NCJ

NATIONAL CONTEST JOURNAL

$4

January/February 2000

Volume 28 Number 1

- Young Contesters—The Promise of a Future
- Band Pass Filters for Contesting
- Contesting with Wolves: VD7D in the 1999 IOTA Contest
- *Results*: August '99 NAQP Phone September '99 Sprints
- *NCJ Profiles*: KE3Q

Special 64-page Bonus Issue!

Top: Rush Drake, W7RM, mentors Jordan Knopp, KC7TWZ

Right: Young contester Thomas Andersen, OZ1AA

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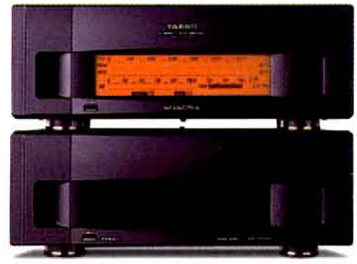

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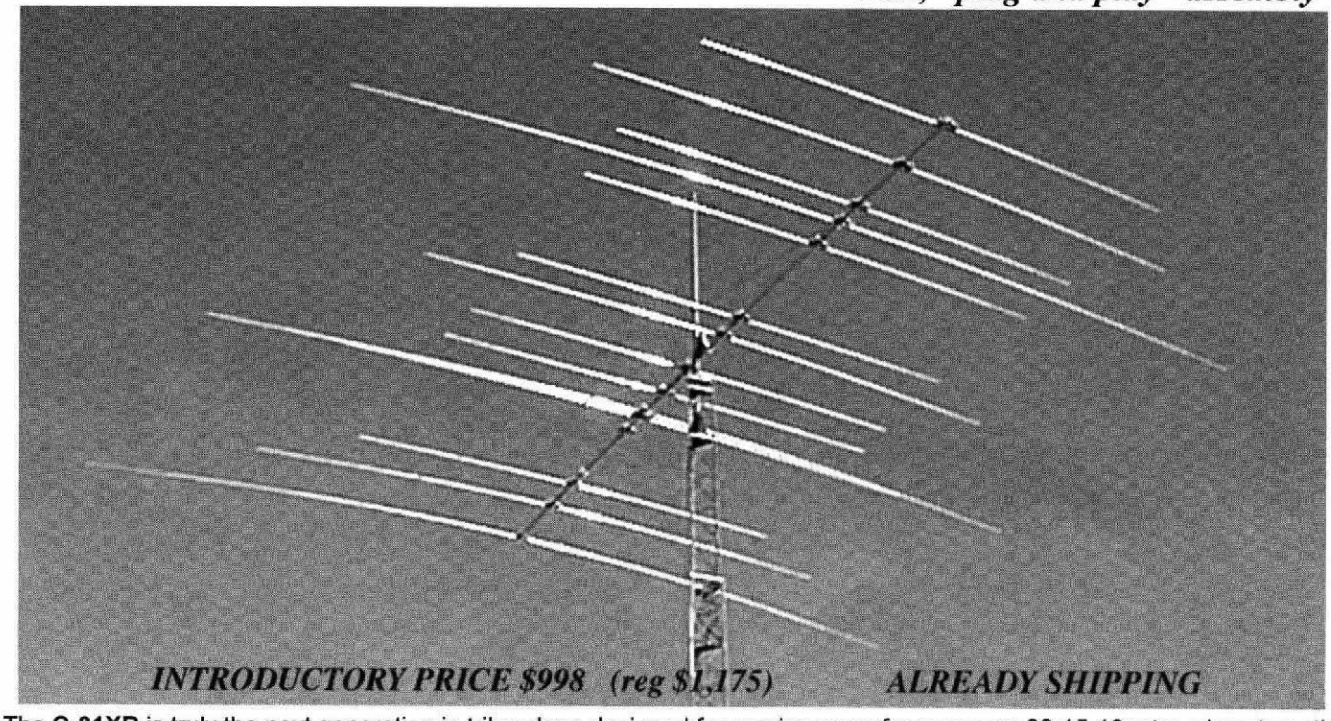

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Editorial

Dennis Motschenbacher, K7BV

A Bonus-Sized Issue—Dedicated to the New Contester

This special *Expanded Issue* of the *National Contest Journal* is dedicated to all the new—be they young or old—contesters around the world. An article about some of the up and coming stars appears in these pages for your enjoyment. Please have a look—we are sure that their stories will instill in you a renewed sense of excitement about the future of contesting.

The Year 2000—An Opportunity for a Fresh Start and Change

I am sure that most of you are as happy as I am to have that Y2K stuff behind me. Hopefully none of you experienced very much discomfort after the gong struck midnight. In any case, the "moment" itself is over.

Now let's turn our attention to the more important *psychological opportunity* that comes along with each New Years holiday. Moving into a new millenium seems to widen the window of possibility even further.

The truth is nothing major has really changed in our lives simply because the calendar rolled over to January 1, 2000. The bills are still there to pay, the boss is still a grump, the antennas didn't grow any new elements and most assuredly, you are still basically the same person. *Unless you decide to change!*

This seems like a grand time to reflect on how much you are really enjoying contesting. If you resolve that you are not having much fun these days, it is indeed time for change. That change does not necessarily need to come in the form of material things such as swapping your Swan 350 for a FT- 1000MP or major actions such as personally spearheading rule changes.

More likely, perhaps it's just time to consider adopting a new set of contesting goals and objectives for yourself—both short and long term.

It would appear that there are an infinite number of goals and objectives to choose from. I would recommend you select ones that will bring you *personal* satisfaction—as opposed to others that might please others or elevate you in their eyes.

Speaking of Change

The *NCJ* certainly has plenty of change in the wind—all of it intended to enhance your contesting enjoyment! Here are a few examples.

The New NCJ *Web site*

Bruce, WA7BNM, is very busy building an entirely new Web site that will interact with the magazine and offer many other useful tools for contesters. We expect its introduction any time now. We are also anticipating that he will tell us about his future expansion plans for the site in our March/April issue.

A New RTTY Contesting *Columnist*

Wayne, K7WM, has assumed the helm of the *RTTY Contesting* column. Wayne, a well-known RTTY contester, will make his debut in the March/April issue of the *NCJ.* Jay, WS7I, has retired to quieter pastures. (Yeah right! That is until he blows your socks off in the next RTTY contest.) We all want to thank Jay for the many hours he devoted last year to growing interest in RTTY contesting through his column. We wish him well.

The NCJ *Contests Committee*

The newly created *NCJ* Contests Committee has been quite active clearing up open issues regarding the *NCJ*'s NAQP and Sprint contests. The first fruit of their efforts appears in the form of new rules for the 2000 NAQP CW and SSB contests. The revised rules appear elsewhere in this issue. The committee gathered input from participants, considered the data and then implemented rule changes where they were deemed necessary.

I erred by running the rules for the 2000 NAQP contests in the last issue of the *NCJ.* I jumped the gun a bit—not realizing the Committee was so close to making their final decisions on the matters under consideration. I offer apologies to the Contests Committee.

More Fun! The NCJ *RTTY Sprint*

A new *NCJ* sponsored contest will be introduced this year—The *NCJ* RTTY Sprint. Wayne, K7WM, has decided to use the same rules as the CW and SSB Sprints. We have added RTTY Sprint dates and log submission information to the 2000 North American Sprint Rules that appear elsewhere in this issue.

The NCJ *WRTC 2000 Support Team*

We are pleased to announce that the *NCJ* will be providing a great deal of coverage of the WRTC 2000 through the efforts of an enthusiastic team of volunteers. These people believe that all of us can enjoy following the activities of this Olympics-style radio competition between the *Best of the Best* contesters from all corners of the Earth—who will be gathering in Slovenia this July.

We now have a full team in place to implement the *NCJ* 's plan. The WRTC Support Team includes NT1N, K1ZZ, K5RC, K7BV, W6OAT and WA7BNM. Our goal is to make the *NCJ* magazine and Web site the premier media sources for information on the US teams and to provide a wide range of coverage for the event. Here's a look at our broad plan.

Articles—Dave, NT1N

Dave will submit articles for each issue of the magazine through October. The articles will cover the background and the history of the WRTC 2000 events. Profiles of the teams will be presented and we'll do some handicapping just for fun. After the winners of WRTC 2000 have been declared, Dave will provide a wrap-up.

Web site—Bruce, WA7BNM

Bruce will work with Dave to use the Web site to support his written efforts. We may also use the site to provide an opportunity for users to handicap the teams before the actual competition begins. Reports from Slovenia will be posted daily to let us experience some of the fun. Team members will also be invited to post daily diaries of their thoughts.

On-Site Reporter—Rusty, W6OAT

Rusty will send daily reports on the activities and the pulse of the competition in Slovenia. He also will post the competition results just as quickly as he can gather the official standings.

Banquet and Awards Ceremony—Tom, K5RC

Tom will employ his considerable writing talents to post a stirring account of the proceedings at the post-competition banquet and awards ceremony.

On-Site Photos—Dave, K1ZZ

Dave will assist Rusty by gathering digital photographs of the activities (whenever he isn't too busy mingling with his fellow contesters!). These will appear on the Web site.

Our Unfortunate Friends

Mother Nature has again laid a path of destruction through the Caribbean and many other parts of the world. Several of our contester friends have lost so much more than their stations and antennas to those terrible hurricanes, earthquakes, floods and other forms of destruction. Let's all take a moment to remember them and wish them well while we are enjoying ourselves in our next contest.

Fall NAQP CW Results Missing

Normally we carry results for both the fall NAQP and Sprints in the January/

February issue of the *NCJ*. This accomplishment is a major challenge for the four Contest Managers involved due to the short period of time they have to compile their material after the log submittal deadlines. Real life caught up with us this time around. Bob, K6ZZ, is over in the Middle East on special assignment with the Air Force so we will not be able to present the fall NAQP SSB results until next issue. If Bruce gets our new Web site up and running before then, we will put them on the site and post an announcement on the CQ-Contest reflector.

Call for Articles

We are always looking for articles for the *NCJ*. I hope to hear from you soon regarding your ideas for interesting, informative or entertaining articles that you can provide for your fellow readers.

73, Dennis Motschenbacher, K7BV

Our Cover

16-year old "young contester" Thomas Andersen, OZ1AA, at the controls of his nicely equipped home station. Thomas and I worked together to collect the stories of several new contesters—from the US and abroad—that appear in this special issue's feature article: Young Contesters —The Promise of a Future.

In the inset, young contester Jordan Knopp, KC7TWZ, receives some operating pointers from the ole master himself —Rush Drake, W7RM—while operating the CQWW WPX Contest from Rush's station.

Perhaps it's time for you to share your contesting experience. ■

Young Contesters—The Promise of a Future

Dennis Motschenbacher, K7BV
k7bv@aol.com

This article is dedicated to the new contesters brightening the bands during the weekend competitions we all enjoy so much. These guys and gals are our future. Therefore, it is only appropriate that we celebrate them in this—our first issue of the 21st Century.

Smile, my friends, contesting is here to stay!

Cedrick, K9YO, has been working with me for some time gathering information on a handful of the new Rising Stars out there. Before we get to the others, let's meet him.

Cedrick Johnson, K9YO

I received my license in August of 1994, after studying every day during that summer. I borrowed an HF receiver—a Hammarlund HQ-110—from the local club: Fox Run Radio League. I became determined to get on HF after listening to 40-meter SSB every morning. I learned Morse code on my own that winter and spring and earned my Tech Plus license in June of 1995. I then borrowed a FT-101 so I could get on 10 meters. That got me even more interested in HF.

I began listening on 40 and 20. I honed my CW skills and finally passed my General the following fall. That was when I got into contesting—*big time*. I had played in the 10-10 contests, but getting on for the CQWW SSB was the thrill of a lifetime.

I bought my first radio, a Kenwood TS-180, in January 1996. I then began studying more, and earned my Advanced that summer. I got into all the major contests that year. I can't remember what my scores were, but I can tell you this—I HAD FUN!

In 1997, I had the chance to travel to Zimbabwe to serve as Communications Coordinator for the African American Outreach Ministry, a ministry from my church, Main Baptist Church in Aurora, Illinois. I took my first real antenna, an 80-10 coil-tuned vertical, and my entire station.

When I arrived—much to my disappointment—the antenna resembled a boomerang and the radio was pretty banged up as well. I only made 3 QSOs from Z2 land. But that didn't stop me from contesting.

I'm glad I joined the Society of Midwest Contesters because I have met and been encouraged by some of the best contesters in the world! Just recently, I was invited to K9XD for the WPX SSB Contest where we operated multi-two. I returned there for the 1999 Sweepstakes CW, where I made 753 QSOs. This was my highest total ever.

I was also invited to WG9L's place in 1998 and 1999, where I had some of my best runs ever. I guest operated from WA9TPQ's wonderful location for the *NCJ* January Sprints, where I took first place in IL in 1998. That fueled my contesting drive to win even more. I now hold certificates for the California QSO Party and the Illinois QSO Party.

My advice—you can do it, just keep trying. Good luck!

Cedrick presents some of the new Stateside gang—AD6DO, KB3CBW and KK7GW

After seeing Dennis's article in the May/June 1999 *NCJ*, I decided to premier some young contesters who know of in a similar article.

I have been on various Internet mailing lists and in chat groups, and have noticed a disturbing trend. Many people are stating that Amateur Radio will probably die out in the near future, supposedly because there is not much interest from "Generation Now." Being a "Generation Now" citizen, and working with the Internet technologies that "accelerate the speed of business," I tend to strongly disagree. You may or may not have realized that you have worked young contesters in a contest, but one thing's for certain—they *are* there!

I have managed to gather the biographies of a few new contesters —Dan, AD6DO; Nat, KB3CBW; and David, KK7GW. Hopefully you will send me information on others so that we can change the attitude that "Amateur Radio is dying." My email address is **k9yo@ix.netcom.com**.

Dan Craig, AD6DO

Dan has repeatedly given the big guns a run for their money in California, and has even beaten many "Big Gun" contest stations.

Dan got started in contesting in the 1980s at a very early age. Dan recalls watching a multi-single operation for CQWW being set up at his house and then watching the guys run DX stations. This got his attention. His dad let him make a few QSOs here and there and he was hooked. When Dan was 8, he passed his Novice exam. He had to share the station with his dad, W6TMD, and his older brother, KK6BB.

He never really got a chance to contest until he was 12. The contests that he enjoyed then were the Novice Roundups. Dan first won that contest when he was 9 and then went on to win it for the next two years. Dan's first major contest was CQWW CW in 1992. He made 690 QSOs in the first 30 hours.

In the summer of 1993 Dan's family moved to Taiwan. They were not allowed to operate from their QTH, but BV2FA was nice enough to let them operate the 1993 CQWW CW and CQWW SSB contests, as well as the 1994 CQ WPX contest. They only made a few hundred QSOs in each contest, but it rekindled his interest in contesting.

Their family moved back to California in 1994—just in time for Field Day at N6AW. Dan made an impressive showing in the 20/40-meter SSB tent, where he made more QSOs than they had ever had on those bands before. That's when N6AW invited him out to W6BA's excellent QTH, where Dan has contested for many years. (On a sad note, W6BA passed away the day before 1999 CQWW SSB contest. We will all certainly miss him.)

Dan has been active in domestic contests from his home for the last few years. Perhaps you remember him winning the August NAQP in 1997? Dan accomplished this all with a General class license. He went on to win many more contests, creating lots of competition in the California sections.

The scores that Dan is most proud of were made in the Sprints, where he has broken records, taken Top 5 places, and even a first place. Another score that he is proud of is his 1999 California QSO Party showing, where he had impressive rates of over 100 per hour, and in Dan's words this " …isn't easy when you are operating from California."

So the next time you hear this young contester on the air, cheer him on! Dan is most certainly bound to be a world class contender. Watch out, guys!

Nat Heatwole, KB3CBW

16-year-old Nat is from Damascus, Maryland, and has recently joined the Potomac Valley Radio Club. He has been contesting for around 6 months, but just started serious efforts recently. Nat's primary contest interests are focused on SSB. He hopes to get into more RTTY and CW contests once his CW speed improves.

Nat's main radio is a Kenwood

TS-140S that he uses to drive a Collins 30L1. Nat currently has two antennas at his QTH—a G5RV at 65 feet for 80, 40 and 20-meter work and a 1/2-wave CB vertical that he uses on 10 and 15. Nat uses an Alinco DJ-190T 2-meter HT to connect to the PacketCluster, where he is an active participant.

His station is currently under construction. He is expecting to build a fairly big contest station, located just down the street from K3MM, and is planning the following improvements: an Ameritron ATR-15 tuner, a Force 12 C-31XR tribander and an ICOM IC-756. A legal limit amp will find its way into the shack as well.

Nat's dedication and hard work in the contests has resulted in some impressive scores. I think that he will be a strong contender for a slot amongst the East Coast Big Guns in the future!

David Jones, KK7GW

(Prepared by Mike Conatore, K7NT)

David, 16 years old, is a frequent op from W7RM's loud QTH. He was licensed in 1995 as a Tech Plus with the call KC7ITM. David learned about contesting and DXing from a friend, Andy, KC7DZZ. Andy told him about working the world. David was soon hooked.

David did not have a radio at home, so he joined forces with Andy and they contested together. It was the bottom of the sunspot cycle—QSOs were hard to come by. David got on the 40-meter Novice band and honed his CW skills.

In the fall of 1996, David passed his General exam. A short time later he passed his Advanced and got his present call—KK7GW. He earned his Extra a week after the 1997 CW Sweepstakes.

David joined up with the Western Washington DX Club and participated in their 1998 Field Day. This was his first exposure to using a HF beam. Later that year, He joined the 1998 CQWW CW W7RM multi-multi team. That weekend was his first experience with high QSO rates—he pounded out a 122 first hour on 10 meters.

David has had a chance to operate from many stations—including WAØRJY/K7ED's place for NAQP SSB. He also operated from N6TR/K7RAT's QTH with Tree and Mike, K7NT, as a multi-two. David describes that experience as a "story in itself."

David is really proud of his CW skills. "CW has always been my love, mostly because you can do so much better on CW with a small station. My CW skills are finally to the point that I can say I'm pretty good at it. I can ragchew now at 30 or 35 wpm, contest at 40 to 45 wpm, and if I really concentrate, pick out calls at 50 or 55 wpm."

David's station at home consists of a Kenwood TS-530, a single lever keyer/paddle and two low dipoles. He has managed to work 131 countries with these antennas. David plans to expand his contesting further in the future and eventually plans to operate a DXpedition from some rare place.

David Jones, KK7GW

West Wash DX club group photo

From Left to right: Joseph Hill, KD7FWQ; Sam Hill, KD7BUQ; Webster Silver, KD7FYX; Caleb Skurdal, AD7U; Lowell Silver, KD7DQO.

Open Those Doors!

There is a point I wish to make here. As you can see from the stories above, lots of young contesters, including me, have discovered REAL contesting through invitations to other experienced operator's stations. So the next time you find a young or new ham asking for a chance to operate, invite him! He may not have the best station on the planet. Once you show him what contesting is all about, you may have created another W4AN or K1AR. This is called "keeping the hobby alive."

Be sure to visit my Young Contesters' Web site **http://www.qsl.net/k9yo**—it will open in February 2000 shortly after the publication of this article. Thanks again for reading, see you on the bands!

73, Cedrick, K9YO

The Family that Plays Together... Dustin, KD7BSW, and Jordan, KC7TWZ

Here is a sneak preview of a new multi-op team that may rise to the top of the multi-op category in the near future.—'BV

I see on the *NCJ* Contest DXpedition List on the Web site that you have me listed as a M/? in the 1999 CQWW Phone contest—which is true. I will probably be doing a multi-op with my two young sons, Dustin, KD7BSW (13 years old), and Jordan, KC7TWZ (12 years old). This operation should be lots of fun! We will be signing FS/K7ZUM from St Martin. *Unfortunately, this trip had to be cancelled at the last moment—but watch out for them in the upcoming years!—'BV*

Dustin, KD7DSW

Jordan, KC7TWZ

73, Ken Knopp, K7ZUM

A New YL Contester—Rebecca, KB0VVT

Hello, my name is Rebecca Rich. My QTH is just outside of Kansas City in Raytown, Missouri. I am ten years old and in the fifth grade. I am very busy with my school's Math Club, playing my violin, tap dancing, jazz dancing, ballet dancing and playing YMCA basketball. I also attend midweek and Sunday School at my church. My favorite hobby is Amateur Radio.

When I was 7 years old my Dad made a computer program to help my Mom study for her license. I thought that the program was neat so I started playing with it. Pretty soon, I started getting answers right and my parents asked me if I would like to really study to get my license. I said "*Yes.*"

I started studying for the tests and in a year or so I passed all of the tests and earned the Extra Class license at the age of 8 on March 22, 1997. This is how I got started in Amateur Radio.

My favorite mode of operation is CW. I am usually on the 15-meter band. There are some very kind people on CW and many are very happy when they find out they have contacted a ten-year-old girl on CW.

Rebecca, KB0VVT

My family and I were introduced to contesting by Steve Lufcy, KM0L, a neighbor who lives a couple blocks away. Steve jokes with me that I can use his swimming pool during the summer if I can just make 300 contacts in the next contest. I have worked several phone contests in the last couple of years. My Mom or Dad are usually there in case I need help logging or tuning the radio. Last fall, I worked both the Phone and CW portion of the CQ Worldwide, ARRL Sweepstakes and the 10-Meter Contest.

Copying high speed CW seemed impossible at first, but seems to become easier towards the end of each contest. I had to send QRS many times and almost every operator was very nice and slowed down.

My Dad thinks there should be at least one contest during the year with a slower CW speed limit to help encourage new CW contesters. This year, I was able to get both the ARRL Sweepstakes Phone and CW pins for making over 100 contacts during each contest.

I presently use a TS-850SAT running 100 W into an R7 vertical 30 feet above the ground. However, my Mom and I bought my Dad a KLM KT34A as a gift during the holidays. This could mean more contacts during the contests this year. I hope to meet you on the air soon!

Rebecca, KB0VVT

(Written with some help from her father, David Rich, KG0US.)

OZ1AA Presents: "*New Blood from Europe and Asia*"

Thomas Andersen, OZ1AA
oz1aa@qsl.net

As we all know, the average age of contesters is increasing. Many hams have predicted that Amateur Radio will cease to exist as a hobby. The next few years. But before you also start to believe this, perhaps you should find out more about some very enthusiastic young contesters. Hopefully you will see just a little light in all that darkness. If you do, I have achieved my goal with this article.

You have probably heard about teenage operators like AD6DO, AD7U, K9YO, KK7GW, N5NU, KL9A (ex WL7KY), *et al*—but here I will focus the spotlight on the young contesters outside of the United States, since they are not that well known.

A Trip around Europe and a Step into Asia

Let's begin our little journey and visit some of the young contesters that I know. I am sure that there are many more young operators out there. If you are one or know of one, please write or email me. I'm always happy to meet another young contester.

Our First Stop—Denmark

First, we shall start at my QTH. Maybe I have talked to some of you on the air. If not, I am looking forward to meeting you. Here's the story of my ham radio career.

My name is Thomas Andersen and I am 16 years old; my call is OZ1AA. I started in ham radio about 4 years ago. I had a CB radio and enjoyed chatting with my friends from school with it. One day I saw a notice in the newspaper that radio amateurs were setting up for something called "Field Day." Before I went there, I really didn't know anything about Field Day or Amateur Radio at all. By the time that weekend was over, I knew that this was the hobby for me.

I really had to study hard for the license. It was especially difficult because we do not have a Novice class license in Denmark. Finally, a half-year later, I had my license.

I began to chat with people on a VHF repeater, but I did not find that activity much different from that on the CB radio. My license allowed me to build my own radios, but I was thirteen years old and didn't know much about electronics. I began wondering if this hobby really was for me.

Fortunately, one day I found out that there was something called "contesting." If it were not for contesting, I am not sure that I would be an active ham radio operator today. This is something I think about every time I enter another contest!

My contesting activity started with the IOTA contest in 1998. I made 90 QSOs. I really found out what contesting was in that contest. I knew that there was only one way to go—forward!

I started to read everything I could find on the Internet and in magazines about contesting. Luckily, I became better and better. Today I mainly operate from the local club station since my own "antenna farm" only includes dipoles under my roof.

At the club station we have an FT-1000MP and a tribander at 24 meters. When one operates from such a station, contesting becomes real fun!

My best results so far are in the IARU and IOTA contests last summer where I participated in the SOAB LP CW-only category. I made 937 QSOs in the IARU and 1034 QSOs in the IOTA contest here from EU-029. It was sure a big step to surpass 1K QSOs. Now I am looking forward to the day when I can break 2K in the SOAB category.

I have been operating the CQWW SSB contest in the multi-single class from the OZ9KY station, and that has been a great experience for me. It would be a dream for me to operate SOAB HP from one of the big stations here in Denmark. I think that this dream will come true soon. OZ1EEZ (the man behind the OZ9KY contest QTH) has said that I am welcome there on the weekends when the group is not working a contest.

I also hope that someday I will have the opportunity to visit some rare DX location and work big pileups. It would also be great to attend a ham/contest convention like Friedrichshafen or Dayton—but these dreams are probably some years out in the future.

Next Stop: Croatia—and Hrle, 9A6NHH

Now let's go down to Croatia to meet Hrle—the usual operator behind the 9A7P club call.

Hi there folks. My name is Hrvoje—but most people know me as Hrle. I come from Croatia as you can probably guess from my long call. I'm 16 years old and have been into Ham Radio since I was a little boy playing in the sand (actually I was 11).

How I got into Ham Radio is a mystery even to me. As a youngster, soccer was my greatest love. After my activities in the soccer club one cloudy day, I somehow ended up in a radio club meeting! I started to learn a little, but I didn't understand much of it in the beginning.

I got my license in 1995 and started to operate HF from the club station. After a while it became boring to just do regular QSOs—so I started to search for something more.

In 1996 I heard some people sending "*CQ TEST*" in CW. "*Test,* what *test*?" I decided to give it a try. My first contest was the SPDX operating as a multi-single with my friend Marko, 9A6NPM. It was lots of fun.

One year later we received an award—tenth place in the world—a nice beginning. The same year I worked the contest of my dreams: the IARU HF (it's my favorite contest even today, even after trying most of the other European and world wide contests). Now, with four IARU Contests behind me, I am still operating from our club station—9A1CHP.

The equipment there has remained

Hrle, 9A6NHH

the same—a TS-440S, a 2-element quad for the upper bands and some dipoles for the lower bands—but we have just received a shorter call: 9A7P (I bet active European contesters have already heard this one).

My personal best scores are in the RA DX Contest (SOAB MIX) and IOTA (SO/24 hr/CW)—both third place in the world. Not bad, considering that we only used 100 W in categories where there is no power limit.

I don't care much about the final scores. I just care about having fun and making lots of QSOs. You'll often find me with more QSOs and less multipliers. I guess I'm a kind of a "without brain" contester. My biggest QSO total is 1,356 in 22 hours (using low power!) and I hope I will break that number soon.

I must mention that I hate SSB and love CW (long live CW!) and RTTY. As is the case with every contester, I dream about joining some nice team one day and hitting the pileups. Until that day, I'll keep myself rolling along with 100 W.

The sad thing is that Hrle always beats me in the contests, and if he is a "without brain" contester, then what kind of contester am I?—'AA

Next Stop: Yugoslavia—and Goran, 4N7RGH

We'll stay in the same general area, but now let's cross the border into YU7. Here we find 17-year-old Goran, 4N7RGH—also known as YU7AL or YZ7EM in the contests. Have you seen the call 4N7RGH before? If you are into RUFZ or high-speed CW in general, you surely have! Goran is one of the top CW operators. I think I can safely say that he is the best CW operator of all the young contesters! This is his story.

Goran, 4N7RGH

I became a radio amateur in 1990 when I was 7 years old. I passed the Morse code exam when I was 11. Since then I have been operating in the WAE, WW DX, WW WPX and all the bigger contests. After a few years of experience I started to obtain better results on CW and SSB and I began to operate RTTY.

I had, I think, seventh place in the world and second place Europe in the WPX SSB in 1997. On RTTY, we took two first places for Europe/World last year. My favorite contest is the CQWW DX. I like all three versions of it. There is always a lot of activity from rare places.

My first multi-multi operation was in the 1997 IARU HF Contest from YU0HQ. I worked 15-meter SSB with my friends. We were fifth in the world, I think. Now I like to participate in a lot of different contests—the SARTG, ARRL, IARU, IOTA, WPX, WWDX, WAE and the TARA, for example.

I hope that one day I will have enough money to go on a contest DXpedition—maybe to a Caribbean island. As a start, I would like to go to Cyprus to work a contest. I just want to feel the real stuff—to be the very wanted station in a contest, to have the pileups all the time. For all these five years that I have been contesting, I have been working low power, so I don't know what it would feel like to operate with high power.

73 to all the contesters. See you in the next one.

Goran, 4N7RGH

Goran is proof that you can develop great skills when you operate with low power and small antennas. He is now an experienced operator—even though he only started contesting in 1994. We should all fear the day he goes down to 5B4!

Next Stop: Sweden—and Mikael, SM3WMV

Now let's visit Sweden and meet SM3WMV. Michael has just received a new call, SM3W. That's the one you should be listening for in future contests.

My name is Mikael Larsmark. I'm 17 years old and I have been licensed since June of 1997. I started contesting in the beginning of 1998 when my dear friend Sam, SM3PZG, called me and asked if I wanted to operate a little from his QTH in the CQ WPX SSB Contest.

I accepted the invitation (of course) and arrived there at about 11 AM on Saturday. Sam programmed *CT* for me and I started working on 15 meters.

This was great! I was using nice Force 12 antennas, the rig was a FT-1000MP and the amp was an Alpha 91B. I was operating with equipment that I've only dreamt about since starting out in ham radio.

Sam pointed the antennas towards Asia. There were lots of JAs, DSs and HLs. After a while Sam said that I had a VK in the pile. I called the VK and he came back to me. I felt like I was in heaven! At home I operate with dipoles and have never worked VK, HL or DS before.

Later, Sam pointed the antenna towards NA and I started to work a lot of American stations. My adrenaline was pumping when I heard all those loud stations calling me! I worked about 200 QSOs before Sam told me that he had to leave. He put the log file on a diskette and gave it to me. I went home to my simple QTH and worked a few more contacts in the contest.

That was how I started contesting. I'm so very grateful to Sam for introducing me to it. I have just moved and I'm working on my new antennas. I hope that everything will be done in time for the CQWW CW contest this year. I've started to build my own dream station with Yagis, quads, wire antennas etc.

I've been working a lot of contests from SK3LH lately (our local Amateur Radio club) with pretty good success. My best contest is probably the CQ WPX CW. I operated from SK3LH in the rookie category and finished with about 1.8 million points. I hope to finish well in the world standings with that score.

I sure love Amateur Radio contesting and I hope that more young people will participate in the hobby.

As you can see, Mikael takes contesting very seriously. I think it is remarkable that he is already building his own station with towers, monoband Yagis and a SO2R setup—at the age of 17! What will his station be like when he is 50? Hi hi. He has generated some very impressive scores. I'm sure we can expect a lot from him in the future!

Onward to Finland—and Juho, OH5JOC

Now we'll jump over OH0, OH1 and OH2 and visit OH5 where 17-year-old Juho, OH5JOC, lives. As we all know, OH-land is the country of big towers—and Juho is often operating from one of the super stations—OH5NQ—and is already racking up some big scores.

I first got interested in ham radio at a scout camp when two hams gave a demonstration of their equipment and told us a little about Amateur Radio. Shortly afterward, in the local newspaper, I read that the Radio Club of Kouvola—OH5AG—was arranging an Amateur Radio course. After about two seconds of thinking, I decided that I wanted to sign up for that course!

I got my first ham license in 1995 at the age of 12. My first license was a Telecommunication class license and I was limited to VHF and UHF operation. At that time I was very happy with even just those privileges.

After some class upgrades, I had my first HF contest experience—the 1997 CQWW SSB Contest where I made 130 QSOs including lots of interesting DX. Even then, I was still not that interested in contesting—I thought "DX, that's what I enjoy."

Then something changed my world. I attended the annual autumn meeting of the Finnish Amateur Radio Association (*SRAL*) in 1997. I met some of the top Finnish contesters. It was there that I was invited to visit Peter's (OH5NQ) super contest station. They were searching for some new operators.

Two months later I upgraded to Extra Class and felt that it was time to try some serious contesting. I contacted Ilkka, OH1WZ. He said that there was room for me at the OH5NQ station. Sooner than I could even imagine I found myself working the 1998 ARRL DX CW Contest from OH5NQ. That was my first big contest experience. I managed to complete just a couple of contacts—Ilkka made the rest of our 850 QSOs.

After that experience, I have had many chances to go to the OH5NQ station to participate in the contests. I must say that working from such a big station is lots of fun! I am still learning the basics of contesting, but I'm improving (at least I hope so!). CW has become my favorite mode. As you all know it has more room for the small guns and people seem to be much more civilized on that mode.

In closing, I want to express my gratitude to the people who have helped me in contesting: Ilkka, OH1WZ; Tapsa, OH5KT; and Peter, OH5NQ—you guys know what the spirit of ham radio is about!

Like Juho, I have also had the chance to be a guest-operator at some of the bigger stations. I am so grateful for these opportunities and I am sure it is one of the factors that has made my love for contesting as strong as it is today. Of course, you learn a lot when you operate a small station, but when you try contesting from one of the bigger ones—where you can have great rates for many hours and make big scores—you really get to see how much fun contesting can be.

And now on to Bulgaria—and Dimitar, LZ5AZ, and Tod, LZ5QZ

Dimitar, LZ5AZ

As the opening paragraph states, this article is about young and old new contesters. So far they have all been teens, but some of them, like Goran, 4N7RGH, you can't exactly consider new to contesting since he is already a very experienced operator.

Now we are going to meet Dimitar, LZ5AZ, who actually is very new to contesting. I met him when I was operating RTTY in the JARTS Contest. The exchange in this contest includes your age. I was delighted when I copied "599 15" from Dimitar.

Dimitar, LZ5AZ

My father was the first one in my family to become a ham. I became his little helper, making antennas, etc. After a year or so I became very interested in how he made the contacts and how the radio worked. At the beginning, I was a bit shy about operating the radio, but one day it seemed that the time had come. I decided to study for an amateur exam.

My first QSO was with Marko, LZ1MP—we are now close friends. We exchanged only signal reports, name and QTH. In that first QSO I didn't know what to say or what to do—I was in a panic. But when I finished it I felt very happy. Soon I became very active "on the air."

After about a year, I was already a very good amateur (at least other hams said I was—hi hi). At that time I only worked VHF, but my friend LZ1KK got me interested in the HF bands. I have now been operating on those bands for about four years.

Amateur radio is very interesting to me. It helps you learn many things. It gives you the opportunity to find new friends—not only from your own country but also from around the world. As hams, it is like we are all people from one big "country" with a large population. We communicate with each other using radio.

I began to play around in the international contests during the 1999 CQ WW RTTY contest. JARTS was my second contest.

When I started out, I was active more in the Bulgarian contests, but now I think that I'll be more active in international contesting. It's more interesting—it's time for me to step up and operate in the bigger contests. I plan to participate in the CQ WW SSB DX Contest too.

As for the future—I'm expecting to see great progress in radio. Maybe we will see new modes. But in many ways, the real thrill for me is in the good old modes like CW and SSB. They are the heart of Amateur Radio.

What does one feel when there are errors in receiving RTTY or when your computer does all the work when you operate CW?—nothing. But turn off the computer and start to operate with paper, pen and the traditional key, and I think you'll see what I mean.

In the future we will see new antennas, and new models of transceivers and amplifiers. Amateur Radio will be continually improving. More and more new things will come along—such as the recent new mode—PSK31. It is good to see new technology come along as long as it does not cause the traditions and history of our hobby to disappear.

Tod, LZ5QZ

My name is Todor (Tod) Kolev and I am 16 years of age. My QTH is Burgas, Bulgaria. I am in high school (10th grade) and am studying Electronics and Electricity. My favorite subject at school is "Radio and Television."

My hobbies are ham radio, cars and computers. I have been in ham radio since 1995. My father got me interested in becoming a radio amateur. He is Kolyo Kolev, LZ1QZ. He is 44 years old and has been a ham since 1976. He works in a chemical plant near Burgas.

My first contest was in the REF contest. My father and I both started operating Amateur Radio from our club's station—LZ1KSN—which is supported by the chemical plant where my father works. My home is situated about 70 km west of Burgas in a very little village (with a population of about 200). Our rig there is a TS-530S, a linear amplifier and delta loops for 80, 20 and 10 meters.

I have made a lot of friends in ham radio. My best friends are Severino, IK3PQG, and Bill, KA2KAN.

I too have learned a lot from ham radio. And not just the mathematics and science that was required to pass the licensing test—my English has developed considerably since I started.

In contesting, I have also learned "how to win." Well, I have not won everything yet, but I have learned that you have to practice if you want to be good. There is a contester's saying that I like—"Winners never quit, quitters never win." This philosophy has also had some influence in my life outside of the contest world.

And Finally a Step into Asia, and a visit with Romeo, UN5PR

Romeo, UN5PR

The final young contester we are going to meet is Romeo, UN5PR—better known in the contest community as UP5P. Romeo is a real RTTY fan. If you also operate this mode you're probably already aware of his impressive scores. Romeo is also active in some of the SSB contests. I've worked him on the air often, and before I knew who he was I thought that he was one of those older very experienced contest operators. I later discovered that he was just 21 years old.

I started in ham radio in August 1992 when I was 14 with help from my father—UN6P (ex RL8PY). He was the chief operator of the RL8PYL club station that turned in some good scores in the 80's.

At that time my call was UL7PBY. In 1993 Kazakhstan call signs changed—I received UN5PR. I started contesting in 1993 but only operated RTTY. My first SSB contest was in 1995 operating a Yaesu FT-101Z transceiver and using a home built computer.

Near the end of 1995, I began improving my computer. I upgraded from an IBM PC XT to a 386DX, then to a Pentium 100 (1996), Pentium 233 (1997) and I now have a Pentium 333. I also added an amplifier— a 500 W ex-military model.

I received the contest call UP5P in 1998. I work mostly RTTY, but I do operate some of the DX SSB contests. I have 274 countries for DXCC RTTY worked and 201 confirmed. My best result in an international contest was a second place in the WPX RTTY 1999. I have won some other smaller RTTY contests. This year I have second place in the claimed scores for the CQWW RTTY contest in the SOABHP unassisted category. Winning this contest from Kazakhstan is very difficult.

When I was a student I had more time for Ham Radio. I graduated from an institute this year and now have an electrical engineering diploma. I am working at a metallurgical plant so I do not have as much time for ham radio and contesting as I used to.

Some Final Thoughts...

I hope that you enjoyed our "journey." I mentioned in the introduction that I hoped this article would make you feel a bit more optimistic about the future of ham radio contesting.

But you should not sit back comfortably and think that all is fine. That is not correct! We should all do whatever we can to introduce ham radio and contesting to people of all ages. Actually, I think that contesting is one of the most valuable activities in the hobby for capturing the attention of young people.

Every contester can do something to encourage new contesters. It can be anything from just explaining to another ham or non-ham what contesting is all about, to inviting newcomers to operate from their stations. I myself have been lucky enough to meet Siggi, TF3CW—who now lives in Denmark. I can't tell you how much I have learned from him and how much motivation for contesting I have received from him.

73 to all contesters. I am certainly looking forward to meeting all of you in the contests to come. Don't forget to call young contesters when you hear us!

—Thomas, OZ1AA ■

Band Pass Filters for Contesting

Brian Bartlett, VK4UW, and
John Loftus, VK4EMM

Quality filters can significantly improve the performance of a multiple radio operation and can protect sensitive receiver front ends from RF damage.

Most of us have participated in our share of Field Day or contest multi-op stations and have undoubtedly experienced the interference from a transmitter at an operating position on one band degrading the performance of a receiver at another operating position on a different band. The symptoms may range from audible breakthrough to severe receiver desense.

You can often solve these problems by inserting high Q band-pass filters in the line between each radio and its linear amplifier on each band. This article summarizes how we developed a filter system based on the Ed Wetherhold, W3NQN filters.[1] *We will not repeat the excellent detailed material published in Ed's* QST *article series here, but we will share our experiences in construction, testing, switching and using the filters. The focus here is on a filter switching system.*

Let's begin by looking at John's contesting experience.

Contest Experience

I'm pleased to comment on the performance of Ed's band-pass filters in the context of my contesting operations. My need for band-pass filters has evolved in line with my experience and development as a contest operator.

As with many contesters, I began as a single operator with a single radio. In this category there is little need for any specialized filtering system.

The next stage was to add another operator and participate in the multi-single category. I first built a simple triode switch to protect the second receiver. This switch allowed the additional receiver to be used for spotting on all bands—including the same band as the nearby transmitter.

As additional operators became interested in joining the fun, I began to participate in categories that employed multiple station positions and multiple operators. This form of operation called for dedicated filters for each band.

I built a set of six "band-reject filters" based on a design by Thomas Moliere, DL7AV.[2] These filters have the ability to handle more than the Australian 400 W power limit, and therefore can be installed in the feed line after the linear amplifier. In this way, the filters also help to ensure a very clean output from the linear amplifiers. The filters were easy to build and align for optimum performance. My greatest difficulty was obtaining the required capacitors during the construction phase.

There are still many contests where my personal preference is for the single operator category, so I have continued to seek ways to improve my single operator performance. Accordingly, my next stage of development was to move from single radio to two-radio operation. Participants in this category know the value of efficient switching for band and radio changing.

My early attempts relied on manual switching of all peripheral devices—this arrangement included two sets of six band-reject filters that were originally designed for multi-multi operation. The risks of manually switching in the wrong filter or wrong antenna were very high—I soon decided that the time had come to add a completely automated switching system.

The design and construction of the new switching system turned out to be a major project. The work was completed and fully tested by January of 1999. The primary components include a "peripheral interface" that shares information from the computer logging software with all of the switched devices, two banks of switched band-pass filters and an "antenna switch matrix." The antenna switch matrix allows either of the two radios to be switched to any of my eight antennas and also connects matching sections for user-controlled beam splitting. Other devices that are switched when changing radios include the computer keyer, the CW paddles, the foot switch and the microphone.

During the design phase, Brian brought to my attention some band-pass filters developed by W3NQN for use in multi-multi operations. The improved out-of-band rejection performance and the relatively small physical dimensions of these filters immediately attracted me. The only major task would be to interface

The DDS Sweeper: A PC-Driven Sweep Analyzer

The *Sweeper* we refer to in this article is a low cost hardware kit and PC software package that can generate a sweep of precise radio signals and measure their levels. It presents the results in a variety of convenient displays.

The Hardware

The Sweeper is a DDS (Direct Digital Synthesizer) generator/wideband detector driven from the personal computer through a parallel port.

The DDS generator itself is the AD9850 from Analog Devices Inc, which provides a very low level of DDS spurs (typically -70 dBc) for frequencies up to 35 MHz.

The wideband detector is accurate to within 1 dB from 0 to -90 dBm. The noise floor is at 95 dBm.

Calibrated 80 dB dynamic range and crystal accurate frequency points, real-time display of 3 sweeps per second, easy interactive keyboard control, easy save and recall of multiple traces, easy screen dumps—all within the typical amateur's budget.

Accurate measurement of inductance, Q and return loss can be made with simple external accessories.

Operation

Operating the Sweeper is pretty straightforward.

1. Set the display parameters: center frequency, span (frequency per display division on the X axis), reference level (level at the top of display) and vertical resolution (dB per division of Y axis).
2. Connect the output to the input for a system check and calibration. Zero the setup with a key press.
3. Insert the device or network under test and a yellow trace on the display screen will display the attenuation/frequency characteristics.
4. Simple adjustments of the display parameters allow you to get the "view" required that most clearly shows the data of interest.
5. The displayed information can be titled and saved for future comparison with a function key.

The device was developed by Tibor Bece and Jim Rowe. An article detailing its construction was published in *Electronics Australia*, September and October 1995. The homebrew cost of one of these units is around A$400 (approximately $256 US). Kits of components including professional quality PC boards are available from the designers.[3]

[1]Notes appear on page 15.

these with relays to provide automatic band selection. Ed's compact design was well suited to enclosing all six band filters and the related switching relays in a single cabinet. My only minor concern was that the 10-meter filter did leave a little to be desired in terms of its rejection of 15-meter signals. This performance was easily improved with the addition of a small 15-meter notch section.

Before building Ed's filters, I ran some tests with my existing band-reject filters moved from their position between the amplifiers and the antennas to the line between the radio and the amplifier. After the tests, I was satisfied that there would be no problem with the performance of the new filters in this location.

Tuning of the W3NQN band-pass filters is more demanding and time-consuming than with the earlier band-reject filters. Every care has been taken to ensure good impedance matching. To this end, within each cabinet, I built 50Ω strip lines in and out of each filter element.

After several contests, I am delighted with the performance of the new filters. The required filter is automatically selected with every band change. The automatic switching allows me to place the filter bank units in a remote location. Both filter cabinets are now tucked away out of site, leaving me with more available space at the operating position.

Although my contest scores continue to improve, it would not be appropriate to attribute this improvement to the filters alone. It would be very difficult to isolate the effects of each of the contributing factors. Rising solar flux, two-radio operation, better planning and an improved antenna system all need to be considered.

We now return to Brian and the approaches taken in construction of the system.

Setting Our Objectives

We began our design and construction process by identifying our objectives.

The ability to operate two separate radios on all contest bands with minimum mutual interference.

100 W power-handling capability (so that the filters could be installed between the transceivers and the amplifiers).

Negligible insertion loss over the amateur band in use.

50 Ω impedance (return loss greater than 20 dB) over the selected band.

Maximum attenuation to all frequencies outside of the desired amateur band—particularly within the other amateur bands.

We set our empirical target for cross band attenuation at about 40 dB (a 10,000 times reduction in the level of the unwanted signals).

Our system was designed for the single operator two-radio category. While the typical multi-multi station is generally equipped with a radio, filter, linear amplifier and antenna dedicated to each band, the single operator two-radio station needs to provide each radio with access to all bands and offer efficient switching of filters, antennas and related accessories.

The Design

The recent designs published in *QST* by Ed Wetherhold, W3NQN,[1] were an obvious improvement over anything we had used or considered using to date. The filter design detail and the author's pedigree were impressive.

Communications with Ed resulted in a complete set of reference performance plots and his hearty encouragement to proceed with our homebrew assembly and testing. Ed also assisted us in finding sources for the critical capacitors and toroids (these are not readily available here in Australia).

Our design concept was to incorporate a set of six band-pass filters into one compact switching unit. Two such units would be suitable for use in a single operator two-radio station. A circuit diagram of one of these units appears in **Figure 1**.

Features of our circuit design include:

Relay switching to ensure short signal leads and to facilitate remote control.

Remote control wiring provided for computer automated band changing.

Additional front panel switching for manual control.

LED indication of the band filter in use.

Good isolation provided by two open relay contacts in series with each filter.

Grounded inputs and outputs to all inactive filters.

Extensive bypassing (used on all of the relays and LEDs) and shielding.

A "safety relay" that allows the signal path to default to a 50 Ω dummy load (or alternate antenna) in the event of loss of power to the accessory.

An interlock circuit on the panel switch to confirm correct positioning before automatic filter selection is enabled.

We used conservatively rated components for durability (the relays are rated at 16 A, for example).

Printed circuit boards are used to simplify the construction and to facilitate the relay and front panel wiring. Back EMF suppression diodes installed across the relay coils are located in the remote switch box and include RF filtering to avoid failure of the diodes due to exposure to high-level RF. (These diodes can also be a source of EMI.) The outer case matches the other station equipment and encloses all the circuitry in an attractive shielded environment.

Once the system was completed and installed, John found that the front panel controls and indicators were not necessary in his automated application. Therefore, you might consider some of the above features optional.

Construction Experience

We needed several filter sets initially so that we would be able to try various arrangements based on the circuit in **Figure 1**.

Three different approaches were taken in the course of the design phase. The first (*Mark I*) uses open filters and relays mounted on PC boards. The second approach (*Mark II*) has the filters in individual metal boxes and the relays located externally. The third approach (*Mark III*) places the relays within each filter box. The second and third methods proved easier to tune and resulted in slightly better performance.

The photograph in **Figure 2** shows the Mark I—with open filters and partitions between each filter. The filters were mounted with the toroids in line on an insulated base strip. Relays are mounted on PC boards. The front panel band switch and LED indicators are also mounted on a PC board.

On the test bench, each individual filter matched Ed's specifications. However, the performance changed once they were installed with the switching circuitry and the other filters. Each filter needed some minor retuning and the full design attenuation out of band (over 80 dB) was not achieved when assembled in this manner. This degraded performance was caused by a combination of input and output coupling factors—primarily ground lead inductance and RF on the outside of coax leads.

We had great difficulty achieving maximum return loss due to the long interconnecting tracks and signal leads in the relay switching and connecting circuitry. The need to carefully maintain 50 Ω impedance throughout became painfully obvious.

Back to the Drawing Board

In the subsequent approaches, each filter was enclosed in a metal box. We stayed with the long thin format. In the Mark II, the individual filter boxes are $6^1/_2$ x $2^1/_2$ x $1^1/_2$ inches (**see Figure 3**).

The performance of the filter sections now closely matched (within a dB or so) Ed's published results. Return loss is very acceptable (more detail below) and the filters, once they were initially tuned on the bench, did not require re-tuning when installed in the larger enclosure. The individual filter units are BNC

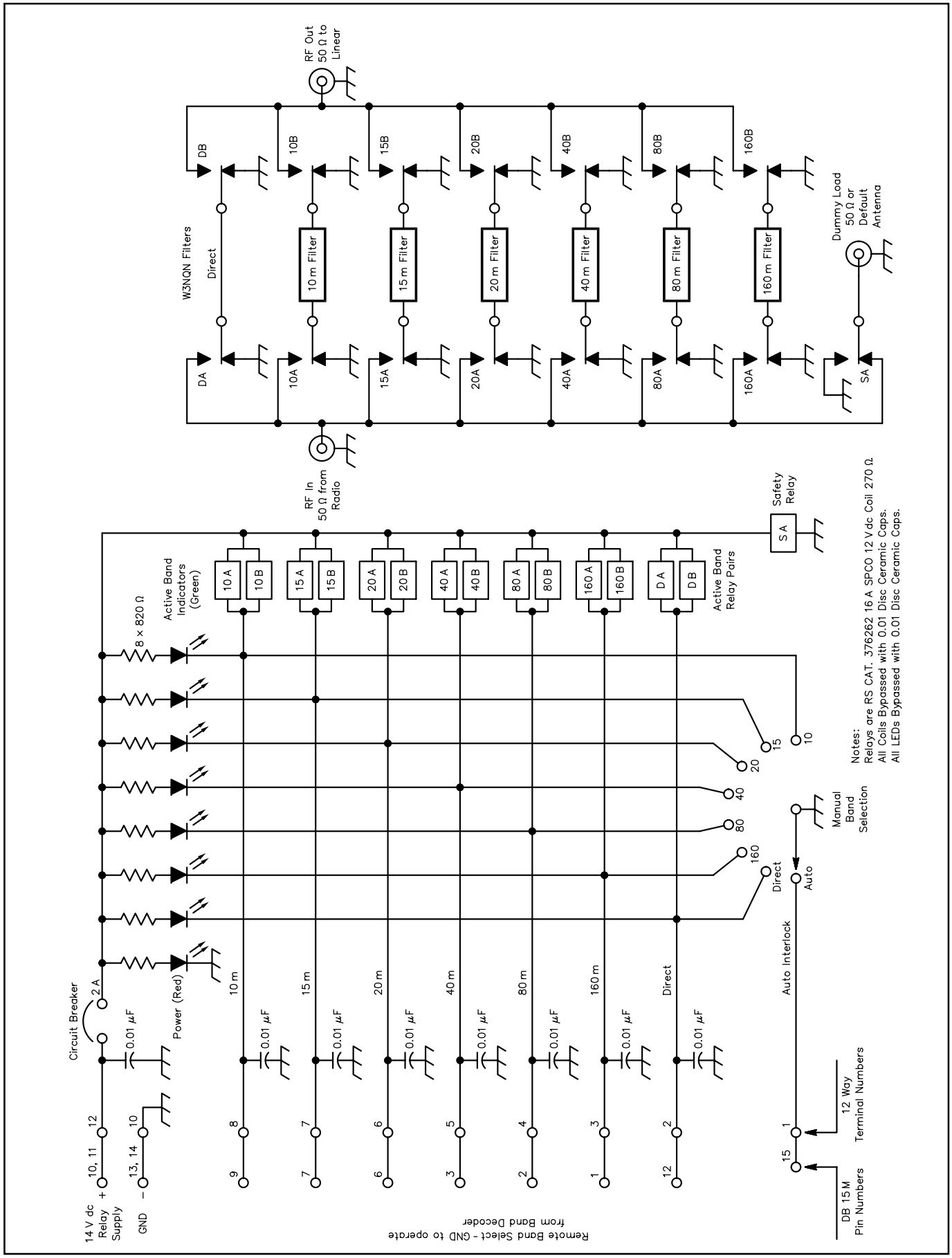

Figure 1—The circuit diagram of one band-pass filter switching unit.

Figure 2—In the Mark I the filters and relays are mounted on open PC boards.

Figure 3—The Mark II filters are mounted within individual boxes.

connected for quick and easy removal for independent use or for servicing or updating.

The deep troughs in the designer's performance curves are more closely replicated (but not always exactly matched with our measuring setup.)

Although our measurements are all on low-cost homebuilt sweep equipment (without NATA calibration), we have confidence in our measurement accuracy to well over 75 dB down (see "The Sweeper" sidebar and reference 3).

To achieve our objective of a minimum of 40 dB cross band attenuation we needed to add a 15-meter notch circuit to the 10-meter filter (see **Figure 4**). This circuit was pre-tuned on the bench and then tested positioned at the input, the center and the output of the filter. The performance was acceptable in each location. The center location allowed some manipulation to assist in tuning the return loss.

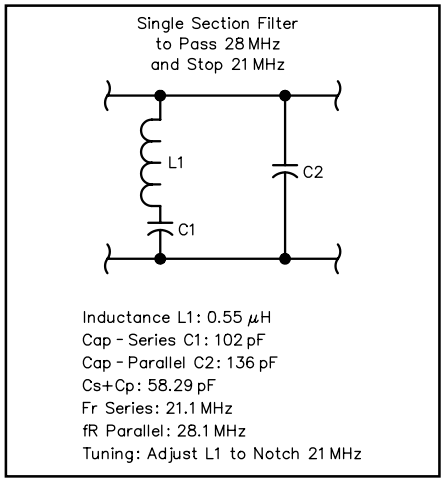

Figure 4—This 15-meter notch circuit was added to the 10-meter filter.

The long thin filter enclosures resulted in lead lengths longer than in Ed's layout and this made critical component placement even more so. **Figure 5** shows the return loss of a 15-meter filter carefully tuned (3 circuits) to resonance. Both traces show the classical resonance pattern confirming the "on resonance," but the excellent lower trace is with the internal connecting lead inductance tuned with stray capacitance—provided by spacing the leads close to the grounded case, thus, closely maintaining the 50 Ω impedance through the box. Sweep adjustment with real-time visual display is essential in getting this optimized and the exact inductance adjustment and lead and component placing is critical.

Final settings are confirmed by reversing the filter. Once checked, the wiring is secured against creep with a smear of non acidic-silicone adhesive.

In the Mark II, the relay sets are installed in 7½ x 2½ x 2-inch zinc annealed boxes and short signal leads are used on the PC boards. These leads are tuned with an adjacent ground strip to closely maintain 50 Ω and to maximize the return loss. The details are shown in the photograph in **Figure 6**. The 50 Ω tuning strip can be seen in the left hand relay box. The switching arrangement, however, is the weak link in achieving optimum return

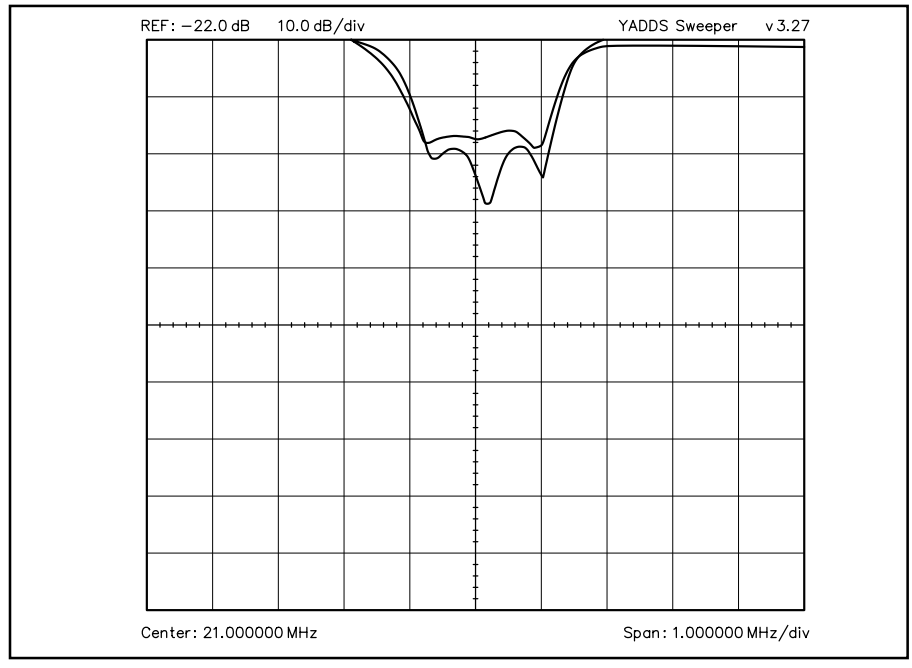

Figure 5—This *Sweeper* trace of the 15-meter filter return loss shows the benefit of maintaining 50 Ω by careful spacing of the components and leads.

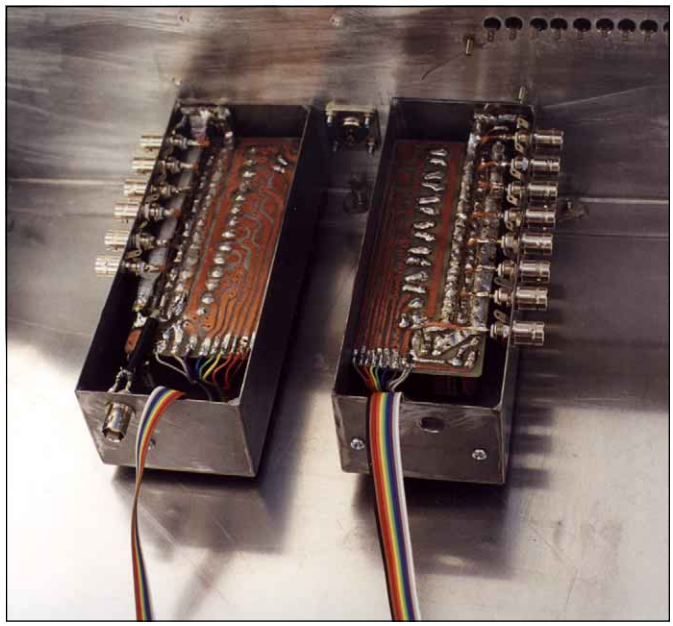

Figure 6—The Mark II relay boxes, during assembly.

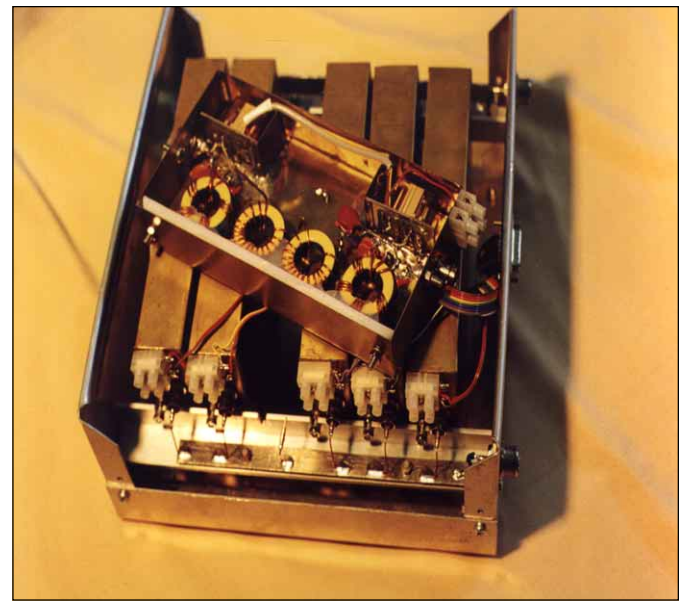

Figure 7—The Mark III. Filters and switching relays are enclosed in individual subassemblies.

Table 1

Insertion Loss of Switched Filter Sets (in dB)

Test	**Band Filter**					
Frequency	**160**	**80**	**40**	**20**	**15**	**10**
1.8	**0.3**	41	75	75	80	73
3.6	50	**0.3**	45	70	78	69
7.1	78	52	**0.4**	40	71	73
14.1	58	70	52	**0.4**	32	40
21.1	38	48	45	33	**0.5**	60
28.2	54	43	41	54	44	**0.7**

loss and ultimate stop band attenuation. Several relay setups were tested and all degraded the individual filter performance to some degree.

Figure 7 shows the third approach with the input and output relays sharing the same box as the filter. Like the Mark II, the signal lines to the relays are also tuned for 50 Ω and maximum return loss. Signal leads are kept as short as possible.

The final results for the Mark III design are summarized in **Table 1**. The filter design band is listed across the top with the measured attenuation in dB below it at each of the test frequencies listed in the left column. This table is a good basis for comparison with other switched filter designs. These results are not the same as those obtained when the filters are individually measured. Measure-ments taken on the individual filters very closely matched Ed's published data. The minor performance degradation is the result of the additional switching circuitry. There is little practical difference between the three different switched designs built to date—all three models can be tuned to achieve the objectives.

Figure 8, taken in the shack of VK4UW, shows a switched filter unit installed below the amplifier.

In summary each filter is tuned to specification in its individual shielded enclosure. The two relay switching units are tuned for maximum return loss in their shielded enclosures. Coax leads connect all the filters to the relay units and all the devices are encased in a large cabinet.

Careful tuning is critical in achieving the design figures. A sweeper, or an oscilloscope with a suitable adapter (such as the one detailed by Ed in the *QST* articles), is the most efficient method of tuning. Nevertheless, John managed to tune his filters using an antenna analyzer, an 80 dB step attenuator, a noise bridge and a HF receiver.

Figure 8—The Mark II filter unit installed at VK4UW.

Conclusion

We have built and tested several sets of band-pass filters using Ed Wetherhold's designs and have confirmed that the performance is easily repeatable. His guidelines for tuning have been used along with the PC controlled Sweeper for greater ease and accuracy. We have taken some novel approaches in assembly and switching, and have employed our filter systems in a contest environment with complete satisfaction.

References

[1] *QST* May and June 1998 "*Clean up Your Signals with Band-Pass Filters*" by Ed Wetherhold, W3NQN

[2] *CQ Contest* Feb 1996 "*Band Reject Filters for Multi/Multi Contest Operations*" by Thomas Moliere, DL7AV

[3] *Electronics Australia*, Sep and Oct 1995. Available on the Web at **http://www.electronicsaustralia.com.au/**. "*A PC Controlled Sweep Analyser*" by Jim Rowe and Tibor Bece. Tibor can be contacted via email at **tbece@netspace.net.au**. ■

Contesting with Wolves: VD7D in the 1999 IOTA Contest

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terry@qcislands.net

Imagine all DXpeditions start out the same way; an idea is tossed around for a while and eventually someone moves to bring it to fruition. That's exactly how our adventure to Dundas Island, IOTA NA118, came to be. So the story begins…

The Planning Stages

Pat, VE7QCR, and I are avid "Island Chasers." In May of 1999, we went to the Terrace Hamfest campout and operated from Ferry Island, Canada. It was our first independent attempt at portable operation. We operated from three other islands and ended up logging close to 400 contacts. While at the Terrace Hamfest, Klaus, VE7KDU, approached me. He let me know that if I decided to operate from Dundas Island that he would like to go along.

Up to that point I had had no plans for such an operation—but on the way home, Pat and I considered the logistics. While waiting for the ferry to take us back home to the Queen Charlotte Islands, we shared the idea with Ron, VE7EDZ. Ron, who lives in Prince Rupert, had operated with N6VV and W7DR from Green Island in 1997 and was already familiar with the area.

We now had the operators—next we needed to identify an operating site. Ron, who lives the closest to Dundas Island, started making some phone calls. I assumed the role of DXpedition leader and began to research how the Big Guns organize this type of operation. The Heard Island model was obviously the one to follow. Pat took charge of radio equipment and Klaus volunteered to handle the grub. Ron would organize the transportation and accommodations. I was left with everything else.

We decided to plan our operation for the 1999 IOTA Contest.

The next 14 months were filled with emails, 80-meter meetings, 2-meter chinwags and a few preliminary Canadian island activations. Slowly but surely the important pieces of the Dundas Island DXpedition began to fall into place. We made a master list of required equipment and gear (of course, we *now* have a better list). We ended up bringing a few things we did not need and excluding several items that would have made our lives on the island much easier.

The Adventure Begins

For Pat and me, the DXpedition began on Tuesday July 20, 1999 when we boarded the ferry for the 6½ hour trip from the Queen Charlotte Islands to Prince Rupert for our rendezvous with Klaus and Ron. We didn't have enough room left in the truck to squeeze in a pack of gum.

Left to right. Klaus, CF7KDU; Terry, VE7TLL; Pat, VE7QCR; and Ron, VE7EDZ, on the clamshell beach. Alaska is in the background.

Captain Bernie and Ron, VE7EDZ, taking gear to the beach, our operating site is in the background.

Terry, VE7TLL, at the top of one of the 30-foot towers, working on one of the tri-banders.

Terry and Ron and some of the gear on the beach, MV *Edith Marie* is anchored in the bay in the background.

The ferry ride was uneventful. On Wednesday we did a bit of last minute grocery shopping. We were all set to catch our charter boat to Dundas Island first thing Thursday morning.

At 4 AM we began to load the three truckloads of antennas, towers, radios, tents and food on the 36-foot MV *Edith Marie*. Captain Bernie and his deckhand Deuce ably stowed our gear. Two hours later we were underway for the north end of Dundas Island. The weather was not looking good but the first hour of the trip is in the somewhat protected waters of Prince Rupert Harbor. For a while we were shielded from the 25-knot NW winds.

It was at about this point that someone decided to grab a snack and began looking for the coolers that contained our food. You can imagine the despair and embarrassment that resulted from the discovery of the now obvious absence of all of our frozen food! We turned around and returned to Prince Rupert, but not before undertaking a cost/benefit analysis of the possibility of helicoptering two dozen pizzas to Dundas Island. In the end it turned out that Captain Bernie had been in somewhat of a holding pattern due to heavy fog—we were actually still pretty close to Prince Rupert. The better part of the 38-mile trip northwest to Dundas Island still lay ahead of us.

Before we knew it, we began to hear the bellowing of the Green Island foghorn. Green Island is where all previous recorded activations of NA118 have occurred. Ron had operated with N6VV and W7DR in August 1997 from the Green Island Light Station. It was because of Ron's experience on Green Island and his stories about lighting up all of the Coast Guard Repeaters on the West Coast when the beams were turned that way that we chose to go to Dundas Island.

Dundas Island

Captain Bernie guided the *Edith Marie* around the northern tip of Dundas, past Goose Bay and west towards Kelp Point—our destination and home for the next five days. Ron had obtained permission from the Port Simpson Band

Council for us to stay there.

We pulled out binoculars and surveyed the site. It was a small peninsula about 25 feet high with salt water on three sides and a clamshell beach on the fourth side. We were all very excited about the close proximity to the salt water and the prospects of good signal takeoff angles.

The work soon began as we shuttled seven skiff loads of gear to the beach. We were greeted immediately by huge swarms of black flies. Several people had warned us that Dundas Island was known for only one thing—bugs. After the last skiff load hit the beach Captain Bernie bid us farewell—we were on our own.

Kelp Point has four small clam shacks (as they are referred to locally). The Tsimshian Indians who come to clam here every spring stay in these very rustic shacks. They are built from driftwood and other beachcombed materials and have floors made of broken clamshells.

We dug out the hammers, nails and chainsaw. Klaus began working on the kitchen while I built the operating desk. About 2 hours later, we had the radios unpacked, stew cooking on the stove and one of the two 30-foot towers up—topped with a TH3 pointed towards continental North America.

Obviously, we were all itching to get on the air. I tuned around and heard KI6T on NA066 calling CQ. I jumped into the pileup and soon logged our first contact from NA118. We continued assembling antennas until dark—around 10:30 PM local time.

Fatigue was setting in, but the excitement of finally getting to Dundas Island and getting on the air was just fuel for sleep deprivation. We finally shut the generators off and climbed into our tents at 1:30 AM. We had set our tents up inside the cabins in an attempt to escape the bugs and the weather. We had little choice—the insides of the cabins were virtually the only areas free of the lush vegetation that covers the ground everywhere else on the island.

A Visit from the Local "Resident"—*The Big Bad Wolf*

The next thing I remember was the big generator roaring to life at 5:30 AM. What was going on? Oh well, I stuffed my head under my pillow to grab a bit more shut-eye. When I eventually crawled out of my tent around 8 AM, I was greeted with evidence of extensive renovations to the cabin housing our tent.

I could smell fresh coffee so I headed for the outdoor kitchen. Immediately Pat cut me off with a shrill question—"*How could you sleep—didn't they wake you up?*"

Pat and Terry at the controls inside our clamshack.

What was Pat talking about? "*The wolves!*" he said. "*I didn't sleep a wink—they were howlin' all night.*"

It turns out that Pat woke up at 3 AM and hastily nailed the cabin shut so that they (the wolves) couldn't get in. When he couldn't take the nerve-racking howling anymore, he went down the hill and fired up the big generator. Two unfriendly wolves greeted him. Apparently, they initially just stared him down. But when they started moving towards him, he took off for the cabin—never looking back or stopping to invite our guests for breakfast. I think Pat thought that *he* might be breakfast!

At this point in our conversation Ron interjected that wolves are more dangerous than bears and that Pat was lucky to have survived his wolf encounter. He then went on to say that the reason that you never hear about wolf attacks is because *there are never any survivors*. Suffice it to say that Pat never wandered anywhere alone in the dark for the remainder of the DXpedition.

Pre-Contest Pileups

On Friday we erected another 30-foot tower and then installed a HyGain Explorer 14. The equipment was ready to go. We tested propagation for the rest of the day and each of us took some time to familiarize ourselves with our new portable multi-op station. The IOTA Contest would begin the next morning.

The HF bands seemed to be in good shape. During our pre-contest operations the European pileups were incredible.

Klaus prefers CW. As he sat down for the first time, he looked at me and said, "*What should I send?*" I told him to call CQ NA118 (what Klaus didn't know was that I had just informed the European 20-meter SSB pileup that CF7KDU/P on NA118 was about to come up on 20-meter CW).

In all my 33 years on this earth I have never seen anything like the look that appeared on Klaus' face after his first CQ. He reached over and pulled out the headphone plug and said "*Listen to this—what do I do now?*"

What we heard pouring out of the speaker was the largest CW pileup we had ever encountered. Sure—we have all experienced big pileups—but the exhilarating feeling of being on the receiving end is incredible!

It was obvious that Klaus would have to operate split. I watched as he switched in the 250-kHz filter and the 18-dB attenuator.

Klaus was obviously very popular. We periodically plugged in another set of headphones and listened as Klaus received: "TNX NEW IOTA" again and again. It was soon time to get some sleep; the contest would begin at 5 AM.

Our Special Call Sign

1999 was the 225th anniversary of the first European exploration of the Queen Charlotte Islands. In 1774, Juan Perez and his ship the *Santiago* anchored off the islands and traded with the Haida who came out to meet them in their canoes. To commemorate this event, Industry Canada approved our application for a special short-term call sign—VD7D. We hoped it would attract both IOTA chasers and prefix hunters.

July 24, 1999—1200Z, Off and Running…

Pat took the first shift on the run radio while Klaus and Ron manned the multiplier position. I decided to sleep in as long as possible—knowing that the night shift would be pretty long.

The band conditions seemed to have tailed off a bit. Pat elected to catch the early morning 20-meter Asia opening. When the propagation died down, he swung the beam to North America.

Maximizing the number of JA contacts was critical to our IOTA contest effort. Japan is IOTA AS007—each island contact is worth 15 points. Continental contacts to everywhere else are only worth 3 points. What this means is that we were better off plugging away at the JAs—we'd need to generate five times the rate to get the same number of points working the continental US or Europe.

20 meters died around 1600Z and made the day seem to drag on. We never found the 15-meter opening to Asia that we experienced three days earlier. The rates picked up again with Klaus operating 20-meter CW to Europe until conditions would support good runs on SSB. We switched back to CW when propagation again deteriorated.

Ron, operating the multiplier station, logged 30 multipliers from NA061, NA051 and NA041. These are the closest IOTA groups to NA118. Ron had arranged skeds beforehand and this made a huge contribution to our final score. This strategy had been in our

initial plan and proved very productive.

The shift times on the run station flew by. At times the rate meter would indicate a rate of over 200 QSOs per hour. Klaus and Ron fueled up the generator and made another pot of coffee as the last few hours of the contest approached. 20 meters was virtually dead. There were signals on 40 meters but nothing new. Klaus worked a few JAs on 40 meters and then did some S & Ping on 20 for a while. Eventually he threw in the towel and said he was going to bed. Ron's bed was right behind the two contest positions. He decided to let Pat and I scour the bands for the last few hours. It is at this point in many contests that you decide your fate.

The final push started. Pat and me alternated on the run station. Pat would scare up a few, then I would roust a few more. I was on the multiplier station on 15-meter SSB around 1000Z. I was swinging the beam around and around. As I was moving it from west to east over the North Pole I heard some signals. At 3 AM local time I can attest that I was running on auto-pilot—I thought I might have been hearing things—then I heard 9A0DX/P calling CQ! I just about fell out of my chair! I screamed at Pat and told him what I heard while I typed the call into the computer to do a dupe check. 9A0DX/P EU112 was a new multiplier.

Pat's station had the bigger amplifier. He wasn't getting any action so we swapped spots and I made the call. Bingo—new multiplier. I tuned up and down the band and located two additional mults.

The MUF plots hadn't predicted this opening. I found a spot and put the hammer down. If I could crack the EU-EU pileups, my signal had to be okay into Europe. I called CQ IOTA three times and then it happened. Pat will concur that what resulted was definitely the biggest pileup we would scare up in the whole contest. One hour later the 15-meter European opening was gone just as quickly as it had appeared. Pat and I hunted down a few more multipliers and spent the last hour of the contest searching the depths of every band.

When the clock finally struck 1200Z, the log showed 1136 QSOs with 149 multipliers for 1.1 million points. Pat and I shook hands as Ron snored in the background. We had finished the contest, breaking the 1000 Q/million point barrier.

We woke up later that morning swelled with an immense feeling of satisfaction. We had each contributed our maximum effort. As we lazed around and slowly began disassembling all but one station, the culmination of our IOTA contest operation helped us realize and appreciate the incredible efforts required for VK0IR, ZL9CI and countless other DXpeditions.

Heading Home

On Monday morning the *Edith Marie* returned to Kelp Point. The boat was loaded one more time. After boarding, we discussed what went well, what didn't, and what to do next. We definitely had brought too much stuff. More importantly, there was less than one year until next year's IOTA contest and we still hadn't decided where to go!

We wish to thank radio amateurs around the world for the 3000 plus QSOs. We'd also like to thank the following for their encouragement and support: NL7LL, VE7DQC, VE7RXB, VE3XN, VE6VK, VE7IU, K9PPY, I1JQJ and VE7YL. We will forever be grateful to Lew, N6VV, and Dan, W7DR, who in 1997 gave VE7QCR, VE7EDZ and me our first taste of what Islands on the Air is really about.

VD7D DXpedition to NA118

Location:
Kelp Point, Dundas Island
54 degrees 37 minutes 30 seconds North
130 degrees 30 minutes 48 seconds West

Operators:
Terry Mitchell, VE7TLL
Pat Trautman, VE7QCR
Ron German, VE7EDZ
Klaus Urbantke, CF7KDU

Equipment:
Transceivers: Two Yaesu FT-1000MPs, a Yaesu FT-847 and an ICOM IC-706.
Antennas: A HyGain TH3 and an Explorer 14, a Cushcraft R-7000, an inverted-V and a 4-element 2-meter Yagi. Two 30-foot towers with Yaesu G-800 rotators.
Amplifiers: Alpha 374 and a Yaesu FL-2000
Computers: A P350 and a P166 running *DX4Win* and *SDI* logging software.
Generators: 6 kW and 1.75kW ■

The Monoband Log-Cell Yagi Revisited—Part 1:

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An Introduction to the Log-Cell Yagi and Some Standards of Comparison

Although the design had been known earlier, the monoband log-cell Yagi array was briefly popular in amateur literature in the late 1970s and early 1980s, largely through the work of Rhodes, K4EWG; Painter, W4BBP; and Zimmer, K4JZB.[1] Versions can be found in Orr and Cowan's *Beam Antenna Handbook* and in the *ARRL Antenna Book*. In recent times, interest in the design has renewed.

Figure 1 shows the outline of a typical monoband log-cell Yagi. It consists of a log-cell driver with 2 or more elements driven with a phasing line that reverses as it connects to each element. The element set is fed at the forward-most position, much like a log-periodic dipole array (LPDA). To the driver cell are added a reflector (usually) and one or more directors.

In **Figure 2**, we see a common variant of the basic log-cell Yagi. In this case, favored especially by K4JZB, the elements are bent forward by about 40 degrees from linear each side of center.

Since most of the articles on the log-cell Yagi appeared before the advent of computer antenna modeling with *MININEC* and *NEC*, the claims for their performance are typically highly optimistic. One source reports a 6-element log-cell Yagi to have a gain of 16 dB, but it conveniently gives no reference standard. Most sources report gain to be greater than that of Yagis of equivalent boom length, but these reports compare the log-cell Yagi with antennas developed before computerized optimization of the Yagi design became commonplace. Perhaps only Rhodes and Painter stress operating bandwidth as a major advantage of the antenna design.

With the renewed interest in the antenna, many potential users read the older claims as if they would stand up to modern scrutiny. However, to date, I have seen no reevaluation of the log-cell Yagi design. Modern analytical tools, such as computer modeling, offer us a chance to better understand the antenna and to assess its place among monoband antennas used by amateurs.

The purpose of this series is to contribute a little toward the reevaluation of the log-cell Yagi, using *NEC-4* as a means of analyzing various aspects of the design. Throughout, I shall use 10 meters as a focal point, since this band is the widest of the upper HF amateur bands. In this introduction, I shall look briefly at a superior log-cell Yagi design, and then look at the performance characteristics of some pure Yagi designs that we might use as standards of comparison. In this way, we can begin to see more clearly where the log-cell Yagi fits into the amateur's arsenal of antennas.

In Part 2, we shall examine some basic principles behind the log-cell itself, with special attention to element phasing. One might also use LPDA principles to show how a log-cell works, but an understanding of the basics of element phasing can make a number of facets of both Yagi and log-cell Yagi design somewhat clearer.

In Part 3, we shall look at several (at least 4) practical 10-meter log-cell Yagi designs. I shall claim no great originality for any of the designs, although each has required considerable effort to optimize all of the operating characteristics—including gain, front-to-back ratio, and SWR bandwidth. All of the antenna designs will feature direct 50-Ω feedpoint impedances.

In the final installment, Part 4, we shall examine the V-element question. Does bending half-wavelength elements forward contribute anything useful to the performance of the log-cell Yagi? This question, of course, will involve us in a broader question of Vee-ing any half-wavelength element.

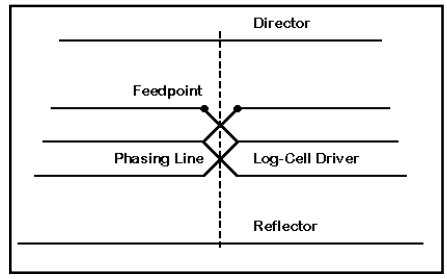

Figure 1—A typical monoband log-cell Yagi outline.

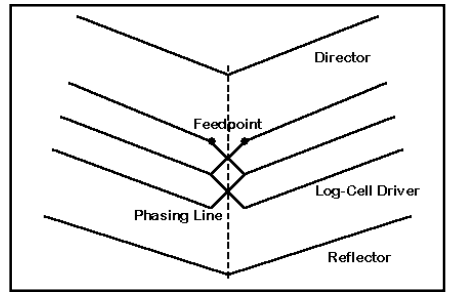

Figure 2—A typical "Vee-ed" monoband log-cell Yagi outline.

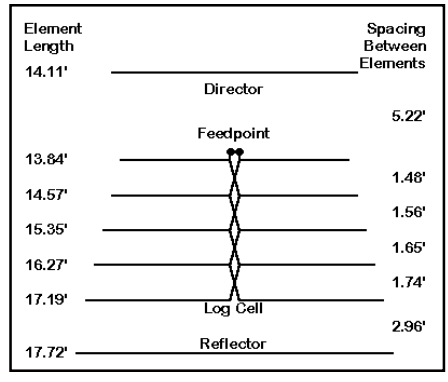

Figure 3—A 7-element 10-meter log-cell Yagi.

A Real Log-Cell Yagi of Considerable Potential

Let's begin with an advanced log-cell Yagi design using a 5-element log-cell plus a reflector and director. This 7-element array was extensively revised from a CB design sent to me by Alan Hughes, ZL3KR. The original had a free-space gain of about 9 dBi, but poor front-to-back ratio. In addition, the SWR and operating characteristics remained usable over only a very narrow portion of the spectrum.

The basic dimensions of the refined model appear in **Figure 3**. The material for the model is 1-inch diameter aluminum, although similar performance can be achieved with elements as small as 1/2-inch diameter.

The log-cell is designed as a true LPDA, with elements tapering in length and spacing as one moves forward toward the feedpoint. As one might expect, the reflector is the longest element of the entire set. However, the director is longer than the forward-most element of the log cell. Directors for log-cell Yagis must be cut for the operating

[1]Notes appear on page 22.

frequency, while the forward element of the log cell will be resonant well above the highest operating frequency. The overall length of the antenna is about 14.6 feet or so, which would fit the antenna easily on a 15-foot boom.

Figure 4 provides a snapshot of antenna performance across all of 10 meters from 28.0 to 29.7 MHz. The highest free-space gain is at the upper end of the band, with the free-space gain at 28 MHz being just above 8 dBi. The first MHz of the band also shows a very high and stable front-to-back ratio of 30 dB or more, with the figure at 28.5 MHz exceeding 40 dB. The 50-Ω SWR of this antenna remains well below 2:1 across the entire 10-meter band.

Actually building this antenna would require element length adjustment if an element diameter-tapering schedule is used. However, nothing in the design would require special construction except perhaps the 100-Ω phasing line for the log cell. We shall return to this and other practical designs later in the series. First, let's consider whether the antenna is worth building. For that evaluation, we need some standards of comparison.

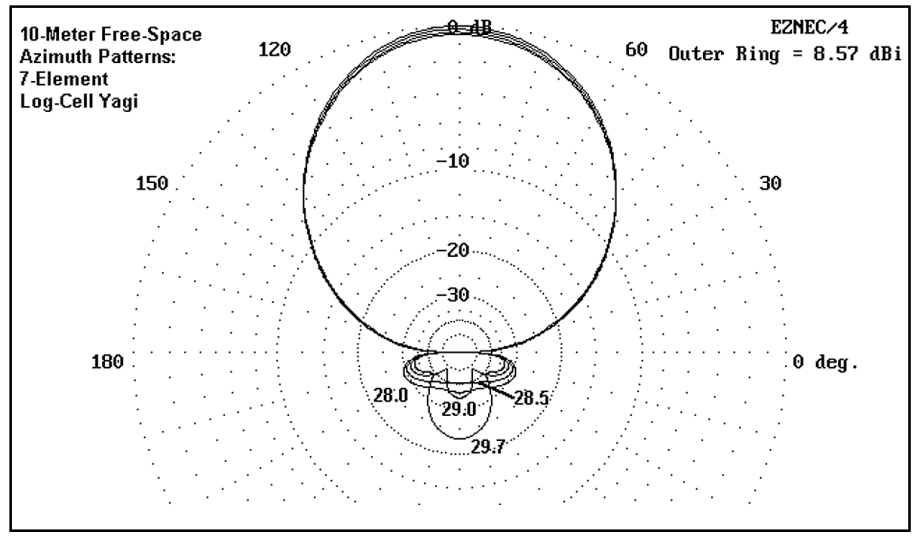

Figure 4—Free-space azimuth plots of the 7-element 10-meter log-cell Yagi from 28.0 to 29.7 MHz.

Table 1
Dimensions of medium-bandwidth Yagis used as standards of comparison

Example 1
3-element, short-boom (<8 feet) Yagi: 0.5-inch diameter aluminum elements

Element	Length (in inches)	Distance from Reflector (in inches)
Reflector	211.9	—
Driver	193.8	36.0
Director	184.9	90.0

Example 2
3-element, long-boom (<12 feet) Yagi: 0.5-inch diameter aluminum elements

Element	Length (in inches)	Distance from Reflector (in inches)
Reflector	206.3	—
Driver	197.0	62.4
Director	185.3	134.5

Example 3
4-element, 13-foot boom Yagi: 0.5-inch diameter aluminum elements

Element	Length (in inches)	Distance from Reflector (in inches)
Reflector	207.5	—
Driver	195.9	35.8
Director 1	194.4	65.5

Some Standards of Comparison

Since the days in which log-cell Yagis were claimed as higher gain, more compact beam designs than pure Yagis, the understanding of Yagi design has improved considerably. Lawson's *Yagi Antenna Design*[2] has become the basic volume for modern Yagi design. In addition, there are several Yagi optimizing programs whose results correlate well with *NEC* models, assuring the builder of predictable results. Consequently, monoband Yagi designs as we approach the end of the century are quite different from those of 15 to 20 years ago.

Because the most common comparator for a log-cell Yagi is a pure monoband Yagi, perhaps it may be useful to examine some of the operating characteristics of several good Yagi designs. Let's begin with designs I refer to as medium-bandwidth arrays, because they hold their operating characteristics from 28 MHz up to 29 MHz—or close to it. We shall look at three designs in particular.

First is a 3-element Yagi on an 8-foot boom ("3-8"). The actual overall length of the antenna is about 7½ feet. The design is adapted from one of Dean Straw's (N6BV) designs in the collection of antennas accompanying the program *YA*.[3] **Table 1** provides the modeled dimensions for this and the other two antennas in the medium bandwidth group.

The second design is adapted from Brian Beezley's (K6STI) design in the samples accompanying *AO*.[4] This longer-boom design ("3-12") is actually about 11.2 feet long and fits easily on a 12-foot boom. The third design ("4-13"), again adapted from an N6BV design, uses 4 elements in under 12.7 feet of length for an easy fit on a 13-foot boom.

For this exercise, all designs use uniform diameter elements. All are modeled on *NEC-4* in free space for the purposes of direct comparison.[5] The driven elements of the 3-element beams have been resonated so that SWR figures can be taken relative to the resonant impedance. Because the 4-element beam had a somewhat lower impedance, it has been equipped with a beta match—that is, a shorted transmission-line stub to effect a match compatible with 50-Ω coax. The 3-element beams can be matched with a quarter-wavelength matching section, or their drivers can be shortened for use with a beta match.

Figure 5 provides a sweep of the free-space gain of each of the beam designs from 28.0 to 29.0 MHz. As one might expect, the 3-element, 8-foot boom model shows the lowest gain—just above 7 dBi. However, the gain is fairly constant across the selected portion of the band.

The long-boom 3-element Yagi shows considerably higher gain, averaging nearly a full dB above the short-boom model. Because the boom length is close to the limit of stable operation for a considerable bandwidth, the curve shows greater changes with increasing frequency.

In contrast, the 4-element Yagi shows only slightly higher gain than the 3-element long-boom model. However, the boom length is only about a foot greater than the long-boom 3-element Yagi. What the fourth element provides is more even gain across the selected bandwidth.

In Figure 6, we get a picture of the 180-degree front-to-back ratio of the antennas. Interestingly, the short-boom

3-element Yagi shows the highest peak front-to-back ratio and the highest average front-to-back ratio across the band, never falling below 20 dB. Comparatively, the long-boom 3-element Yagi shows a good peak front-to-back ratio, but the value falls below 20 dB between 28.7 and 28.8 MHz. The 4-element Yagi shows a much lower value of peak front-to-back ratio, but the overall curve is smooth and falls below 20 dB only at the lower edge of the band.

From these two parameters alone, we can obtain an impression of the designs. The short-boom 3-element and the 4-element designs are conservative. However, the long-boom 3-element design is pressing the limits of what is possible for that number of elements and boom length. One might obtain even higher gain, but at the expense of an even narrower bandwidth for the operating characteristics.

The impression is further deepened in the SWR curves in **Figure 7**. The long-boom model shows under 2:1 SWR relative to the resonant impedance through 28.9 MHz. The short-boom 3-element Yagi easily achieves a 2:1 SWR bandwidth relative to the resonant impedance that is wider than the selected band portion. Despite the slight narrowing of the long-boom SWR bandwidth, the use of a beta match would likely permit a wider operating bandwidth at the 50-Ω matched value. This is illustrated by the 4-element Yagi's 50-Ω bandwidth, which shows under 2:1 SWR across the band. The native bandwidth relative to the antenna's resonant impedance would be about 800 kHz. (However, there may be slight losses associated with operating a beta match well off its optimal values, despite the resulting good impedance match.)

These three antennas are good designs of their types, despite the limitations of each. However, they are not adequate to cover the entirety of 10-meters. For that, we must turn to wide-band designs. The dimensions of two wide-band Yagi designs appear in **Table 2**.

One design is a 3-element Yagi. This version was developed by Joe Reisert, W1JR, and is similar to a design published by Bill Orr, W6SAI, in *Ham Radio* many years ago.[6] The boom would be 12 feet long to hold an antenna whose inherent length is about 11.2 feet or so. The other design is my own, which fits on an 8-foot boom and uses 4 elements. The extra element is a second driver open-sleeve coupled to the first such that the two together cover all of 10 meters.

As shown in **Figure 8**, the gain curves of the two antennas are very similar, with the 4-element model having a slight edge at the lower end of the band, a function of the dual driver system. It is notable that in a 3-element design, wide-banding the gain requires a boom length similar to that of the higher-gain medium-bandwidth long-boom model—about 12 feet.

The front-to-back curves in Figure 9 once more do not give one design a major edge over the other. The dip in value below 20 dB occurs at opposite ends of the band for the two designs—but might be made more coincident with slight redesign of element lengths and spacings. The 4-element model shows a very high front-to-back ratio peak around 29 MHz, where all 4 elements show the highest activity in terms of current magnitude.

The SWR curves for both wide-band antennas in Figure 10 are referenced to 50 Ω without need for a matching system. The 3-element antenna easily achieves a 2:1 operating bandwidth that covers the entire band. The open-sleeve coupled drivers of the 4-element model allow superior performance in this department, with an SWR that never

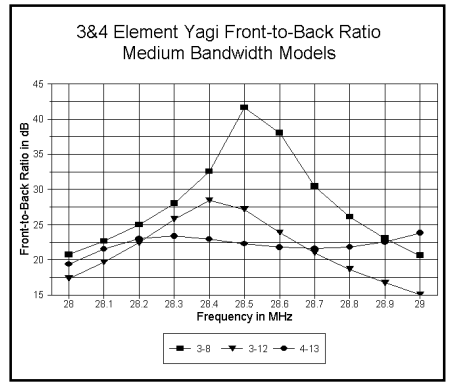

Figure 6—180-degree front-to-back ratio of three medium-bandwidth Yagi designs used as standards of comparison.

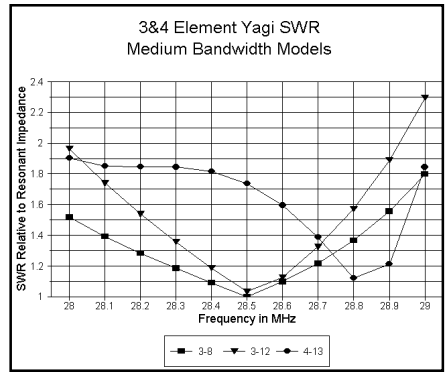

Figure 7—SWR curves of three medium-bandwidth Yagi designs used as standards of comparison.

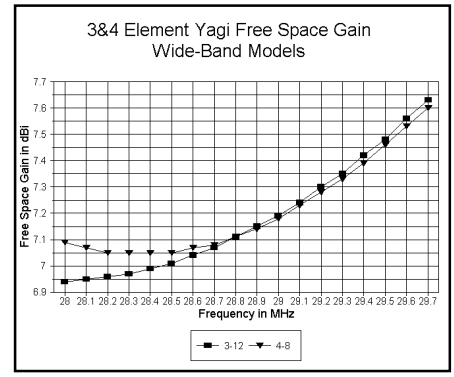

Figure 8—Free-space gain of two wide-bandwidth Yagi designs used as standards of comparison.

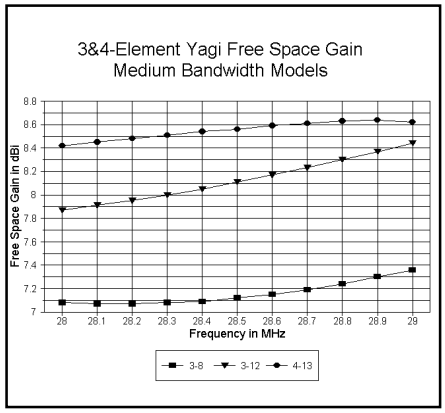

Figure 5—Free-space gain of three medium-bandwidth Yagi designs used as standards of comparison.

Table 2
Dimensions of wide-bandwidth 3- and 4-element 10-meter Yagis used as standards of comparison.

Example 1
3-element, long-boom (<12 feet) Yagi: 1.0-inch diameter aluminum elements

Element	Length (in inches)	Distance from Reflector (in inches)
Reflector	214.0	—
Driver	195.6	74.5
Director	176.0	134.5

Example 2
4-element, short-boom (8-foot) Yagi: 0.5-inch diameter aluminum elements

Element	Length (in inches)	Distance from Reflector (in inches)
Reflector	212.0	—
Driver	205.0	40.5
Slaved Driver	189.0	44.0
Director	181.0	96.0

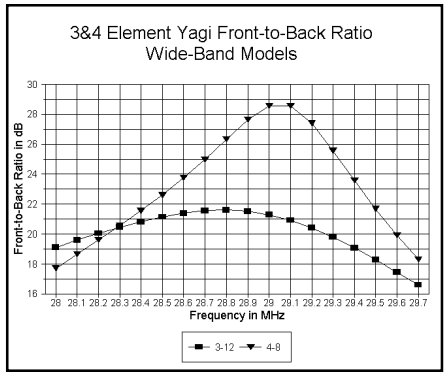

Figure 9—180-degree front-to-back ratio of two wide-bandwidth Yagi designs used as standards of comparison.

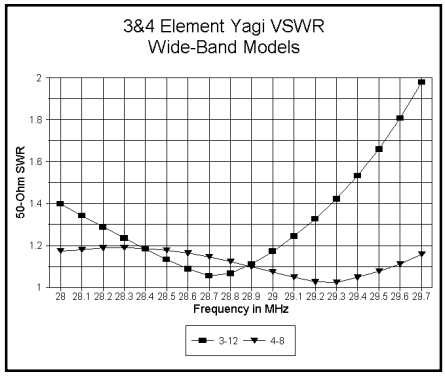

Figure 10—SWR curves of two wide-bandwidth Yagi designs used as standards of comparison.

rises to 1.2:1 across the entire band.

Relevant Comparisons

The standards of comparison we have just established will be used throughout this series in various ways. To illustrate how we may sensibly use them, we may return to the 7-element log-cell Yagi that we briefly described. The 4-element medium-bandwidth Yagi matches the log-cell Yagi in gain on a boom that is 1 to 2 feet shorter. However, that antenna is limited to only about 1 MHz of the band, while the log-cell Yagi provides coverage of the entire band. The gain of the log-cell Yagi is from 1 to 1.5 dB greater than either of the 2 wide-band beams discussed.

In front-to-back ratio, the log-cell Yagi is superior to all of the standard designs, with better than 30 dB until well past 29 MHz and better than 22 dB across all of the band. One of the areas in which well-designed log-cell Yagis excel is in front-to-back ratio. The log-cell Yagi also has a 50-Ω SWR well under 2:1 across the entirety of the 10-meter band, matching both wide-band Yagis in that performance category.

For a given boom length, then, a log-cell Yagi does not make its claim to fame at the end of the 20th century in the gain department. Advances in pure monoband Yagi design give the edge to the pure Yagi. What may have been true of 1980s Yagi designs is no longer true today.

However, well-designed log-cell Yagis can achieve very wide operating bandwidths, not only with respect to SWR, but with respect to operating characteristics as well. In particular, the log-cell Yagi has the potential for very smooth front-to-back ratio curves at very high levels across a band as wide as 10 meters.

There is, of course, a cost involved in achieving these goals: extra elements and their associated weight. In addition, the log cell requires careful design with considerable attention to the phasing line that interconnects the phased driven elements. To the subject of element phasing we shall turn in Part 2.

Notes

[1]For information on various log-cell Yagi designs see the following items on this incomplete literature list:

P. D. Rhodes, K4EWG, and J. R. Painter, W4BBP, "The Log-Yagi Array," *QST*, Dec 1976. The main elements of this article are reprinted in *The ARRL Antenna Book*, 18th Ed, pp 10-25 to 10-27.

Robert F. Zimmer, K4JZB, "Development and Construction of 'V' Beam Antennas," *CQ*, Aug 1983, pp 28-32; and "Three Experimental Antennas for 15 Meters," *CQ*, Jan 1983, pp 44-45.

W. I. Orr, W6SAI, and S. D. Cowan, W2LX, *Beam Antenna Handbook*, pp 251-253.

John J. Meyer, N5JM, "A Simple Log-Yag Array for 50 MHz," *Antenna Compendium*, Vol 1, pp 62-63.

Reference to log-cell Yagis is also made by L. A. Moxon, *HF Antennas for All Locations*, 2nd Ed, pp 199-200, but the design shown is the Rhodes-Painter version in *The ARRL Antenna Book*.

[2]James L. Lawson, W2PV, *Yagi Antenna Design* (ARRL, 1986).

[3]*YA* is a Yagi analysis program developed by Brian Beezley, K6STI, and accompanies recent editions of *The ARRL Antenna Book*.

[4]*AO* is a *MININEC* analysis and antenna optimizer program by K6STI that is no longer available.

[5]Two commercial implementations of *NEC-4* are available: *EZNEC Pro* by Roy Lewallen, W7EL, PO Box 6658, Beaverton, OR 97007; and *GNEC* by Nittany Scientific, Airline Hwy, Suite 361, Hollister, CA 95023. Use of *NEC-4* requires licensure from the University of California. Fortunately, most of the analysis in this series can be replicated using more easily obtained versions of *NEC-2*.

[6]Joe Reisert, W1JR, "Yagi/Uda Antenna Design: Part 1: A Different Approach," *Communications Quarterly*, Winter 1998, pp 49-59. Orr's version of the antenna appeared in his regular column for *Ham Radio*, May 1990. ■

The Evolution of the WRTC

Dave Patton, NT1N
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Not all sports have a clear-cut method for determining the absolute "Best of the Best." Some sports come close, but others—such as college football—simply do not have the time or the resources to make that determination. Various polls of the experts could be taken and used to formulate an educated guess—but political overtones and favoritism may influence even these sources.

What about the sport of Amateur Radio Contesting? Can the absolute "Best of the Best" be identified? Considering the vast array of presently available contests and all of the inherent variables that contribute to the final scores—probably not.

The World Radiosport Team Championship events, however, may come close. The event was originally conceived as an international radio competition to take place in conjunction with the 1990 Goodwill Games in Seattle. Danny Eskenazi, K7SS, spearheaded and drove that first competition to a very successful conclusion. Twenty-two 2-person teams of operators, chosen to represent their countries, flocked to Seattle to compete in a ten-hour contest using similar stations (see *The World RadioSport Team Championship* by John Crovelli, W2GD, in *QST*, October 1990).

The response to that first competition was so positive that the international contesting community's attention was immediately captured—clearly there would *have* to be more of these international events. The Washington organizers had shown that volunteerism could work. Dozens of people came forward to donate time, money, lodging and even station equipment. Software developer N6TR spent countless hours writing the log checking program. World-class talent, such as N6AA, K6NA, N6ZZ, OH2BH, OH2MM and others, agreed to participate—not as operators but as judges and log checkers. The 1990 winners, K1AR and K1DG, can certainly take pride in knowing that they won with a "clean log."

The Northern California Contest Club took up the challenge of organizing the next WRTC in 1996—and what a job they did! There were so many people involved that it's impossible to list them all in the space available here, but much was written on that event in the *NCJ*. The WRTC 96 had been expanded to include 52 2-person teams representing regional and national contest clubs from around the world.

For 1996, the contest period was lengthened to 20 hours and was operated within the IARU HF Championship in July. Operating locations were spread throughout the San Francisco Bay area using the stations of volunteers—one of the most incredible examples of volunteerism contesting has ever seen. WRTC 96 organizers were able to successfully involve non-contesters as never before. Every attempt was made to provide equal antenna systems for the competitors with the organizers going even so far as to hold a "40-meter dipole building and erection weekend" for those stations that lacked those antennas. "Bigger" stations were, in some instances, modified to be "littler." Noise sources were tracked down and cured. Transportation problems were overcome.

Best of all, tens of thousands of dollars worth of donations flowed into the WRTC coffers. Corporate underwriting was obtained from many amateur equipment retailers, manufacturers and associations—and even from some non-amateur companies such as Shell Oil, WJET-TV and *"Give Pizza Chance!"* The effort was absolutely extraordinary. Costs to participants were held to a minimum and the social side of the event easily rivaled the operating fun. (A videotape covering the event may still be available—see **http://www.jps.net/k6xx/wrtc96.htm**.

Many people who were not directly involved in the event came to the Bay Area just to witness the fun and to be a part of the action. All were truly welcome. This has become the hallmark of the WRTC—and it's heading to Slovenia in 2000.

The winners of WRTC 1996, KR0Y (now N5TJ) and K1TO, will be defending their title in Slovenia, just as K1AR and K1DG had the opportunity to do in '96. Once again, as in both previous WRTCs, the actual contest will be a battle that is as fairly conceived as is possible.

An addition made for the 1996 running of the event was the placement of "judges" at each station. The judges, led by K4VX, set a new standard in contesting by volunteering their services to come to San Francisco and "listen" to what was going on for those 20 hours. They also performed log-checking duties and were in charge of recording the entire contest for future log checking decisions.

An unexpected phenomenon that arose from WRTC-96 was that many of the on-site judges almost seemed to become part of the team they were adjudicating! While they didn't actually operate or assist towards the total score, the judges were cheerleaders and became virtual participants—a great experience for them that quickly erased any of their concerns about the apparent drudgery of such an assignment. Virtually the same group of experts—led by N6AA—made sure that the logs were fairly and cleanly evaluated—furthering another standard that will be evident in Slovenia.

Now we come to the WRTC 2000—led by Tine, S50A. All indications are that this event will surpass anything seen before! The Slovenian contingent that attended WRTC 96 is keenly aware of what is necessary to pull-off another such event in 2000, and there is no doubt that they will do just that. The operating event will take place around the city of Bled, a stunningly beautiful place that offers mountaintop stations for the competitors. There will be 51 teams from around the world and the rules will be very similar to those used at WRTC 1996. Top contest clubs will be selecting their representatives to go to Slovenia and do battle! The Web site for WRTC 2000 is **http://wrtc2000.bit.si**.

As was the case with the past events, this effort needs as much support as possible. Financial donations are critical. There is a very organized effort underway once again to make the event as financially uncomplicated as possible.

Carl Cook, AI6V/P49V, is leading the US fund-raising drive for WRTC 2000—a role familiar to him from his previous experience with WRTC 1996. In the US, donations of less than $250 should be sent to Carl Cook, 2191 Empire Ave, Brentwood, CA 94513. Donations of more than $250 may be submitted via a directed contribution to the Northern California DX Foundation, earmarked "WRTC 2000," and sent to Bruce Butler, W6OSP, 4220 Chardonnay Ct, Napa CA 94558. The NCDXF has agreed to work this arrangement with the WRTC so that US donors can claim the income tax deduction available for a contribution to a tax-exempt foundation—such as the NCDXF. Donors who contribute amounts greater than $250 need a proper receipt for income tax purposes—the NCDXF is already set up to provide those receipts. Hopefully, by being able to deduct their contributions, donors will be inclined to write larger checks!

Operator participants for WRTC 2000 are being named as this issue goes to press. The next issue of the *NCJ* will include a closer look at some of these Big Guns and see "*the who, what, why and when*" behind them. Remember, you really need to be a part of this event; either as a participant, judge, member of the audience or donator. At the very least, please plan on being on the air to work the competitors in July 2000!

WRTC is the absolute best that Amateur Radio contesting has to offer. I can say that from personal experience.

73, Dave Patton, NT1N (Operator at W6T at WRTC 96, along with Randy Thompson, K5ZD) ■

WRTC2000

Organizational Committee Communiqué No.6

Ljubljana, Slovenia, November 22, 1999

It has been awhile since our last communiqué. The Organizational Committee is moving full steam ahead. We look forward to a continuing increase in the interest in WRTC2000 in the upcoming months. We would like to provide some information on the current status of our work.

National team selection is nearly complete. We are presently waiting to receive some last minute applications before we close the roster. We urge everyone who was not selected for the national teams and who has not yet submitted wild-card applications, to do so before the 31st of December 1999.

We have already received team applications from DL, EA, I, UR, G, YU, OH, LY, HA, 9A and OM. Others have confirmed that they will attend. We will announce the final rosters for the national teams as soon as the list is complete.

American clubs have also announced their team leaders and we expect that they will be announcing their teammates before the end of November.

During our last meeting, the Organizational Committee confirmed the RAC application that names two Canadian teams. As you may already know, the Canadian teams are VE3EJ/VE7ZO and VE7SV/VA7RR.

Our schedule for the upcoming months

National Team selection will continue until the end of November.

Wild-card applications will be accepted until the end of December.

Referees will be selected through the end of February 2000.

The Organizational Committee has decided that all of the teams will be allowed to select additional team members in case of unforeseen circumstances (illness, inability to attend, etc). Please note, however, that the Organizer is not in a position to cover lodging or any other expenses for these additional team members.

For those of you that wish to attend the WRTC2000 (competitors, referees, visitors, etc), we remind you to send in your lodging application as requested in Communiqué No.4 (hotel application form). Based on the list of competitors and referees, the Committee will determine a final list of participants who will reside at Bled at the expense of the Organizer. Regardless of whether you will be having your expenses covered or will be paying them yourself, all of those wishing to attend must apply so that we can facilitate the arrangements that we have negotiated with the hotels in Bled.

Due to the high level of interest of individuals who will not be participating as competitors or referees, the Organizational Committee has decided to include "official observers." These individuals will serve as operators at stations in S5, 9A, OE, I and some of the other neighboring countries. They will be bringing diskettes with those station's contest logs to Bled the night after the contest. We will use these logs when processing the competitor's logs. These stations will also be regular participants in the IARU contest.

We have already received quite a number of requests for arrangements for dedicated national and club social events. We have reserved two time slots for such events on Thursday the 6th of July and Sunday the 9th of July. Please apply as soon as possible so that we can schedule the events accordingly.

Considering the importance of the WRTC, the Organizational Committee is trying to attract the largest possible number of sponsors and donors. Contributions of any amount are greatly appreciated.

Our US representative is the well-known contester Carl Cook, AI6V/P40V. We request that prospective sponsors/donors in the United States and Japan get in touch with Carl at **AI6V@aol.com**. All others are asked to contact us directly at **SCC@bit.si**.

We would like to request that all competitors consider providing their own radios and PCs. Although the Organizing Committee will supply all the needed equipment, we can not suit every team's special requirements. All competitors are also requested to supply a list of equipment that they will be bringing into Slovenia.

The final set of rules for the competition is nearly complete and will be announced shortly.

If you have any questions please contact **SCC@bit.si**, and be sure to check our Web page **http://wrtc2000.bit.si** frequently. A great deal of information about Slovenia is available on the site.

We are all looking forward to seeing you here in July 2000.

73, Tine Brajnik, S50A
President, Organizational Committee
WRTC2000

The ARRL DX Competition 1935 to 1947

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

Contests over the years have always been an exciting adventure. But activity is a relative thing! At the end of the Twentieth Century, we have six bands to use and major contests fill those bands to overflowing at times.

Let's use the ARRL DX Contest as an example—at times it is difficult to find an open frequency. There are stations running pileups from both here and abroad with the majority calling "*CQ Contest*" to gain attention.

Not so in the '30s. There were five bands, 1.75, 3.5, 7, 14 and 28 MHz. As World War II approached, only 7, 14 and 28 MHz were permitted. There were other differences, but let me walk you through the contests of 1935 through the 13th International DX Competition of 1947 to give you a feel for what those operators experienced. I suspect you will conclude, "*How lucky we are!*" after reading about the "Good Ol' Days."

Henry G. Elwell, Jr., N4UH

The Sixth International Relay Competition

The *Sixth International Relay Competition* of 1934 was CW only. My collection of *QST*s go back to September 1934 and can only provide the results of that contest. Unfortunately, the rules appeared in the February or March issue.

The participants in 1934 broke all previous records. Forty-eight operators had scores of over 10,000 points. Thomas Hall Jr, W3ZJ, set a new record of 32,879 points with 237 QSOs and 49 countries. Julio Prieto, X1AA (Mexico), was the highest scoring foreign operator with 22,722 points. There were a total of 1,302 stations reporting with 932 in W/VE and 379 in sixty foreign countries. These were very good numbers for those days.

The Seventh International Relay Competition

March 9th through 17th 1935 were the dates for the *Seventh International Relay Competition*—a nine-day contest period. It was the World working W/VE stations. The total operating time limit was set at 90 hours. You could operate for more than 90 hours, but your score was adjusted by multiplying it by the fraction of 90 divided by the total operating hours. Participants exchanged a self-assigned three-digit number followed by a serial number beginning at 000. Signal reports of the RST type were encouraged—but were not mandatory.

Since many stations were crystal controlled, a system of four Q signals was devised. These Q signals would be used by stations calling CQ to let others know where they would be listening. QHM indicated that you would begin listening at the high end of the band and tune towards the middle; QMH for middle to high; QLM for low to middle; and QML for the middle to the low end. The use of simplex operation was unusual.

A "fixed credit" was added after the score was tallied for the completed contacts. These were 500, 1000, 2000, 4000 or 8000 points and corresponded to the number of bands used—five bands being available.

Most amateurs wanted to discourage the use of CQ by W/VE stations. The rules stated, "We urge the view that the smartest operators will refrain from sending unnecessary CQs anyway (within W/VE) in their own best interest" to do away with needless QRM. The reasoning was that since there were relatively few foreign stations, they would not bother answering W/VE stations that were CQing when their own CQs would generally produce a pileup. The DX stations were urged to CQ.

The World DX (foreign participant) leader that year was Judy Leon, HC1FG! She worked 810 stations in all 14 W/VE districts for 35,782 points.

The event was claimed to be " …the greatest contest ever held in the history of Amateur Radio." There were 1,490 logs submitted—1,069 W/VE and 421 from 65 foreign countries. It was a CW contest. World high was Charles Myers, W3SI, with 40,808 points—234 contacts and 56 countries—an all time record in DX contests.

The Eighth International DX Competition

In 1936 it was the *Eighth International DX Competition*. The exchange was RST and a self-assigned three-digit number. A quota of three stations per country per band for W/VEs was instituted. The intention was to encourage stations to look for new countries and to reduce the QRM level so that working the DX would be easier. Letters from abroad stated " …we deplore the dumbness of W/VE hams who use CQ DX."

That year there were 1,521 operators reporting—1,103 W/VEs and 418 in 68 foreign countries. Dave Evans, W4DHZ, was high scorer with 91,530 points—226 QSOs and 60 different countries in 86 hours and 40 minutes of operating time. Dave worked 9 countries on 3.5, 39 on 7, 58 on 14 and 29 on 28 MHz. Juan Lobo y Lobo, XE2N, gathered 189,081 points by completing 1,370 QSOs from all 14 W/VE districts using 150 W. He averaged 15.2 QSOs per

hour. The "quota" rule was believed to have reduced QRM and to have increased the number of countries worked. Approximately 4.3% of all W/VE participants and 10.6% of all foreign contestants used four bands. D. Reginald Tibbetts, W6ITH, and Clarence Roach, VE1EA, were the only reporting participants to use all five bands—1.75, 3.5, 7, 14 and 28 MHz.

The usual complaints were made about bad notes, long CQs, CQs by W/VE contestants, out of band operation, edge of band operation, QRM from thoughtless individuals tuning up during busy operating periods and not enough use of the QHM/QMH/QLM/QML system.

The Ninth International DX Competition

The rules for the *Ninth International DX Competition* of 1937 instituted separate periods for Phone and CW operation. Although the "quota" condition continued for the CW contest, there was no such restriction for the Phone competitor. It was still stated in the rules that the wise W/VE ham would avoid the use of "CQ DX" like poison. The first period, March 6th through 14th, was for CW and the second period, March 20th through 28th, for Phone. The 90 operating hours rule described earlier was still in affect.

There were 1,391 CW operators reporting (1,024 in W/VE and 367 in 61 foreign countries), and 376 Phone operators reporting (241 in W/VE and 135 in 45 foreign countries). In the CW fracas, Ralph Thomas, W2UK, captured high W/VE with 119,796 points—286 QSOs and a multiplier of 149 that included 71 different countries. Ralph operated 87 hours and 52 minutes.

Tops in the foreign country category was James Wilson, K5AY (Canal Zone), who completed 1,618 QSOs—averaging about 18 QSOs per hour of operation. In the Phone Section, the highest W/VE scorer was Robert Henry, W9ARA, with 250 QSOs on 14 and 28 MHz and 42 different countries for 45,445 points. He operated 89 hours and 47 minutes. World high was Juan Lobo y Lobo, XE2N, with 566 QSOs and 39 multipliers on 1.7, 3.9, 14 and 28 MHz. He operated for 50 hours and 50 minutes.

The Tenth International DX Competition

In 1938 the *Tenth International DX Competition* was held. Phone and CW sections were used again, but contacts between CW and Phone stations were no longer considered legitimate for contest work. Violations of government regulations (off-frequency operation, improperly modulated notes, etc) with disqualification penalties (started in 1937) were again enforced as they would be thereafter. The use of "CQ DX" by W/VE stations continued to be discouraged—all those doing so were considered lids. The contest continued to be a 90-hour affair spread over 9 days for each mode. The "three stations per country per band" rule continued for the CW mode, but was not used as a limit for Phone stations. Use of more than one receiver and receiving operator at one time to locate available DX was not permitted.

There were 1,352 CW operators reporting—1,013 W/VEs and 339 in 66 foreign countries. The Phone section had 559 operators reporting—381 W/VEs and 178 in 54 foreign countries. Ralph Thomas, W2UK, again took the high CW W/VE spotlight with 175,500 points, 329 QSOs and 76 countries. XE1A (Juan Lobo y Lobo, XE2N in disguise), scored 236,322 with 1,419 QSOs on 5 bands in 74 hours and 40 minutes. He averaged 18.7 QSOs per hour using 150 W. A number of W/VE and foreign stations were disqualified—most for off frequency operation.

In the Phone contest, Fenton Priest Jr, W3EMM (who placed second in the CW event), finished in first with 97,092 points. He completed 374 QSOs compared to W2UK's 329 CW contacts. Fenton used 3.9, 14 and 28 MHz. In the foreign area, K4SA (Puerto Rico), completed 674 QSOs and a multiplier of 35 to give him 70,630 points. He worked 3.9, 14 and 28 MHz for 60 hours.

The Eleventh International DX Competition

The 1939 *Eleventh International DX Competition* saw some changes made in the CW rules permitting four contacts per band for D (Germany), G (UK) and VK (Australia—not including Tasmania, VK7). A quota of 3 per band remained the rule for all other countries. Also, new FCC regulations invoked restrictions in the 3500-4000 and 1715-2000 kHz bands in the event of a declaration of a communication emergency. That restriction was issued because of flagrant violations by amateurs earlier during a flood disaster. No contacts in the 3.5 and 1.7 MHz bands were allowed to count in any fashion. That left 40, 20 and 10 meters as usable bands for CW operation with 20 and 10 for Phone operation. Violators of government regulations were penalized and two accredited reports from Official Observers would disqualify a station. The "CQ DX" by W/VE stations still classified them as lids, and was frowned upon. The 90-hour limit over 9 days continued.

In spite of the operating band restrictions, there were record-breaking results. CW activity was slightly down with 1,298 reporting—949 W/VE and 349 foreign. Phone activity increased to 803 with 568 W/VE and 235 foreign stations reporting. Dan Smith Jr, W3CHE, tipped the scales at 178,200 points with 360 QSOs and a multiplier of 165. C.E. Stuart, W6GRL, had a higher multiplier of 171. Juan Lobo Y Lobo, using XE2N again, was the highest foreign station with 230,584 points. That score was less than his 1938 score due to the fewer bands available. But his contacts numbered 1,910—about 500 more than the previous year. He put in 85 operating hours producing an average of 22.4 QSOs per hour!

In the Phone category, Fenton Priest Jr, W3EMM, had 438 contacts in 66 countries for a score of 142,002 points. Guillermo Madrid, CO2WM, was tops for foreign operators with 1,312 contacts and a score of 109,563 points.

It's interesting to take a snapshot of the different foreign countries participating in 1939. In some respects it is a more impressive level of participation than today. For example, there were three SU (Egyptian) stations active while only five J (Japanese) stations submitted entries. A YM (Danzig) operator sent in a score. This was the last year of contesting for awhile for most of the European operators. 23 D (German) stations were active. 30 G (English) stations sent in their logs—and they all had two-letter suffixes. LA (Norway) had 11 entries each displaying only single letter suffixes. Australia turned in 29 entries and Hawaii had 15!

The Twelfth International DX Competition

In 1940, the *Twelfth International DX Competition* was bleaker. The war in Europe began in September 1939 so there were fewer countries available for this running. Rule changes were made to keep interest up. Working States by foreign stations instead of Call Areas was introduced. The nine-day period was reduced to two weekend periods. The CW and Phone periods were combined; you operated in one or the other mode. You could, however, submit separate logs for each mode. The competition remained a March activity as before. The exchange for W stations was RST and a progressive serial number, plus the state, or country, for foreign operators.

Due to the war in Europe, a new rule regarding disqualification was implemented that stated "Contacting amateurs in any nation included in a proclamation of neutrality of the President of the United States or excluded under 'any' Century Club rule, also will be grounds for disqualification." That statement was in addition to those addressing FCC regulation violations.

The clause, "W hams not wanting to show themselves lids will avoid all use of 'CQ DX'" remained in the rules.

The scoring was different. 100 points were given to W stations for completing an exchange with a foreign participant. 50 points were counted if information in one direction only was transmitted. Five points could be claimed for completing two way exchanges with other W stations. Each received-serial number counted 3 points and serial numbers sent and properly acknowledged counted 2 points. W operators were limited to three such W exchanges per licensing area per band. The quota of three foreign stations per band was no longer in effect. Multipliers were the number of countries plus the number of US licensing areas (9 in those days) for each band operated. Foreign operators received a total of 5 points per completed contact and used the number of states worked as multipliers per band. Due to the war, no VE stations were allowed to operate. Again, only 7, 14 and 28 MHz could be used.

1940 saw an all time low with 919 US stations reporting—632 on CW and 311 on Phone. Foreign reporting stations numbered 138—80 CW and 62 on Phone. (Some entrants turned in logs for both the CW and Phone subcategories—that's the reason that the totals don't add up—*Ed*) The West Coast triumphed due to the lack of European activity. C. E. Stuart, W6GRL, working CW, had 2,562,310 points with 368 QSOs and 89 multipliers. Larry Barton, W6OCH, had 1,287,660 points with 240 contacts and 66 multipliers. Juan Lobo y Lobo, XE2N—now signing XF1A—made 1,338 QSOs on CW. Felix Rodrigeuz, K4FKC (Puerto Rico), made 916 QSOs on Phone.

A.F.M. Schrovens, OQ5AB, and Joe Gabrial, OQ5IM, participated from Africa on Phone. China had 3 CW and one Phone operator entrants. Chosen (Korea) was represented on CW by Chiaki Onishi, J8CL. Nine CW and 3 Phone stations from Japan reported. Sakae Tamogami, MX3H, from Manchukuo sent in a log for his CW work.

Alaska was on with 6 CW and 2 Phone stations. Close-in competition included K5 (Canal Zone), TI, XE, YN, K4 (Puerto Rico), HR, HP and K4 (Virgin Islands). Cuba was very active with 4 CW stations and 7 Phone stations. The Pacific was represented by KB6 (Guam), a slew of K6s (KH6)—18 on CW and 7 on Phone—Java (PK6), Philippine Islands (KA) and Sumatra (PK4). South America provided LU, PY, CE, HK, HC, OA, CX and YV.

This was to be the last DX contest for half a decade...

A War Intervenes

The concluding comment in the results of the Twelfth ARRL DX Competition stated: " ...and now 12 ARRL DX Competitions have gone down the pike. According to schedule, the next will be number '13,' and that's a good number for it, judging by the present prospects! Hi." That was a subtle but prophetic statement as there was no mention of a DX contest in the 1941 issues of *QST*. Perhaps further evidence could be found in Byron Goodman, W1JPE's, *How's DX?* column in the December 1940 issue of *QST*. In it, he reported the last listing of the DXCC standings "...until world conditions again become such as to make it worthwhile to run it." Top of the list was A. Edward Hopper, W2GT, at 152 with C.E. Stuart, W6GRL, second at 151. Antenna famer Louis Varney, G5RV, had 122 and was in 51st position.

In his last column in the February 1941 issue of *QST*, Byron signed off with the following:

In the very near future, we hope, we hope

When certain guys swing from the end of a rope

And the ham bands ring with "VS" and "PX"

There'll be something to write about in "HOW'S DX?*"*

There was a *Thirteenth International DX Competition* in February 1947—held on the 15th and 16th for CW, and the 22nd and 23rd for Phone. The 3 station per band quota applied for CW but not for Phone. Multipliers for foreign stations were again the W/VE Call Areas and the use of "CQ DX" by W/VE stations was still being discouraged. That first year after the war did not bring about much change in the contest field.

But there have certainly been plenty of changes since! ■

NCJ Profiles—Get Out the Broom —Here's Rich Boyd, KE3Q

H. Ward Silver, N0AX
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When I first asked Rich to be a profile subject, *QST* had just printed the Phone Sweepstakes write-ups for the 1998 running. From WP3R, KE3Q had taken the top spot in SSB and number two in CW. Now, as I compile this interview, the early reported totals indicate that KE3Q piloted WP3R to a top position in the 1999 CW fray. How did all this come about?

"It shows the value of going to contest club meetings and Dayton. I had gotten to know Jim, WA3FET, at the Antenna Forum in Dayton and while driving home, as I was chatting with someone on a repeater, he chimed in. He mentioned a contest station he and some Penn State students of his had built in Puerto Rico. Knowing that the island had a geographical advantage in Sweepstakes apparently at least equal to the West Coast and Gulf Coast of the continental US, I said 'Man, I'd really like to do Sweepstakes from there!'"

"After some consultation, he said I was on! He warned me that the station was 'pretty rough,' meaning Field Day style, which was okay with me. I flew down in November, did some antenna repairs sufficient to do the CW Sweepstakes, set up the station, and went for it. Two weeks later I flew down again for phone. In February I was there for ARRL DX CW (second to W2GD in P4). A tip—I have been amazed by how many people forget to take a flashlight or alarm clock when they go to a DX location for a contest."

"The WP3R station has a single tower with interlaced 15 and 20-meter Yagis on a 48-foot boom at 60 feet and a 6-element 10-meter Yagi at 30 feet on a Ringrotator. The hilltop is 1400 feet above sea level and is cone shaped, so the takeoff angle is lower than the height of the antennas on the tower might indicate."

"Here's an idea that might help someone. When you chisel guy anchor holes out of a rock hill, put 30 feet or so of husky tower in each hole (in addition to the anchor rod for the central tower). This way you get a bonus tower out of each, near the point where the hill drops off, increasing their effective height in that direction. The steel should serve the function of rebar in the concrete. WP3R also has inverted-Vs for 160, 80 and 40 meters, and a 40-meter 3-element wire beam pointed at the US." The results speak for themselves.

Rich has also been busy at W3LPL over the years, at A61AJ and from his home. His perspective on going single-op vs multi-op is worth an article of its own. "I went many, many years without ever having done a full-blown multi-op. In the last few years, though, I have operated at Frank Donovan's (W3LPL) multi-op on several occasions. I have had the opportunity to experience all the bands from Frank's and his wide range of antennas. Switching from one band to another, from one make/model of rig, to different antennas, can really test your total ham operating abilities. *'Where's the RIT? How do I do A/B switching? Where's the volume control?'* etc. Finding answers to these questions on the fly while trying to be competitive is a challenge."

Rich Boyd, KE3Q

"Operating at a multi-multi, when assigned to a single band, is much like doing a single band from home. At a big multi-multi like W3LPL, you're not on the band alone—you have another operator to work with. You have the camaraderie of a room full of operators as well—it really is great fun. Single-op can be lonely, and by Sunday you're often saying to yourself '*Why am I doing this? I could be sleeping. I could be laying on the couch watching football.*' At a multi you tend to get a little more sleep and you have all the other guys to help keep things interesting. I think multi-op is terrific for someone who doesn't have a good station of his own to operate from, or who finds the camaraderie aspect a big motivator. It's more fun than going it alone, which can be a hard road."

"You have to realize that the multi-multi operator tends to go unnoticed except by those doing the same band at other multi-multis, who often will be heard saying '*Who was/is your 15-meter op?*' They want to know who they're getting beat by or whom they're beating. Being part of a multi-multi in your area makes you a part of a team and at least in your own area you should get some recognition from the other ops at that station or within your contest club."

"You can learn a lot at a multi-multi, especially if you're a newer contester. It can help demythologize some of the other guys you operate with. You can see that they're not doing anything terribly special—but then again, maybe they *are*!"

"Single-op does offer more variety. When one band gets slow, you can change to a faster band. At a multi-multi you may be stuck with your band assignment 'til the band goes dead. You want to be there for the *entire* opening—from the marginal beginning to the marginal end including a lot of slow rate times—but that's when some rare multipliers might pop up. You really do need them if you're going to win. You experience some really weird openings and rare stuff at times and on paths you wouldn't expect. The single op, on the other hand, shouldn't be wasting his time with most of that marginal stuff and should be on whatever band he can run on at the moment."

As with all of our interview subjects, there is also an interesting story from the beginning, as well as at the top of their game. "My dad had heard about ham radio during radio's 'glory days' in the twenties and thirties—when listening to the Cubs on the radio in the living room was full of the mystique of faraway, exciting places far from his small town in Illinois."

"When I was in first or second grade my dad bought me a pair of Morse keys connected by a wire, with battery operated buzzers and the code molded into the plastic shell. When I was in the Boy Scouts in seventh grade, I was a hero in the troop as I was the first to pass the Morse requirement for First Class. The troop leader tested me by putting out his left arm as a dit and his right as a dah."

"In the fall of 1964 Dad said '*You know, you can copy Morse code on the radio*,' and for Christmas he got me a Hallicrafters S-120. I read through my dad's ARRL License Manual from the thirties, got an updated copy and studied it. In the winter of 1965 I took the 5 wpm Morse and written tests from W3AAY. As the weeks went by I waited for a letter from the FCC telling me I had failed or ...assigning me my Novice call sign, WN3DSD!"

"As my birthday approached, we bought a Johnson Viking Adventurer kit for $55 and I spent the next couple of months building it. I got a couple crystals too—3733 and 3720 kHz—and started CQing. I could hear my transmitted signal at a number of places on the dial of my general coverage S-120. I couldn't tell which one was the real me. When I finished a CQ I had to quickly tune across the whole spectrum to listen for an answer—hoping I'd come across them while they were still giving my call so I'd know it was me they were answering." [I believe this is a skill that has been lost in the following generations.—*N0AX*]

"In 1967 (I think it was), *QST* had a cover article about how to build your own 2-element 15-meter Yagi from Reynolds 'Do-it-Yourself Aluminum.' I bought the parts at the local hardware store and built it, gamma match and all. Shortly afterward, WN3GZM returned there with me and I bought a 21-foot-long water pipe to use as a mast. We were too young to have driver's licenses so we walked it home, one of us at each end. Crossing streets took a lot of planning because the guy in the back was still way out in the street even when the first guy had safely made it to the other side."

"My rotator was broken more often than it was working, so I got used to running out to a rope dangling from the boom. I got so that I could do the roundtrip in less than 30 seconds, rotation included—the apple tree for Europe, the third fence post for Africa, the cherry tree for South America… etc." This should bring back some youthful memories for many of you readers.

"Eventually, long after I had decided I was a contester, I sought out and joined the Potomac Valley Radio Club *(PVRC)*—in about '77. K3EST was one of PVRC's regulars then—along with W3LPL, W4BVV, W3AU, W3FA, W3ZZ, W3GRF and other luminaries. Clearly, the contest club meetings were a wealth of information on antenna design, operating, etc. I found it greatly added to my enjoyment on the air to be able to actually picture some of the guys I'd hear in the pileups. Through those formative years, I didn't have a single particular 'Elmer' as such; my buddies and I encouraged each other. W3IO was one, but WY3A was the main one."

"As far as contesting role models, I was always impressed with W4KFC's CW contest operating. I generally worked him in Sweepstakes and I hoped I could operate like that someday. The omnipresent booming CQ of W4BVV multi-multi (with the nasal voice of W3ZZ on the CQ tapes on every band) was awesome to my buddies and me. K4PQL, also in the DC area (now N4AF) was another blockbuster. We wanted to be like THOSE guys!"

"I'm very proud of the operating that my wife Amy, W3AMY, has been doing in Field Day as our Novice/Tech operator. She's gotten very good at 10-meter phone. I've coaxed and cajoled her along, but that's kind of taken hold now. It's fun to work her when I'm at A61AJ or WP3R. We usually keep daily schedules."

It always fascinates me to see what the "pull" is for top contesters. Some like the competition; others are rate junkies. Rich votes for "*The Contact*." "I'm motivated by the thrill of making QSOs, rare DX type QSOs—but also domestic QSOs. To me the magic of working someone a few hundred miles away isn't necessarily much less of a thrill than working someone thousands of miles away—it's *all* amazing. I like the challenge of competing and doing well. I'm amazed how much experience and knowledge is tucked away in our heads that make us able to do what we do."

"Contesting really is a complex game—I think of it as 'the world's greatest techno-sport.' That thousands of people can participate at once, all over the world, competing against each other but also interacting with each other, really astounds me. Another part of my current motivational landscape is that I feel like I'm still rising in contesting. My wins and seconds were greater in number the last year or two than ever before. I'd say the 'top 10 types' are more aware of me now than they've ever been before. Part of the reward is having this or that renowned operator call you by name at Dayton and maybe stop to chat a while."

"I plan significant station improvements that will give me a lot more tools than ever before, and that should help me continue improving. If I get to the point where I feel I've plateaued or am declining, going multi-multi would be a possibility. It would be a way to take off some of the pressure of the all-out single op, especially if I already have a capable station by that time. I bought 14 acres a few miles away, further out in the country, and am building a new house and ham shack. I hope to be in the new place in the summer of 2000."

"A major reason for the new place was to have more space for towers. I've already stockpiled a few thousand feet of tower—from 'takedowns' mostly—and I think I have the largest collection of Telrex antennas around these parts—even though I accept that the modern crop of computer designed monobanders must be superior. My wife would like me to 'store them vertically' as they say, just to reduce the clutter at ground level! My interest really has been to build a big, effective contest station, so I've scrounged hardware with that in mind. I'm considering the various options available today, such as rotating towers versus standard guyed towers. Whether I can make it become reality or not, the next year or so should tell."

On the subject of time-will-tell, "It appears to me contesting is healthy, that the number of stations to work has grown. It is the current conventional wisdom that there is a lack of newcomers and youth, but judging from activity levels on the air, there are more hams on the air than ever. Certainly this is true on contest weekends—the bands are packed."

"Perhaps there's been a change that makes newcomers more likely to be in their thirties—when they've finished their education, settled down in a career, moved a few times, gotten married and started a family. I feel that if we ever are truly convinced that the lack of new teenage hams or teenage contesters is a real problem, we can solve it if we get serious about it. I think there are various things we can do. I think it'd be a simple matter for the popular contest logging programs to have a more video game-like look—that's just a for-instance, something to attract youth. I've called ham radio contesting 'the world's greatest techno sport,' but we could just as well call it 'the world's greatest video game' or 'computer game.'"

"I think real-time score reporting with a master scoreboard on the Internet is an interesting prospect. That might be a way to increase the spectator aspect of our sport. N1FD updated their FD score on their Web site, and some stations recently have had live video clips of their operations on the Internet, '*When you work us tell us you're watching on the Internet and we'll wave or do something funny for you*.' I see a lot of additional whiz-bang things that can be done with

our logging programs too."

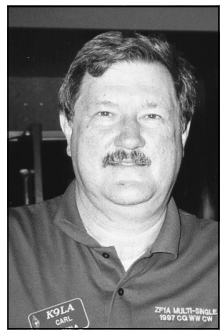
With all the cool technology out there, is the role of the operator somehow diminished in the overall equation for success? "I just don't see that at all. The operator is still the critically important element of the operation, perhaps more than ever. I think the demands on a top single op competitor may be greater than ever before. The 'more technology' I do see is bigger stations, more big stations, bigger arrays (both individual antennas and more stacks), more rotating towers, WX0B-type antenna-switching, more sophisticated radios, etc. In many ways these are more demanding on the operator—more judgments to make, all of which have to be made instantly if the op is going to be competitive. Then there's the additional work installing and maintaining the gear. It's certainly more demanding on someone. You have to do more operating if you're to take advantage of the automation. But... it also means you may not get as bored as you would if you were just CQing over and over, without a second radio to do something with."

But in the final analysis, technology isn't the only thing that holds us. Technology is everywhere, but why are *we* focused *here*? "To me it's magic to be able to talk to someone far away over the air. In a letter to the editor of *QST* that I sent-in a year or so ago I compared it to ocean surfing. What's so fun about *that*? It's the exhilaration of experiencing the natural phenomenon of waves. I think we have a similar exhilaration in experiencing the phenomenon of radio—of ionospheric propagation. It's really an amazing natural phenomenon." Some people find Nature on the mountaintop; maybe we just find it between the headphones. ■

Propagation

Carl Luetzelschwab, K9LA

High Latitude Propagation



K9LA

During the weekend of September 18th and 19th, 1999, I made many 40, 20 and 15-meter contacts while operating the CW portion of the Scandinavian Activity Contest. I enjoyed working the OHs, SM, LAs, etc… but it would have been much more entertaining if the signals had been stronger. They were generally weak and suffered from lots of flutter.

I'll have to admit that part of the reason for the low signal strengths at my station could be directly attributed to my temporary antenna—the driven element of a TA-33 at 25 feet. My regular antenna got bent up a bit a couple of weeks earlier when I was cranking up my 72-foot base-hinged aluminum tower. Just as the tower reached an angle of about 35 degrees, one of the pulleys in the cable system let go and the tower and antenna came down *real* fast. As they say—it wasn't the fall that bent the antenna (and two tower sections)—it was the sudden stop at the end.

The other reason for the low signal strengths—and for you, the more important—was the auroral activity during the contest period.

The k index reports from the high latitude Meanook observatory just north of Edmonton, Alberta, Canada are a good indicator of the propagation conditions on polar paths to Northern Europe from the Midwest and West Coast; and to Japan from the Midwest and East Coast. For September 18th, their k index report was 4 or higher from 0600 to 1800Z. For September 19th, things were a bit better—the k index remained at 4 between 0900 and 1200Z.

A description of the conditions I experienced during last year's Scandinavian Activity Contest are a good lead-in for a closer look at the propagation conditions that are encountered at the high latitudes. As we'll see, there's more involved here than just the effects of the auroral zone.

There are three regions that can have an effect on the propagation at the high latitudes. These are diagrammed in **Figure 1**. The first is the mid-latitude trough, the second is the auroral zone, and the third is the polar cap.

The mid-latitude trough is located at the equatorward edge of the auroral oval. During the winter and equinox months, it stretches along the dusk to dawn sector of the oval. During the summer months it is confined to the midnight sector of the oval. Within this 5 to 10 degree band the critical frequency of the F region drops by a factor of two or more, and the ionization peak rises by 100 km or so. If a signal is traveling along a path that includes an F region encounter within the trough, the region will exhibit a much lower MUF than that predicted by propagation programs.

The trough has walls that have steep horizontal electron density gradients. These walls are a suspected cause of skewed signal paths (paths that don't conform to great circle paths) on frequencies above 5 MHz or so.

The polar cap is in the inside of the auroral zone, putting it roughly between 70 and 90 degrees geomagnetic latitude. High energy protons from solar flares are guided by the Earth's magnetic field into the polar cap. Being high energy, they can get all the way down into the D region, resulting in greatly enhanced absorption over most of the polar cap. This is called a polar cap absorption event (*PCA*). For the past several solar cycles, we've recorded an average of 60 PCAs per cycle—that works out to about 5 per year—thankfully not too many. Since solar protons originate from outside the magnetosphere, the impact of a PCA can affect the north and south polar areas differently—thus short path over the northern polar cap may be shut down while long path over the southern polar cap may still occur.

The auroral zone (also referred to as the auroral oval) lies roughly between 60 and 70 degrees magnetic latitude, and expands equatorward as the Earth's magnetic field becomes more disturbed. The auroral zone, depicted as an annular ring, is the statistical area in which visible aurora occurs. Aurora is caused by streams of electrons from the sun that are accelerated in the magnetosphere and are deflected toward the polar regions by the Earth's magnetic field.

The ring of the auroral oval is thinnest in that portion that is in daylight and is thickest in that portion that is at local midnight. It is centered about the geomagnetic pole, which is just north of Thule, Greenland at roughly 79 degrees north/70 degrees west. Within the auroral zone, F region MUF decreases and absorption increases.

Auroral E occurs in the auroral zone and at the equatorward edge of the auroral zone, and most frequently occurs around the midnight sector of the auroral zone. This can give us enhanced propagation on the higher HF bands and at VHF. Auroral E, having steep horizontal electron density gradients similar to the mid-latitude trough, is also suspected of being the cause of the skewed signal paths that occur on 160 and 80 meters between North America and Europe.

The auroral zone is the most common

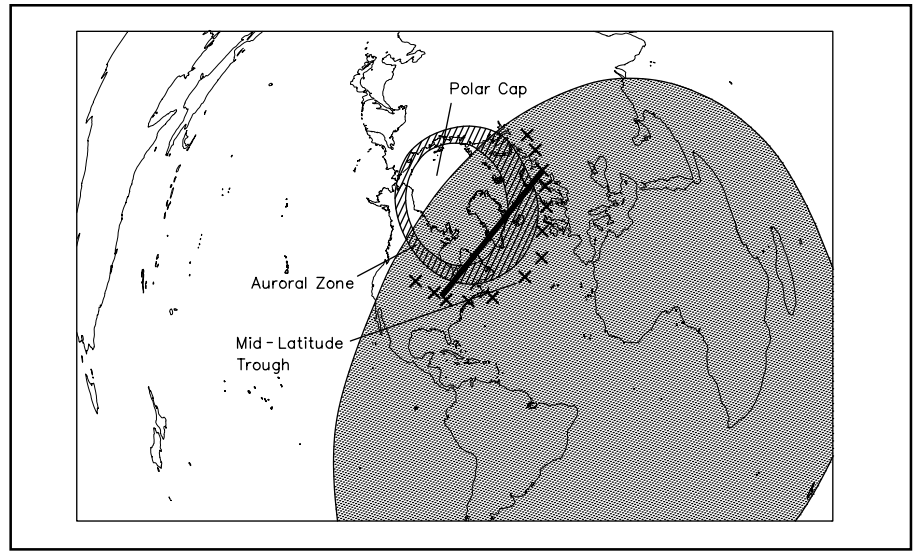


Figure 1—High latitude propagation problem areas.

cause of high latitude propagation problems—about 20 magnetic storms occur each year. A graph showing the distribution of these storms during the year (based on data from five solar cycles) appears in **Figure 2**. A_p is the daily 24-hour planetary magnetic index, and is an average derived from the eight 3-hour k indices of 13 observatories around the world. It is a linear scale from 0 to 400 (the k index is quasi-logarithmic from 0 to 9). A_p values of about 40 and greater indicate disturbed conditions and correspond to a k index between 4 and 5. The equinox months have the greatest number of storms. The summer and winter months have fewer.

Perhaps those in charge of the Scandinavian Activity Contest should re-think the September date for the CW portion. Operating this contest from a high latitude is enough of a challenge—holding it during the month with the highest occurrence of magnetic storms only makes matters worse.

A good question comes to mind: "*Why can't the effects of these three problem areas be factored into our propagation prediction programs?*" The reason is that the model of the ionosphere for propagation prediction purposes was initially set up as a monthly model—monthly median ionospheric parameters (foE, foF2, hmF2, etc) are correlated to the monthly smoothed (12 month running average) sunspot number (or smoothed solar flux) of the desired month. As such, these models would have trouble predicting short term events such as the position of the mid-latitude trough, the occurrence of magnetic storms and the occurrence of PCAs.

This leaves us with high latitude predictions that are most accurate only for quiet conditions (which is probably not the norm!). For auroral issues dealing with MUFs, several current prediction programs provide an input for the k index. This attempts to give a short-term update of the MUF in 3-hour intervals, since the k index is reported in 3-hour intervals. Carl Kratzer, K3RV, discussed this in his *Propagation* column in the January/February 1998 *NCJ*. Note that this short-term correction only addresses the MUF issue—it does not take into account absorption. Although the MUF decreases at high latitudes as the k index increases, the MUF at low latitudes can increase somewhat under those same high k index conditions. **Figure 3** shows this by making comparisons between a high latitude path and a low latitude path for both quiet and disturbed magnetic fields.

What's in store for the future with propagation prediction programs? Check out the Web site of the Solar Terrestrial Dispatch up in Canada: **http://solar.uleth.ca/**. They offer two software packages—one is a prediction and ray tracing package called *PROPLAB PRO*, and the other is a solar activity and space weather early warning system called *SWARM*. There's some mighty interesting stuff there.

Now you know what causes our high latitude problems. But what can you do if you're in a contest and it's obvious that high latitude propagation is degraded? Just sit there and fume?

With respect to the mid-latitude trough, I'll be the first to admit that you can't do much of anything except cross your fingers. For a PCA, look a bit more at long path, as the southern polar cap may not be affected. For auroral activity, look for 15 and 10-meter openings (see my *NCJ* Mar/Apr 1999 *Propagation* column), look for skewed paths (the topic of a future column), and in general look for lower latitude paths. No guarantees here of course—but it's better to be pro-active than inactive. ■

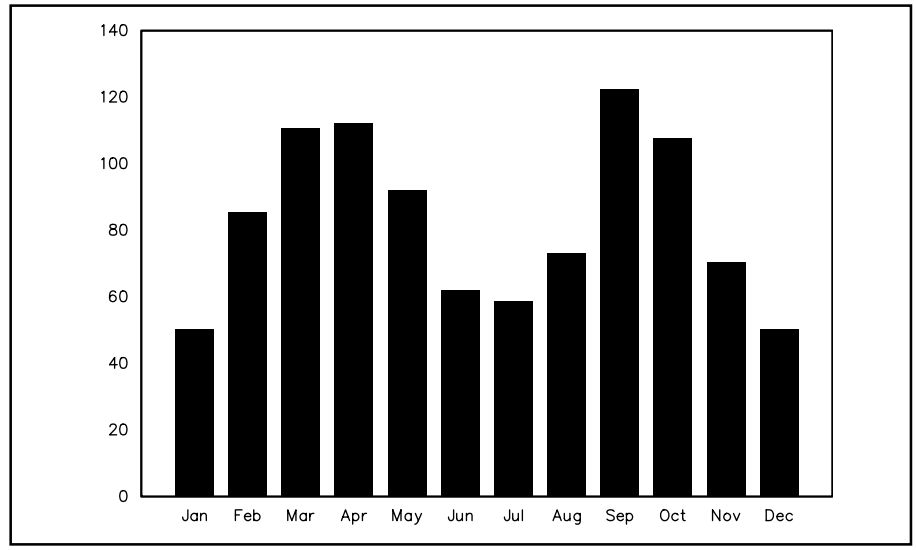


Figure 2—The distribution of magnetic storms with A_p values greater than 40 for each month (averaged over five solar cycles).

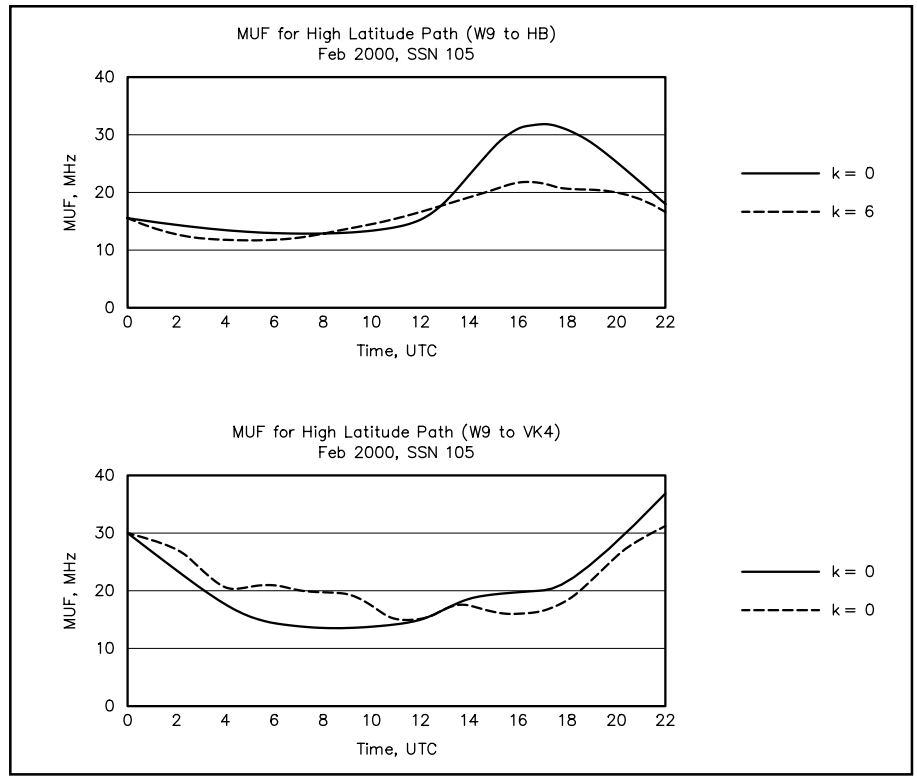


Figure 3—The effect of k on the maximum usable frequency for high and low latitude paths.

Contest Tips, Tricks & Techniques

Gary Sutcliffe, W9XT
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Contesting in the Past

With the turn of the century, it seems fitting that this installment of CTT&T takes a look at radio contesting in the past. How it has changed over the last 20—or more—years!

W9XT

First Contests

N9IJ's first contest was the 1967 Novice Roundup. Len notes that you only had one shot at it back then. At the time, the Novice license was only good for one year and could not be renewed. He remembers turning on the rig and discovering that everyone on his few crystal frequencies was participating in the contest—it was either join in or go QRT. Later he operated the ARRL CD parties. Both of these contests have since been discontinued. Now his favorite contest is the CW Sweepstakes.

KB8N started contesting at the age of 13. Back then Paul participated in Sweepstakes using a hand key, paper logs and a rig that he describes as a "souped-up" Novice rig. One of the things he recalls is the smell of the hot 807s. He could tell by the smell if the rig was out of tune. Today he still enjoys operating in the Sweepstakes and occasionally participates in DX contests as well.

W5GN was KG4CS in Guantanamo Bay from 1970 to 1972. Barry had read about W1BB and decided to activate KG4 on 160 meters for the CQWW CW. He put up a 1400-foot long wire over the sea and rigged up a receiver for the band using an old Navy RBD tank receiver as a front end. An SX-43 was tuned to the tank receiver's 955 kHz IF. Barry set a 160-meter CQWW CW world record with 161 QSOs, 36 countries and 11 zones.

Equipment Changes

Tube radios, straight keys and bugs, paper logs and dupe sheets—computers, no tune amplifiers, packet, stacked beams. We have come a long way!

W3CP's 1937 Sweepstakes transmitter was a homemade crystal oscillator driving an RK-20 into a single-wire-fed 80-meter half-wave wire. The receiver was a TRF type with a regenerative detector that was also homebrewed.

W2GD thinks that assembling competitive stations 20 years ago was much easier. John notes that back then a large tribander such as TH6, a short 2-element 40-meter Yagi and a high dipole for 80 represented a very competitive antenna farm. You were on the leading edge if you had monobanders or Beverage antennas.

For back in the shack, Brian, K9QQ, and John, W2GD, commented that the Drake C-line with the Sherwood filters were the competition-grade radios of their day. Of course, the Collins S-line was also popular—for those who could afford them. The Heath 401/301 combination was another popular choice.

I remember that at W9YT, my old college club station, one member, WA9TPV (now K9MA), thought that the 401/301 combo was great—primarily because they were easy to modify. He added an RF speech processor to the transmitter and cascaded crystal filters in the receiver. These are standard features in today's competition-grade radios.

For amplifiers, the Heath SB-220 was typical. It is still in use in many stations today. Homebrew amps were also a lot more common back then than they are today.

KB8N says that his station has not changed much quantitatively, but the qualitative changes have been remarkable. Paul still operates using low power and wire antennas—but today he uses two radios and everything is under computer control.

The Evolution of Logging

One of the most important changes noted by VK5GN was the transition to computer logging. Martin painfully remembers dupe checking before the digital age. It would take him and his XYL, VK5QP, hours and hours to go over the logs and dupe them.

He had a "dupe book" that was constructed of sheets of cardboard. Each page had ten columns. Each column had a heading with a prefix. Some prefixes such as JA1 had several columns. Martin used his past experience to determine how much space to allocate to each prefix. Calls were checked for duplicates and then recorded in the proper columns. Call signs were written in using different colored pens to indicate which band the contact was on.

Things changed when he purchased a TRS80 computer. Martin started using it for duping—but that was still *after* the contest, not in real time. He pulls out his old logs and dupe sheets from time to time—just to remind him how easy it is these days.

In the past, paper logs and dupe sheets served as a natural deterrent to excessive contesting.

Keeping dupe sheets up to date while logging by hand was a real art. Everyone had their favorite dupe sheet styles and techniques. I recall arguments between those who preferred recording the full call and those who would record just the suffix. Full call advocates believed that seeing the whole call would make it easier to recognize dupes. Suffix advocates countered that writing just the suffix was faster.

Back then there were only a few prefixes to keep track of for the domestic contests—W, K, WA, WN, and WB for the continental US. As I recall, the ARRL dupe sheet instructions recommended that you write only the suffix for W calls, underline the K call suffixes, circle the WA suffixes, double underline the WB calls… and so on.

As the years progressed, the FCC began assigning call signs starting with A and N (not to mention a lot of calls with two-letter prefixes). No one knew how to handle those. The ARRL even sponsored a competition looking for ideas on how to record the new call signs on dupe sheets.

W2UP's technique for keeping the dupe sheet in real time was to send CW with his left hand and to log and dupe with his right hand. Barry is happy to leave "OP Aid 6" and other dupe sheet forms in the past. Today he prefers to concentrate on the operating—and let the computers handle the paperwork.

Keyers

I had my introduction to Field Day as a Novice in 1971. I upgraded and operated my first Sweepstakes that fall. I used a straight key and a TR4 (with no CW filter!). I think I made around 220 contacts in about 20 hours. The next year I had a keyer—I swore I would never operate another contest without one.

A couple of years later I designed and built my first memory keyer, and stayed up until 2 AM the night before Sweepstakes to get it running. After using it I proclaimed I would never operate another CW contest without a memory keyer. I remember joking that someday I probably would not operate a contest without a computer. Fifteen years later that joke became reality.

Operating Differences

W2GD thinks that for a lot of baby boomer contesters the emphasis has changed from domestic contesting to DX contesting. John said the primary focus used to be on CD Parties and Sweepstakes. John feels that once the ARRL discontinued the CD Parties, many

contesters started looking to the other contests—like the 160-meter and DX contests—to fill the void. Of course, the Sprints and NA QSO Parties are now available for those who enjoy domestic contesting.

Another trend John has noticed over the last twenty years is the increase in the number of contest DXpeditions. His first contest DXpedition was 9Y4W in 1978. Now he operates regularly from P40 during the DX contests.

K9QQ remembers encountering more JAs in the contests a couple of solar cycles ago. Brian says that a full 50% of his contacts in DX contests were with Japan. While Japan is still a contest population center, activity is down from what it was 20 years ago.

One explanation that I have heard is that when we were going through the Citizen's Band craze, the Japanese people were getting entry-level ham licenses—there was no CB band there. Just as our CB craze died out, the interest in radio has dwindled there as well.

Some say that China will be the next radio population center in Asia. Club stations have been around for about a decade, and private stations are now allowed. As their affluence and level of technology increases, the number of Chinese hams is sure to rise. Back when I started contesting and DXing, BY was very close to the top of the DXCC Most Wanted list. I worked close to a dozen in the last CQWW.

N5NJ got to thinking about contesting in the past while listening to the scores on 3830 right after the last phone CQWW. He remembers back in the late 1970s when a new multi-multi record would have been about 13 million points. The high claimed scores in the 1999 event were more than twice that.

Bob feels that the biggest contributor to the higher scores is computerized logging. The computer frees up time for the operator to make more QSOs. It also helps them keep track of needed multipliers.

Bob recalls contests at the K2GL multi-op station where he would work up "needed multiplier" lists. He ran off copies and distributed them so that everyone knew what was still needed on each band.

Bob also believes that the improvements in station technology have contributed to the increase in scores. He thinks that advances in antennas, stacking and switching are some of the major reasons. Radios are better than they were—but perhaps more importantly they cost less (adjusted for inflation) than they did in the past.

Going Back Even Further

Most of the responses that I received on this topic centered around contesting in the late 1960s to early 1980s—but a few reached back even further.

K0OU's first contest was the 1958 Sweepstakes. Steve was a Novice. Novices were restricted to 75 W and crystal control. He would call CQ and then tune through 30 to 40 kHz searching for replies. Steve believes he managed only 9 QSOs in that contest, but still considered it a real thrill.

W3CP recently came across a certificate he won in the 1937 Sweepstakes. Jim won the South Texas Section and West Gulf Division under his original call—W5CPB. This feat was accomplished with 245 QSOs, 64 sections, and 45,978 points. The QSO leader that year was W6MVK with 469 QSOs. Sweepstakes was held over two weekends then, giving him an average QSO rate of about 12 per hour.

Jim says the main reason for the low QSO totals was that everyone was crystal controlled. Most hams only had one or two crystals for each band and would have to tune across the entire band to search for other stations. That took a lot of time. Jim feels that the all time biggest factor in raising contest scores was the introduction of the VFO.

The Golden Age of Contesting

When was the golden age of contesting? W2GD is not sure. John believes that it was easier to be competitive with simple stations in the past. The operator was a larger factor in the equation. Still, he enjoys the challenges of today's innovations.

KB8N thinks that it took more skill to make 250 QSOs in Sweepstakes in the 1960s than it does to make 1000 now, but that we enjoyed it just as much then as we do today. He believes that the technical changes have been good for us. Paul says he " *…loves yesterday, but I can't wait for tomorrow!* "

Personally, I fear that we may be nearing the end of the golden age of contesting. We have better technology and practices (for the most part) than ever before, and I expect these improvements will continue. On the other hand, there are fewer younger hams, and most of them seem content to limit their radio activities to the local repeater.

The price of land is increasing, making it difficult for many contesters to have enough space for efficient antennas. Restrictive covenants and tower legislation is making it even more difficult. Hopefully new technology will help us overcome our antenna limitations and there will be a renewed interest in radio that will translate into more contesters.

I hope you enjoyed this look back. If you were operating contests 20 or so years ago, perhaps this has brought back some fond memories. If you are new to contesting, I hope you learned a bit about the past. Thanks to KB8N, K7QQ, K9QQ, K0OU, N5NJ, N9IJ, VK5GN, W2GD, W3CP and W5GN for their input on this subject.

Topic for March-April 2000

(Deadline January 4, 2000)

Measuring for Success, How Do You Know You're Getting Better?

Scores are one way to know if you're becoming a better contester, but how do you use them to measure self-improvement? For contesters who do not operate in the same contests year after year, or operate from different locations, how do you know if your signal strength and/or your operator skills are improving between major contests?

Topic for May-June 2000

(Deadline March 4, 2000)

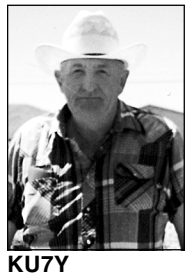
Design Your Own Contest!

If you could design the ultimate contest, what would it be? What bands would be used? What modes would be allowed? What would be the exchange? Under what conditions, if any, could you work the same station more than once? What would be the different multipliers, and would different contacts be worth different numbers of QSO points? How long would it last, and would there be off times? What time of the year would it be held?

Send in your ideas on these subjects or suggestions for future topics. You can use the following routes: Mail—3310 Bonnie Lane, Slinger, WI 53086. Internet—**w9xt@qth.com**. Be sure to get them to me by the deadline. ■

Contesting for Fun

Ron Stark, KU7Y
ku7y@dri.edu


KU7Y

I'm writing this column right after the 1999 running of the ARRL CW Sweepstakes. Many people on the CQ-Contest reflector are talking about the level of participation, code speed, "*it's broken so fix it*," "*it's not broken so leave it alone*," and so on.

Over on the QRP email reflector many are talking about how nice everyone was to QRS to their calling speed without having to be asked, how mad they are because no one would slow down for them even if they asked them to, how well they got out with their 2 W of power and attic antenna or how they couldn't get anyone to hear them at all!

Not really that much difference between the two groups from what I can see…

For many of those QRP folks this was the first time they had tried to participate in a major contest. Most of the comments were very positive with many even having nice things to say about the high scoring contest stations. Congratulations to all! The couple who did have negative things to say might not be back. They really didn't have any fun but instead came away with the feeling of not being wanted!

I think it would do all of us some good to remember this when we are calling CQ at 30 wpm and someone calls us at 15 wpm. It really doesn't take much of an effort to cut the speed down to something at least close to the other station's speed and help them get the exchange. A friendly little "HI" or "TNX" might also be worth the time it takes! I only found one Technician-Plus station playing in the contest. I worked him and it took a good 15 minutes. It was NOT your typical rapid-fire exchange. Instead, it included a couple of comments and an exchange of names. While I realize that I "should" be watching my time to get the maximum number of QSOs, that one contact was worth every minute it took—and then some! *This* is our major source for new contesters—let's not let our drive to win discourage them!

Most of you know Bob, N4BP. He always told me that he really didn't care for the NA Sprint and that you had to be nuts to try it QRP. While both of those things might be true, he did succumb to my goading and wound up having a grand time. Doing it with his newly built Elecraft K2 QRP transceiver was just icing on the cake. I'll bet a cup of coffee that Bob will get over that 200 number in the next Sprint.

1999 Fall NA Sprint—N4BP QRP

Bob Patten, N4BP

I don't recall ever putting in a serious effort for a NA Sprint. I never much liked the "QSY rule" format and I've never had effective antennas for 40 and 80 meters.

There were two reasons why I decided to put in a full effort in this running. A little over a week before the Sprint, I finished building and aligning my Elecraft K2 transceiver and was itching to try it in a contest. Actually, I did run it in the BUBBA (*Burn Ur Big B—s Away*) Sprint the week before. The BUBBA is a QRP four-hour sprint hosted by the Arizona *ScQRPions*. It uses the relative heat index at the station location as a multiplier. As it turned out, this was a poor test for the rig—conditions were horrendous.

As for reason two—while comparing notes with Ron, KU7Y, he somehow goaded me into trying the NA Sprint with my K2. A couple of days before the event, I shot an email off to Tree, N6TR, asking if there was a QRP category. He acknowledged that there was and invited me to join him on his "Boring Team." I explained that my score was likely to be "really boring," so he signed me up for his second team, the "Really Boring" team!

I hopped aboard that runaway train at 0001Z and stuck it out the full four hours.

On 20 meters, I basically "ran" two frequencies with the K2's dual VFOs. Most of the first two hours were spent CQing near 14.050 and 14.060. After each QSO, I found the nearest clear spot on the alternate VFO and CQed again. While probably a poor strategy, it did yield a 50 first hour and a 44 second hour.

Later, when I moved to 40 meters, I learned how this contest is supposed to work! On this band CQs were totally unproductive. I could seldom scare up a second QSO when I inherited a frequency, so the 1½ hours of the contest were spent mainly in the S&P mode. On 40 meters, even with only 5 W to a 35-foot high dipole, I managed 43 QSOs in the final hour. In retrospect, this strategy probably would have yielded a better rate on 20 meters.

Some of the highlights for me—I played leapfrog with WL7KY for a while, but always found him when it was his turn to QSY. Finally, *he* called *me* for my next to last QSO on 20! LY2BTA called me on 40 for my only non-North American QSO. He must have been desperate for contacts since I later saw a post from him on the CQ-Contest reflector complaining that everyone had been ignoring him. Not me—I needed all the help I could get!

XE1/AA6RX also called me on 40 for my only North American DX QSO. He was going like a bat out of Hades and it took me three tries to get his full call. Thankfully he had the patience to stick with me…

If you haven't seen the Elecraft K2, take a look at their ad in *QST*—or better yet check their Web site: **http://www.elecraft.com**. This is one sweet little QRP transceiver whose receiver rivals the FT-1000MP! It only comes in kit form and is a joy to put together.

During the Sprint, I was also testing the stamina of a tiny IBM notebook power supply, that I had just located a couple of days beforehand. It barely warmed up over the four hours.

On 20 meters, my antenna is the Hy-Gain TH7DXX at 65 feet. On 40—as I stated earlier—just a simple dipole at 35 feet. I made only one band change—from 20 to 40 after about 2½ hours.

For logging, I used *NA* v10.40. *NA* has a "Sprint format" box in the keyer setup menu. This tells the software where to place your call depending on whether you are soliciting a QSO or calling someone else.

The results of my N4BP/QRP effort:

Band	*QSOs*	*Points*
40 meters	51	51
20 meters	124	124
total	175	175

175 × 46 multipliers = 8,050

I'd like to thank Ron for persuading me to give it a try. I thoroughly enjoyed the NA Sprint and will try to better my score in the next one using the knowledge I've gained from this one. Ron suggests that I set a 200 QSO goal for the spring.

73, Bob, N4BP

Don't forget that the Number One reason to contest is to have FUN. Next time I'll show you how a new team record was set in the QRP ARCI contest in October 1999.

73, Ron KU7Y

For more information about the people, equipment and philosophy of QRP, please check out these two Web sites. Each of these sites also contains many links to other related sites. The first is the home page of the QRP Amateur Radio Club International: **http://www.qrparci.org/**. The second is the home page of the NorCal QRP Club: **http://www.fix.net/~jparker/norcal.html**. ■

Contest DX-Ventures

DXpedition Destinations By Sean Kutzko, KX9X; kx9x@uiuc.edu

Greetings, fellow contesters, and welcome to the first issue of *NCJ2K*. As you know, this column fills you in on properties around the world that The Deserving can rent for the next contest. We've shown you property from all around the globe, with the exception of one area—*the United States!* At the request of several readers, this issue's column will feature the first review of a property in the USA. Let's take a trip to Colorado and the cottage of Ken Eigsti, W0LSD.

KX9X

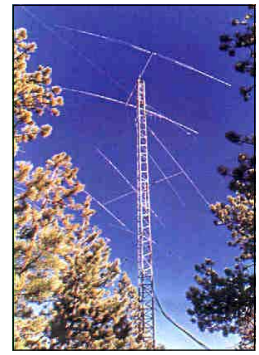
Ken's QTH is located on the eastern slope of Mount Princeton, which is near Buena Vista, in the center of Colorado. It is about a 2-hour drive from Colorado Springs, and a 3-hour drive from Denver. The chalet-style cabin is around 1300 square feet and offers four bedrooms, three bathrooms, a sunroom and a loft. The kitchen has all the major appliances, including a microwave oven. Just stock the pantry with groceries and you're all set. Other amenities include a washer and dryer, TV and VCR, telephone and gas forced-air heat. For those who enjoy the ambiance, there is a wood-burning stove. Ken assures that " *...the wood pile is always well stocked.*"

Not only is this a great cabin, Ken can provide a great radio, too. The shack comes well-equipped with a Kenwood TS-930, an Alpha 91B amplifier, a NYE Viking antenna tuner, Bencher paddles and headphones. If you want a computer, you will need to bring your own.

The mountain cabin QTH of W0LSD.

The shack at W0LSD. All you'll need for great pileups.

As far as antennas go, you have little to worry about; Ken has installed two towers just loaded with aluminum! Tower one is 50 feet tall and holds a Tennadyne 8-element log periodic. This antenna gives you coverage on 20,17,15,12 and 10 meters. Tower two is 90 feet tall and sports a KLM 2-element 40-meter Yagi on the top. There is also a side-mounted Cushcraft A-4 at 75 feet and that can be rotated to cover Japan through Europe. There are also wire antennas for 80 and 160 meters. Ken is confident you'll have a great signal from his QTH. "*At an elevation of almost 9,000 feet,*" Ken says, "*these antennas really play.*"



The 90-foot tower, complete with a 40-meter beam and a Cushcraft A-4.

The area around Buena Vista provides some great scenery and outdoor activities. Hiking, rock climbing and horseback riding are available within a few miles of the cabin. For those who enjoy the history of the West, there are many historic sites and "ghost towns" to explore. In the summer, you can enjoy kayaking and white-water rafting, and in winter, the skiing and snowmobiling is top-notch. All of these activities are available within a short drive of the cabin.

If you're looking for a family getaway that will provide you with some good radio opportunities, you might want to look into W0LSD's Colorado QTH. For more information, you can reach Ken at PO Box 156, Buena Vista, CO 81211. His telephone number is 719-395-6547. You can also send Ken email at **diverken@chaffee.net**

That's it for this issue. Keep those suggestions and information on other QTHs coming in! Be sure to stop by the QTH Rental Page for listings of many rentals available all around the world. You can find it on the Web at **http://hobbes.ncsa.uiuc.edu/sean/qthlist.html**.

Until next time, see you on the Other Side. ■

Contest DXpedition List by Dennis Motschenbacher K7BV

This is a listing of Contest DX-Ventures scheduled for upcoming contests. Visit the *NCJ* Web site **http://www.vramp.com/~ncj** to view the most current update of this list. Please send corrections and additions to Dennis Motschenbacher K7BV via email **k7bv@aol.com**.

2000

Contest	*Category*	*QTH/Call*	*Operator(s)*	*Status*
CQ 160 CW	SOHP	8P9DX	VA3DX	Firm
ARRL DX CW	SB/80M	C6AKQ	N4BP	Plan
ARRL DX CW	SB/40M	C6A/K4PG	K4PG	Plan
ARRL DX CW	SB/15M	C6A/W5VBO	W5VBO	Plan
ARRL DX CW	SB/10M	C6A/AA7TT	AA7TT	Plan
ARRL DX CW	M/S	8P9JA	AA4NC, K4MA	Firm
ARRL DX CW	M/S	KG4DZ	W4ZYT ++	Firm
ARRL DX SSB	SOABHP	8P	W5AJ	Firm
ARRL DX SSB	SOABHP	FS	W0GJ	Plan
ARRL DX SSB	SB/40M	ZF2JB	KK9A	Firm
CQ WPX SSB	SOABLP	VP5E	K6HNZ	Firm
CQ WPX SSB	SOABHP	WP2Z	W6XK, W7MH, W7WN	Firm
CQ WPX CW	SOABHP	8P	YT6A	Firm
CQ WPX CW	SOABHP	WP2Z	N0KK	Firm
IARU HF	?	WP2Z	AG8L	Firm
CQWW SSB	SOABHP	WP2Z	K6RO	Firm
CQWW SSB	M/S	8P	K4FJ, K3KG	Firm
CQWW SSB	M/M	GZ7V-Shet	North of Scotland CG	Firm
CQWW SSB	M/M	IH9P	IT9BLB+Intl team	Firm
CQWW SSB	M/M	PJ9B	N3ED +	Firm
CQWW CW	SOABHP	8P9Z	K4BAI	Firm
CQWW CW	SOABHP	WP2Z	WD5N	Firm
CQWW CW	M/M	PJ9B	N3ED +	Firm
ARRL 10	M	8P9Z	K4FJ, K3KG	Firm

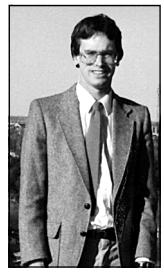
Thanks to ARRL DX Bulletin, Ohio/Penn DX Bulletin, 425DXN, Bill Feidt/NG3K, DXNL ■

VHF-UHF Contesting!

Jon Jones, N0JK
n0jk@hotmail.com

The Sunspots are Back!

I was operating Sunday morning during the 1999 ARRL CW Sweepstakes and was tuning around looking for the last few sections for a clean sweep. In 1998 6 meters had popped open around that same time. I had the 6-meter rig on "just in case."



N0JK

At 1600Z I was trying to work Wyoming on 15-meter CW backscatter for the Sweep when HP2CWB broke the squelch. He was 40 over 9 on 6. The Wyoming station called "*QRZ N0?*" A good contest operator would have turned off the 6-meter rig and worked Wyoming. Wrong! This is the VHF/UHF column, 6 meters was wide open and I hadn't been able to bust the pileup on Jose the previous year.

I called him and soon added a new country to my 6-meter log. Many loud signals were also heard from Costa Rica, Colombia, Panama, Puerto Rico, St Lucia, Venezuela—even 9J2BO from Africa. Maybe the ARRL should swap the dates for the CW Sweepstakes and the VHF Sweepstakes this year…

Tropo 101

Tropospheric propagation is the "bread and butter" of VHF contesting and a primary means of making the majority of contest QSOs in most parts of the country—especially on 2 meters and up—in the September and January VHF Contests. Tropo even occurs on 6 meters.

Most VHF contesters are familiar to some degree with E-skip, aurora and F2, but the various tropo modes and the mechanisms behind them confuse many. Understanding the various "tropo" modes may help you to use them to compete more effectively.

William Hepburn is a "TV DXer" who supplied the following introduction: "Tropo 101." He states that "By no means am I an expert on propagation modes… "—but I found his definitions helpful and added some comments of my own.

The tropospheric modes are defined by the mechanics behind them. Tropo DX is any condition that scatters, reflects or refracts signals in the troposphere allowing DX to occur. Refraction occurs when the normal index of refraction has been altered (boundaries between different types of air masses usually cause this).

N0JK operating 6 meters from HC8.

George Fremin, K5TR, operating in the June 1999 VHF QSO party from W5KFT.

Tropospheric VHF/UHF/Microwave DX Modes

Line of Sight (also known as "ground wave") is normal reception where the transmitting and receiving antennas can see each other (taking into account the $^4/_3$-earth curvature ability of radio waves).

Tropospheric Scatter (TrS) is ever present under even normal conditions. (*Even the January VHF Sweepstakes—'JK*) This mode produces distant fluttery signals that randomly fade in and out. Depending on your equipment and location, tropo scatter can extend out to 300, 400 or even 500 miles. The theoretical maximum is about 500 miles and is based on the height of the scattering layer in the atmosphere. Scatter is caused by small particles and water droplets in the air—such as dust, haze, clouds, etc.

Tropospheric Enhancement (TrE) or tropospheric refraction is common. On most clear nights during the warmer months the ground radiates heat and the air near the ground cools. Eventually an inversion is formed and stations that are normally weak and fading come in continuously with increasing strength. In addition, weaker tropo scatter stations that are not normally heard (because their signal strengths never cross the background noise signal threshold) begin to appear. When the sun comes up and the ground and air heat up, the inversion breaks down and the signals disappear. The maximum DX is no further than that possible with tropo scatter, but the signals are stronger.

Tropospheric Ducting (TrD) is an abnormal condition. A strong inversion forms at a much higher level above the ground. This inversion has not formed due to nighttime cooling, but rather from some other weather phenomenon such as high pressure subsidence aloft, warm frontal boundary, or a cold frontal boundary. This ducting can occur day or night (though it strengthens at night) and is often sharply directional. The maximum distance is theoretically unlimited. (*A good example of tropo ducting is the famous Hawaii-California duct—'JK*)

These are the rare "blockbuster" openings that make DXer's mouths water. One large area can have multiple ducts occurring simultaneously, but these are usually parallel paths. It is possible in a very strong high pressure system to have large areas of ducting creating a multi-directional opening. Careful study of surface and upper level weather maps can help in predicting these openings. (*Sometimes stations only one grid apart experience radically different conditions. One night I recall listening to WB0DRL in EM18 running 8s and 9s on 2 meters during a September VHF QSO Party tropo opening and here in EM17 I had only band noise!—'JK*)

Rain Scatter (RS) is a rare mode that sometimes occurs with UHF and microwave signals. A band of very heavy rain or hail can scatter signals. Distances covered are typically around 100 to 200 miles, although up to 400 miles is theoretically possible. (*10 GHz signals sound like aurora on rain scatter—'JK*) Heavy snow is not a useful reflector.

Sleet Scatter (SS) or ice pellet scatter occurs during colder months and is similar to rain scatter.

Aircraft Scatter (AS) is simply reflection of signals off of aircraft, although reflections off large flocks of birds are also possible. Maximum distance is up to about 500 miles. (*Aircraft scatter has been used to make 1296 MHz QSOs from Texas to Colorado during the winter months—'JK*)

Lightning Scatter (LS) is thought to occur because lightning strikes produce ionized trails. Reception is similar to

other forms of scatter except the signals are more "burst like," similar to meteor scatter. (*I have worked lightning scatter on 6 and 2 meters from central Kansas to Texas by beaming into a large thunderstorm over Tulsa, Oklahoma. It should also be possible to make microwave QSOs by this mode—'JK*)

Some Tips For the January VHF Sweepstakes

Tropo scatter can produce DX up to 500 miles any time of year between well-equipped stations and is a way for "Big Gun" contest stations to collect extra grids. Effective use of tropo scatter during a "flat contest" such as the January VHF Sweepstakes can make a significant difference in your score. Contacts may take a few minutes to complete because the signals are very weak and have heavy QSB. Calling in 1 to 2 minute sequences sometimes helps. Running high power and big antennas definitely helps. Patience and persistence pays off. CW may be the preferred mode of operation.

Tropo enhancement and ducting can occur during the January contest, especially for stations along the Gulf Coast. Sometimes other regions experience this enhancement if the weather is unseasonably warm. Tropo enhancement is a plus for the "little pistols" because they can get out like the Big Guns.

Rain and sleet scatter are ways to make contest QSOs up through the microwaves for stations in colder regions of the country—such as the Northeast, Midwest, and western mountain regions. Watch a real-time weather map and beam into an area of heavy precipitation to try for these QSOs. Lightning scatter may occur if there is thunderstorm activity—a more likely occurrence in the South but occasionally in other areas as well. Aircraft scatter can be utilized in any part of the country, although it is more successful when used with schedules than with random QSOs. It does work!

The Contest "Radio Zone"

Mike Wasserbauer, N2YB

From the November 1999 edition of the Rochester VHF Journal

Imagine that it's minutes before the start of the January contest. You are sitting there with the headphones on; the station all warmed up and the logging program waiting for the first entry. There are a few stations already on the air anticipating the starting flurry.

With only the radio audio in your ears, you are already in the "Zone"—that place where your mind is connected to the airways by your radio equipment. Your mental awareness of the room or any of the current surroundings disappears as your mental focus is consumed by the transceiver front panel and the rotor position indicator.

Your mental image has been extended to the reach of the current band conditions in the direction of your antennas. All the setting and adjustments you make with antenna position, mode or filters affect that connection, enhancing it.

Do you enter a "Zone" when you put the headphones on? Do you put them on in anticipation of this effect on your mind? Both of these questions may sound silly, but have you ever thought about it before? I think that this is the reason why radio is so popular and why a computer interface to communications will never take the place of radio. I was captivated by this effect during my first QSO—I was not aware of it at the time but I am sure it was there. This is the reason why I (…and I'll bet I'm not alone here) look forward to putting on some nice quiet headphones and entering the "Zone."

A radio contest is a time when this mental effect can be the most fun. The high activity level makes operating the VHF and UHF bands a lot like fishing in a pond that's been overstocked with too many fish and not enough food. You just turn the dial or the antenna to find new stations to log. Time slips by very quickly as you get caught up in the flurry of working a station through some bands. Suddenly the next station is calling you. At times, you have to remind yourself to breathe.

This kind of excitement is part of the essence of radio contesting. Without it, I doubt many of us would be doing it. In my case, the level of this excitement is proportional to the amount of preparation that I have put into the effort. Is the station easy to operate? Are all of the past problems that I've encountered with equipment resolved? Have I sharpened my operating skills?

The contest is going to come and go whether I participate or not. The operators who prepare and anticipate having the most fun are perhaps the ones most likely to be in the winner's circle.

Propagation Tips for the January VHF SS

The high solar activity may enhance conditions this year. F2 and backscatter QSOs may be possible on 6 meters and aurora could appear. Watch the solar flux and k index. Good luck! ■

Announcing the 2000 Roadrunners Microwave Group Cumulative Competition

The recently formed Roadrunners Microwave Group (*RMG*) announces a competition to foster increased activity on the bands above 220 MHz.

The RMG Cumulative Competition is designed to reward constant activity on the higher bands and is inspired by the old adage, "Use 'em or lose 'em." The 2000 RMG Cumulative Competition begins January 1, 2000 and ends December 31, 2000. Points are earned for daily contacts with any station or stations on all authorized amateur bands above 220 MHz. Multipliers are applied for distance and band. Any licensed amateur in the world is eligible to participate; RMG membership is not required.

The Roadrunners Microwave Group is composed of hams, mostly in south Texas and nearby areas, dedicated to promoting the use of the higher amateur bands. For complete rules, Tally Sheets, and a Multiplier Sheet, send an SASE to RMG Cumulative Competition, c/o W3XO, HCR5 Box 574-334, Kerrville, TX 78028.

Remember—Only the United States has lost the use of 220 to 222 MHz. In Canada and many other Region 2 countries, the band is still 5 MHz wide. The RMG membership sponsors this competition to prevent further erosion of our bands.

—From W3XO

RTTY Contesting

Jay Townsend, WS7I
ws7i@ewarg.org

The New Decade


WS7I

I am saddened to have to report that this is Jay's last column for the NCJ. *We have all benefited from his effort to share his knowledge of and passion for RTTY contesting.*

Thanks for your dedication to providing interesting and informative columns for the readership, Jay!

We are happy to have a good friend of his—Wayne, K7WM—waiting in the wings to take over this column in the next issue of the NCJ. *Welcome, Wayne.*

Please take a moment to drop Jay an email and thank him for his tireless work spreading the word about RTTY contesting and introducing a great number of contesters to this fun sport. – 'BV.

Welcome to the year 2000!

RTTY contesting is alive and well. Nearly every contest is growing. There are actually now so many contests that I recently read on a RTTY reflector that " *…people must be tired from doing the last two—they didn't show up.*" This was in reference to the JARTS WW RTTY Contest, which suffered from a shortage of JA operators. This seems funny—especially with both 10 and 15 meters wide open between the US and Japan.

No New Era is Complete without a Forecast

The first prediction that comes to mind is the complete automation of a remotely located station. I think that the Kachina folks are pretty close, and judging from some recent discussions with Dan, K7MM, and Joe, NK7U, there sure seems to be a demand.

I think that sometime this decade—with the improvements in station automation and the increase in available bandwidth on the Internet—that remote station operation over the Internet will become popular. Then we'll all be just like the duck and goose hunters—scrambling for a 15-year lease on some farmer's piece of prime real estate.

I have been thinking about my second prediction a lot lately—complete *contest* automation. The other day I was visiting a local Internet guru and watched him play some pretty serious on-line Web games. There were over 3,500 people playing a 3D game—*all at the same time*. How long will it be before we all send in our $99 "contest game site" signup fee and buy a $300 adapter to hook up our radios (complete with a dummy load to bleed off all that unnecessary RF) and participate in a simulated contest over the Internet? I suspect that we will see this as well in the next 10 to 20 years.

Nearly all of us that contest are now on the Internet and there are always discussions about leveling the playing field. You could enter the Internet version of the CQWW, choose a "virtual" CT3 station location and operate the "contest" from "there."

Gee, the non-contest folks would really like us off the bands—so perhaps they will be the ones to develop the hardware and software.

Back to Business

This is supposed to be a column that talks about getting started in RTTY contesting. Actually, I wonder why all the magazines (including the *NCJ*) seem to dwell on this subject. Now that we have entered this new century most of you already have just about everything you need—HF equipment and a decent computer in the shack. I noticed while operating recently in the CQWW SSB Contest at NK7U's that he's got all the pieces on hand.

Your computer's sound card can be used with several of the contesting software programs to serve as your RTTY terminal unit—this is supported in *NA*, *WF1B* and *Writelog*. There are even some very basic sound card RTTY programs available on the Web (see: **http://www.megalink.net/~n1rct/**).

About the only thing you have to do is hook up some audio cables and fiddle with setting up the message buffers. These will change from contest-to-contest. When deciding what to program in your message buffers, I might point out that "short and sweet" is always best.

If you feel compelled to use dedicated hardware instead of the sound card, I recommend the HAL Communications gear. The DXP38 comes to mind. There are gazillions of PK232s and KAMs around as well. With any of these RTTY systems, you should set up all the stuff and start practicing with it a couple of weeks *before* the next event.

I have noticed a large outcry in the CQ-Contest reflector for some additional RTTY contests. Not to worry—*CQ Magazine* along with co-sponsor *RTTY Journal* run a CQWW DX contest and a WW WPX contest. The ARRL sponsors the ARRL RTTY Roundup. The *NCJ* sponsors the NAQP. The rules for these contests are usually pretty similar. Have a look at the Web sites of the sponsors or **http://home.sol.no/~janalme/RTTY.html** for contests, dates and details.

The skills required for RTTY contesting are the same as those for the other modes—and the advantage of a good location is just as important.

Some of the RTTY contests offer a greater variety of plaques. The big stations like W3LPL whined for a long time about the lack of multi-multi classes in our RTTY contests—then they didn't even bother to enter the 1999 CQ/DJ WPX in February! Those plaques are now waiting for others to claim them!

Heck—I went to Joe Rudi, NK7U's, for the CQWW SSB contest, and I even managed to get on and work a few of you in the CW Sweepstakes—the least you can do is hook up a couple of wires and give RTTY a try. The good news for us RTTY guys is that Rich, N6KT, who I spoke with the other day on his way to HC8A, hasn't taken up RTTY yet. (He's also the only person that I know who still logs by hand.)

Seriously—since Ray, WF1B, implemented mouse operation in his software you don't even have to type very well to play the RTTY game.

The Gotchas

RTTY has two "gotchas" that I should warn you about. The first is transmitting "upside-down." What this means is that your signal, which essentially consists

Upcoming RTTY Contests

Contest	*Dates*	*Starting Time*	*Ending Time*
SARTG New Years	Jan 1	0800Z Saturday	1100Z Saturday
ARRL RTTY Roundup	Jan 8-9	1800Z Saturday	2400Z Sunday
Mexican RTTY	Feb 5-6	1800Z Saturday	2400Z Sunday
CQ/DJ WW WPX	Feb 12-13	0000Z Saturday	2400Z Sunday
Ukraine RTTY	Mar 4-5	2200Z Saturday	0159Z Sunday
NA Sprint	Mar 12	0000Z Saturday	0400Z Saturday
BARTG Spring RTTY	Mar 18-19	0200Z Saturday	0200Z Monday

of two tones, has the high and low tones swapped. This might be caused by operating on the wrong sideband or your tone settings could be reversed in the software or TNC. Some transceivers also include provisions for inverting the tones. Most of the available software includes a command that will let you toggle back and forth. Ask the very first guy or gal that you work on RTTY if you're transmitting "right side up." Check this out *before* you participate in a contest.

The second "gotcha" is that RTTY is supposed to have a 170-Hz shift between the two tones. Recently some of the Johnny-come-lately software developers have been setting this wider than necessary. There are good reasons for using a 170-Hz shift—not the least of which is that the signal can still be decoded when the receiving station has a 250-Hz filter engaged!

The 2000 CQ/DJ WW WPX

This fun contest is held the second weekend of February. We actually moved it once and really like it falling on Valentine's Day now (sigh). This contest has a tremendous plaque program run by Ron, K5DJ. He and I started it five years ago and just this last year *CQ Magazine*—along with the *RTTY Journal*—took over sponsorship.

Most operators go for maximum rate—just like the other WPX events—hoping that they will collect enough multipliers as they go along. You can select from a variety of single and multi classes and there's even a unique multi-two class that no other RTTY contest offers.

We went back to the proven 30 hours of the original WPX. We resisted making the change to 36 or anything else. Each contest should be a little unique—that makes things much more interesting.

Rumor has it that HC8N, after taking Multi-Single in 1999, is going to take a run at the Multi-Two plaque this year. One of the W6s that operates from HC8N was recently inquiring about dates so that he can arrange his vacation time.

Eddie, G0AZT/W6 (last heard /GU), is the current manager of the WPX and is an absolute stickler for the rules. This is one of the only RTTY contests with a contest advisory committee. The results will be out prior to Dayton.

Another little RTTY contester thing—we like our "wallpaper" and we like our plaques. Ron does an outstanding job getting out the plaques. Oh—that brings to mind some of the problems that we have been having getting awards delivered to a handful of locations in Central Europe. If any of you have suggestions on how best to do this, please drop Ron, K5DJ, a note.

This is a User Supported Magazine

In the last issue of the *NCJ,* I noted that Dennis, K7BV, is onboard for another tour. He is seeking articles for the magazine. Each of you should take a few minutes to put together a few ideas or a few words and send them in to your favorite columnist or to Dennis.

WS7I's RTTY Tip

The first tip of the new decade is to take advantage of the know-how and experience of others. Pick up the telephone or drop someone an email or a letter. You can find out a lot about RTTY contesting by simply asking someone who has "been there and done that."

I would recommend consulting Wayne, K7WM, for a little RTTY contesting advice. Wayne has been contesting with quite a few different folks. He has put in his time learning to operate the RTTY contests and knows many—*if not all*—of the answers.

By the way—if you are interested in operating in a multi with some of the "big" name operators, why not drop them a line? Many times contest stations are in need of additional operators.

And finally, it's not too early to mark your calendars for this year's Dayton. It always arrives before you know it. ■

International Contests

Joe Staples, W5ASP
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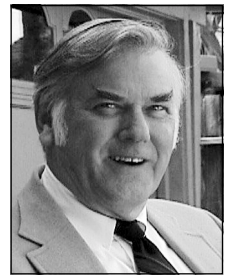
What are Friends For?


W5ASP

How often have you heard one of the locals say, "*Oh, I think I'll just play around on the bands this week-end and see if I can pick up a few new band-countries*"? It's the common refrain of the once eager DXer, for whom the mystique of DXing has become a bit musty. It's most often heard just before the big weekends, ie the CQWW DX and the ARRL DX. To many of the newly anointed these events are a Pandora's box of the semi-rare ones. But what many don't realize is that there are quite a few other equally good opportunities for them to scoff up some real goodies. Maybe it's the chance you've been looking for to pay back a few debts.

After All, What are Friends For?

Of course I am referring to the upcoming torrent of international contests occurring during the opening months of the new year. A glance at the calendar is enough to bring joy to the heart of even the most jaded DXer. But some may not be aware of the impending feast, unless you tell them about it. Perhaps a few words at the next club meeting or a succinct posting on the Cluster will turn the trick. Remember that the more often you get these guys on the air, the more likely that they will be there for *you* during those slow hours of the next Sweepstakes or NAQP.

Many of us found our way into contesting as a result of chasing rare DX, where we learned how to tune, to listen, to identify and to pounce. So it's kind of like payback time. Here are a couple of things that make this an especially opportune time to go to the aid of our friendly DXers.

The ARRL has just announced an expanded DXCC program for the new millennium. During calendar 2000 there will be a DXCC 2000 Millennium Award for any and all. It simply involves working 100 or more entities on the DXCC List. Everyone starts from scratch. What's neat is that it is a "no QSL card" award. Furthermore, there is now a new 20-Meter Single-Band DXCC Award. All the details are in the December issue of *QST*.

Looking at the upcoming contest menu, there are a couple of real sleepers. For instance, the REF contests that bring out not only the French, but their overseas territories (some twelve prefixes including FW, FR, FH, FO, etc) and the many "French speaking" countries (and that's a bunch).

The Bermuda and Russian contests are open events—everyone works anyone. The RSGB Commonwealth, as its name implies, pretty much brings out all the Queen's men. And regardless of the particular contest there will be plenty of participants from South America, Africa and Asia to pick up along the way.

So now is the time to share your extensive knowledge of the wide world of contesting with your friends who labor diligently in the DX fields. In fact, you just might want to sneak in a few Qs yourself—just "playing around" of course.

1999 French REF CW Contest

Country	*Call*	*Category*	*QSOs*	*Mults*	*Points*
Canada	VE3KZ	MO	428	259	319088
	VE3ZT	MO	155	117	51129
	VE5SF	MO	63	38	5624
	VE3VIG	MO20	19	12	588
Mexico	XE1RGL	MO40	17	16	784
USA	K3ZO	MO	475	267	370863
	W8KV	MO	115	90	31050
	K2YJL	MO	188	43	24252
	W7LGG	MO	82	69	17733
	W2EZ	MO	50	41	12054
	N7DR	MO15	69	46	9016
	AA9KH	MO	30	22	1826
	N4MM	MO	23	21	1365
	K3WWP	MO	20	18	1008
	N7IF	MO15	6	6	108
	N8WTH	MO20	1	1	1

1999 French REF Phone Contest

Country	*Call*	*Category*	*QSOs*	*Mults*	*Points*
Canada	VE3ZT	MO	94	76	20824
USA	W8KV	MO	77	58	13050
	W5RQ	MO	62	43	7998
	W1AZT	MO	41	29	3567
	W7LGG	MO	41	29	3567
	W1MMM	MO10	35	25	2625
	W7LBN	MO	33	25	2475
	W6AFA	MO10	25	20	1500
	N4MM	MO	15	13	585
	N3WIZ	MO10	11	11	363

1999 Marconi Memorial HF Contest

Call	*Score*	*Finish*
KC7JEF	20,833	#19

1999 Holyland Contest
USA

	Call	*Category*	*QSOs*	*Points*	*Mults*	*Score*
1	K1DWQ	Mixed	75	75	55	4,125
2	K8ED	Mixed	38	44	29	1,276
3	W3UJ	Mixed	34	41	29	1,189
4	WA2AR	SSB	14	14	12	168
5	K2DP	SSB	5	5	5	25
6	WB4SQQ	SSB	1	1	1	1

1999 Dutch PACC Contest
USA

Call	*Score*	*Call*	*Score*	*Call*	*Score*
K3ZO	12,880	K1BV	850	W2MKW	112
KM5G	5,120	N2CU	561	KC5ZJA	91
VE7CPN/W4	4,644	W7LGG	544	WB4SQQ	88
N8II	3,737	W2CVW	368	N4MM	66
AB9E	2,914	WA2VQV	360	W8WNX	24
K4BAI	1,219	N1XS	150	KC2CKI	5
W2EZ	920			N8WTH	1

Upcoming International Contests

Japan Int. DX CW—Low Band	07-Jan-00
HA Hungarian DX Contest—CW	15-Jan-00
REF French Contest—CW	29-Jan-00
UBA Belgium Contest—Phone	29-Jan-00
Dutch PACC Contest	12-Feb-00
RSGB 1.8 MHz Contest	12-Feb-00
REF French Contest—Phone	26-Feb-00
RSGB 7 MHz CW Contest	26-Feb-00
UBA Belgium Contest—CW	26-Feb-00
RSGB Commonwealth Contest	11-Mar-00
Bermuda Amateur Radio Contest	18-Mar-00
Russian DX Contest	18-Mar-00

Notes
With few exceptions, logs and summary sheets must be postmarked within 30 days of the contest. ■

Contest Calendar

Compiled by Bruce Horn, WA7BNM
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Here's the list of major contests to help you plan your contesting activity through April 2000. The Web version of this calendar is updated more frequently and lists contests for the next 12 months. It can be found at: **http://www.hornucopia.com/contestcal/**.

Please note that the rules have changed for the NAQP CW/(VY0) SSB contests in January to reduce the maximum allowed output power to 100 W and to add the Canadian territory of Nunavut as a multiplier. The complete revised NAQP rules can be found elsewhere in this issue of the *NCJ*, or on the *NCJ* Web site.

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

January 2000

Millenium PSK31 Contest	1200Z, Jan 1 to 1200Z, Jan 2
Kid's Day Contest	1800Z-2400Z, Jan 1
Japan Int. DX Contest, 160-40m	2200Z, Jan 7 to 2200Z, Jan 9
Midwinter Contest, CW	1400Z-2000Z, Jan 8
ARRL RTTY Roundup	1800Z, Jan 8 to 2400Z, Jan 9
North American QSO Party, CW	1800Z, Jan 8 to 0600Z, Jan 9
Midwinter Contest, Phone	0800Z-1400Z, Jan 9
QRP ARCI Winter Fireside SSB Sprint	2000Z-2400Z, Jan 9
Hunting LIONS in the Air Contest	0000Z, Jan 15 to 2400Z, Jan 16
LZ Open Contest, CW	1200Z-2000Z, Jan 15
MI QRP Club CW Contest	1200Z, Jan 15 to 2359Z, Jan 16
North American QSO Party, SSB	1800Z, Jan 15 to 0600Z, Jan 16
BARTG RTTY Sprint	1200Z, Jan 22 to 1200Z, Jan 23
ARRL January VHF Sweepstakes	1900Z, Jan 22 to 0400Z, Jan 24
CQ 160-Meter Contest, CW	2200Z, Jan 28 to 1600Z, Jan 30
REF Contest, CW	0600Z, Jan 29 to 1800Z, Jan 30
UBA Contest, Phone	1300Z, Jan 29 to 1300Z, Jan 30
Kansas QSO Party	1800Z, Jan 29 to 1800Z, Jan 30

February 2000

New Hampshire QSO Party	0000Z, Feb 5 to 2400Z, Feb 6
Vermont QSO Party	0000Z, Feb 5 to 2400Z, Feb 6
10-10 Int. Winter Contest, SSB	0001Z, Feb 5 to 2400Z, Feb 6
Minnesota QSO Party	1400Z-2400Z, Feb 5
YL-OM Contest, CW	1400Z, Feb 5 to 0200Z, Feb 7
Delaware QSO Party	1700Z, Feb 5 to 0500Z, Feb 6 and 1300Z, Feb 6 to 0100Z, Feb 7
North American Sprint, Phone	0000Z-0400Z, Feb 6
CQ/RJ WW RTTY WPX Contest	0000Z, Feb 12 to 2400Z, Feb 13
FISTS Novice Roundup	0000Z, Feb 12 to 2400Z, Feb 13
Asia-Pacific Sprint, CW	1100Z-1300Z, Feb 12
Dutch PACC Contest	1200Z, Feb 12 to 1200Z, Feb 13
YL-OM Contest, SSB	1400Z, Feb 12 to 0200Z, Feb 14
RSGB 1.8 MHz Contest, CW	2100Z, Feb 12 to 0100Z, Feb 13
North American Sprint, CW	0000Z-0400Z, Feb 13
ARRL School Roundup	1300Z, Feb 14 to 0100Z, Feb 19
ARRL Int. DX Contest, CW	0000Z, Feb 19 to 2400Z, Feb 20
CQ 160-Meter Contest, SSB	2200Z, Feb 25 to 1600Z, Feb 27
REF Contest, SSB	0600Z, Feb 26 to 1800Z, Feb 27
North Carolina QSO Party	1200Z-2359Z, Feb 26 and 1200Z-2359Z, Feb 27
UBA Contest, CW	1300Z, Feb 26 to 1300Z, Feb 27
RSGB 7 MHz DX Contest, CW	1500Z, Feb 26 to 0900Z, Feb 27
High Speed Club CW Contest	0900Z-1100Z and 1500Z-1700Z, Feb 27

March 2000

ARRL Int. DX Contest, Phone	0000Z, Mar 4 to 2400Z, Mar 5
World Wide Locator Contest	0000Z, Mar 11 to 2400Z, Mar 12
Southern African HF Field Day	1000Z, Mar 11 to 1000Z, Mar 12
RSGB Commonwealth Contest, CW	1200Z, Mar 11 to 1200Z, Mar 12
North American Sprint, RTTY	0000Z-0400Z, Mar 12
UBA Spring Contest, CW	0700Z-1100Z, Mar 12
Wisconsin QSO Party	1800Z, Mar 12 to 0100Z, Mar 13
Bermuda Contest	0001Z, Mar 18 to 2400Z, Mar 19
BARTG WW RTTY Contest	0200Z, Mar 18 to 0200Z, Mar 20
Russian DX Contest	1200Z, Mar 18 to 1200Z, Mar 19
CQWW WPX Contest, SSB	0000Z, Mar 25 to 2400Z, Mar 26

April 2000

SP DX Contest	1500Z, Apr 1 to 1500Z, Apr 2
EA RTTY Contest	1600Z, Apr 1 to 1600Z, Apr 2
Japan Int. DX Contest, 20-10m	2300Z, Apr 7 to 2300Z, Apr 9
His Maj. King of Spain Contest	1800Z, Apr 8 to 1800Z, Apr 9
UBA Spring Contest, SSB	0700Z-1100Z, Apr 9
Australian Postcode Contest	0000Z-2359Z, Apr 15
YU DX Contest	1200Z, Apr 15 to 1200Z, Apr 16
EU Spring Sprint, SSB	1500Z-1859Z, Apr 15
Holyland DX Contest	1800Z, Apr 15 to 1800Z, Apr 16
SP DX RTTY Contest	1200Z, Apr 22 to 1200Z, Apr 23
Helvetia Contest	1300Z, Apr 22 to 1300Z, Apr 23
Florida QSO Party	1600Z, Apr 29 to 0159Z, Apr 30 and 1200Z-2159Z, Apr 30 ■

North American QSO Parties (NAQP) CW/SSB 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 rules of the CQWW DX Contests with the addition of KH6.

4. Contest periods:

January Contests:

CW: second full weekend in January (1800Z January 8 to 0600Z January 9, 2000)

SSB: third full weekend in January (1800Z January 15 to 0600Z January 16, 2000)

August Contests:

CW: first full weekend in August (1800Z August 5 to 0600 UTC August 6, 2000)

SSB: third full weekend in August (1800Z August 19 to 0600 UTC August 20, 2000)

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 100 W for eligible entries. Use of external amplifiers capable of more than 100 W output is not allowed.

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

8. Bands: 160, 80, 40, 20, 15 and 10 meters only. 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.

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: US States (including KH6 and KL7), Canadian Provinces/ Territories (British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia, PEI, Labrador, Yukon, NWT, and Nunavut) and other North American countries. Newfoundland counts as Labrador, and 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 2 to 5 single operator stations whose individual scores are combined to produce a team score. Although clubs or other groups having more than 5 members may form multiple teams, there is no distance or meeting requirements for a team entry.

Teams must be registered with the appropriate contest manager prior to the start of the contest. Team registration information must be in written form (mail or email) and must include the name, call sign of the operator, and the call sign of the station operated if the operator is a guest at a station other than his own (eg K6ZZ op at K6RO). Use the log submission addresses given below for team registration notification.

14. Log submission: Entries must be postmarked no later than 30 days after the contest to be eligible for awards. All logs containing more than 200 QSOs, which were generated with a computer program, must be submitted on 3.5-inch floppy disk or via email. If paper logs are submitted, please submit originals. Sample log sheets and a summary sheet may be obtained with an SASE to the appropriate contest manager. These forms are also available on the *NCJ* Web site.

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 legible log of all contacts.

Logs and summary sheets submitted on floppy disk or via email must be in ASCII text format. Name your files with your call sign (ie yourcall.SUM and yourcall.LOG). Please do not send binary files produced by a contest logging program (eg yourcall.BIN, yourcall.QDF, etc). Use of the Cabrillo log format for electronic log submissions is encouraged and may be required in the future.

Send CW logs to Bob Selbrede, K6ZZ, 6200 Natoma Ave, Mojave, CA 93501 USA; email: **cwnaqp@ncjweb.com**.

Send SSB logs to Bruce Horn, WA7BNM, 4225 Farmdale Ave, Studio City, CA 91604 USA; email: **ssbnaqp@ncjweb.com**.

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: A total of five plaques will be awarded for the high score in each of the following categories: Single Operator CW, Single Operator Phone, Multi-Operator CW, Multi-Operator Phone, Single Operator Combined CW/Phone High Score. 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.

—Revised 14-Nov-1999 ■

Rules for the 2000 North American Sprint Contests

1. Eligibility: Any licensed radio amateur may enter.

2.Object. To work as many North American stations (and/or other stations if you are in North America) as possible during the contest.

3. Entry Classification: Single operator only. Use of helpers or spotting nets is not permitted

4. Contest Periods:

February Contests:
SSB: 0000 - 0400Z February 6
CW: 0000 - 0400Z February 13
RTTY: 0000Z-0400Z March 12

September Contests:
CW: 0000Z-0400Z, September 10
SSB: 0000Z-0400Z, September 17
RTTY:0000Z-0400Z October 15

These are entirely separate four-hour Sprints. An entrant may submit scores for one or more Sprints, but he may not combine his scores. Note that the CW Sprint is first in September and second in February.

5. Mode: CW only in CW Sprints, Phone only in Phone Sprints, RTTY only in RTTY Sprints.

6. Bands: 80, 40, and 20 meters only. Suggested frequencies are around 3540, 7040, and 14040 on CW; and 3850, 7225, and 14275 on Phone, and 3580, 7080 and 14080 on RTTY. You may work the same station once per band. NOTE: For RTTY only, the same station can be worked multiple times provided 3 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). 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 (1) and must be sequential thereafter. 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.

9. North American Station: Defined by the rules of the CQ WW DX Contests.

10. Scoring: Multiply total valid contacts by the sum of US 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, VO1, and VO2), VE2 through VE7, and Yukon-NWT (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," QRZ, or any other means of soliciting a response), he is permitted to work only one station in response to that solicitation. He must thereafter move at least 1 kHz before he works any other station, or at least 5 kHz before he again solicits 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 at least 1 kHz or 5 kHz (as appropriate) from the vacated 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.

13. Reporting: CW Sprint entries must be sent to Mark Obermann, AG9A, 6713 Forestview Lane, Niles, IL 60714. Phone Sprint entries must be sent to Rick Niswander, PO Box 2701, Greenville, NC 27836. RTTY Sprint entries must be sent to Wayne Matlock, Rt 2, Box 102, Cibola, AZ 85328. Entries must be received no later than 30 days after the Sprint to be eligible for trophies and awards. An entry consists of (1) a summary sheet showing the number of valid contacts by band, total contacts, total multiplier, total score, name, call sign and address of the operator, station call sign and station location, whether low power (150 W or less) was used, and name used; (2) a complete, legible log of all contacts (including dupes marked as such) with indication by numbered sequence of each multiplier claimed. Logs, summary sheets, and check sheets may be home-made or patterned after those published periodically in the *NCJ* or available from the contest coordinators listed above.

You are encouraged to send your log in computer readable form, either by diskette or by email. If your log is submitted by diskette, the output from any of the popular logging programs is appropriate. Electronic summary sheets are required in case of electronic submission. If you are submitting your log by email, send your logs to:

CW Sprint Logs:
cwsprint@contesting.com
Phone Sprint Logs:
niswanderf@mail.ecu.edu
RTTY Sprint Logs:
k7wm@i10net.com

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. Pre-Contest Requirement: To qualify as a team entry, the name, call sign of each operator, and call sign of the station operated (if the operator is a guest at a station other than his own; eg W6AQ operated by WA6OTU), must be registered with AG9A for the CW Sprints, K7GM for the Phone Sprints or K7WM for the RTTY Sprints. The team registration information must be in written, telegraphic, spoken or electronic form, and must be received before the start of the Sprint.

Submission by email to the appropriate address listed above is a valid means of submission as is a telephone call. There are neither distance limitations nor meeting requirements for a team entry. The only requirement is pre-registration of the team.

15. Penalties and Disqualification: For each unmarked duplicate QSO, you lose that contact plus an additional three contacts. For each QSO for which you are not in the other station's log, you lose that QSO plus an additional one contact. For each QSO for which the log data is incorrectly copied in any respect, you lose that contact. Entries with score reductions in excess of 5% may be disqualified. Any entry also may be disqualified for illegibility, illegal or non-ethical operation. Such disqualification is at the discretion of the *NCJ* Contest Review Committee.

16. Awards: A trophy or plaque will be awarded to the highest scoring entrant. Certificates of merit will be awarded to the highest scoring entrant from each USA or Canadian call district and other country, to each of the ten highest scoring entrants, to each member of the winning team, and to the highest scoring entrant on each team. ■

Results, August 1999 NAQP SSB Contest

Bruce Horn, WA7BNM
bhorn@hornucopia.com

As expected, activity and scores for the August 1999 edition of the NAQP SSB contest were down when compared to the January running. Because of the large difference in band conditions and vacation schedules between January and August, the two editions of the NAQP each year are very different.

Although 10 meters continues to improve as we move through the sunspot cycle, this band was a "no show" in August. Even 15 meters cooled off rapidly after starting the contest with the most activity of any band in any hour. The result was that 20 and 40 meters were the places to be for most contesters with sustained activity during much of the contest.

After the log checking was over, AD6DO emerged as the Single Op winner by a margin of less than 2K over fellow SCCCer K6LL. Dan's 12-multiplier advantage overcame Dave's 54 QSO advantage for the win. Once again K4XS led the Southeastern US to finish third. KW8N captured fourth, while N6RT piloted W6EEN to fifth place. KB3AFT managed sixth as K3CR, and K4WX continued his string of Top Ten finishes with seventh. Operating almost exclusively on 20 and 15 meters, KH6ND turned in the first NAQP SSB log from Hawaii to capture eighth. K9XD, operated by K9PG, took ninth, with N6KI rounding out the Top Ten.

N5RZ won the plaque in the Multi-Two category. The KK1L ops moved up from their third place finish in January to take second, with K7ZO rounding out the top three.

In the team competition, the Southern California Contest Club #1 team, led by four Top Ten finishers (AD6DO, K6LL, W6EEN and N6KI), easily outdistanced the field to take top honors. The Tennessee Contest Group #1 team (K4WX, K4RO, K4JNY, W0ETC and N4VI) took second, with the Society of Midwest Contesters Full Timers capturing third. Particularly notable, the Tennessee Contest Group fielded six complete teams for the contest with a total score of almost 2 million points!

Although the band conditions didn't produce the type of record-setting performances we've seen for the past several contests, there was still plenty of activity. Even non-North American stations submitted logs. S51CK managed almost 300 QSOs on 20 meters.

Please read the complete revised rules for the NAQP CW/SSB contests published elsewhere in this issue of the *NCJ*. Important changes effective for the January 2000 editions of the NAQPs include 1) maximum permitted power limit reduced to 100 W and 2) the addition of Nunavut as a multiplier.

Based on conditions during the fall contest season, it looks like the January 2000 NAQP has the potential to be an all-time record setting opportunity. Don't miss this one! What better way is there to usher in 2000 and chase the winter blues away than with a red hot NAQP! See you in January.

Soapbox

This was my first NA QSO party—What a Blast! Can't wait till next time!—*KM5VI*. Helping friends move and church obligations do not make for a successful contest but I had an hour or so of fun anyway running QRP SSB to a "random" 75-foot wire. Thanks to all who dug me out of the noise.—*N5NW*. Lee and Mark, thanks for the encouragement. Boy, do I have a long way to go.—*KG4BIG*. Was only on for an hour; Twin Cities DX Association picnic and sister's B-day party kept me away until about 1030 PM CDT and then the lightning started. Oh well, maybe next time.—*K0XQ*. Lack of high band propagation, but 80 and 160 were a blast! Wish I had more time on the low-bands.—*KI9A*. A lot of fun once I got past the 10/15-meter disappointment! My LOW wires are in need of repair and static crashes once again proved the need for some receiving antennas does indeed exist. Took time off to take 2-year-old for a walk and tuck in bed! 2-month-old was also making his presence known... couple years and I will have a good little multi-op family for these events!—*NX9T*. Band conditions weren't very good. Never heard anything on 10 meters, just a handful of stations on 15 meters and no DX to speak of on 20 meters. Still managed a respectable average QSO rate, and had a GREAT time!—*KS2G*. Not such a bad time for only 4 hours operating. Bands seemed in better shape this time.—*K4XU*. 10 meters was a bust from here. Almost doubled my last year's score, so I guess I'm getting the hang of this "fone" stuff. Great ops, no run-ins with anyone anywhere!—*K1KY*. Bands were poor. I had lots of QRN from one of the neighbors on 20 and 15. Otherwise this was fun.—*K4HA*. As usual, I had a lot of fun for the short time I was able to operate. All work and no play... —*WA1ZYX*. First time entrant. Enjoyed using only low power. Did poorly on 80 and 160 due to high swr. I'll be ready next time.—*WM2V*. Conditions not good here and only able to operate for 4.5 hours. Still had fun.—*VE6FU*. Of course 10 and 15 were very poor, but 20 and 40 did a good job. 80 and 160 were very noisy. Had a nice 2nd opening to the West Coast on 20 when we went back there after being on 40 meters. As usual fun to work old friends and new ones as well. I knew it was time to go to 80 when the guys on 20 wanted

Team Scores

1. Southern California Contest Club #1		*2. Tennessee Contest Group #1*		*3. Society of Midwest Contesters Full Timers*	
AD6DO	192,852	K4WX	140,700	K9XD	138,380
K6LL	191,208	K4RO	97,174	K9DX	127,328
W6EEN (N6RT)	154,000	K4JNY	89,376	W9RE	60,648
N6KI	132,825	W0ETC	59,595	WT9U	45,045
K6RO	113,176	N4VI	44,722	Total	371,401
Total	784,061	Total	431,567		

4. Ozark Contest Club #1 (W5YM, K5OY, AB5SE)	298,194
5. PVRC I (K4HA, NX9T, W3DQ, K4MA)	272,538
6. Florida Contest Group (K4XS, KB4N, WC4E)	239,482
7. Kentucky Contest Group Alpha (N4OKX, W4LC, KT4ZX)	209,226
8. Order of Boiled Owls (KS2G, WM2V, K2KV, W2GSB)	190,516
9. Tennessee Contest Group #2 (NY4T, KE4OAR, K0EJ)	174,466
10. Southern California Contest Club (WN6K, N6VH, KR6NA)	139,054
11. Yegua Valley Contest Club (N5XJ, N5HC, NX5M)	127,426
12. Tennessee Contest Group #4 (KE4YBS, N5NW, NN4T, W4CAT, K4OOO)	124,521
13. Tennessee Contest Group #5(WO4O, W4ZUG, NA4K, W4PZA)	115,518
14. PVRC II (N4CW, W2CS)	102,752
15. Minnesota Wireless Association (K0AD, KT0R)	97,496
16. Society of Midwest Contesters, Part Timers II (K9MMS, WE9V)	80,442
17. Team Pocatello (W7II, KW7N, KJ7TH)	66,840
18. Tennessee Contest Group #3 (K4HSM, N4PQV, W4PA, KF4ZR)	54,543
19. Society of Midwest Contesters Part Timers I (N7IN, KI9A)	48,715
20. Twin City Ham Club (K5JRY, N5MYH)	29,075
21. Ozark Contest Club #2 (W5KI, KM5G)	20,274
22. Kentucky Contest Group Zulu (K4AT, KG4BIG)	19,481
23. Tennessee Contest Group #6 (W4JH, W9WI)	1,167

Single Op Top Ten Breakdowns

Call	*Score*	*QSOs*	*Mults*	*160*	*80*	*40*	*20*	*15*	*10*	*Team*
AD6DO	192,852	974	198	5/3	46/25	195/52	462/60	245/47	13/11	SCCC #1
K6LL	191,208	1028	186	10/6	33/18	184/46	402/56	372/47	18/13	SCCC #1
K4XS	182,400	960	190	26/14	106/37	207/52	486/56	110/28	8/3	FCG
KW8N	154,584	678	228	69/32	139/44	165/50	191/48	79/30	34/24	
W6EEN (N6RT)	154,000	770	200	6/4	67/35	177/52	204/55	299/46	8/8	SCCC #1
K3CR (KB3AFT)	144,969	759	191	32/19	102/37	284/51	240/45	77/23	18/16	
K4WX	140,700	804	175	60/24	182/45	328/53	200/44	24/8	2/1	TCG #1
KH6ND	138,996	972	143	0/0	0/0	85/29	433/55	441/55	6/4	
K9XD (K9PG)	138,380	740	187	49/26	180/43	251/48	215/49	40/19	3/2	SMC FT
N6KI	132,825	805	165	10/5	21/15	172/45	296/55	295/44	4/1	SCCC #1

Multi-Two Breakdowns

Call	*Score*	*QSOs*	*Mults*	*160*	*80*	*40*	*20*	*15*	*10*
N5RZ	252,636	1138	222	53/29	61/25	221/50	547/59	204/49	13/10
KK1L	203,136	1104	184	46/23	189/38	334/53	429/47	97/22	1/1
K7ZO	187,824	1092	172	12/8	44/22	252/53	516/54	257/35	0/0

to rag chew at each QSO.—*KT0R*. I had S7 noise on 20 meters which really hurt my score. Luckily it looks like I still did pretty good in the standings.—*N6RT*. Always Fun! Couldn't get out of going to wedding. Thanks for all Qs.—*W6TK*. Really had fun in the contest this year. Had a late start and quite a break around 2200Z but was happy with the results. Most fun for me was working Mike, KH6ND, on 40 meters at 0510Z after only two calls! Thanks again for sponsoring the contest.—*KF0UK*. This was the first time for me to play single-op NAQP from my new place. I was in and out most of the time, but the bands sounded good to me during the times I did operate... except for 10.—*NX5M*. 10 meters was not there and 15 was not much better. Bummer!—*N5YA*. Had a great time in the NAQP. Conditions on the high bands were terrible! More Qs on 160 than 10 meters in August! Thanks to Tim, N4GN, for his hospitality. It was a great "shakedown" for the station. Coolest Qs: WA2KBZ/4 using a wire out his hotel window in Arlington, VA and KE4TUU/M for KL7 multiplier.—*N4OKX*. Conditions on the high bands were just terrible! Next year I'll be doing this with a beam.—*N4CW*. Less than 40 QSOs on 10 and 15 combined tells the story here. 160 was a pleasant surprise though! See everyone in January!—*N0AV*. The Southwest Idaho Contest Club traveled over to NK7U's Baker, Oregon contest superstation to have some fun. Unfortunately, Joe, NK7U, could not make it, so we carried on without him. Our exchange, "JOE Oregon" was in his honor.—*K7ZO*. Crummy high band conditions! A late start due to antenna work and conditions hurt the score, but it was fun anyway!—*K3PP*. Thanks to all for the QSOs, especially all the Europeans on 15 meters!—*N5RZ*. Went up to 10 meters several times and it was slim pickins, After working another frustrated station and giving my name as TOM, I heard, " ...and will you please turn out the lights, Mr Bodett!"—*N6KI*. Wow! The score my not seem like much, but this was only a part-time effort for me. I bested my last NAQP Phone effort in summer 1997 (which was 9 hours).—*AA4LR*. Enjoyed the contest. Took a nice slow pace, while my 8-year-old son listened along.—*KJ7TH*. This station was operated from Fire Island Lighthouse as part of International Lighthouse weekend. When I asked permission to operate the contest, the consensus was that the contest would overwhelm the special event station anyway, so if you can't beat them, then join them! With that, W2GSB/Lighthouse was in the NA QSO Party.—*N2GA*. A fun contest, even with poor conditions on 10 and 15 meters. The length of the contest keeps it an "XYL friendly contest." You should do this contest quarterly!—*W1CTN*. T-Storms all weekend long killed any chances of a full effort in this one.—*WC4E*. Let's see... poor conditions on 10/15 and thunderstorms making 40 and 80 and headache. What can I say... bring on fall and winter!—*N4VI*. I gave up and went to bed at 10:45 PM wondering if I should ever aggravate myself with contesting again. When I got up and saw all the low scores I realized that I should have stuck around. I also realize that my only antenna is a dipole, but a good one. It just isn't enough for serious contesting.—*K4OOO*. Thanks to Jim, WA3FET, for use of the station. Already looking forward to the January NAQPs! Thanks to everyone who was willing to try 15 and 10!—*KB3AFT*.

Single Operator Scores

Call	*Score*	*QSOs*	*Mults*	*Section*	*Team*
K1VUT	110,528	704	157	MA	
K1PLX	77,532	546	142	RI	
N1ND	46,256	392	118	CT	
N4CW	30,797	299	103	ME	PVRC II
K1HT	21,922	226	97	MA	
AA1SU	21,244	226	94	VT	
W1CTN	14,022	171	82	CT	
K1QM	5,130	95	54	MA	
W1WIU	4,888	94	52	RI	
WA1ZYX	3,440	80	43	NH	
WM2V	57,743	511	113	NY	Order of Boiled Owls
K2KV	56,126	422	133	NY	Order of Boiled Owls
W2GSB (N2GA)	48,840	440	111	NY	Order of Boiled Owls
KS2G	27,807	299	93	NY	Order of Boiled Owls
W5KI	8,418	122	69	NJ	Ozark CC #2
W2HCA	6,930	126	55	NJ	
N2LQQ	2,178	66	33	NY	
WB2BAU	391	23	17	NY	
K3CR (KB3AFT)	144,969	759	191	PA	
WA3HAE	85,400	610	140	PA	
KB3CBW	65,400	545	120	MD	
K3PP	56,375	451	125	PA	
WA3SES	17,353	259	67	PA	
W3DQ	10,472	154	68	MD	PVRC I
K4XS	182,400	960	190	FL	FCG
K4WX	140,700	804	175	TN	TCG #1
K4MA	113,031	661	171	NC	PVRC I
KT4ZX	103,695	669	155	KY	KCG Alpha
K4RO	97,174	631	154	TN	TCG #1
K4JNY	89,376	588	152	TN	TCG #1
WO4O	88,616	583	152	TN	TCG #5
NX9T	87,248	574	152	NC	PVRC I
K4NO (KA9EKJ)	84,700	550	154	AL	
W4CAT (K1KY)	77,575	535	145	TN	TCG #4
W2CS	71,955	533	135	NC	PVRC II
N4OKX	66,885	455	147	KY	KCG Alpha
K0EJ	62,604	423	148	TN	TCG #2
K4HA	61,787	451	137	NC	PVRC I
NY4T	60,800	475	128	TN	TCG #2

Call	Score	QSOs	Mults	Section	Team
KE4OAR	51,062	422	121	TN	TCG #2
K4JYO	50,840	410	124	AL	
W4LC	38,646	342	113	KY	KCG Alpha
WC4E	36,250	290	125	FL	FCG
NN4T	31,110	305	102	TN	TCG #4
K4BAI	27,455	289	95	GA	
N4PQV	25,957	257	101	TN	TCG #3
KB4N	20,832	217	96	FL	FCG
AA4LR	20,582	251	82	GA	
NA4K	18,778	229	82	TN	TCG #5
K4HSM	15,744	192	82	TN	TCG #3
KF4ZR	11,620	166	70	TN	TCG #3
KG4BIG	11,396	154	74	KY	KCG Zulu
K4OOO	8,640	135	64	TN	TCG #4
K4QPL	8,184	132	62	NC	
K4AT	8,085	147	55	KY	KCG Zulu
W4ZUG	7,998	129	62	TN	TCG #5
KE4YBS	7,076	122	58	TN	TCG #4
K2UFT	5,555	101	55	GA	
KF4OAD	5,136	107	48	NC	
K4IU	4,730	110	43	KY	
W4NTI	3,480	87	40	AL	
K4UNC	2,014	53	38	NC	
W4PA	1,222	47	26	TN	TCG #3
K1UNC	1,092	39	28	NC	
W9WI	819	39	21	TN	TCG #6
W4JH	348	29	12	TN	TCG #6
W4PZA	126	14	9	TN	TCG #5
N5NW	120	15	8	TN	TCG #4
W5WMU	127,218	699	182	LA	
NX5M	119,712	696	172	TX	Yegua Valley CC
W5ASP	117,280	733	160	TX	
W5YM	111,154	746	149	AR	Ozark CC #1
AB5SE	98,880	618	160	AR	Ozark CC #1
K5OY	88,160	608	145	AR	Ozark CC #1
N5DO	76,881	523	147	TX	
NA5B	54,332	578	94	OK	
K5WA	35,910	342	105	TX	
N5MYH	18,715	197	95	LA	Twin City
KM5VI	17,630	205	86	TX	
K4NR	16,415	245	67	TX	
WA0SXV	13,068	198	66	NM	
KK5CA	12,062	163	74	TX	
KM5G	11,856	152	78	AR	Ozark CC #2
K5JRY	10,360	148	70	LA	Twin City
N6ZZ	8,494	137	62	NM	
N5XJ	5,494	134	41	TX	Yegua Valley CC
W5DDX (WM9M)	5,130	90	57	LA	
N5HC (AC5GH)	2,220	60	37	TX	Yegua Valley CC
AD6DO	192,852	974	198	CA	SCCC #1
W6EEN (N6RT)	154,000	770	200	CA	SCCC #1
KH6ND	138,996	972	143	HI	
N6KI	132,825	805	165	CA	SCCC #1
K6RO	113,176	658	172	CA	SCCC #1
WN6K	99,450	663	150	CA	SCCC #2
W6TK	60,187	433	139	CA	
N6VH	17,760	185	96	CA	SCCC #2
KQ6QW	15,800	200	79	CA	
WA7BNM	5,900	100	59	CA	
KB6OQJ	3,476	79	44	CA	
WA6DLM	3,384	72	47	CA	
KF6PKG	3,168	72	44	CA	
K6CSL	2,146	58	37	CA	
W6RKC	442	26	17	CA	
K6LL	191,208	1028	186	AZ	SCCC #1
N7LOX	60,000	480	125	WA	
KJ7TH	29,146	247	118	ID	Team Pocatello
KW7N	22,816	248	92	ID	Team Pocatello
K7KJ	21,075	281	75	OR	
W7II	14,878	173	86	ID	Team Pocatello
K4XU	8,040	120	67	OR	
W7YS	7,344	108	68	AZ	
NW7DX	4,042	86	47	WA	
K7UB (AA7TR)	1,269	47	27	UT	
W7/JR1NKN	1,066	41	26	WA	
KW8N	154,584	678	228	OH	
AA8U	118,184	748	158	MI	
K9TM	102,500	625	164	OH	
ND8DX	91,494	598	153	OH	
WA8YRS	62,609	457	137	OH	
K8IR	30,240	280	108	MI	
KA8FCC	19,688	214	92	OH	
K9XD (K9PG)	138,380	740	187	IL	SMC Full Timers
K9DX	127,328	692	184	IL	SMC Full Timers
N9PQU	79,488	552	144	WI	
W9RE	60,648	399	152	IN	SMC Full Timers
WT9U	45,045	385	117	IN	SMC Full Timers
KI9A	43,815	345	127	IL	SMC Part Timers I
K9MMS	42,262	374	113	IL	SMC Part Timers II
WE9V	38,180	332	115	WI	SMC Part Timers II
K9WX	15,066	186	81	IN	
N7IN	4,900	98	50	IN	SMC Part Timers I
N9NT	4,214	98	43	IL	
N9ZUT	2,920	73	40	IL	
N0AV	23,284	629	196	IA	
KT0R	90,440	595	152	MN	Minn Wireless
W0ETC	59,595	411	145	IA	TCG #1
N4VI	4,722	379	118	CO	TCG #1
KF0UK	22,540	245	92	MN	
KR6NA	21,844	254	86	CO	SCCC #2
K0DAT	7,442	122	61	MO	
K0AD	7,056	112	63	MN	Minn Wireless
K0XQ	1,900	50	38	MN	SMC Part Timers III
N9HDE	620	31	20	MO	
VE7TLK	46,090	419	110	BC	
VE5SF	38,073	343	111	SK	
VE2AWR	21,408	223	96	PQ	
VE3BUC	13,728	176	78	ON	
VA3SWG	11,826	162	73	ON	
VE3ZT	5,460	105	52	ON	
VE3KP	4,845	85	57	ON	
VE6FU	2,479	67	37	AB	
VE3SYB	2,100	60	35	ON	
VE2GWL	1,734	51	34	PQ	
VE6/K6LRN	588	28	21	AB	
XE2DV	130,350	869	150	XE	
WP4LNY	4,545	101	45	KP4	
S51CK	15,132	291	52	DX	
DK3KD	1,050	42	25	DX	

W5NN, DL7ULF, N1LN Check Logs

Multi-Two Scores

Call	Score	QSOs	Mults	State/Province
N5RZ (+ KT5E)	252,636	1138	222	TX
KK1L (+ N1MEZ)	203,136	1104	184	VT
K7ZO (+ K7MK, KD7CB, W7ZRC)	187,824	1092	172	OR
N5YA (+ K5OT, K5WO, K8IT, KM5UB, K5KR)	183,060	1017	180	TX
W0EEE (+KB0VLG, KC0CDG, KC0EWD, KC0EYD, KC9UMR, KI0MI, KI0PT)	24,087	259	93	MO
N0WWL	22,632	246	92	ND

Relative Band Activity

This table shows the relative activity, based on submitted logs, for each band during each hour of the contest. A score of 100 is assigned to the most active band-hour, in this case 15 meters during the 18Z hour. As an example, for 80 meters/2Z had 72 percent of the activity of 15 meters/18Z.

Hour/Band	160	80	40	20	15	10
18Z	—	—	—	99	100	1
19Z	—	—	2	99	55	3
20Z	—	—	10	94	28	3
21Z	—	—	45	75	16	1
22Z	—	—	61	52	15	1
23Z	—	—	61	58	9	1
0Z	—	2	82	58	5	1
1Z	1	32	96	55	1	—
2Z	3	72	83	46	—	—
3Z	19	60	68	22	—	—
4Z	28	60	34	10	—	—
5Z	14	39	26	2	—	—

■

Results, September 1999 *NCJ* CW Sprint

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Despite the unfortunate problems with Sprint date confusion, activity was still generated at a very high level. So high, in fact, that a new all-time CW Sprint record was posted by Dan, K1TO. His efforts also resulted in a new all-time high multiplier record of 53. Dave, K5GN, tied the old record score, which had been held by N6TR, on his way to a strong second place finish. K4AAA finished third, up two places from February. N6ZZ had everything in sync, resulting in fourth place. The Midwest showed some real strength with W4PA, N9RV and AG9A closing out the top ten. A grass roots postcard writing campaign, urging stations from around the country to operate the Sprint worked very well. The results were increased activity and a terrific number of available multipliers.

Dave, NT1N, threw up some wires and a small tribander at 40 feet at his new location in CT and placed first among low power entries (see the sidebar for Dave's take on moving from the Black Hole of the Midwest to New Europe). AD6DO came in 2nd from the opposite coast, while K9AA, had to settle for third place. K2SQ came in fourth with another nice effort and W4OC, who has become a dependable South Carolina multiplier to grateful Sprinters, placed fifth.

In addition to K1TO's record-setting effort, other records also fell by the wayside. Thirteen section records were broken, with new ones set in FL, GA, IN, MN, NM, SC, TX, VT, WI, WY, VE3 and VE6. The most ancient record broken was Minnesota's, which was a full 20 years old and the last record to stand from the 70s. From the DX side, LY2BTA recorded an all-time high from Lithuania.

Golden Logs with 100 or more QSOs were achieved by K1HT, K1KY, K4BAI, K5OT, AD6DO, and K8JM. This is AD6DO's second perfect log in a row. K4BAI's golden ears landed him back on this very elite list.

NCCC#1 worked hard and took first place in the competitive team category. SCCC#1 came in second in a flip flop of February's results. South East Sprint Team and FRC Domestic put in strong efforts to round out the top four. Again, one of the keys to team victory is to not only get everyone on, but also to send in the logs after the contest is over. When it comes to team competition, it is sometimes difficult to build up complete teams. Check the scores in this write-up and contact those without team affiliations. Teams must be registered with **cwsprint@contesting.com** before the beginning of the contest.

All logs received will be listed at *NCJ*'s Web site. Team coordinators can easily check to see if the team members have sent in logs. The page will be updated weekly as logs are received. The internet address is **http://www.ncjweb.com**. Logs are due no later than 30 days after

Golden Logs
(No QSOs Removed for 100 QSOs min)

Call	*QSOs*
K4BAI	291
K5OT	287
K1KY	279
AD6DO	268
K1HT	246
K8JM	138

Guest Ops

Call	*Station*	*Op*
K1KY	W4CAT	K1KY
N2NT	N2NT	N2NC
W2GD	N2EA	W2GD
K3CR	WA3FET	KB3AFT
W4PA	K4JNY	W4PA
K5TR	N5XU	K5TR
K6AW	K6KM	K6AW
K6GV	W6UT	K6GV
W6CT	AK6L	W6CT
W6EEN	W6EEN	N6RT
W6RGG	N6BT	W6RGG
W6UE	W6UE	W4EF
AG9A	K9XD	AG9A
K9AA	WE9V	K9PG

Top 10 Scores		Top 10 QSOs		Top 10 Mults		Top 10 Low Power Scores		Band Changes	
K1TO	18762	K5GN	358	K1TO	53	NT1N	13720	AG9A	111
K5GN	18258	K1TO	354	K4AAA	51	AD6DO	12596	W4PA	103
K4AAA	18003	K4AAA	353	K5GN	51	K9AA	11985	K5GN	74
N6ZZ	16881	K1KI	342	N6ZZ	51	K2SQ	11822	K4AAA	54
N6TR	16709	N6TR	341	K6XX	51	W4OC	11730	N5KO	52
K1KI	16416	W4PA	334	K1KY	50	K5NZ	11408	N6IG	42
W4PA	16032	N9RV	334	K9AY	50	K1HT	11316	K1TO	31
N2NT	15974	N6ZZ	331	N6AA	50	K4XU	10944	K2UA	31
N9RV	15698	N2NT	326	W6UE	50	K7NT	10260	W6EEN	30
AG9A	15500	W6EEN	321	AG9A	50	K4FXN	10191	K6LA	29
				K9TM	50	K9AY	9750		

Team Scores

NCCC#1		SCCC#1		SEST		FRCD	
N6TV	14784	N6AA	15100	K4AAA	18003	N2NT	15974
N5KO	14700	W6EEN	15087	K4BAI	13968	AA3B	14064
N6IG	14544	K6NA	14592	AA4GA	11750	K3WW	14006
N6RO	13104	K6LA	14382	W4OC	11730	K2UA	11968
K6XX	12648	AD6DO	12596	K4NO	11520	W2GD	11868
K6AW	12267	W6UE	12350	K3MM	11352	K2SQ	11822
K7BV	11565	N6VR	12336	K9AY	9750	WW2Y	11270
AE6Y	11454	W6TK	7965	K2UFT	8299	N2NU	6765
W6EU	10120	W6MVW	5504	K4MA	4551		97737
W6RGG	9976		109912		100923		
	125162						

5. YCCC #1 (K1KI, K1DG, NT1N, W1WEF, K1HT, K1IR, N2MG, W1EAT, AA1SU) .. 93604
6. MRRC (K8MR, KW8N, K9NW, KU8E, K9TM, K0OU, K4LT, N8ET) 88688
7. TCG #1 (W4PA, K1KY, K4RO, K4WX, N4CW, WO4O, K3WU, K0EJ, N3DEL) 86474
8. ABT (N6ZZ, N6TR, K4XU, K9JF, K7NT, K5KA, N7LOX) 83422
9. DLCSCW (AG9A, K9AA, K9ZO, K9IG, WT9U, K9YO, W0UY, K9YA) 74434
10. RBT (K1AR, K5OT, KI7Y, N4BP, KU7Y, AD7U, AA8U) 55134
11. TDXS (K5GN, K5NZ, KG5U, N5TU, W5ASP) 54029
12. NCC (N9RV, K3CR, VE3EJ, NI3S) 48742
13. NCCC #2 (K6GV, AJ6V, W6CT, N6PN, NI6T) 45426
14. SMC #2 (K9BGL, N9SD, KI9A, N9JF, KA9FOX) 33563
15. CTDXCCS (N3BB, K5PI, K5TR, N5CQ) 32661
16. CCC (W5WMU, KZ5D, W5ZR, N5AN, K5UA, N8RR) 29254
17. MNWA (K0AD, NA0N) 18350
18. TCG #2 (NA4K) 11760

the contest.

Please check the ARRL Contest Calendar for the Sprint dates for the year 2000.

See you in February.

Soapbox

WHAT A CONTEST!!!—*AD7U.* Thanks to K9XD for use of his terrific Chicago area station.—*AG9A.* Delighted to join the fray and offer a few points. I hereby claim first place for fastest log submission—sent one hour before end of contest!—*G3SXW.* Difficult to work west of the Mississippi this time, thanks to K7BV and K6NA who pulled my signal through. Still paper bound in this Sprint. I must get on the TR learning curve.—*G4BUO.* I had a sub-par first hour and wasn't able to make up for it. At least my mult total equaled my previous best. First time I've worked AK in the Sprint—thanks, WL7KY!—*K1HT.* Love those mults—had all 53 by 0221Z! Even heard KO7X and VE9DX for 55 potential mults! 2nd rig was barefoot this time. First Sprint with my new MP. Glad the t'storms stayed away again.—*K1TO.* It was a kick to work two LYs on 40 meters and CT1BOH on 20. The Sprint is simply the best CW contest there is! Next time: Page 7!—*K2UA.* First serious entry, hit the wall at 3.5 hours but stuck it out to the bitter end. Better strategy in February and a nap ahead of time might help!—*K2UFT.* Thanks to Jim/WA3FET for use of the station.—*K3CR.* Good activity, It always takes me about 2 hours to get the "hang" of the contest. By the time I get used to what I'm doing it's over !!!—*K3JT.* My first full-time Sprint. I think I need practice turning the big knob! Hi!—*K3MM.* Lots of fun. Had to track down an RF problem mid-contest that took some valuable time. Look forward to the winter Sprint.—*K3WU.* This remains the most humbling contest of all for me, and demands the highest level of performance every

Guidelines for Log Submissions

Please submit both a log and summary sheet with your entry. Any format created by the popular logging programs is acceptable. E-mail your logs to **cwsprint@contesting.com** or send me your disk with the required information. An acknowledgement message will be sent to all e-mail submitters. Those sending disks can provide a SASE or stamped QSL for confirmation. Feedback on log accuracy is available via e-mail (request to cwsprint@contesting.com) or SASE once the results have been published.

Please remember the following when submitting your log:

- All log-related issues MUST be stated in the summary sheet. Comments included within the log will NOT be read.
- Clearly indicate your power level in the summary sheet. If you operated as a guest op from another station, please include this information in the summary.
- An electronic log is the preferred method of entry. If you logged by paper, please convert the log into an electronic format before sending it in. All logs are fully checked.
- All e-mail entries should be sent to **cwsprint@contesting.com** only. Check the Sprint Rules for any changes to these guidelines.

NCJ CW Sprint Records - Through September 1999

QTH	Date	Call Sign	QSOs	Mults	Score
CO	**2/99**	**N2IC/0**	**352**	**49**	**17,248**
IA	2/98	N0NI (AG9A)	321	46	14,766
KS	9/82	K0VBU	231	42	9,702
MN	9/99	KM0O	244	48	11,712
MO	9/96	K4VX/0 (WX3N)	332	46	15,272
NE	2/91	KV0I	204	34	6,936
ND	9/98	WB0O	320	42	13,440
SD	2/93	WD0T	319	39	12,441
CT	**2/99**	**K1KI**	**362**	**49**	**17,738**
MA	2/99	K5ZD	351	48	16,848
ME	9/88	K1KI	218	41	8,938
NH	2/99	K1DG	304	45	13,680
RI	2/90	K1IU	236	44	10,384
VT	9/99	W2GD	258	46	11,868
NJ	**2/99**	**N2NT**	**334**	**50**	**16,700**
NY	9/80	N2NT	319	42	13,398
DE	9/89	KN5H/3	272	46	12,512
MD	9/89	W3LPL	310	47	14,570
PA	**2/92**	**K3LR**	**334**	**45**	**15,030**
AL	9/89	N4KG	251	45	11,295
FL	**9/99**	**K1TO**	**354**	**53**	**18,762**
GA	9/99	K4AAA (W4AN)	353	51	18,003
KY	9/98	K4LT	281	44	12,364
NC	2/99	N4AF	310	46	14,260
SC	9/99	W4OC	255	46	11,730
TN	2/99	W4PA	334	49	16,366
VA	9/89	KT3Y/4	296	48	14,208
AR	2/82	K5GO	302	40	12,040
LA	2/95	W5WMU (K5GA)	306	48	14,688
MS	2/98	WQ5L	230	40	9,200
NM	9/99	N6ZZ	331	51	16,881
OK	9/89	KM5H	289	49	14,161
TX	**9/99**	**K5GN**	**358**	**51**	**18,258**
CA	**2/99**	**AD6DO**	**317**	**51**	**16,167**
AK	2/90	NL7GP	176	37	6,512
AZ	2/97	K6LL/7	338	48	16,224
ID	9/82	K7NHV	281	38	10,678
MT	2/98	K7BG	273	43	11,739
NV	2/98	K7BV	272	43	11,696
OR	**2/95**	**N6TR/7**	**358**	**51**	**18,258**
UT	9/91	K6XO/7	263	44	11,572
WA	2/92	K7SS	329	42	13,818
WY	9/99	K7KU (N2IC)	312	48	14,976
MI	9/96	K8CC	284	44	12,496
OH	**9/91**	**K3UA/8**	**322**	**45**	**14,490**
WV	9/82	N8II	250	42	10,500
IL	**2/99**	**K9XD (W9QA)**	**319**	**50**	**15,950**
IN	9/99	N9RV	334	47	15,698
WI	9/99	K9NW	278	47	13,066
VE1	2/88	VO1QU	143	33	4,719
VE2	9/88	VE2ZP	214	41	8,774
VE3	9/99	VE3EJ	264	46	11,712
VE4	9/93	VE4VV	237	40	9,480
VE5	2/99	VE5MX	216	43	9,288
VE6	9/99	VE6EX	195	46	8,492
VE7	**9/92**	**VE7NTT**	**274**	**47**	**12,878**
VY1	9/94	VY1JA	6	3	18
C6	2/99	C6AKP	21	14	294
HH	9/96	HH2AW	139	33	4,587
HI8	2/91	HI8DMX	40	19	2,430
VP2E	2/96	VP2E/KI4HN	68	30	2,040
VP9	2/85	W6OAT/VP9	202	31	6,262
V4	2/96	V40Z (AA7VB)	54	23	1,242
XE	9/90	XE2XA (WN4KKN)	305	47	14,335
ZF	9/92	ZF2KI (K1KI)	251	49	12,299
4U1	2/85	4U1UN (W2TO)	70	23	1,610
8P	2/96	8P9EN	10	8	80
CT	9/98	CT1BOH	225	40	9,000
EA8	2/94	EA1AK/EA8	36	21	756
F	9/90	F/N6TR	196	38	7,448
G	2/98	G4BUO	101	29	2,929
HC8	2/99	HC8N (N5KO)	113	38	4,788
I	9/98	IK0HBN	100	35	3,500
JA	2/91	7J1AAI	13	9	117
KH6	9/81	KH6NO	121	30	3,630
LY	9/99	LY2BTA	59	240	1,416
OH	9/98	OH1NOA	56	22	1,232
PY	9/80	PY8ZPJ	29	14	406
VK	9/94	VK5GN (N6AA)	48	22	1,056
ZD8	9/90	ZD8Z (N6TJ)	228	43	9,804

Highest score: 9/99, K1TO, 18,762
Highest multiplier: 9/99, K1TO, 53
Highest QSO total: 2/92, KR0Y/5, 375
Logs received: 9/99, 163
Number logs >= 300: 2/99, 24
Number Golden Logs: 9/94, 9
Highest team score: 9/98, Make No Mistake About It, 139,628

second. Still need to eliminate those "deer in headlight" moments, or learn to recover from them even more quickly. I'm determined to break 300 in this contest someday...—*K4RO.* 20 faded fast and 80 was rough. Sprint reminds me of the sign at the roller coaster..."Fasten your seatbelts and keep your arms and legs inside the vehicle at all times" ... who needs caffeine?—*K5KA.* Best I've done so far. Operated from W6UT, Randy's QTH. Thanks again to Randy and Sue for letting me pollute the airwaves from their QTH.—*K6GV.* Once again, I had a great first 2 hours, 88, then 90, then lost it with a 66 then 69. It's not fatigue. I'm obviously into the rhythm. Someone have some tips for me???? Moved to 40 at 0127Z. Too early? Used the second radio on 20 until 0245Z when I moved it to 80. I thought I was doing great with mults until I got to the real 3830. Only heard VE9 that I didn't work and he only made 19 QSOs. Missed AR AZ??? (where was K6LL?) IA and UT, which I usually get.—*K6LA.* I decided to participate at the last minute (2320Z) then had to run an errand that had me getting home at 2345. No problem, cool as a cucumber—right! I was glad that the interface and computer worked the first time since I had zero time to fiddle about. It seemed like I would not make my goal of 10,000 points, and that I was behind most people. I worked all through the contest, but I ended up doing better than I thought I would. 20 didn't last as long as I hoped, and I kept getting beat out on 40 but all bands produced enough to make this event a great time for me. Gee! What a great contest!—*K7NT.* It's been said many times before by many people "This is the most intense 4 hours of contesting that you'll ever experience." My sincere thanks again to the *NCJ* for the sponsorship of the Sprints.—*K8KFJ.* Operating with my CW arm in a cast made it difficult to type, but now I have the bionic fast CW option installed for future contests!—*K9ZO.* On family vacation out west, brought my new IC-746 and 20m/40m mag mount antenna and operated contest from hotel parking lot in Ogalala, Nebraska from the family mini van! Missed first 40 minutes of contest due to dinner with family going late and wasted time trying to figure out how to use my new IC-746's built-in keyer. Also didn't learn until after the contest that the IC-746 has a pseudo CW filter (APF), so I did the entire contest without a CW filter!! Note for next contest: learn how to use radio BEFORE the contest. Had no 80m antenna, so end of contest was a little boring. I really had a BLAST and was very glad that I could give out the 'rare' Nebraska multiplier for a few deserving contesters.—*KA9FOX/0.* First Sprint...FUN!—*KF6GUH.* First time in a Sprint contest. It will take some time to get accustomed to the proper procedures in a Sprint.—*KG8GW.* First time ever making more than a handful of Qs in this contest—what a ball, what a headache! I love it. See you in SSB and CW this winter! I'm hooked!—*KI9A.* This was my first ever Sprint contest and wow, talk about culture shock! It took me the first hour or so to get the hang of the format, then it was a lot of fun. I duped people 3 times (sorry) but had 7 people dupe me. I guess I'm 4 under par in the "oops—I-duped" competition. :-)—*KU6J.* Missed the first 16 minutes, but plenty of activity when I did get on. First time using *TR* in Sprint. Helpful, but definitely a learning curve.—*KZ5D.* Sure worked lots of new blood this time. I seem to have reached a plateau in the 320 QSO range—very frustrating. Sure was great to operate from home again. 80m was very noisy, and I don't think the wire vertical I put up Saturday morning had any oomph. Missed AZ IA ME MT ND RI UT VE1,2,8. Of those I heard AZ and ME. Was happy to pick up W0UY (KS) and W7ZRC (ID) in last 10 minutes on 80m for new ones. Still the greatest contest!!—*N5RZ.* I started out pretty good and then seemed to hit a wall. This was only my third Sprint, but it sure seemed like I had to CQ a whole lot more than usual. Even after answering somebody else's CQ, I often had no takers waiting. CQing was not overly productive either.—*N6RT (op at W6EEN).* Good start—but the low bands were slow to open. Congrats to K1TO for establishing a new mark for us all to shoot for. Many thanks to all of those who responded to our post cards.—*N6TR.* First Sprint in several years—and was I ever rusty! I know I had several broken QSOs!—*N8ET.* Nice laid-back effort interrupted by a birthday party. More people got "POGO" this time.—*N9JF.* I'm really not sure why I did better in this Sprint than in any other I have run, but I'll take it! Have been doing a lot of antenna work and very little operating, so I was surprised to be able to get into the flow so quickly. Best hour for me was the last one. W9 was just about perfect for 80 meters, with the West Coast audible and the East Coast loud. One of these days I'll try two radios in one of these things. N6ZZ gets my vote as the loudest signal anyplace but 80.—*N9RV.* My first attempt at a Sprint contest. Lots of fun!—*N9SD.* My second attempt. Spent first 45 minutes on wrong antenna—things improved when that was found and corrected. We are indeed our own worst enemies.—*NI6T.* From the " I might'a column": I might'a done better if 80m hadn't been so noisy. Still short of the 200 QSO mark but still a great contest.—*W0UY.* Hmmm, this OM is becoming too bandwidth limited for this high adrenaline stuff. Sorry for all the repeat requests, but my brain was even more foggy than normal this time around (maybe next time I will wear a bib and change my Sprint name to "Drool"). Fortunately there were lots of multipliers running around which helped to save my bottom line a bit. From what I can gather there were at least 54 mults available (heard Iowa and Ark. along with rumors of Del. and Utah). CU all next time!—*W4EF (op at W6UE).* Local WX QRN was bad on 20, worse on 40, and impossible on 80.—*W5ASP.* Only had 20m dipole and 3 hours. My best multiplier total ever. Still my favorite contest.—*W6MVW.*

My Best Sprint!?

I have heard over the years how bad the East Coast, and particularly New Europe (New England) is for domestic contests. Naturally I wasn't real concerned with truly competing in this CW Sprint, but I thought I would put in a full effort from here in Connecticut, and leave myself with a comparison tool for when I have my big station going. For the record, I ran my JST 245 to a C3S on a roof tower (about 40 feet) and 40 and 80 meter dipoles in the trees. My QTH is on top of a hill with downslope in all the important directions.

I have done many Sprints from the Midwest (MO and IL); thus I immediately recognized the skip zone differences when I hit 20 meters from Northeast CT. The "Northeast" part might be important because I remember being able to work lots of W1s from W9, but they were the more northern and eastern W1s. Anyway, the 9s, some 8s and all the 4s and everything westward was pounding-in. The nature of the Sprint is that you are essentially "trapped" on each of three bands because of the activity concentrations during different times therein. From the Midwest the best band is 80 meters where there is the greatest coverage of participants. However, most ops don't hit 80 until the last hour. Being on a fringe of the continent (basically any fringe) allows for excellent skip zone coverage to the most participants on 20 and 40. And those bands are where most ops spend at least an hour and half each. From the Midwest, a small group of stalwarts has continued to start the contest on 40 where they can work each other before the band goes long. Knowing that, I started on 40 for a dozen very easy QSOs before hitting the rat race on 20. But 20 was great for me, and I was able to keep the strings of QSOs going easily.

How interesting to hear 9s, 8s, and 5s that I never heard before on 20. And there are plenty of 'em. Now I truly can see just how much of a contribution the Midwest makes to the record breaking scores of those winners on the coasts!

Forty meters is just as good. My antenna looks flat and horizontal about 300 feet above New Europe, and it's great to have easy strings of QSOs on 40. And naturally, like the good New European op that I now am, I maximize both 20 and 40 and hit 80 with little less than an hour to go. And predictably it is the toughest band for this particular contest. The West Coast is audible but not really workable low power—certainly a big change from the Midwest. But in the 50 minutes here there are plenty of "local" stations to work to fill in the time. A quick QSY or two back to 40 brings in some straggler Western QSOs, and all of a sudden I have a low power score that treks amongst the best ever. A total of 280 QSOs and 49 mults is a score I would be happy with from the Midwest with high power! I had fun too! The moral of the story is: "Don't listen to us East Coasters complain about domestic contests, because we might just psyche you out and pull a K1KI out of the bag and win it all!"—*73, NT1N*

Team Key

ABT	A Boring Team
CCC	Cajun Contest Club
CTDXCC	Central Texas DX & Contest Club
DLCSCW	Dead Lizards Can't Send CW
FRCD	Frankfurt Radio Club Domestic
MNWA	Minnesota Wireless Association
MRRC	Mad River Radio Club
NCC	North Coast Contesters
NCCC#1	Northern California Contest Club #1
NCCC#2	Northern California Contest Club #2
RBT	Really Boring Team
SCCC#1	Southern California Contest Club #1
SEST	South East Sprint Team
SMC#2	Society of Midwest Contesters #2
TCG#1	Tennessee Contest Group #1
TCG#2	Tennessee Contest Group #2
TDXS	Texas DX Society
YCCC#1	Yankee Clipper Contest Club #1

Scores

Call	*Name*	*QTH*	*20*	*40*	*80*	*QSO*	*Mul*	*Score*	*Team*
K1KI	Tom	CT	142	117	83	342	48	16416	YCCC#1
K1AR	John	MA	137	133	46	316	48	15168	RBT
K1DG	Doug	NH	124	114	75	313	47	14711	YCCC#1
NT1N	*Dave	CT	122	115	43	280	49	13720	YCCC#1
W1WEF	Jack	CT	108	113	61	282	48	13536	YCCC#1
K1ZZ	Dave	CT	118	116	65	299	45	13455	
W2GD	John	VT	106	89	63	258	46	11868	FRCD
K1HT	*Dave	MA	101	106	39	246	46	11316	YCCC#1
K1IR	Jim	MA	85	69	62	216	41	8856	YCCC#1
W1EAT	*Tom	VT	38	33	33	104	35	3640	YCCC#1
AA1SU	*Paul	VT	31	36	27	94	34	3196	YCCC#1
N2NT (N2NC)	John	NJ	128	123	75	326	49	15974	FRCD
K2UA	Rus	NY	83	110	79	272	44	11968	FRCD
K2SQ	*Ed	NJ	101	93	63	257	46	11822	FRCD
WW2Y	Peter	NJ	89	87	69	245	46	11270	FRCD
N2MG	Mike	NY	92	51	48	191	43	8213	YCCC#1
N1EU	Barry	NY	75	58	48	181	42	7602	
N2NU	John	NJ	61	75	29	165	41	6765	FRCD
KB2ZRD	*Buz	NJ	43	52	34	129	37	4773	
AA3B	Bud	PA	109	110	74	293	48	14064	FRCD
K3WW	Chas	PA	116	122	60	298	47	14006	FRCD
K3CR (KB3AFT)	Jim	PA	122	87	71	280	47	13160	NCC
K3MM	Ty	MD	89	106	69	264	43	11352	SEST
K3WU	Jim	PA	71	91	47	209	41	8569	TCG#1
NI3S	Ty	PA	51	91	38	180	43	7740	NCC
N3DEL	**Del	DE	6	1	0	7	5	35	TCG#1
K1TO	Dan	FL	154	137	63	354	53	18762	
K4AAA (W4AN)	Bill	GA	123	138	92	353	51	18003	SEST
W4PA	Scott	TN	126	134	74	334	48	16032	TCG#1
K4BAI	John	GA	98	108	85	291	48	13968	SEST
K1KY	Tom	TN	88	112	79	279	50	13950	TCG#1
K4RO	Kirk	TN	76	124	82	282	49	13818	TCG#1
WC4E	Jeff	FL	126	103	58	287	48	13776	
KT3Y	Phil	VA	102	94	61	257	49	12593	
K4WX	Don	TN	76	101	80	257	46	11822	TCG#1
NA4K	Steve	TN	71	102	72	245	48	11760	TCG#2
N4GN	Tim	KY	70	107	68	245	48	11760	
AA4GA	Lee	GA	101	94	55	250	47	11750	SEST
W4OC	*Don	SC	93	99	63	255	46	11730	SEST
K4NO	Greg	AL	96	84	76	256	45	11520	SEST
N4CW	Bert	NC	73	112	61	246	45	11070	TCG#1
K4FXN	*Dan	KY	71	101	65	237	43	10191	
W4AU	John	VA	91	84	50	225	45	10125	
K9AY	*Gary	GA	72	83	40	195	50	9750	SEST
WO4O	*Ric	TN	63	77	67	207	43	8901	TCG#1
K2UFT	*Dick	GA	71	84	38	193	43	8299	SEST
N4DU	*Jim	GA	66	83	41	190	43	8170	
K4LT	Doug	KY	63	127	0	190	42	7980	MRRC
K4MX	*Jeri	VA	54	72	58	184	41	7544	
N4BP	**Bob	FL	119	51	0	170	34	5780	RBT
K4MA	Jim	NC	29	68	14	111	41	4551	SEST
K4GU	*Mike	AL	14	84	12	110	39	4290	
K0EJ	*Mark	TN	24	18	27	69	33	2277	TCG#1
K5GN	Dave	TX	159	126	73	358	51	18258	TDXS
N6ZZ	Phil	NM	158	120	53	331	51	16881	ABT
N5RZ	Gator	TX	142	120	56	318	48	15264	
K5OT	Larry	TX	113	114	61	288	47	13536	RBT
N3BB	Jim	TX	121	106	54	281	46	12926	CTDXCCS
AD5Q	Roy	TX	113	88	56	257	45	11565	
K5NZ	*Mike	TX	98	104	46	248	46	11408	TDXS
K5KA	Ken	OK	76	95	59	230	44	10120	ABT
W5WMU	Cajun	LA	107	93	25	225	44	9900	CCC
NA5B	*Dave	OK	56	97	34	187	45	8415	
KG5U	**Dale	TX	111	68	7	186	45	8370	TDXS
KZ5D	Art	LA	81	69	36	186	45	8370	CCC
N5TU	*Earl	TX	99	77	20	196	42	8232	TDXS
K5PI	Rob	TX	72	83	47	202	40	8080	CTDXCC
W5ASP	Joe	TX	102	60	37	199	39	7761	TDXS
K5TR	Geo	TX	66	55	27	148	41	6068	CTDXCC
W5ZR	Bert	LA	81	35	30	146	41	5986	CCC
N5CQ	John	TX	50	69	32	151	37	5587	CTDXCC
W3DYA	*Norm	TX	55	47	0	102	36	3672	
K5TQ	Gary	NM	30	67	2	99	36	3564	
WA8GHZ	*Jack	TX	34	41	0	75	35	2625	
N5AN	Bud	LA	44	28	1	73	32	2336	CCC
K5UA	Chas	LA	71	0	0	71	32	2272	CCC
W5XD	Wayne	TX	45	2	0	47	23	1081	
N8RR	*Chas	LA	26	0	0	26	15	390	CCC
N6AA	Dick	CA	146	105	51	302	50	15100	SCCC#1
W6EEN (N6RT)	Don	CA	134	122	65	321	47	15087	SCCC#1
N6TV	Bob	CA	137	138	33	308	48	14784	NCCC#1
N5KO	Trey	CA	150	108	42	300	49	14700	NCCC#1
K6NA	Glen	CA	145	100	59	304	48	14592	SCCC#1
N6IG	Jim	CA	139	125	39	303	48	14544	NCCC#1
K6LA	Ken	CA	137	126	43	306	47	14382	SCCC#1
N6RO	Ken	CA	116	111	46	273	48	13104	NCCC#1
K6XX	Bob	CA	117	100	31	248	51	12648	NCCC#1
AD6DO	*Dan	CA	137	100	31	268	47	12596	SCCC#1
W6UE (W4EF)	Mike	CA	140	70	37	247	50	12350	SCCC#1
N6VR	Ray	CA	129	97	31	257	48	12336	SCCC#1
K6AW	Steve	CA	112	98	51	261	47	12267	NCCC#1
AE6Y	Andy	CA	111	102	36	249	46	11454	NCCC#1
K6GV	Bo	CA	91	105	29	225	45	10125	NCCC#2
W6EU	Jim	CA	87	96	47	230	44	10120	NCCC#1
AJ6V	Ed	CA	97	88	39	224	45	10080	NCCC#2
W6RGG	Bob	CA	89	98	45	232	43	9976	NCCC#1
W6CT	Scott	CA	106	76	41	223	43	9589	NCCC#2
N6PN	*Matt	CA	74	85	29	188	44	8272	NCCC#2
W6TK	Dick	CA	79	74	24	177	45	7965	SCCC#1
NI6T	Garry	CA	84	74	26	184	40	7360	NCCC#2
W6MVW	Dick	CA	128	0	0	128	43	5504	SCCC#1
KU6J	*Eric	CA	75	36	19	130	41	5330	
N6NF	Tom	CA	46	36	0	82	35	2870	
KF6GUH	*Becky	CA	39	28	7	74	31	2294	
N6TR	Tree	OR	157	123	61	341	49	16709	ABT
K7KU (N2IC)	Steve	WY	132	117	63	312	48	14976	
K7BV	Denny	NV	109	100	48	257	45	11565	NCCC#1
K4XU	*Dick	OR	97	97	34	228	48	10944	ABT
K9JF	Jim	WA	109	79	36	224	47	10528	ABT
K7NT	*Mike	OR	114	79	35	228	45	10260	ABT
N7LOX	*Brian	WA	85	78	27	190	42	7980	ABT
KI7Y	*Jim	OR	102	52	21	175	45	7875	RBT
N7WA	*Dink	WA	90	59	13	162	41	6642	
KU7Y	**Ron	NV	60	47	17	124	37	4588	RBT
AD7U	*Caleb	WA	63	43	17	123	37	4551	RBT
AC7AF	Brian	WY	55	27	0	82	29	2378	
W8AEF	*Paul	AZ	40	13	0	53	31	1643	
W7/JR1NKN	*Zuo	WA	20	0	0	20	11	220	
K8MR	Jim	OH	99	116	71	286	48	13728	MRRC
KW8N	Bob	OH	107	107	64	278	48	13344	MRRC
KU8E	Jeff	OH	87	120	63	270	47	12690	MRRC
N8EA	Joe	MI	80	109	66	255	47	11985	
K9TM	Tim	OH	90	89	36	215	50	10750	MRRC
K3JT	Terry	WV	111	65	32	208	48	9984	
WA8WV	Dave	WV	84	96	51	231	42	9702	
N8ET	Bill	OH	63	30	62	155	42	6510	MRRC
K8JM	John	MI	50	88	0	138	44	6072	
K8KFJ	Gary	WV	45	67	35	147	41	6027	
W8WTS	*Jim	OH	28	52	31	111	37	4107	
AA8U	Ugly	MI	35	38	28	101	36	3636	RBT
KG8GW	*Ron	WV	0	37	36	73	30	2190	
AA8IV	Rich	OH	0	0	3	3	3	9	
N9RV	Pat	IN	109	136	89	334	47	15698	NCC
AG9A	Mark	IL	114	129	67	310	50	15500	DLCSCW
K9NW	Mike	WI	81	126	71	278	47	13066	MRRC
K9AA	*Paul	WI	80	120	55	255	47	11985	DLCSCW
K9ZO	Ralph	IL	92	98	59	249	48	11952	DLCSCW
K9BGL	Karl	IL	81	97	53	231	47	10857	SMC#2
K9IG	Liz	IN	60	101	78	239	45	10755	DLCSCW
K0SN	Tom	WI	62	95	48	205	45	9225	
WT9U	*Jim	IN	59	73	65	197	41	8077	DLCSCW
N9SD	Scott	WI	52	76	53	181	39	7059	SMC#2
K9YO	Fred	IL	48	78	16	142	43	6106	DLCSCW
KI9A	Chuck	IL	45	42	50	137	40	5480	SMC#2
N9JF	*Pogo	IL	63	61	3	127	41	5207	SMC#2
K9YA	*Bob	IL	44	55	0	99	41	4059	DLCSCW
KM0O	Tony	MN	80	105	59	244	48	11712	
K0OU	Steve	MO	72	104	60	236	45	10620	MRRC
K0AD	Al	MN	79	93	58	230	45	10350	MNWA
NA0N	*Pat	MN	80	69	51	200	40	8000	MNWA
W0UY	*Tom	KS	60	63	27	150	40	6000	DLCSCW
KA9FOX/0	*Scott	NE	77	47	0	124	40	4960	SMC#2
N0XW	*Hel	MN	44	0	0	44	18	792	
VE3EJ	John	VE3	88	102	74	264	46	12144	NCC
VE3IAY	*Rich	VE3	58	50	38	146	39	5694	
VE5SF	*Sam	VE5	92	81	20	193	44	8492	
VE6EX	*Dan	VE6	117	64	14	195	46	8970	
XE1/AA6RX	*Dave	XE	33	80	0	113	36	4068	
LY2BTA	Andy	DX	4	54	1	59	24	1416	
G4BUO	Dave	DX	48	0	0	48	28	1344	
G3SXW	*Roger	DX	41	0	0	41	19	779	

* Denotes 150W or less
** Denotes 5W or less

■

Results, September 1999 Phone Sprint

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Although overall conditions were not quite as good as last February, the September installment of the Phone Sprint gave participants throughout the country something to be happy about. Overall, scores were higher thanks particularly to higher multiplier totals (even though some usually-common mults like GA and NJ were scarce). In this, the 35th running of the Phone Sprint, log submissions continued to push close to the magic 100 mark, with 91 logs from 36 areas received this year.

In February, K6LL and VE7NTT tied for the top spot. This time, 'LL had the same number of Qs and added three multipliers to take the brass ring. This is the sixth time in the last nine contests that Dave chalked up the win. Even though 'NTT added two multipliers, he lost 32 QSOs primarily as a result of 20 folding early at his northern latitude. Don't feel bad for Gary though; he ended up fourth using his VA7RR call. Maybe it's the call sign. AD6DO continues to progress up the Top Ten list, getting second this time. KW8N took third and led three other Midwesterners in the Top Ten (if you are trying to figure out how I come up with four, K3CR's station is very close to Ohio). N6ED and K6LA again grace the top list. We also welcome N6ZZ who put down his keyer long enough to snag number 9 from NM. Keep at it Phil, you might get good at this contest stuff. (The humor impaired can place a smiley here.)

The low power leaders were bunched fairly closely with W4OC winning the battle of the "Souths" over KA9FOX (as in South Carolina over South Dakota). Gamecock fans will be pleased that, for once this year, South Carolina won. (I bet I get some letters for that one.) Congrats to all the LP contestants. I know from personal experience that LP Phone Sprint is as close as you can get to injuring yourself without leaving visible bruises.

Aided by four Top Ten scores, SCCC picked off the number one club again for the eighth time in a row—*Zounds*! Who is going to knock them off their perch? DLCT and MRRC were comfortably in second and third, respectively. The gang in the Tennessee Contest Group were fighting like cats and dogs, with the Cats coming out on top in that state. Welcome to the Minnesota Wireless Association who usually don't field a team. Come on back next time guys. Thanks to all 11 clubs who submitted scores. That level has not been matched since September 1995.

The Golden Log group was led by VA7RR who posted a Top Ten score with no score reduction. That's quite an accomplishment. Congrats also to the other four perfect logs over 50 Qs from AE6Y, KN5H, K5OT, and K1HT.

Lower sunspots of a few years back and generally-high scoring records in most locations have conspired to severely limit the number of records set from contest to contest. We finally had a few records go by the wayside. Congrats to KK1L who set a new mark in VT, K1ZO in NH, VE3FU in Ontario and 4X3DIG who sent in the first entry ever from Israel. Special thanks also to N0AH who submitted a good score from usually-scarce Wyoming.

I hope your contest season has been everything you hoped it would be, and I look forward to the inflow of logs from the February running of the Phone Sprint.

Soapbox

My best score ever. N2EA and myself had a side challenge going on who would take the VT record. One of us will have it after the log checking.—*KK1L*. Wife made apple cobbler and delivered a piece in the last half hour. KK1L got me. Hard to talk and eat at the same time.—*N2EA*. The challenge of running low power from the West Coast in this contest was most noticeable on 80 meters. Heard many Midwest and Southeast sprinters on 80 but they generally CQed in my face. Even so, still a great way to spend 4 hours.—*WA7BNM*. Was at a tennis tournament and got home at

Top 10 Scores

Call	*QSOs*	*Lost*	*Band Changes*
K6LL	16677	3	2
AD6DO	15351	7	5
KW8N	15040	2	68
VA7RR	14750	0	2
N6ED	14178	2	2
K6LA	13600	6	63
K9XD	13156	3	6
K3CR	12788	3	14
N6ZZ	12624	2	2
W9RE	12495	1	16

Top 10 QSOs

K6LL	327
KW8N	320
AD6DO	301
VA7RR	295
K9XD	286
K3CR	278
N6ED	278
N9RV	277
K6LA	272
N6ZZ	263

Top 10 Mults

AD6DO	51
N6ED	51
K6LL	51
K6LA	50
VA7RR	50
W9RE	49
N6ZZ	48
AE6Y	47
W6TK	47
KW8N	47

Top 5 Low Power

Call	*QSOs*	*Lost*	*Band Changes*
W4OC	9680	9	2
KA9FOX	9552	8	5
K6ZH	9338	1	8
WA7BNM	9135	2	4
VE5MX	9116	3	10

Golden Logs
(Over 50 QSOs with no score reductions)

VA7RR	295 QSOs
AE6Y	208 QSOs
KN5H	118 QSOs
K5OT	75 QSOs
K1HT	62 QSOs

Team Scores

Southern California Contest Club

K6LL	16677
AD6DO	15351
N6ED	14178
K6LA	13600
K6RO	11250
N6HC	11132
W6TK	11045
WA7BNM	9135
N6AA	4592
	106960

Dead Lizards Can't Talk

K9XD	13156
W9RE	12495
K9IG	10948
NX9T	10516
K9ZO	10500
K9BGL	10492
WE9V	6680
K9YO	6630
	81417

Mad River Radio Club

KW8N	15040
KU8E	10620
K0OU	10252
N8KR	7812
K8MR	2656
	46380

Northern California Contest Club

VA7RR	14750
AE6Y	9776
AJ6V	8510
	33036

5. Big Black Hole (KA9FOX, KI9A, WI9WI, WT9U) 29576
6. Yankee Clipper Contest Club (KK1L, K1ZO, KR1G, K1HT) 23415
7. Tennessee Contest Group—Cats (W9WI, K4RO, KF4ZR, K0EJ, K4OOO) 18775
8. Texas DX Society (W5ASP, KN5H) 16482
9. Hurlers (VE5MX, K7NT) 16045
10. Minnesota Wireless Association (KT0R, AC0W) 15565
11. Tennessee Contest Group—Dogs (NY4T, KU4LL) 5270

0025Z. Sure wish I could have worked the whole contest.—*W9RE*. First serious attempt at Phone Sprint. I should stick to CW.—*N6ZZ*. Still tryin'.—*W6TK*. Only one antenna and one hour available. Most fun ever in an SSB contest.—*W6MVW*. New viewpoint from the West Coast.—*WC4E at N6HC*. Been in the new house for three months and don't have a tower up yet. Put the tribander up 15 feet on the kids play structure out back and threw up a 40-meter vertical and 80-meter V in the trees. Lot's of fun.—*VE3FU*. I've got a lot to learn in these SSB things.—*N9RV*. Got a little sidetracked at about 0230 when a call came in on the phone from the folks who are buying our house. Took a while to get going again. Here we go again with the antennas.—*NX9T*. Phew! Now that's a contest.—*N7RX*. Got the new rotor installed on the 20-meter beam one hour before the Sprint. Wish we could get more participation from the traditional CW guys. Hey, I do the CW one even though I'm better on Phone.—*KW8N*. On family vacation out west, wound up in SD on the day of the contest. Was going to operate from the mini-van like on CW, but spotted a tribander and wires and asked if I could do the contest. Thanks to K0STF for letting me operate.—*KA9FOX*. It was quite difficult to type accurately with my arm in a cast.—K9ZO. Seems like the thing to do from the Black Hole is to start on 40.—*K9PG at K9XD*. This was the hardest, most brutal contest I have done for a long time. I felt like I earned every single contact the hard way. It really was fun.—*K7NT*. Conditions seemed tough, especially compared to last February. Lots of multipliers this time though (even though I missed GA, KY, and NJ!).—*K6ZH*. My operating time turned out to be a demonstration of phone contesting to a neighbor.—*K4RO*. My last Phone Sprint contest I had 24 QSOs. This time 71. I loved this contest.—*K4OOO*. I enjoyed my first Sprint attempt. I wish I had more time.—*K4JYO*. On the East Coast at least, 40 is no fun.—*K1HT*. Worked the first hour on 20 without the amp since I forgot to take it off standby. Probably not much difference since 20 from MO is a lost cause in a domestic contest.—*K0OU*. I need a better location, a second radio and a second brain. Maybe all three.—*AE6Y*. Conditions on 20 were good for the first hour, then everything deteriorated rapidly.—*VA7RR*. Lost about 30 minutes due to lightning. Better than CW where I lost the whole thing.—*WI9WI*. My kids brought home a cold from school. I had fun while I could talk.—*KR4QI*.

SCORES

Call	*Name*	*QTH*	*20*	*40*	*80*	*QSO*	*Mul*	*Score*	*Team*
KK1L	RON	VT	85	78	55	218	43	9374	YCCC
N2EA	JIM	VT	66	82	52	200	41	8200	
K1ZO	DOUG	NH	82	42	50	174	42	7308	YCCC
NT1N	*DAVE	CT	66	58	22	146	42	6132	
KR1G	TED	NH	46	62	33	141	35	4935	YCCC
AA1SU	*PAUL	VT	34	48	43	125	37	4625	
K1HT	*DAVE	MA	13	13	36	62	29	1798	YCCC
K3CR	JIM	PA	96	102	80	278	46	12788	
NI3S	TY	PA	40	96	72	208	45	9360	
WA3HAE	*KEITH	PA	65	54	57	176	44	7744	
AJ3M	MASA	MD	64	55	32	151	41	6191	
NX9T	JEFF	NC	79	84	76	239	44	10516	DLCT
W4OC	*DON	SC	77	94	49	220	44	9680	
N4CW	BERT	NC	70	92	58	220	42	9240	
W4AU	JOHN	VA	65	59	52	176	39	6864	
W9WI	DOUG	TN	34	74	32	140	39	5460	TCG Cats
K4RO	KIRK	TN	43	52	53	148	36	5328	TCG Cats
K4JYO	*CORT	AL	75	55	0	130	39	5070	
NY4T	*LEE	TN	30	54	52	136	36	4896	TCG Dogs
KF4ZR	JEFF	TN	43	41	13	97	36	3492	TCG Cats
K0EJ	*MARK	TN	9	29	42	80	34	2720	TCG Cats
KR4QI	STEVE	AL	46	31	0	77	31	2387	
K4OOO	*LARRY	TN	23	29	19	71	25	1775	TCG Cats
KU4LL	*DAVID	AL	0	22	0	22	17	374	TCG Dogs
N6ZZ	PHIL	NM	158	67	38	263	48	12624	
W5ASP	JOE	TX	115	83	50	248	46	11408	TDXS
W5WMU	PAT	LA	109	88	59	256	43	11008	
NA5B	DAVE	OK	60	90	51	201	42	8442	
N5SMQ	BUTCH	LA	59	0	7	66	35	2310	
K5OT	*LARRY	TX	0	50	25	75	30	2250	
K5TQ	GARY	NM	36	44	0	80	27	2160	
W5NR	ART	TX	30	16	0	46	17	782	
AD6DO	DAN	CA	146	93	62	301	51	15351	SCCC
N6ED	ED	CA	148	90	40	278	51	14178	SCCC
K6LA	KEN	CA	162	79	31	272	50	13600	SCCC
K6RO	LARRY	CA	107	101	42	250	45	11250	SCCC
N6HC	JEFF	CA	116	88	49	253	44	11132	SCCC
W6TK	DICK	CA	99	82	54	235	47	11045	SCCC
AE6Y	ANDY	CA	103	58	47	208	47	9776	NCCC
K6ZH	*JIM	CA	100	72	31	203	46	9338	
WA7BNM	*BRUCE	CA	102	71	30	203	45	9135	SCCC
AJ6V	ED	CA	82	67	36	185	46	8510	NCCC
N6AA	DICK	CA	41	33	38	112	41	4592	SCCC
W6MVW	*DICK	CA	47	0	0	47	29	1363	
WA6DLM	JIM	CA	14	3	0	17	12	204	
K6LL	DAVE	AZ	188	86	53	327	51	16677	SCCC
N0AH	PAUL	WY	82	77	53	212	39	8268	
K7NT	*MIKE	OR	81	52	36	169	41	6929	Hurlers
N7LOX	*BRIAN	WA	73	59	32	164	42	6888	

Call	*Name*	*QTH*	*20*	*40*	*80*	*QSO*	*Mul*	*Score*	*Team*
KN5H	*HOSE	AZ	89	29	0	118	43	5074	TDXS
N7RX	*NEAL	OR	50	50	29	129	38	4902	
KW7N	*STEVE	ID	33	15	12	60	30	1800	
K7SS	*DANNY	WA	50	0	0	50	25	1250	
W7/JR1NKN	*ZUO	WA	17	0	0	17	9	153	
KW8N	BOB	OH	104	134	82	320	47	15040	MRRC
KU8E	JEFF	OH	62	100	74	236	45	10620	MRRC
K9TM	BOB	OH	71	99	73	243	43	10449	
ND8DX	ED	OH	61	75	67	203	44	8932	
N8KR	KEN	MI	44	83	59	186	42	7812	MRRC
K8MR	JIM	OH	23	34	26	83	32	2656	MRRC
N8NX	*DOUG	MI	26	42	0	68	31	2108	
K9XD	DAVE	IL	63	130	93	286	46	13156	DLCT
W9RE	MIKE	IN	64	107	84	255	49	12495	DLCT
N9RV	PAT	IN	81	112	84	277	44	12188	
K9IG	LIZARD	IN	71	99	68	238	46	10948	DLCT
K9ZO	RALPH	IL	65	101	84	250	42	10500	DLCT
K9BGL	KARL	IL	64	104	76	244	43	10492	DLCT
N9PQU	JR	WI	68	81	53	202	45	9090	
WG9L	BOB	IL	57	91	54	202	44	8888	
KI9A	CHUCK	IL	47	99	68	214	41	8774	BBH
WI9WI	JIM	WI	66	72	61	199	41	8159	BBH
WE9V	CHAD	WI	21	85	61	167	40	6680	DLCT
K9YO	FRED	IL	43	74	53	170	39	6630	DLCT
WT9U	*JIM	IN	0	38	63	101	31	3131	BBH
K9BG	*JERRY	IN	7	54	0	61	25	1525	
N9ZUT	*JEFF	IL	13	14	0	27	14	378	
K0OU	STEVE	MO	76	99	58	233	44	10252	MRRC
KA9FOX	*SCOTT	SD	74	87	71	232	41	9512	BBH
KT0R	DAVE	MN	70	86	49	205	41	8405	MWA
AC0W	*BILL	MN	60	88	31	179	40	7160	MWA
KC0XU	*JIM	NE	30	28	13	71	34	2414	
KC0FUD	*JOHN	NE	28	9	0	37	21	777	
N9HDE	*SCOTT	MO	18	0	0	18	13	234	
AB0EM	MARK	CO	9	0	0	9	5	45	
VE3FU	*CHRIS	VE3	44	43	47	134	36	4824	
VE4YU	ED	VE4	3	21	13	37	21	777	
VE5MX	*TODD	VE5	96	64	52	212	43	9116	Hurlers
VE5SF	*SAM	VE5	69	81	33	183	40	7320	
VA7RR	GARY	VE7	120	112	63	295	50	14750	NCCC
VE7IN	EARL	VE7	66	76	30	172	43	7396	
4X3DIG	ZAKH	4X	10	0	0	10	8	80	

* Denotes a Low Power entry
Guest Operators:
KB3AFT at K3CR, W5AO at NA5B, WC4E at N6HC, K9PG at K9XD ■

Sour Grapes —Contester Style

Dennis Motschenbacher, K7BV

Contesters are such poor losers! I intercepted this email exchange between a buddy of mine Bob, N5RP, who operated Single Band 10 meters in the 1999 CQWW SSB and his friend (?) Mike, K5NZ, just after the contest. Now, this is the way we taught our stud fellow Texas DX Society contesters (in my KZ5M previous life) to thrash themselves and take a loss back in the good ol' days before the gentler softer contesting of today.

Just kidding, thanks for the laughs, Bob (you loser)—K7BV

N5RP wrote:

Looks like a close race between North American 10-meter single-banders.

Call: KP2A
Operator(s): KW8N
Class: SOSB/10M HP

QSOs	*Zones*	*Countries*	
5309	37	146	= 2,479,467

Call: WP2Z
Operator(s): N5RP
Class: SOSB/10M HP

QSOs	*Zones*	*Countries*	
5210	37	146	= 2,456,775

Looks like I lose!

K5NZ wrote:

Well, I wouldn't feel bad at all, Bob! He is a much better op and you never know what will happen in the log checking! To stay with a real pro like him is something!

N5RP wrote:

Well, I *do* feel bad.

I'm just no good. I never will be. I never can be.

I shouldn't have turned my log in so fast.

I could have gone to the CD ROM.

I could have called up friends and asked if I could have logged them.

I could have belonged to the YCCC.

I could have run more power.

I could have been rude and used more audio compression.

I could have checked into a net.

I could have used both sidebands.

I'm just no good. I never will be. I never can be.

I'm just N5 Radio Pitiful. :-(

WORLD RADIOSPORT TEAM CHAMPIONSHIP 2000

The amateur radio community owes a debt of gratitude to the energetic and ambitious amateurs in the small European country of Slovenia. Led by Tine Brajnik, S5ØA, the Slovenia Contest Club has agreed to host the **World Radiosport Team Championship 2000**, to be held in the city of Bled, from July 5 to July 11.

The on-the-air operating portion of the event will be held in concurrence with the IARU HF World Championship on July 8. Amateurs worldwide are welcome to come to Slovenia to experience the event or get on the air and participate in the contest.

Having attended the '90 event in Seattle and having been on the committee for the '96 event in San Francisco, I can attest to the goodwill and comradeship generated among the participants from around the world.

It is with great pleasure that I announce my appointment as the United States Treasurer of WRTC 2000.

Having seen the rewards that were reaped by WRTC '90 and '96, I strongly urge everyone to support the Slovenian effort by sending a donation. Donations in excess of $250 may be submitted via a directed contribution to the Northern California DX Foundation, earmarked "WRTC 2000" and sent to Bruce Butler, W6OSP, 4220 Chardonnay Ct., Napa, CA 94558.

Contributions less than $250 may be sent to Carl Cook, AI6V/P49V, 2191 Empire Ave., Brentwood, CA 94513.

For event information, please see the WRTC 2000 website at
http://wrtc2000.bit.si

Thanking you in advance. 73, Carl Cook AI6V/P49V

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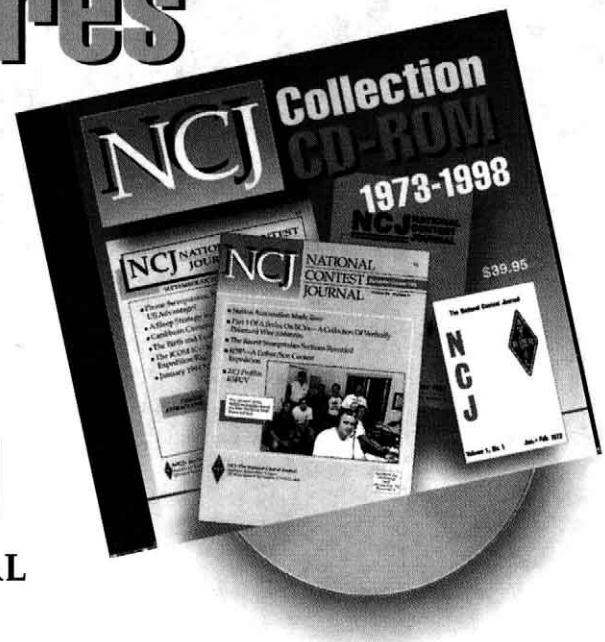

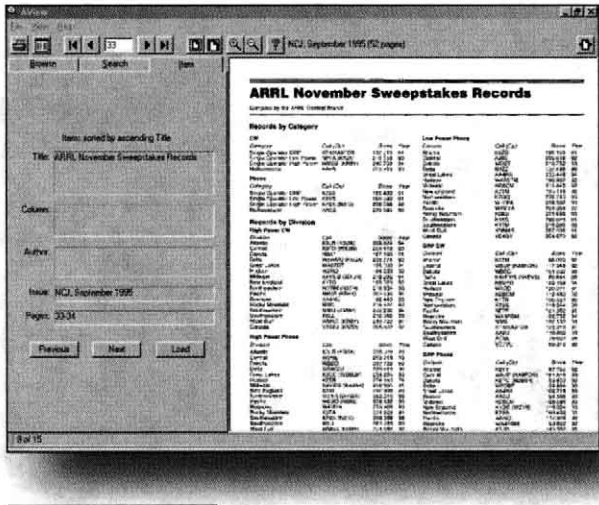

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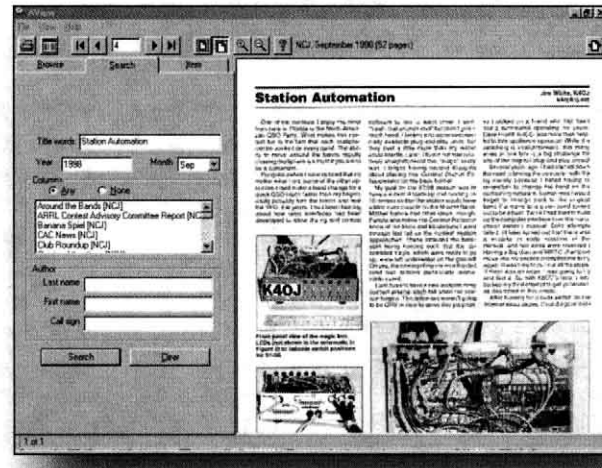

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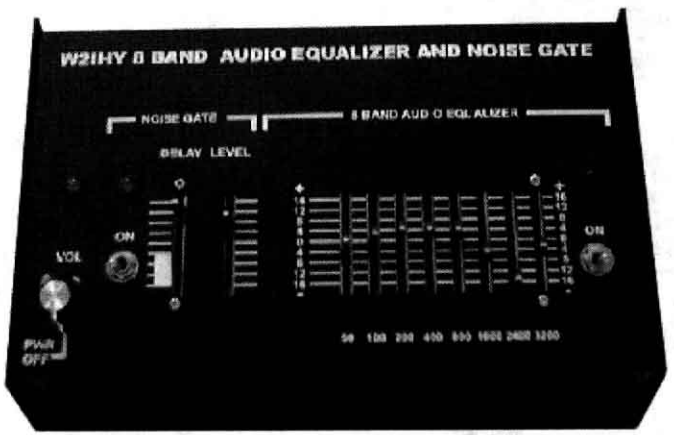

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RG58A/U STRD CENTER 95% TC BRD UV RESISTANT JKT 2.6dB/350 WATTS @ 30MHz	.17/FT	.15/FT	.13/FT
RG214/U STRD SC 2 95% BRD NC/DB/UV JKT 1.2dB/1800WATTS @ 30MHz.....	.25FT/UP	1.75/FT.	
RG142/U SOLID SCCS 2-95% SILVER BRAIDS *Teflon®* JKT 8.2dB/1100WATTS @ 400MHz.....	.25FT/UP	1.25/FT.	

COAX (75 OHM GROUP)	100FT/UP	500FT	1000FT
RG11A/U STRD BC (VP-66%) 95% BRAID NC/DB/UV JKT 1.3dB/1000WATTS.....	.44/FT	.42/FT	.40/FT
RG6/U CATV FOAM 18GA CW FOIL + 60% ALUM BRAID.....	.20/FT	.13/FT	.11/FT
RG6/U CATV FOAM 18GA CW FOIL *QUAD SHIELD*.....	.25/FT	.18/FT	.16/FT

LADDER LINE GROUP	100FT/UP	500FT	1000FT
"FLEXIBLE" 450 OHM 16GA COMPRESSED STRD CCS(PWR-FULL LEGAL LIMIT+).....	.20/FT	.18/FT	.16/FT
"FLEXIBLE" 450 OHM 14GA COMPRESSED STRD CCS(PWR-FULL LEGAL LIMIT++).....	.25/FT	.24/FT	.23/FT
300 OHM 20GA STRD (POWER: FULL LEGAL LIMIT).....	.15/FT	.13/FT	.12/FT

ROTOR & CONTROL CABLES	100FT/UP	500FT	1000FT
5971 8/COND (2/18 6/22) BLK UV RES JKT. Recommended up to 125ft	.20/FT	.18/FT	.16/FT
1618 8/COND (2/16 6/18) BLK UV RES JKT. Recommended up to 200ft.....	.35/FT	.34/FT	.32/FT
1418 8/COND (2/14 6/18) BLK UV RES JKT. Recommended up to 300ft.....	.47/FT	.45/FT	.43/FT
1806 18GA STRD 6/COND PVC JACKET Recommended for Yaesu Rotors.....	.23/FT	.21/FT	.19/FT

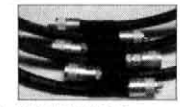
Quick disconnects: PS308 KIT (JONES 8/C M/F) $7.95/pr., PS309-KIT (JONES to AMP ROUND M/F)..$10.95/pr.
Or we can install either pair for $22.95, $25.95.

ANTENNA WIRE (UNINSULATED BARE COPPER)	100FT/UP	500FT	1000FT
14GA 168 STRD *"SUPERFLEX" (great for Quads & Portable set-ups etc.)*.....	.14/FT	.12/FT	.10/FT
14GA 7 STRD *"HARD DRAWN" (perfect for permanent Dipoles etc.)*.....	.10/FT	.08/FT	.06/FT
14GA SOLID *"COPPERWELD" (for long spans etc.)*.....	.10/FT	.08/FT	.06/FT
14GA SOLID *"SOFT DRAWN" (for ground radials etc.)*	.10/FT	.08/FT	.06/FT
ROPE: 3/16" DOUBLE BRAID *"POLYESTER"* 770# TEST WEATHERPROOF	.12/FT	.09/FT	.08/FT
ROPE: 5/16" DOUBLE BRAID *"POLYESTER"* 1790# TEST WEATHERPROOF	.17/FT	.14/FT	.13/FT

FLEXIBLE 2/COND RED/BLK DC POWER "ZIP" CORD

8GA (rated:40 amps) .....25FT $16.00.....50FT $31.00.....100FT $60.00
10GA (rated:30 amps) .....25FT $10.50.....50FT $19.00.....100FT $36.00
12GA (rated:20 amps) .....25FT $8.00.....50FT $14.00.....100FT $26.00
14GA (rated:15 amps) .....25FT $6.00.....50FT $10.00.....100FT $18.00

COAX CABLE ASSEMBLIES



with USA made Silver/Teflon® Gold Pin PL259 connectors.

FLEXIBLE 9913 strd BC cntr foil+95% braid 2.7dB 400MHz NC/DB/UV JKT.
200' $129.95 175' $114.95 150' $99.95 125' $84.95 100' $69.95 75' $54.95
50' $39.95 25' $24.95 15' $21.95 10' $18.95 6' $12.95 3' $11.95 1' $10.95

RG213/U strd BC Mil-Spec NC/BD/UV JKT. 1.2dB 2500 watts @ 30MHz.
200' $89.95 175' $79.95 150' $69.95 125' $59.95 100' $49.95 75' $39.95
50' $29.95 25' $19.95 15' $17.95 10' $15.95 6' $11.95 3' $9.95 1' $8.95

RG8/U strd BC foam 95% braid UV resistant JKT. 0.9dB 1350 watts @ 30MHz.
150' $64.95 125' $54.95 100' $44.95 75' $34.95 50' $24.95 25' $14.95
10' $13.95 6' $11.95 3' $9.95 1' $8.95

RG8 MINI(X) strd BC foam 95% braid UV resistant JKT. 2.0dB/875watts@ 30 MHz
150' $34.95 125' $29.95 100' $24.95 75' $19.95 50' $15.95 25' $10.95
6' $4.95 3' $3.95 *(3ft & 6ft are China made)*

LMR 400 SOLID CCA CNTR FOIL + BRAID 2.7dB @ 450MHz WP/UV JKT 100' $72.95

With USA made Silver/Teflon®/Gold Pin male "N" connectors.
FLEXIBLE 9913 strd BC cntr foil+95% braid 2.7dB 400MHz NC/DB/UV JKT.
150' $110.95 125' $95.95 100' $80.95 75' $67.95 50' $54.50 35' $45.95
25' $39.95 15' $32.95 10' $25.95 6' $16.95 3' $15.95 1' $14.95

With USA made Silver/Teflon®/Gold Pin PL259 to male "N"
FLEXIBLE 9913 strd BC cntr foil+95% braid 2.7dB 400MHz NC/DB/UV JKT.
150' $104.95 125' $89.95 100' $74.95 75' $59.95 50' $44.95 25' $29.95
15' $26.95 10' $23.95 6' $14.95 3' $13.95 1' $12.95

With USA made Silver/Teflon®/Gold Pin PL259 to male "BNC"
FLEXIBLE 9913 strd BC cntr foil+95% braid 2.7dB 400MHz NC/DB/UV JKT. 50' $45.95

HT Solutions: use any of these jumpers to improve & increse the life of your HT.

RG8 MINI (X) 6'	PL259-male BNC 6'	$9.95
RG58/U w/Right Angle Male BNC to SO239 3'		$14.95
RG58/U w/Right Angle Male BNC to PL259 3'		$14.95
RG142/U w/Female BNC to Male SMA 3'		$9.95

All connector terminations are soldered, Hi-Pot® tested @ 5kv for one minute, continuity checked, ultra violet resistant heat shrink tubing, and red protective caps. Which can also be used as a boot. CUSTOM CONNECTOR WORK TOO.
Call for price and delivery.

CONNECTORS

Both connectors fit 9913 types and LMR400 MADE IN USA

PL 259 SILVER/*Teflon®*/GOLD TIP.....10PC $12.50.....25PC $27.50.....50PC $52.50....100PC $100.00
"N" (2PC) SILVER *Teflon®* /GOLD TIP...10PC $32.50.....25PC $75.00.....50PC $143.75..100PC $275.00
For our other connectors and adapters see http://www.cablexperts.com

TINNED COPPER	"FLAT" GROUNDING BRAID
1 INCH WIDE (equivalent to 7ga).....	25FT $24.00.....50FT $47.00.....100FT $94.00
1/2 INCH WIDE (equivalent to 10ga).....	25FT $14.00.....50FT $27.00.....100FT $53.00
1/2 INCH x 6FT Copper Plated Ground Rod w/clamp.....	$7.00 each

I.C.E. PRODUCTS

180A Beverage/Longwire matching unit.....$39.00/ea
348 Rotor cable Line filter.....$44.00/ea
303U Coax impulse suppressor 8 kW 1.5-200MHz.....$44.00/ea
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HELIAX® LDF series from ANDREW® Corporation.

- **Premium electrical performance.**
- **100% RF shielding.**
- **50 Ω Impedance.**
- **Very Low Loss Foam Dielectric.**
- **Use "N" and/or UHF connectors.**
- **Termination price: $15.00/each.**

CABLE PRICES

Cable	Size	Price/ft
LDF2-50A	3/8"	$1.70
LDF4-50A	1/2"	$2.10
LDF5-50A	7/8"	$5.37

CONNECTOR PRICES

Cable	"N"/Price	UHF/Price ea.
LDF2-50A	$27.00	$41.75
LDF4-50A	$30.00	$27.00
LDF5-50A	$73.00	$70.00

Prices do not include shipping. $20.00 minimum order.
Prices subject to change without notice.

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TECH INFO: 847-520-3003
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TELESCOPING ALUMINUM TUBING

DRAWN 6063-T832

.375	$.60/ft	1.375"	$1.55/ft
.500"	$.70/ft	1.500"	$1.75/ft
.625"	$.80/ft	1.625"	$2.00/ft
.750"	$.90/ft	1.750"	$2.25/ft
.875"	$1.00/ft	1.875"	$2.50/ft
1.000"	$1.10/ft	2.000"	$2.75/ft
1.125"	$1.25/ft	2.125"	$3.00/ft

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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Skyhawk, Triband Beam	$769
HF2V, 2 Band Vertical	$199
HF5B, 5 Band Minibeam	$429
HF6VX, 6 Band Vertical	$269
HF9VX, 9 Band Vertical	$329
A1712, 12/17m Kit	$54
CPK, Counterpoise Kit	$119
RMKII, Roof Mount Kit	$139
STRII, Roof Radial Kit	$109
TBR160S, 160m Kit	$109

More Bencher/Butternut–call

COMET ANTENNAS

GP15, 6m/2m/70cm Vertical	$149
GP6, 2m/70cm Vertical	$149
GP9, 2m/70cm Vertical	$179
B10NMO, 2m/70cm Mobile	$36
B20NMO, 2m/70cm Mobile	$49
SBB2NMO, 2m/70cm Mobile	$39
SBB5NMO, 2m/70cm Mobile	$49
SBB7NMO, 2m/70cm Mobile	$75
Z750, 2m/70cm Mobile	$55
Z780, 2m/70cm Mobile	$69

Much more Comet in stock–call

DIAMOND ANTENNAS

D130J/DPGH62	$79/139
F22A/F23A	$89/119
NR72BNMO/NR73BNMO	$39/54
NR770HBNMO/NR770RA	$55/49
X200A/X300A	$129/159
X500HNA/700HNA	$229/369
X510MA/510NA	$189/189
X50A/V2000A	$99/149
CR627B/SG2000HD	$99/79
SG7500NMO/SG7900A	$75/112

More Diamond antennas in stock

GAP ANTENNAS

Challenger DX	$259
Challenger Counterpoise	$25
Challenger Guy Kit	$14
Eagle DX	$269
Eagle Guy Kit	$22
Titan DX	$299
Titan Guy Kit	$22
Voyager DX	$389
Voyager Counterpoise	$49
Voyager Guy Kit	$38

CUSHCRAFT ANTENNAS

X7/X9	$569/819
XM240	$599
R6000/R7000	$269/369
A50-3S/5S/6S	$89/139/219
AR2/ARX2B	$45/65
AR270/AR270B	$69/99
ARX270U/ARX270N	$219/219
13B2/17B2/26B2	$119/199/329
719B/729B	$115/179
A270-6S/A270-10S	$59/79

Please call for more Cushcraft items

M2 VHF/UHF ANTENNAS

144–148 MHz

2M4/7/9	$80/99/109
2M12/2M5WL	$145/179
2M5-440XP, 2m/70cm	$149

420–450 MHz

420-450-5/420-450-11	$119/84
432-9WL/432-13WL	$159/209
440-18/440-21ATV	$109/129

Satellite Antennas

2MCP14/2MCP22	$155/209
436CP30/436CP42UG	$209/249

M2 ANTENNAS

50–54 MHz

6M5/6M7	$189/269
6M2WLC/6M2.5WLC	$399/529

10/12/15/17/20m HF

10M4DX, 4 El. 10m	$379
12M4DX, 4 El. 12m	$379
15M4DX, 4 El. 15m	$419
17M3DX, 3 El. 17m	$379
20M4DX, 4 El. 20m	$499

More M2 models in stock–please call

MFJ ANTENNAS

259B Antenna Analyzer	$219
1798, 80–2m Vertical	$239
1796, 40/20/15/10/6/2m Vert.	$179
1793, 80/40/20m Vertical	$159
1792, 80/40m Vertical	$145
1788, 40–15m Loop	$399
1786, 30–10m Loop	$349
1780, 14–30 MHz Loop	$229
1768, 2m/70cm Beam	$65
1762, 3 Element 6m Beam	$65

Big MFJ inventory–please call

LAKEVIEW HAMSTICKS

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

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

HUSTLER ANTENNAS

4BTV/5BTV/6BTV	$129/169/189
G6-270R, 2m/70cm Vertical	$149
G6-144B/G7-144B	$109/159

Hustler Resonators in stock–call

FORCE 12–MULTIBAND

C3	10/12/15/17/20m, 7el	$519
C3S	10/12/15/17/20m, 6 el	$459
C3SS	10/12/15/17/20m, 6 el	$449
C4	10/12/15/17/20/40m, 8 el	$660
C4S	10/12/15/17/20/40m, 7 el	$569
C4SXL	10/12/15/17/20/40m, 8 el	$839
C4XL	10/12/15/17/20/40m, 9 el	$929
C19XR	10/15/20m, 11 el	$849
C31XR	10/15/20m, 14 el	$1119
C36XR	10/15/20/40m 13 el	$1449

Please call for more Force 12 items

FORCE 12–MONOBAND

EF410	10m, 4 element	$249
EF415	15m, 4 element	$379
EF420	20m, 4 element	$499
EF240	40m, 2 element	$539
MAG810	10m, 8 element	$619
MAG615	15m, 6element	$719
MAG520	20m, 5 element	$869
MAG620	20m, 6 element	$1119
MAG340	40m, 3 element	$899
MAG280B	80m, 2 element	$1829

Please call for more Force 12 items

GLEN MARTIN ENGINEERING

Hazer Elevators for 25G

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

Aluminum Roof Towers

RT424, 4 Foot, 6 sq ft	$159
RT832, 8 Foot, 8 sq ft	$229
RT936, 9 Foot, 18 sq ft	$389
RT1832, 17 Foot, 12 sq ft	$499

Please call for Glen Martin info

COAX CABLE

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

Please call for more coax/connectors

TIMES MICROWAVE LMR® COAX

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

ANTENNA ROTATORS

M2 OR-2800P	$1095
Yaesu G-450A	$239
Yaesu G-800S/SDX	$319/399
Yaesu G-1000SDX	$479
Yaesu G-2800SDX	$1069
Yaesu G-550/G-5500	$289/499

ROTATOR CABLE

R51(#20)/R52 (#18)	$.22/.32/ft
R61 (#20)/R62 (#18)	$.28/32/ft.
R81/82/83/84	$.25/.39/.52/.85/ft

US TOWER

MA40/MA550	$659/1055
MA770/MA850	$2359/3649
TMM433SS/HD	$1139/1379
TMM541SS	$1499
TX438/TX455	$1069/1319
TX472/TX489	$2649/4599
HDX538/HDX555	$1379/1919
HDX572	$4139

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

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25G/45G/55G	$79/179/229
AS25G/AS455G	$39/89
GA25GD/45/55	$68/89/115
GAR30/GAS604	$35/24
SB25G/45/55	$39/89/109
TB3/TB4	$85/99
HBX32/HBX40	$349/439
HBX48/HBX56	$589/699
HDBX40/HDBX48	$549/699
BXB5/6/7/8	$39/49/59/59

Please call for more Rohn prices

UNIVERSAL ALUMINUM TOWERS

4-40'/50'/60'	$519/739/1049
7-50'/60'/70'	$939/1369/1789
9-40'/50'/60'	$729/1049/1469
12-30'/40'	$559/869
15-40'/50'	$969/1399
23-30'/40'	$859/1289
35-30'/40'	$979/1509

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

TOWER HARDWARE

3/8"EE / EJ Turnbuckle	$10/11
1/2"x9"EE / EJ Turnbuckle	$15/16
1/2"x12"EE / EJ Turnbuckle	$17/18
3/16" / 1/4" Preformed Grips	$4/5

Please call for more hardware items

HIGH CARBON STEEL MASTS

5 FTx .12" / .18"	$35/59
10 FT x .12" / .18"	$65/110
15 FT x .12" / 17 FT x .18"	$95/180
20 FT x .12" / .18	$120/199
12 FT x .25" / 24 FT x .25"	$189/359

PHILYSTRAN GUY CABLE

HPTG1200I	$.39/ft
HPTG2100I	$.52/ft
PLP2738 Big Grip (2100)	$5.50
HPTG4000I	$.79/ft
PLP2739 Big Grip (4000)	$7.65
HPTG6700I	$1.15/ft
PLP2755 Big Grip (6700)	$10.95
HPTG11200	$1.55/ft
PLP2558 Big Grip (11200)	$16.50

Please call for more info or help selecting the Phillystran size you need.

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CT 9 - The Ultimate Contest Software

CT™ has been the recognized leader in contest software since 1985. No other program is as easy to use or contains as many helpful features. With CT, you can operate entire contest without ever touching a pencil or paper. Key features include logging, duping, scoring, PacketCluster® interface, MS and MM networking, QSL labels, radio support for nearly all popular transceivers, Multiplier lists, rate information, log stats, and free unlimited access to the K1EA Software BBS.

CT 9 now supports Dxpedition mode and 13 contests:

- *ARRL DX Competition (W/VE & DX)*
- *ARRL VHF QSO Parties*
- *ARRL Sweepstakes*
- *ARRL Field Day*
- *ARRL 10-Meter Contest*
- *ARRL 160-Meter Contest*
- *WAE European DX Contest (Europe & DX)*
- *CQ WW DX Contest*
- *CQ WPX Contests*
- *CQ 160-Meter Contests*
- *JARL All Asia Contest (Asia & DX)*
- *IARU HF Championship*
- *California QSO Party*

CT Version 9 continues the tradition of cutting-edge, innovative leadership with a host of exciting new features that makes contesting (and winning) easier than ever: 50-line display mode, color coded band map, window position and color control, mouse support, sunrise/sunset tables, band switch support, Variable CW spacing, increased CW speed range, beam headings, rotor control for the Yaesu G-1000 SDX, and more!

Ordering Information:

⇒ CT Version 9 (for 386/486 computers only)	79.95	_____
⇒ Upgrade from CT 8 to CT 9	44.95	_____
⇒ CT Version 8 (for XT/AT/386/486 computers)	69.95	_____

Shipping:
⇒ $5.00 US, $6.00 Canada, $10.00 DX _____

Total _____

Disk Size: **CT 9** is available only in 3.5" HD format (1.44MB)
CT 8 is available only in 3.5" HD

MasterCard/Visa accepted; checks must be in US$ and drawn on a US bank, payable to *K1EA Software*

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ICOM IC-746

HF/6M/2M with IF-DSP and 100 Watts, Even On 2 Meters

SAVE $200

NOW IN STOCK

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limited time special savings

PC Remote Control
Windows™ software, RS-746, developed by ICOM

Pull out more signals. DX'ing? Even faint signals buried in noise can't hide from the '746's adjustable IF-DSP noise reduction. **Eliminate adjacent channel interference** with Twin Passband Tuning, 3 optional filter slots (front panel selectable), and a selectable DSP Audio Peak Filter (320/160/80 Hz). The '746's DSP Auto Notch eliminates multiple heterodyne signals.

One look at the large LCD display says it all. A glance "above the line" instantly lets you know all operating conditions and settings. Look "below the line" for menu selection, 5 soft key functions (which vary with the menu), passband width, and a band scope to search for signals.

***QST* bottom line:**
"An impressive transceiver for HF, 50 MHz and 144 MHz work. With loads of those features desirable to the serious HF operator *and* all modes at 100 W on both 6 and 2 meters, the IC-746 is a fine choice in a mid-priced rig."
– *QST*, September, 1998

SPECIFICATIONS

Transmit: ..... HF/6 Meter/2 Meter, 100% Duty Cycle
Receive: ..... 30 kHz-60 MHz, 108-174 MHz Quadruple conversion superheterodyne
Mode: ..... AM, FM, FM-N, SSB, CW, RTTY
Power: ..... 5-100 Watts (2-40W, AM)
Power Supply Requirement: ... 13.8 V DC
Memory Channels: ..... 102 total, 99 regular, 2 scan edges, and 1 call
Size: ..... 11.3(W) x 4.7(H) x 12.5(D) in. 287(W) x 120(H) x 316.5(D) mm.
Weight (approx.): ..... 19 lb, 10 oz / 8.9 kg

FEATURES

- **IF-DSP (15.625 kHz)**
  - Noise Reduction
  - Automatic Notch Filter
  - Selectable Audio Peak Filter
- **Twin Pass Band Tuning (PBT)**
- **Multi-Function LCD Display**
  - Band Scope, Memory Names, Key Assignments, PBT Settings, Split Frequency, Memory Keyer Contents
- **3 Optional Filter Slots**
  - 2 for 9 MHz, 1 for 455 kHz
  - All Front Panel Selectable
- **Digital, Multi-Function Metering**
  - Signal Strength, RF Output, SWR, and ALC levels
- **Auto Antenna Tuner**
- **Speech Compressor**
- **Tone Squelch and Tone Scan**
- **Auto Repeater Duplex Setting for 2 Meters**
- **Quick Split Function**
- **Complete CW Functions**
  - 4 Ch. Memory Keyer
  - Electronic Keyer
  - CW Pitch Control
  - Full Break In (QSK)
- **VOX**
- **Voice Synthesizer (opt)**
- **Triple Band Stacking Register**
  - Remembers tuner selection, preamp, antenna, mode and frequency for last 3 frequency selections

Call Button
One touch recall of user programmed frequency and mode

RF Gain and Squelch
Programmable RF gain, squelch, or both

Continuously Adjustable Power Level
5-100 watts variable

3 Antenna Connectors
Two for HF & 6M, and one for 2M

Digital Metering (on LCD)
Measures three parameters, all at once

SmarTune™
Automatically senses how fast you want to tune by how fast the knob is turned

Quick RIT/XIT Access
with zeroing function for today's crowded bands

Built in Auto Antenna Tuner
No external antenna tuner is required for HF and 6M operation.

ICOM options required for PC operation:
CT-17 Level converter
RS-746 Windows™ Remote Control Software
OPC-478 Connection Cable

PC Ready!

ICOM Connect 2000

Get more out of your HF. Let the digitally-advanced '746 give you the edge, and still hand you the best of 6 & 2 meters. For a brochure, call **425-450-6088**

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