	12,600	168	75	IL	WA9TPQ Memorial-2
K9BIG	11,564	196	59	IL	
W0HED	9,112	136	67	IL	WA9TPQ Memorial-2
K9JIG	7,998	129	62	WI	
K9LA	7,869	129	61	IN	
W9IFR	6,461	91	71	IL	
K9QVB	6,435	117	55	IL	
W9LYA	6,032	104	58	IL	SMC #4
N9LF	5,643	99	57	IN	
KB9LIE	5,328	111	48	WI	
W9AYJ	5,264	94	56	IL	WA9TPQ Memorial-5
KB9OWD	5,130	114	45	WI	
KD9XP	5,115	93	55	IL	WA9TPQ Memorial-5
AI9X	4,900	100	49	WI	
KG9N	4,752	99	48	IL	
K9EFP	4,100	82	50	IN	
W9CZA	3,312	92	36	IL	WA9TPQ Memorial-4
AE9YL	2,664	72	37	IN	
KW9L	2,622	69	38	IL	
K9OZ	2,278	67	34	IL	
W9THD	2,255	55	41	IN	
K9JS	1,792	56	32	IL	
K9YA(N9BOR)	1,550	50	31	IL	
W9AN	1,062	59	18	IL	WA9TPQ Memorial-3
N9HED	297	33	9	IL	WA9TPQ Memorial-2
KB9UJB	250	25	10	IL	WA9TPQ Memorial-4
KB9YSI	50	10	5	IL	WA9TPQ Memorial-2
K9PG	303,028	1067	284	MO	SMC #1
K0DU(KC0DKX)	263,432	1192	221	CO	
KT0R	223,668	1026	218	MN	MWA #1
AC0W	221,340	1020	217	MN	MWA #1
W0NO	201,960	935	216	KS	
W0LSD	177,275	1013	175	CO	GMCC Horsethief Pass
N4VI	172,377	963	179	CO	GMCC Horsethief Pass
K0OU	170,676	862	198	MO	KCDXC #1
K0OB	162,870	890	183	MN	MWA #3
N0AG	134,846	706	191	KS	KCDXC #1
K7RE	129,822	843	154	SD	
K0XM	124,871	647	193	KS	KCDXC #1
KR6NA	117,810	765	154	CO	
N0SXX	115,440	780	148	CO	GMCC Wagon Wheel Gap
K4IU	111,408	633	176	MN	MWA #2
N0AT	110,940	645	172	MN	MWA #3
K0GAS	110,418	717	154	CO	GMCC Wagon Wheel Gap
N0ZA	103,929	707	147	CO	
K0MPH	95,360	596	160	MN	MWA #1
W0ETC	94,860	510	186	IA	TCG-2
K0RH	90,584	676	134	KS	
N0AV	86,320	520	166	IA	SMC #4
K0VBU	71,222	478	149	KS	KCDXC #2
WB0TRA	63,474	426	149	MN	MWA #2
K0SV	61,388	412	149	MN	MWA #2
AA0MZ	51,740	398	130	KS	KCDXC #1
W0TM	49,750	398	125	CO	GMCC Windy Saddle Pass
KI0II*	41,844	317	132	CO	GMCC Windy Saddle Pass
AB0MV	40,777	337	121	CO	GMCC Windy Saddle Pass
K0BUD	40,595	353	115	MN	
W0RK	34,684	299	116	MN	MWA #2
NN0G	33,252	326	102	CO	GMCC Wagon Wheel Gap
KB8CL	32,760	280	117	ND	
K0AD	32,155	295	109	MN	MWA #4
WA2HFI	29,856	311	96	MN	MWA #3
KC0IGY	23,959	247	97	CO	
AA0AW	21,216	204	104	MN	MWA #3
W8TM	18,825	251	75	NE	
KI7WO	17,745	195	91	MO	KCDXC #2
WG0M	17,568	244	72	MN	MWA #3
WB0N	17,127	173	99	MN	
KC0IOX	14,181	163	87	SD	
N0MWY	13,321	173	77	CO	
KB0ARZ	11,096	146	76	NE	
W0OSK	10,496	164	64	CO	
WA0IYY	10,184	134	76	MO	
KC7QY	8,880	120	74	CO	
W0IE	8,192	128	64	KS	
KB0ENE	7,744	121	64	IA	
N0OBM	6,726	114	59	KS	
W0CBH	6,572	106	62	CO	
KE0FT	5,858	101	58	IA	

Call	Score	QSOs	Mults	QTH	Team
N0SG	5,459	103	53	CO	GMCC Wagon Wheel Gap
WA5SWN	5,264	112	47	KS	
K9IUA	3,485	85	41	IA	
W0NEB	2,205	63	35	KS	
KA0ITA	1,860	60	31	KS	
K0FJ	1,170	45	26	KS	
AB0OX	1,066	41	26	MO	
K9WN	920	40	23	MN	
K0IRL	900	36	25	CO	
W0AGC	840	35	24	CO	
WB8QVI	432	27	16	CO	
K0XU	143	13	11	NE	
VE5SF	252,436	1132	223	SK	TCG #1
VE7IN	185,276	1018	182	BC	
VE3AGC	115,276	644	179	ON	
VE4VV	89,570	689	130	MB	MWA #1
VE7FO	81,992	554	148	BC	
VE6JY	70,176	408	172	AB	
VE7UQ	69,204	474	146	BC	
VE2AWR	63,523	457	139	QC	
VE4YU	42,795	317	135	MB	
VE9MY	41,650	425	98	NB	Team VE9
VE9WH	40,252	347	116	NB	Team VE9
VE3EBN	34,270	298	115	ON	
VA3SWG	33,170	310	107	ON	
VE3SLI	33,120	288	115	ON	
VA3XRZ	32,214	273	118	ON	
VE3TW	31,188	276	113	ON	
VE3KP	30,000	250	120	ON	
VO1HP	26,840	244	110	LAB	
VE9IM	20,148	292	69	NB	Team VE9
VE3NWA	19,780	215	92	ON	
VE3GLO	16,835	185	91	ON	
VA7DP	16,714	274	61	BC	
VE9GLF	15,120	210	72	NB	Team VE9
VE3UDK	14,823	183	81	ON	
VE9SAB	12,118	166	73	NB	Team VE9
VA3IX	9,936	144	69	ON	
VA3KOC	7,973	119	67	ON	
VA3PL	5,100	102	50	ON	
VE3BDN	4,900	98	50	ON	
VA3HUN	4,752	99	48	ON	
VE3WZ*	1,802	53	34	ON	
VE5MX	1,302	42	31	SK	
VE7DAO	144	16	9	BC	
VP5AZ(KN4UG)	85,625	625	137	VP5	
WP3GW	4,144	74	56	KP4	
KP4JRS	2,788	68	41	KP4	
PY8AZT	6,375	125	51	DX	
LW5EE	266	19	14	DX	
LU5DIT	88	11	8	DX	
VK2CZ	25	5	5	DX	

Multi-Two Scores

K9NS	808,033	2549	317	IL
(K9HMB,K9PW,K9XW,W9RM)				
NX5M	622,442	2239	278	TX
(NX5M,N5XJ,KB5ZFO)				
W6YX	601,818	2254	267	CA
(N7MH,K6IF,K6UFO,N7MH,W6LD)				
W5NN	559,073	2063	271	TX
(NO5W,N1LN,K5GA,K5NZ,W5ASP,W5WW,KG5U,N5RP,K5NZ)				
K4NO	474,192	1776	267	AL
(K4NO,KA9EKJ)				
N5YA	419,900	1700	247	TX
(N5UM,N5YA,W5LL,NN7L,N5KR)				
K9SD	352,580	1445	244	IL
(K9SD,KI9A)				
K0UK	237,838	1091	218	CO
(K0UK, K0CL,W0DET,KB0QAA)				
W6OAT	153,755	805	191	CA
(W6OAT)				
K4YTZ	120,342	647	186	SC
(AE4VJ,N4UFP)				
W6AB	82,152	652	126	CA
(W6AB)				
AB4GG	48,415	421	115	TN
(AB4GG,AG4HG,KA0YDC,KG4OVV)				
K0RAY	44,928	351	128	MO
(K0RAY,N0PKX)				
K5BSA	24,745	245	101	TX
(KR1ZAN,KD5IQO,WA5TET,K5ZMJ,KD5CTT,KC5QAI,K9VOL,KD5QXE,KD5HDR)				
KC9BLY	11,175	149	75	IL
(KC9BLY)				

Check Logs: K1UM, K6HRT, K7VT, KF0U, N9XD, W6IXP, W9AEM

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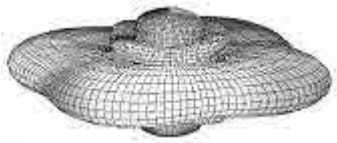

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In 6' or 12' lengths, 6' lengths ship UPS. Call for 3/16"& 1/4" rod, bar stock, and extruded tubing.

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

Please call for more Cushcraft items.

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C3	10/12/15/17/20m, 7 el	$599
C3E	10/12/15/17/20m, 8 el	$649
C3S	10/12/15/17/20m, 6 el	$539
C3SS	10/12/15/17/20m, 6 el	$559
C4	10/12/15/17/20/40m, 8 el	$759
C4S	10/12/15/17/20/40m, 7 el	$679
C4SXL	10/12/15/17/20/40m, 8 el	$979
C4XL	10/12/15/17/20/40m, 9 el	$1119
C19XR	10/15/20m, 11 el	$959
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T300-88	88', 22 square feet	$2189
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T500-72	72', 45 square feet	$1979
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HF2V, 2 Band Vertical	$249
HF5B, 5 Band Minibeam	$359
HF6VX, 6 Band Vertical	$339
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A1712, 12/17m Kit	$54
CPK, Counterpoise Kit	$129
RMKII, Roof Mount Kit	$159
STRII, Roof Radial Kit	$125
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More Bencher/Butternut–call

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144–148 MHz

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

420–450 MHz

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

Satellite Antennas

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

ROHN TOWER

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

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TMM541SS	$1499
TX438/TX455	$979/1579
TX472/TX489	$2459/4579
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GP9, 2m/70cm Vertical	$169
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SB14, 6m/2m/70cm Mobile	$59
SBB224NMO,2m/220/70cm	$69
SBB2NMO, 2m/70cm Mobile	$39
SBB5NMO, 2m/70cm Mobile	$49
SBB7NMO, 2m/70cm Mobile	$69
UHV4/UHV6	$109/135

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M2 ANTENNAS

50–54 MHz

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6M2WLC/6M9KHW	$459/499

10/12/15/17/20m HF

10M4DX, 4 Element 10m	$399
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X500HNA/X700HNA	$229/369
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RG-8X Jumpers	Ple ase Call

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Eagle Guy Kit	$29
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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

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ANTENNA ROTATORS

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Yaesu G-2800SDX	$1089
Yaesu G-550/G-5500	$299/599

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R81/82	$.25/ft./.39/ft.
R84	$.85/ft

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PLP2739 Big Grip (4000)	$8.50
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HPTG11200	$1.89/ft
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