NCJ

NATIONAL CONTEST JOURNAL

$4

July/August 2001

Volume 29 Number 4

- Florida Contest Group Energizes W1AW/4
- Return to The Rock—ZB2X in the 2000 CQWW Contests
- Some Facts of Life About Modeling 160-Meter Vertical Arrays—Part 4
- All Time ARRL Field Day Records
- *NCJ* Profiles —N9RV
- *Results*: February 2001 *NCJ* CW and Phone Sprints

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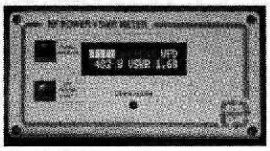

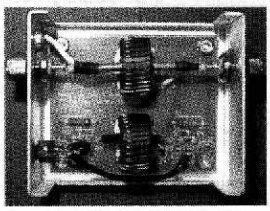

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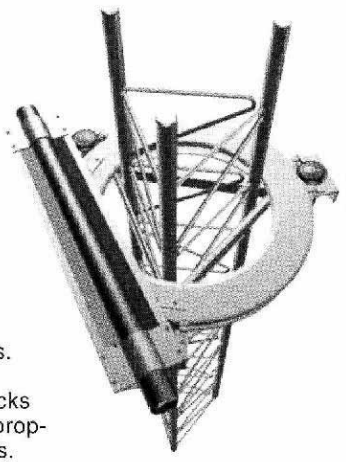

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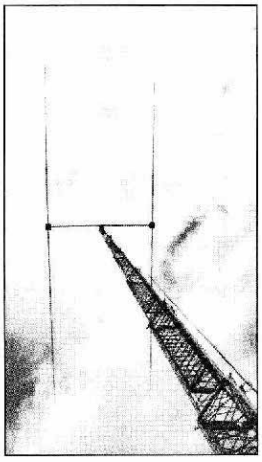

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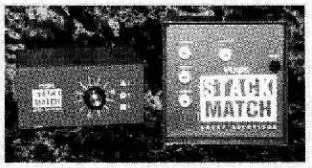

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TABLE OF CONTENTS

NCJ Advertising Index

Editorial

Dennis Motschenbacher, K7BV

Winter NAQP Results

Getting the results from the NAQP CW and SSB contests tabulated and ready to go for the *NCJ* issue that comes out before the *next* competition has become an almost insurmountable challenge for the contest managers: Bob, K6ZZ, and Bruce, WA7BNM. The NAQP competitions appeal to a lot of first-time or new contesters, many who are not yet familiar with computer logging. Since we want to encourage these new contesters, we do accept paper logs.

The downside of this is that those logs need to be manually entered into computer format before the contest managers can go ahead with the long process of log checking and results reporting. All of our NAQP competitions have been seeing significant steady growth. It appears as though we may have a nearly permanent challenge getting CW and SSB results into the traditional issues of the *NCJ* until a solution to this log input workload is discovered. Your patience is appreciated…

We will post the results of these contests on the *NCJ* Web site, **www.ncjweb.com**, as soon as possible. The contest managers will then announce their availability on the cq-contest reflector.

WRTC2002

It appears that our OH contester friends have their hands full with all the preparations that are needed to put on a successful World Radiosport Team Championship next July in Finland. Take a moment to look at the WRTC2002 Web site: **www.wrtc2002.org**. You will see many high-profile OH contesters serving on the various committees. They are working long hours to insure that the fourth running of this exciting event is as great a social and competitive success as the previous gatherings.

They have instituted various changes in the competitor selection process that are, of course, creating plenty of need for bandwidth on numerous club and public contest reflectors—we are such a mild mannered bunch of passive types, aren't we?

I have seen signs that the organizers are indeed listening to the many opinions that are being so generously shared. I trust that the majority of us can accept their final decisions in a gracious manner.

Some won't, though. They will continue to whine and make fools of themselves right through the running of the competition and even after it is all over and the medal winners have gone home. Some of these people will be stumped when they try to figure out why not one Team Captain bothered to contact them to be their competition partner. Sadly, most of these unhappy souls would not even benefit from the running of a tape recording of their self-serving rantings and ravings of "It shoulda been me!"

But WRTC is not about these people. It is about making a sincere effort to bring together teams from around the world that represent the best contesters in the world that were able to take time out of their busy lives to attend. Some fantastic contesters will not be there due to work, family or financial challenges. Others simply will chose *not* to compete—even if selected. Others will not be selected for a multitude of reasons that are out of their control.

I am sure that the organizing committee in Finland is more concerned with getting the best contesters to WRTC2002 than any of us are. Will the 100+ competitors that finally show up represent the absolute top 100+ contesters? I doubt it. But I do trust that they will be there after going through a good and fair a selection process.

Life is imperfect. There will always be inequities and differences of opinions. Past WRTC events have been able to sufficiently overcome those challenges. They have consistently managed to bring happiness and excitement into the ham shacks of contesters all over the world as they listened to *most* of the Best of the Best perform their magic for all to hear on the competition weekend. I implore you to not get wrapped up too deeply in the mechanics of the event, but instead be part of the *magic.*

Spend more time focusing on what a fantastic undertaking a WRTC represents. One does not need to be in actual attendance to share in the excitement and emotion. Keep close to it by regularly visiting the WRTC2002 Web site for updates and announcements. *Have some ownership in it by generously contributing some of your hard-earned dollars*. And, for sure, make a point to be on the air when these masters of our sport burn the bands up July 13th and 14th, 2002 in the IARU HF World Championship.

Finland, arguably the world's leading communications technology powerhouse, has several unique and innovative technical projects underway. These projects will result in technology being employed during the games that virtually insure that a worldwide Amateur Radio audience can participate "on the air" with the WRTC competitors during this exciting 24-hour operating event *while they also watch the results on the Web almost on a real-time basis*.

The Finns are making a major effort to open WRTC2002 to any and all who wish to attend, so they can experience in-person all the excitement of this world class event. WRTC2000 saw many spouses attend and enjoy the hospitality of the Slovenians. The Finns promise to continue the "family tradition" aspect of WRTC competitions started by our S5 brothers.

Funding WRTC2002

Financing an undertaking as large as a World Radiosport Team Championship is a tremendous challenge. These competitions are expensive to put on and are totally dependent upon financial support from thousands of individual contributors and a limited number of commercial sources. WRTC2002 will be more expensive than any precious competition as modern Finland is a rather expensive country. The Amateur Radio operators in Finland, naturally, have assumed that a great deal of support will be forthcoming from the Amateur Radio community throughout the world.

The WRTC2002 budget is calculated to be in the neighborhood of $200000 (USD). The Organizing Committee was able to raise 100k before committing to the event. Dedicated efforts to raise the remaining funds are now underway.

I have the honor of being the USA West Rep for WRTC2002. I would like to use this opportunity to make a call for support from all interested corporations, clubs or individuals. An ad appears elsewhere in this issue of the *NCJ* that describes how you can provide financial assistance at whatever level is comfortable for you, be it $5 or $5000. Please take a moment to be a financial part of WRTC2002.

What About WRTC2000?

Yes, there was one of those. Yes, I was there on the Society of Midwest Contesters team with Ralph, K9ZO. Yes, we got our hindends soundly kicked for reasons still not clear to us, BUT we gave it our best shot while having a great time.

An entertaining and informative video produced by Dave Bell, W6AQ, vividly projects the excitement and intensity of WRTC2000, which was held in Slovenia. His professional video report on WRTC2000 is available from the ARRL. Go to **www.arrl.org/catalog/?item=NO-WR** for information on obtaining your own personal copy of this moment of Amateur Radio contesting history.

Call for Articles

It is again time to see if I can stir some of the creative juices within our readers. Almost all of the material that appears in the *NCJ* comes from our readers—Y O U. We are still looking for several articles from the various parts of the USA that describe the particularly unique challenges one must overcome to contest from where you live. Team up with a fellow contester and tell us what it feels like to pound heads against the rest of us from your part of the world.

Or run around the area taking pictures of the contesters and their stations in your neck of the woods. Tell us a little about each of them.

Maybe you have mastered an antenna problem or other technical hardspot. Share your success or design genius with us!

73, Dennis Motschenbacher, K7BV

Our Cover

While on a recent business trip, KL7RA had the opportunity to drop by for a visit at KC1XX's New Hampshire home—and Rich just *happened* to have the 2000 ARRL International DX Contest Phone plaque that his team earned for their winning world multi-multi effort with him. Not to be outdone, Matt whipped out the W/VE multi-unlimited plague that he and his gang secured. ■

Some Facts of Life About Modeling 160-Meter Vertical Arrays—Part 4: A Potpourri of 160-Meter Vertical Antennas and Modeling Issues

L. B. Cebik, W4RNL
1434 High Mesa Dr
Knoxville, TN 37938
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So far, I have drawn some tentative conclusions about the inadequacies involved in using the *MININEC* no-radial system as a substitute for models employing radials, and of similar inadequacies of above-ground radial system models as substitutes for buried-radial system models. The converse of these negatively stated ideas is the following: For radial systems, (usually) only radial-system models will suffice, and for buried-radial systems, (usually) only buried radial-system models will suffice. As general propositions, these statements need further grounding. Although one might resort profitably to an examination of the mathematics of ground calculations, we shall stay with our present mode of demonstrating both the scope and the limits of these propositions by the use of demonstration models. In this way, we can also gain some appreciation of the likely properties of these antennas—or at least of these antenna models.

The Venerable Inverted L

One of the most popular "beginners" antennas for 160 is the inverted **L**. When the total length is approximately 1/4-λ, the inverted **L** is simply a vertical monopole with the top bent over for structural convenience. The implementations of this antenna are as varied as the circumstances in which they are constructed. However, let's settle for test purposes on a 2-mm diameter wire that is 40 meters long.

Inverted-**L**s vary in shape depending upon the vertical and horizontal territory and supports that are available to the builder. Some are quite tall, with only a small horizontal portion. Others are quite low, in the 10-meter height range (about 33 feet), with the remainder spread horizontally. Therefore, let's test the three versions shown in **Figure 1** as a reasonably fair sampling of the diverse forms of the **L**. As usual in this series, we shall use the *MININEC* no-radial ground system, the 32-radial above-ground system and the 32-radial buried system as test vehicles. The radial systems will use tapered-length techniques as laid out in earlier installments of this series.

Table 1 shows the results of modeling the inverted **L** in its three iterations. As

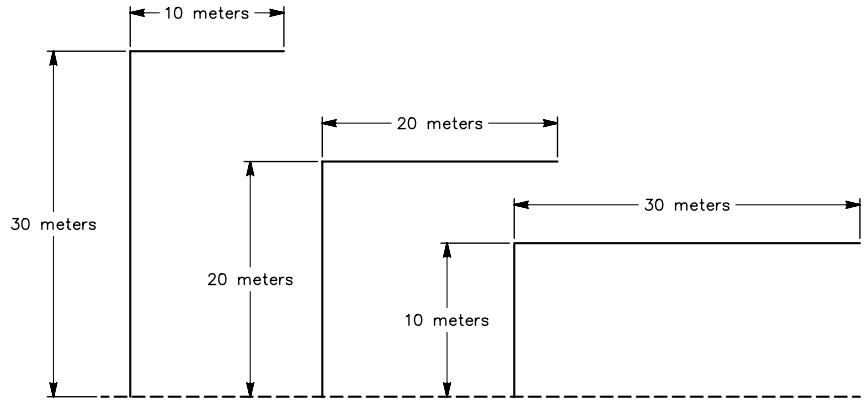
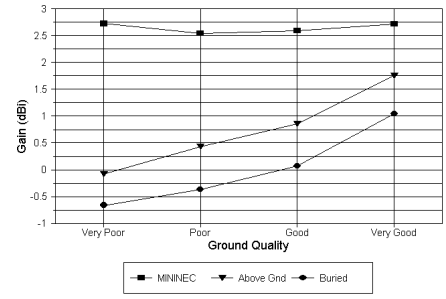


Figure 1—Three versions of the inverted L to be examined over various ground systems and soil qualities. See the text for the ground treatment.

Figure 2—Gain reports for the shortest inverted L using three different ground systems.



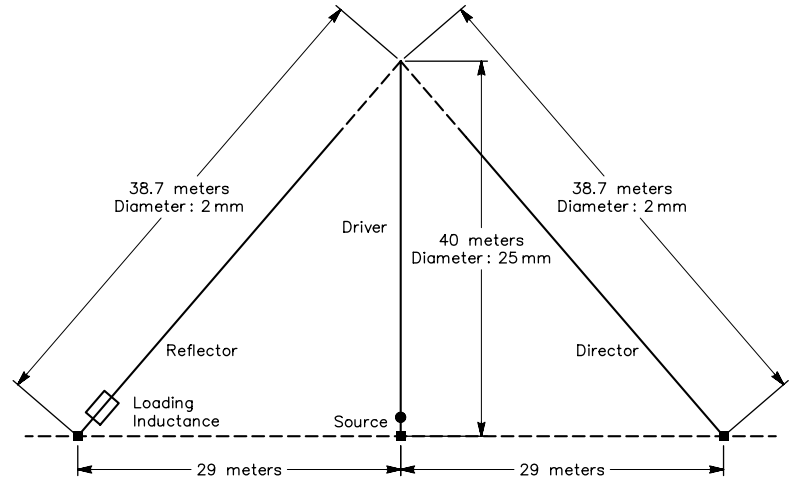


Figure 3—Outline of the 3-element parasitic array to be examined over various ground systems and soil qualities. See the text and Figure 4 for the ground treatment.

Table 1

Inverted L, 40-meter vertical total length, 2 mm in diameter. 40.96-meter (1/4-λ) radials, 2 mm diameter, tapered segmentation: 0.001- to 0.04-λ per wire (where used).

NEC-4

Soil Type	*Gain (dBi)*	*TO Angle (degrees)*	*Source Impedance (R +/–jXΩ)*
A. Vertical, 30 meters; horizontal, 10 meters			
MININEC (no-radial) ground			
Very Poor	–0.79	28	31.64 – *j*13.76*
Poor	0.38	27	
Good	1.40	24	
Very Good	3.01	17	
32 Radials, 0.001-λ above ground			
Very Poor	–1.23	29	31.18 – *j*21.22
Poor	0.12	25	30.91 – *j*18.78
Good	1.09	23	31.54 – *j*17.62
Very Good	2.80	17	32.26 – *j*16.85
32 Radials, 0.001-λ below ground			
Very Poor	–1.12	29	35.76 – *j*7.66
Poor	–0.01	26	36.34 – *j*6.96
Good	0.86	23	36.19 – *j*7.09
Very Good	2.60	17	34.82 – *j*8.00
B. Vertical, 20 meters; horizontal, 20 meters			
MININEC (no-radial) ground			
Very Poor	0.26	33	20.32 – *j*22.33*
Poor	1.01	30	
Good	1.73	25	
Very Good	2.92	19	
32 Radials, 0.001-λ above ground			
Very Poor	–0.60	32	21.04 – *j*27.51
Poor	0.45	29	20.64 – *j*25.79
Good	1.22	26	20.75 – *j*24.94
Very Good	2.61	19	21.02 – *j*24.87
32 Radials, 0.001-λ below ground			
Very Poor	–0.61	33	25.07 – *j*14.62
Poor	0.17	29	25.30 – *j*14.33
Good	0.86	26	24.80 – *j*14.56
Very Good	2.30	19	23.38 – *j*15.90
C. Vertical, 10 meters; horizontal, 30 meters			
MININEC (no-radial) ground			
Very Poor	2.72	45	7.73 – *j*23.91*
Poor	2.54	39	
Good	2.59	33	
Very Good	2.71	24	
32 Radials, 0.001-λ above ground			
Very Poor	–0.08	49	10.22 – *j*24.59
Poor	–0.43	41	9.62 – *j*24.11
Good	0.86	34	9.23 – *j*23.83
Very Good	1.75	24	8.78 – *j*24.92
32 Radials, 0.001-λ below ground			
Very Poor	–0.65	46	14.57 – *j*12.34
Poor	–0.37	39	13.98 – *j*12.95
Good	0.07	34	12.86 – *j*13.55
Very Good	1.04	23	11.09 – *j*15.97

**MININEC* impedance is over perfect ground.

we saw in Part 3 when working with tilted verticals, the *MININEC* no-radial system results diverge from the radial systems in an ever-more radical manner as we shorten the vertical portion and extend the horizontal portion of the antenna. The pattern of the antenna is stronger away from the horizontal wire by a small amount (1 to 2 dB) so that the patterns are not perfectly circular. The table shows the maximum gain figures.

Figure 2 shows the maximum gain values for the shortest of the inverted **L**s over various soil qualities for each of the three modeled ground systems. The nearly level gain—and its elevated value—for the *MININEC* no-radial system are once more unrealistic as approximations of the gain values for either radial system. Over poor soil, the difference between the *MININEC* ground result and the buried radials system result is nearly 3.5 dB.

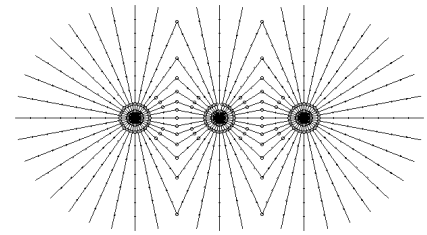


Figure 4—Sketch of three intersecting radial systems, 32 radials each, used with the 3-element parasitic array.

Similar divergences show up in the source resistance values. For the tallest **L**, the differences among all three systems are minor. However, for the shortest version, the *MININEC* value becomes a poor indicator of what a buried-radial system model will show. Whatever the parameter, the different models of ground once more prove inadequate approximations of each other.

A 3-Element Parasitic Array Using Sloping Guys

Since the inverted **L** requires only a single radial set, models are simple to construct. In contrast, a 3-element parasitic array of the sort shown in **Figure 3** is a far more tedious project. Again, the array is an adaptation of a fairly standard arrangement. The 40-meter long driver is 25 mm in diameter. Each 2-mm diameter guy is 38.7 meters long and slopes 54 degrees relative to the ground (or 36 degrees relative to the driver). In this array, a loading inductor serves to increase the electrical length of the reflector. Our interest in this particular array stems not only from the differences in reports from using different radial systems, but as well, differences that may emerge in the required value of the loading inductor to achieve maximum front-to-back ratio.

Each element base is centered in a radial system for other than the *MININEC* no-radial test runs. **Figure 4** is a screen "grab" of the length-tapered intersecting 32-radial system used with the model for the test runs. There are 26 intersections. The initial model with uniform segmentation required 99 wires and 1559 segments. With length-tapering, the model has shrunk to 1015 segments, but needs 619 wires. The obvious question is whether the added work of setting up the model over a radial system is worth the effort.

The results appear in **Table 2**. The divergence in gain among the three ground systems is perfectly in parallel with results obtained for other arrays

with sloping parasitic guys. Over Very Poor soil, the *MININEC* system shows over 4.5 dB of excess gain, although this shrinks to about 1.1 dB over Very Good soil. Interestingly, the above-ground radial system shows better gain than the buried system when over Very Poor soil, but less gain over Very Good soil.

The most dramatic differences occur in the front-to-back reports, as summarized in **Figure 5**. Two facets of the front-to-back ratio are significant. First, the maximum obtainable ratios for the radial systems are mediocre (although operationally usable) compared to the reports of the *MININEC* no-radial system. The no-radial and the buried-radial systems show parallel curves, but the above-ground system curve does not join the parallel until the transition from Good to Very Good soil.

It is impossible to ignore all comparisons to reality, and the front-to-back ratios of the 2-element (in Part 3) and the 3-element parasitic arrays are a case in point. The values reported by the radial system models for both cases are in line with typical 2- and 3-element horizontal parasitic beams. For the 3-element array, only the most highly optimized 3-element horizontal beams show the level of front-to-back ratio reported by the *MININEC* no-radial model. Yet, it would be difficult to assert that the vertical array uses dimensions that approach any degree of optimization, with the possible exception of refining the loading coil.

The loading inductor in the models is the second important area of divergence among the models. To obtain the highest values of front-to-back ratio, the loading inductors were assigned a Q of 300. In other words, the load uses a series value of resistance about 1/300 of the required inductive reactance and its associated inductance at the 1.83 MHz test frequency. The difference in required loading coil between the no-radial and the above-ground radial system represent about 1 Ω of reactance: 33 Ω for the *MININEC* ground model and 32 Ω for the above-ground radial system. However, to obtain the best front-to-back ratio of which the model was capable with the buried radial system, the loading inductance had to be reduced to about 1.9 µH or 22 Ω reactance.

Figure 6 shows the elevation patterns for the three models over Good soil. The differences in the predicted patterns among the three ground systems are clearly evident. It is well to be reminded at this point that the data and patterns apply only to the modeled radial systems and that some variance will become apparent with changes in the model. For example, changing radial length and number will likely alter the reported data to some degree, in line with expectations that might emerge from our survey of system ranging from 4 to 128 radials in Part 1.

Table 2

3-element parasitic array. Driver: 40-meter tall vertical monopole, 25 mm diameter. Reflector and director: sloping 2-mm diameter guy, 38.7 meters long; intersecting 32 40.96-meter (1/4-λ) radial system, 2 mm diameter, tapered segmentation: 0.001- to 0.04-λ per wire (where used).

NEC-4

Soil Type	*Gain (dBi)*	*TO Angle (degrees)*	*Front-to Back Ratio (dB)*	*Source Impedance (R +/– jXΩ)*
MININEC (no-radial) ground: Load = 2.87 µH, Q = 300				
Very Poor	4.85	29	20.85	15.11 + *j*32.45*
Poor	5.73	26	23.53	
Good	6.75	23	24.92	
Very Good	8.15	17	27.55	
32 Radials, 0.001-λ above ground: Load = 2.78 µH, Q = 300				
Very Poor	1.53	28	16.74	16.95 + *j*43.54
Poor	2.69	26	16.02	15.77 + *j*43.78
Good	3.71	22	15.45	14.98 + *j*43.57
Very Good	6.14	16	18.20	14.56 + *j*40.27
32 Radials, 0.001-λ below ground: Load = 1.91 µH, Q = 300				
Very Poor	0.15	27	12.23	14.46 + *j*32.44
Poor	2.16	25	12.99	11.93 + *j*31.72
Good	4.06	22	13.62	10.12 + *j*31.10
Very Good	6.98	16	15.36	8.62 + *j*27.93

**MININEC* impedance is over perfect ground.

Table 3

Two 40-meter tall, 25-mm diameter monopoles, separated 84 meters, fed in phase. 40.96-meter (1/4-λ) radials, 2 mm diameter, tapered segmentation: 0.001- to 0.04-λ per wire (where used).

NEC-4

Soil Type	*Gain (dBi)*	*TO Angle (degrees)*	*Source Impedance (R +/– jXΩ)*
MININEC (no-radial) ground			
Very Poor	2.96	27	29.05 – *j*7.60*
Poor	4.27	25	
Good	5.37	23	
Very Good	7.11	16	
32 radials, 0.001-λ above ground			
Very Poor	2.95	27	26.40 – *j*22.70
Poor	4.27	25	26.95 – *j*11.40
Good	5.21	22	28.00 – *j*10.80
Very Good	6.98	17	28.90 – *j*10.30
32 radials, 0.001-λ below ground			
Very Poor	2.36	27	35.25 – *j*2.93
Poor	3.84	25	33.71 + *j*1.78
Good	4.90	22	32.80 – *j*1.50
Very Good	6.79	17	31.32 – *j*2.74

Where the *MININEC* Ground System Works

So far we have examined cases in which the results of using the *MININEC* no-radial system diverge in very significant ways from results obtained from using modeled radial systems. Not all models exhibit such large levels of deviation among models. For example, let's examine a pair of 1/4-λ monopoles, each 40 meters tall and 25 mm in diameter and positioned as shown in **Figure 7**. We shall space them 84 meters apart, which is just over 1/2-λ. The selected separation is intentional so that the 1/4-λ radials that we place under each monopole for certain tests do not overlap. Therefore, we end up with elementary though large models for the above-ground and buried radial systems—about 400 wires and 795 segments for length-tapered models. Of course, the *MININEC* no-radial model is simple by comparison.

We shall feed each monopole in phase with the other and examine the results, as we have for each test case so far. **Table 3** lays out the numbers. **Figure 8** graphs the gain figures in order to show that there

is little difference among the three modeling systems. In fact, for this particular antenna, the *MININEC* and the above-ground systems yield figures that are closer than those of the buried-radial system. **Figure 9** compares the *MININEC* no-radial azimuth pattern with the buried-radial model pattern to show that there would be little or no operationally significant difference in the numbers.

The one arena in Table 3 in which we find a difference that may be significant is the source impedance figures. Of course, the *MININEC* values show no variation, while the above-ground radial system figures show only small variations (with the exception of the reactance over Very Poor Soil). The values are for each of the two feedpoints of the 2-element array. As we have noted before, the buried radial system shows a wider range of variation with changes in soil quality and generally higher values than for each of the other ground systems. For this antenna, the variation carries over into the reactance column, where the array appears to be closer to resonance at 1.83 MHz than with either of the other ground modeling systems.

Despite these differences, all three ground modeling systems would generally be adequate for analyzing the array in question. Where the elements are perfectly vertical, they do not encroach on the error-producing aspects of the *MININEC* ground. As well, the model lacks potential complications that might be introduced by the use of intersecting radial systems. As a result, we have a type of case in which the simplification of the ground system to a *MININEC* no-radial model yields reasonable results.

A $^1/_4$-λ Monopole Over 32 Radials Buried at Three Depths

I have shown exemplary applications of overlapping radial systems, but have not yet shown an example that uses the technique of sloping the first two sections of each radial in order to model either a "fat" monopole or a shallow buried radial system. To rectify this gap, let's consider a monopole that is 250 mm in diameter. As always, we shall leave the top height at 40 meters. In addition to working with the fat monopole, let's consider whether the depth of the buried radial system makes a difference to performance. With a 32-radial system, we shall use depths of 0.0005-λ (0.082-meter or 3.23 inches), 0.001-λ (0.164-meter or 6.46 inches), 0.002-λ (0.328-meter or 12.91 inches), 0.003-λ (0.492-meter or 19.37 inches), and 0.004-λ (0.656-meter or 25.82 inches).

Figure 10 shows the general modeling setup for the areas of the antenna nearest the junction. Only the first of the 32 radials is shown, but the separate values for the X and the Z axes appear on the sketch. The objective was to keep the shortest wire or segment length at 1-meter, which is 4 times the diameter of the monopole. As well, the length of segments adjacent to the source wire are equal to its length. The models consisted of 164 wires and 460 total segments and were run over the usual span of Very Poor to Very Good Soil.

The results of the runs yield operationally insignificant but numerically interesting differences for any soil quality. As with the other models which we have surveyed, the results over Very Poor soil strongly suggest the need for more radials. See Part 1, which has some data for some systems up to 128 radials. For Very Good soil, 32 radials may suffice.

The gain figures represent the most interesting facet of the runs. As shown in the graph in **Figure 11**, the radial systems

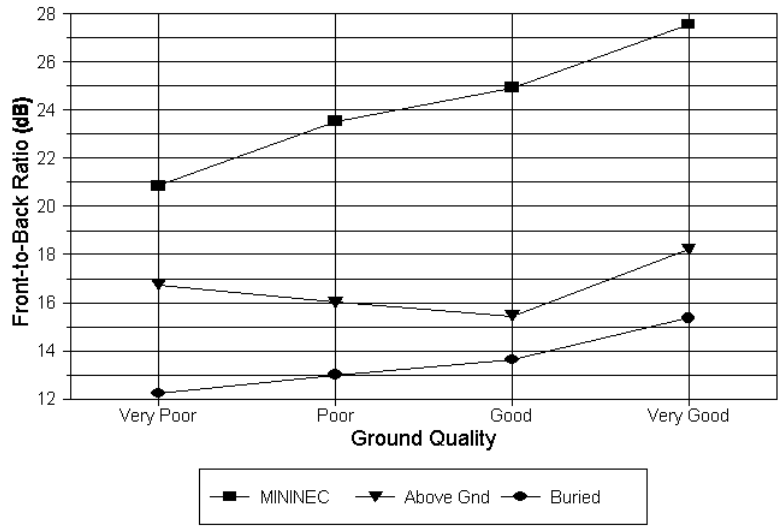


Figure 5—Front-to-back ratio reports of the 3-element parasitic array over various grounds.

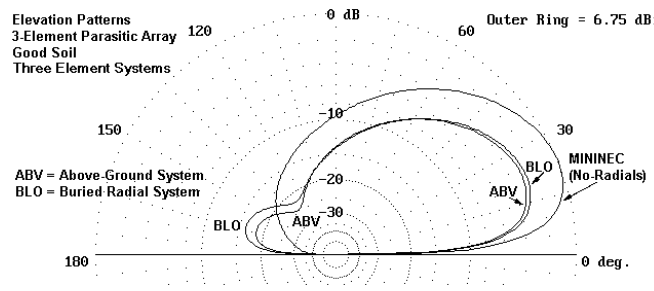


Figure 6—Elevation patterns of the 3-element parasitic array as modeled over a *MININEC* (no-radial) ground and over intersecting radial systems both above and below ground.

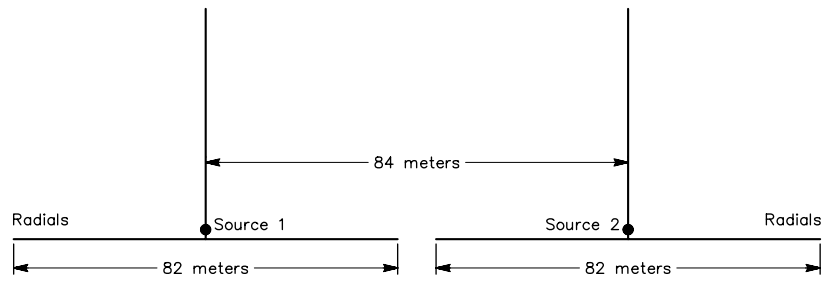


Figure 7—Two $^1/_4$-λ monopoles spaced $^1/_2$-λ apart and fed in phase (with non-intersecting radial systems).

at depths of 0.0005- and 0.001-λ are even numerically insignificantly different. The question raised by these two runs is whether the maximum 0.01-dB gain difference over any one soil represents a trend or a mere artifact of rounding. Deepening the radial system to 0.002- through 0.004-λ shows that there is indeed a trend. For the depths modeled, the deeper the radial system, the higher the gain.

What these runs do not establish is whether there is a maximum depth below which the performance of the monopole would decrease. The rate of gain increase itself decreases as we move from 0.003- to 0.004-λ, suggesting that there is indeed a limit. The differences are not artifacts of the changing radius of the portions of the slanting radials that are above ground. This fact was established by modeling the 25-mm monopole using a single vertical wire below ground to the radial junction. The results of model runs with the radials wholly buried and between 0.001- and 0.004-λ below ground appear in **Table 5**. For the thinner monopole, maximum numerical gain reports appear at different depths of the radial field for each soil type, as indicated by the "+" notations in the table. Although the results of these studies do not yield any particular construction recommenda-tions, since the differences are very small, the trends have their own fascination.

Other buried-radial questions abound and are ripe for detailed and systematic modeling. For example, we have examined only 1/4-λ radials: other radial lengths have been recommended for various reasons. Moreover, this set of runs was made for 1.83 MHz only. The runs do not tell us what the modeling reports would be for various depths on

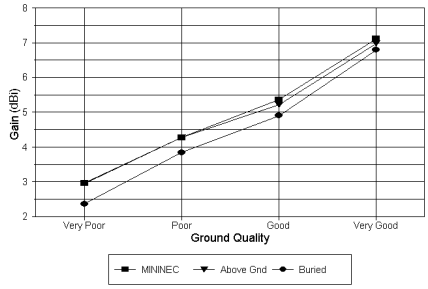


Figure 8—Gain reports of the two 1/4-λ monopoles spaced 1/2-λ apart and fed in phase.

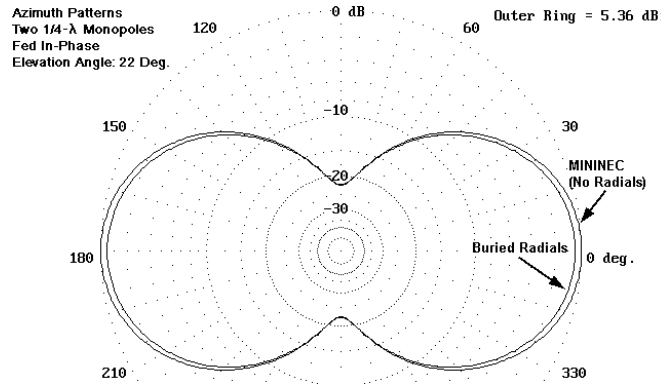


Figure 9—Azimuth patterns for an in-phase fed pair of 1/4-λ monopoles over *MININEC* (no-radial) ground and over a buried radial system.

Table 4

Vertical monopole, top at 40 meters, 250 mm in diameter, 32 40.96-meter (1/4-λ) radials, 2 mm diameter, tapered with interior wires slanted, depth: 0.0005- to 0.004-λ.

NEC-4

Soil Type	*Gain (dBi)*	*TO Angle (degrees)*	*Source Impedance (R +/– jXΩ)*
Depth: 0.0005-λ (0.082-meter)			
Very Poor	–1.31	28	43.08 + *j*13.11
Poor	–0.07	25	44.68 + *j*14.49
Good	0.86	22	44.86 + *j*14.64
Very Good	2.72	17	43.41 + *j*14.34
Depth: 0.001-λ (0.164-meter)			
Very Poor	–1.30	27	43.91 + *j*13.33
Poor	–0.06	25	44.71 + *j*14.56
Good	0.87	23	44.85 + *j*14.63
Very Good	2.72	17	43.40 + *j*14.26
Depth: 0.002-λ (0.328-meter)			
Very Poor	–1.21	27	43.36 + *j*13.66
Poor	0.01	25	44.15 + *j*14.68
Good	0.94	22	44.24 + *j*14.65
Very Good	2.78	17	42.79 + *j*14.09
Depth: 0.003-λ (0.492-meter)			
Very Poor	–1.14	28	43.06 + *j*14.10
Poor	0.06	25	43.94 + *j*14.95
Good	0.99	22	43.92 + *j*14.88
Very Good	2.82	17	42.46 + *j*14.07
Depth: 0.004-λ (0.656-meter)			
Very Poor	–1.09	28	42.83 + *j*14.73
Poor	0.11	25	43.68 + *j*15.54
Good	1.03	23	43.71 + *j*15.32
Very Good	2.85	17	42.25 + *j*14.24

Table 5

Vertical monopole, top at 40 meters, 25 mm in diameter, 32 40.96-meter (1/4-λ) radials, 2 mm diameter, tapered with single wire to junction, depth: 0.001- to 0.004-λ.

NEC-4

Soil Type	*Gain (dBi)*	*TO Angle (degrees)*	*Source Impedance (R +/– jXΩ)*
Depth: 0.001-λ (0.164-meter)			
Very Poor	–1.61	27	44.89 + *j*7.54
Poor	–0.16	25	43.44 + *j*9.55
Good	0.86	22	42.67 + *j*10.46
Very Good	2.79+	17	40.48 + *j*10.03
Depth: 0.002-λ (0.328-meter)			
Very Poor	–1.29	27	42.07 + *j*12.38
Poor	–0.04+	25	42.48 + *j*13.30
Good	0.91+	22	42.36 + *j*13.32
Very Good	2.75	16	40.87 + *j*12.49
Depth: 0.003-λ (0.492-meter)			
Very Poor	–1.25+	27	41.98 + *j*15.48
Poor	–0.04+	25	42.75 + *j*16.20
Good	0.89	22	42.75 + *j*16.01
Very Good	2.70	17	41.48 + *j*14.89
Depth: 0.004-λ (0.656-meter)			
Very Poor	–1.25+	27	42.28 + *j*18.41
Poor	–0.06	25	43.23 + *j*19.00
Good	0.85	22	43.27 + *j*18.68
Very Good	2.62	16	42.24 + *j*17.24

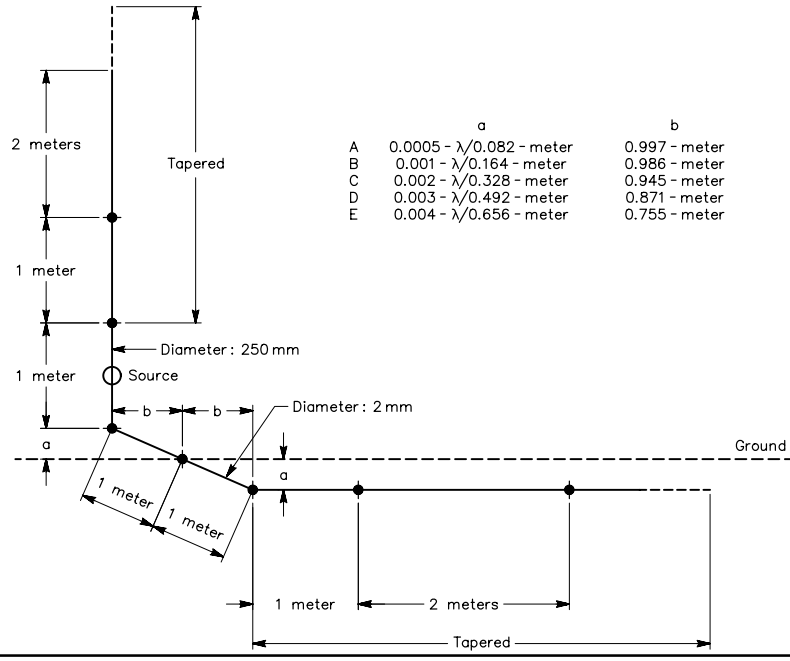


Figure 10—The model set-up for testing a vertical monopole over a 32-wire radial system buried at 5 depths.

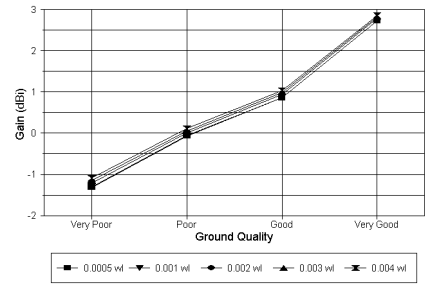


Figure 11—Gain reports for a 1/4-λ vertical monopole over 32 radials buried at 5 depths.

other amateur bands on which the use of vertical antennas and arrays is common. All of that we shall leave as unfinished business (or, as texts are fond of saying, as exercises for the reader).

There are a myriad of other modeling questions associated with verticals that we shall also have to leave unanswered. For example, there is evidence in preliminary models that the required length of phasing line required to establish a maximum rear null in 1/4-λ monopole spaced 1/4-λ apart will vary somewhat with the soil quality. How this variation itself varies with the size and depth of a radial field remains unanswered. To this question we might also add one about 1/2-λ near-ground verticals that are base fed. Preliminary models suggest that only minor changes in performance occur with various types of radial systems beneath the antenna, a result that is at odds with user experiential reports. However, what remains to be developed are models that adequately handle all of the aspects of the antenna system, including the usual source-matching system that places a network between the base of the antenna and the ground.

To these questions, we may add any number of others that involve the development of adequate models of various arrays. One final simplification technique remains to be treated: the use of inner and outer ground qualities to simulate a radial system. We shall examine that proposal in the final episode of this series. ■

Florida Contest Group Energizes W1AW/4

Jim White, K4OJ
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A few years back I sent an e-mail to ARRL Executive Vice President Dave Sumner, K1ZZ, inquiring about the possibility of the Florida Contest Group (*FCG*) hosting a "W1AW/4" IARU Headquarters Station operation for the 2000 IARU HF Championship. In my message I mentioned that our membership included a large number of talented operators and that the K4XS station (then still in its planning stages) would be sporting three 200-foot towers. At that time I felt confident that I could twist Bill's arm a little and get him to run the show from there—although I'll admit that I had not yet approached him with the idea.

I really didn't expect such a rapid response from Dave—I received his reply the following day! He said that he was delighted to hear that the FCG was interested in hosting the HQ station operation, and that the W1AW/4 call was ours for the asking.

Similar operations had already been aired during previous Championships from W3LPL, W7RM, K4VX/0 and W0AIH/9. We would be the first group from the Southeast to step up to the plate. What a thrill! We would have the honor of representing our nation's Amateur Radio society, the ARRL, as W1AW/4!

The first step was taken, now it was time to figure out what needed to be done to put it all together. I have organized many multi-ops over the years, and I was painfully aware of how difficult it would be to get a large number of our members together in a single location for a multi-multi operation. Our membership is scattered over a very wide geographic area—we don't even all live within what's considered an ARRL "club territory"! I had hoped that the lure of having the chance to operate as the IARU Headquarters Station and to sign W1AW would be enough to entice them into traveling whatever distance was necessary for this unique opportunity.

The HQ Edge

Shortly after the finish of the 1999 Championship, a few e-mail messages appeared on the CQ-Contest e-mail reflector posted by folks wondering how some of the European HQ stations had amassed such incredible QSO totals within the short 24-hour contest period. It was eventually revealed that some bands and modes were operated from one site and others from another. This was allowed?

I got back in touch with K1ZZ. Dave told me that not only is that permissible, but that it's even okay for HQ stations to run multiple operating positions transmitting the *same mode* on the *same band* simultaneously! At this point I began to feel a little apprehensive. I knew that to do an operation such as this justice would require at least a 20-man team (and I typically consider myself lucky to be able to scratch together five guys for a multi-op effort at W1CW/W1YL).

But hang on, if it's okay for HQ stations to sign the same call from multiple sites, we could tap our entire membership by setting up stations in several different locations spread out throughout the state. Operators who wanted to participate could travel to the closest site.

QST de FCG

In addition to the Florida Contest Group's West Central Florida core group, there are plenty of other active contesters in the state and there was, at the time, a rival contest organization: the Florida Contest Club (*FCC*). The gang from the FCC had helped support our club in resurrecting the Florida QSO Party, why not see if we could get some of these same guys involved in helping us air W1AW/4?

In 1999, Vic, N4TO, hosted a gathering of contesters at his Sebring, Florida home. He belongs to the FCG and was also a member of the FCC, and had invited members of both organizations. The two main topics up for discussion were the clubs' selection of a contender to send to WRTC2000 and the development of plans for W1AW/4. Unfortunately, Dan, K1TO, wouldn't be able to participate in the W1AW operation as he would be attending WRTC2000 to defend his first place finish in WRTC96. As it turned out, Jeff, WC4E, would be heading for Slovenia as well. Dang! I had originally hoped that two of our sites could be set up at their well-equipped stations.

When talk eventually came down to brass tacks—just who would be willing to host the various bands and modes for W1AW/4—Vic chimed in with "what about Pete, N8PR?" Pete, who is located in Hollywood, Florida, graciously accepted. Great! This would accomplish two objectives: it would provide a way to tap into the pool of contesters who live along Florida's lower southeast coast and would also serve to enhance the camaraderie between the members of the FCC and FCG organizations.

Working Up the Spectrum

We assembled a tentative plan: we would set up stations in six locations. Each would cover two band/modes.

WEAG (AM?!)/NU4Y—Starke, Florida

For 160-meter CW and SSB, we ended up unearthing a real gem: AM broadcast station WEAG. Jim, NU4Y, had used the site for 160-meter contests in the past and was confident that he could convince the station owner—Ben Dickerson, K4EL—to allow us to use it for this operation. It still amazes me that someone would actually *volunteer* to operate on 160 meters in Florida in July—even from a super site! This made the task of convincing folks to fill the remaining slots seem easy.

N8PR—Hollywood, Florida

Pete's station features phased verticals for 80 meters. He'd cover CW duties. I also knew that he would be inviting Bob, N4BP, to operate with him. Bob is a big fan of 10-meter CW, so running a combination of 80 meters (nighttime) and 10 meters (daytime) from Hollywood seemed logical.

K4XS, New Port Richey, Florida

Bill, K4XS, had been playing around with a *pair* of 4-element 75-meter quads. It would be tough to find a worthier station to cover our SSB operations on that band.

Twenty-meter phone would most likely be the place where the majority of US operators would get their opportunity to work W1AW/4, and who better for that assignment than "anyone, anywhere" K4XS. Bill has a four-stack of Yagis, not to mention "some history," on 20 meters.

N4TO—Sebring, Florida

As we sat there in N4TO's backyard, gazing up at his recently installed 40-meter Yagi in a 40-2CD over 40-2CD stack, it was immediately apparent that this would be the place to base our 40-meter CW operations. Vic has stacked antennas for 15 meters as well, and he figured that he could probably convince the AE4RO/AE4SW team and KT3T to help out on SSB.

N4PN—St George Island, Florida

I had already exchanged e-mail messages with Charlie, WA4IMC. He

had expressed an interest in coordinating 40-meter SSB operations from his friend Paul's (N4PN) vacation home, which is located on an island off the Florida panhandle. Ten-meter SSB could also be set up at Paul's island getaway.

W1CW/K4OJ—Seffner, Florida

We had recently completed installation of a 4/4/4 stack at W1CW. We'd take care of 20-meter CW operation from there. The previous year 15 had been the "money band" for several of the contests. As we were even closer to the peak of the sunspot cycle, we had every reason to believe that 15 would again be hot. The 4-element 15 at W1CW had already proven itself in the Sweepstakes, the CQWW and the ARRL DX contests—we'd take on 15-meter CW duties too.

Done deal! We had lined up 12 band/mode combinations, two per site in six geographically diverse areas of the state ranging from the west (Panhandle), to the northeast (Starke), and down south to Broward. The three remaining stations were located in between. We were set—or were we?

Inter-Station Communication

Having reliable direct communications between the sites would be an absolute necessity. All of us had operated in this contest before and had experienced shutdowns due to lightning storms. Storms could force us to close down a station during important run-times on a particular band.

RF links seemed out of the question—the stations were too far apart to easily link them via VHF or UHF. So what was the alternative? The Internet, of course! Temporarily passing off band/mode duties between sites wouldn't be a problem. What about multipliers though? If we handed off band/mode assignments, how would the assisting station know if they needed to chase a particular rare zone or HQ multiplier?

We contacted several of the contesting software manufacturers and some gurus like K1TTT. It was finally decided that while it was definitely possible to fully network the six sites over the Internet, it would be pretty challenging.

We eventually decided to set up a simple "chat room." We would use that to exchange QSO total information, identify needed multipliers and pass messages and alerts of potential shutdowns. The band totals would be tracked at W1CW on an *Excel* spreadsheet that already contained the previous year's W1AW/9 operation's running totals. Each site would report in with hourly totals and these would immediately be added to the spreadsheet. This would allow us to gauge our progress against that of the 1999 W1AW/9 operation.

W1AW/4—2000 IARU HF Championship

The Florida Contest Group

Band	*QSOs*	*QSO Points*	*Zones*	*HQ Stations*
160	141	205	8	2
80	508	1020	17	15
40	1169	3137	38	26
20	4153	13055	49	37
15	3668	13420	54	34
10	1737	4079	33	16
Totals	11376	34916	199	130

W1AW/4 Participating Operators

AE4SW, AJ4Y, K4EL, K4LM, K4LQ, K4OJ, K4PG, K4XS, KD4UJK, KR4YL, KT3T, N3NN, N4BP, N4DL, N4KM, N4OX, N4PN, N4QV, N4TO, N4UF, N8PR, NA4AR, NA4CW, NU4Y, W1CW, W1YL, W4IR, W4SO, W4ZW, WA4B, WA4IMC, WD4AHZ

All Eyes on the Prize

We did encounter some bad weather and did end up having to temporarily shut down one station during the weekend. (Thunderstorms and bikinis are just considered facts of life for those of us who live in Florida!) The shutdown lasted a little less than an hour. The W1CW site passed the 20-meter and 15-meter CW batons off to N4TO and N8PR. This ended up saving us well over a hundred contacts that would have been lost otherwise.

As the end of the contest approached, we were nearing our goal of breaking 10000 QSOs. Each and every hour we managed to top the previous year's QSO totals up to that point. Our 10k goal was easily within our grasp. The question soon became how far we would exceed the 10k barrier. At the final bell—at 1200Z—all stations reported their grand totals through the Internet chat room connection. The spreadsheet soon confirmed that we had broken the 10k barrier by a healthy margin: 11376 raw QSOs... Wow!

Post-Contest Paperwork

Now came what turned out to be the tedious task of merging the logs. The six sites were using three different versions of *CT*. Unfortunately the different versions of the software did not merge easily. Changes in the way *CT* looks at time meant that some logs had to have their times altered by 6 hours before they would merge correctly. (A lesson here: if you are running a multi-site operation, make sure that everyone is using the same version of the logging software!)

The end results were most gratifying, and we all had a blast. We got to play the part of the rare multiplier from our own turf and we experienced some truly awesome run rates.

The Florida Contest Group club Web page—**www.qsl.net/fcg**—includes an extensive collection of photos of this operation. We would like to thank all of the operators—over 30 of them all told—who helped put W1AW/4 on the air. And, of course, our very special thanks to the American Radio Relay League and K1ZZ for this once-in-a-ham-lifetime opportunity. Hey, Dave! Any chance we can reserve a chance to do it again somewhere near the top of the next Sunspot Cycle? ■

Return to The Rock—ZB2X in the 2000 CQWW Contests

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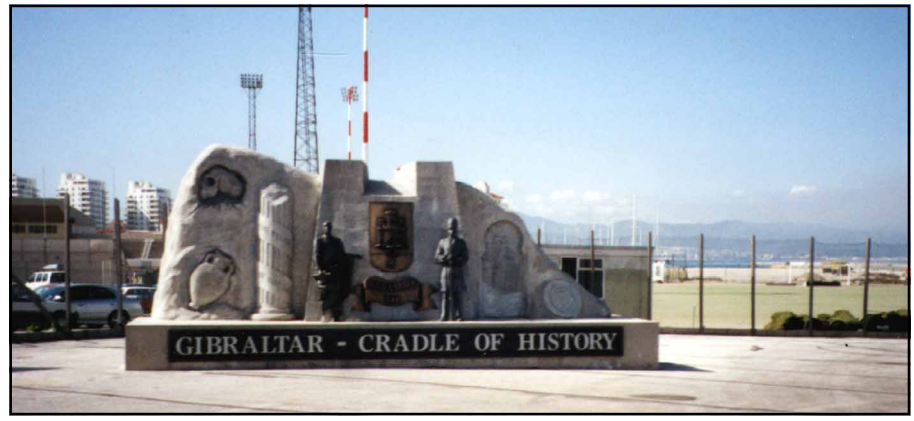
Jorma, OH2KI/ZB2X has a long and successful history of contesting from Gibraltar. During the last couple of years, the ZB2X operations have been single band affairs. For the 2000 CQWW contests, however, ZB2X hit the airwaves on all the bands. Here are Jormas' comments on the operations.



ZB2X 2000 CQWW SSB Contest Results
High Power/All Band/Zone 14

Band	*QSOs*	*QSO Points*	*Points/ QSO*	*Zones*	*Countries*	
160	54	75	1.39	9	38	
80	254	537	2.11	14	54	
40	577	1268	2.20	21	77	
20	1951	5116	2.62	38	129	
15	2029	4411	2.17	34	131	
10	2925	6019	2.06	36	132	
totals	7790	17426	2.24	152	561	12424738

OH1EH: *It's been awhile since the last ZB2X all-band effort. Were you waiting for the sunspot maximum? What kept you away for such a long time?*

OH2KI: No, it wasn't the sunspot activity. History has proven that a sunspot maximum is not necessary for generating record scores from the southern parts of Europe. The sunspots are a more important consideration for stations located in the northern regions. Up there, if 10 meters is dead, record scores are essentially impossible. In southern Europe, 10 is almost never dead. If an operation has been on frequently from the same location, interest in working it seems to decrease.

This year when Tony, N7BG; Oliver, W6NV; and I developed our plan for a multi-single operation for the phone contest, we decided that I would return and participate in the CW contest as a single operator. The plan was for me to use the tower and antennas left behind after the phone operation.

OH1EH: *What lead to the decision to put together a CQWW phone multi-single effort?*

OH2KI: The members of our group met several years ago at TI1C. While we were there we decided to assemble our own team. We considered operating from either Africa or India. We finally settled on a plan to travel to Gibraltar for the 1999 CQWW contests, but the team members ended up signing up for another interesting effort that year—R1MVZ.

Getting set up for our 2000 Gibraltar multi-single phone operation was quite a project. With just us three old men to set up all the antennas and hook up the gear, we had to work like horses to get the station ready in time. We ended up finishing the assembly process about five minutes before the start of the contest.

OH1EH: *What kind of equipment and antennas did you use?*

OH2KI: This was our weak point. We used my old Rohn tower and rotator, and equipped it with a Force 12 C4SXL/D. This covered 40 through 10 meters. We set up a butterfly dipole for 160 and 80 meters. We also erected multiplier Yagis: a 5-element monobander for 10 meters and a 3-element monobander for 15—both on the same rotator. We had two complete sets of radios. What we did not have was Web access for DX spotting.

Jorma, OH2KI, takes a shift during the phone contest.

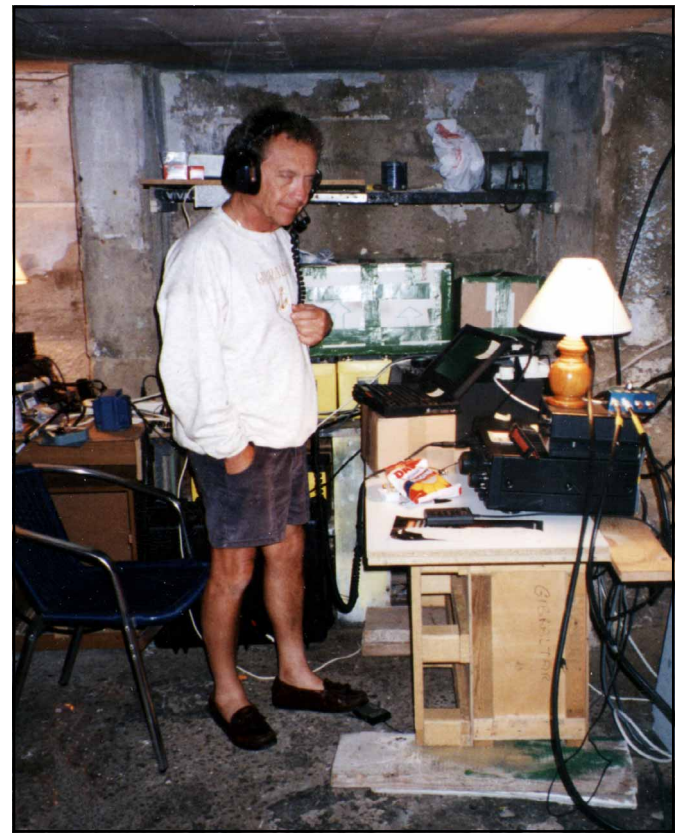
OH1EH: *You returned and operated the CW contest as a single operator on all bands. Any comments on that?*

OH2KI: Unfortunately, this is a story without a happy ending. A storm that passed through the area between the phone and CW contests blew down the tower and left the C4 bent and broken into pieces. The other antennas were damaged as well. Luckily, I found out about the disaster ahead of time and managed to recruit Andy, OH2DT, to come with me and help me straighten things out. On the only available workday before the contest—Friday—Andy and I welded the tower back together and put up an A3 tribander and dipoles for 40, 80 and 160 meters. Without Andy's help, I would not have gotten on the air for the contest, or at best would have had to settle for another 80-meter single band effort.

This year left us all with a longing to operate from there next year, but we'll see. Each year we become a little older, and that 48-hour contest is a horse race, no matter where you are operating from. Once you start becoming accustomed to operating from your cozy shack at home, it gets tougher and tougher to keep up the enthusiasm for these temporary contest station operations in remote locals.

OH1EH: *Do you still feel Gibraltar has*

Tony, N7BG; Oliver, W6NV; and the primary antenna system for the phone contest: a C4SXL/D.



N7BG often finds it more comfortable to operate from a standing position.

the propagation advantage over the rest of Europe?

OH2KI: The high band propagation advantage is there. Those in the north can compensate somewhat for the less favorable propagation by employing big arrays and by knowing the local propagation conditions well. But our experiences have proven to us that you have to have at least passive access to the DXcluster. We did not, and our scores suffered.

OH1EH: *What are your plans for the future?*

OH2KI: This was an ad-hoc team. Any team needs boosters. A mix of exotic DX and the possibility of winning a trophy are the basic requirements. If I remember correctly, right at the end of the phone contest we agreed that that was the last time that we would compete in the multi-single class. Multi-single operation sets limits on the multiplier work, and simple two transmitter multi-singles cannot be competitive against multi-multi operations that invest heavily in multiplier hardware and typically have DX spotting access.

We are between a rock and a hard place: We are not finding multi-single operation all that satisfying, and a serious multi-multi operation requires at least a dozen or so operators. This seems to leave only the single band categories for small teams such as ours. ■

NCJ Profiles—A Survivor from the Black Hole—Pat Barkey, N9RV

H. Ward Silver, N0AX
hwardsil@wolfenet.com

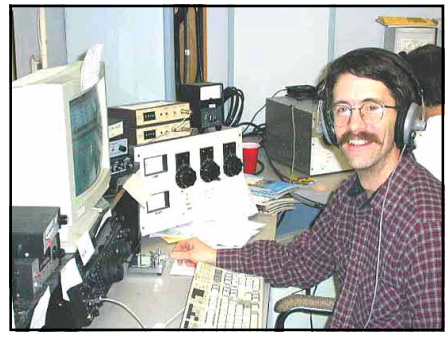
Over the past thirty years, the call WA8YVR was one of the most vigorous and tenacious on the bands. Then suddenly, it disappeared. Where did it go? In 1997 it became N9RV, the call sign of this column's subject, Mr. Pat Barkey (with whom I enjoyed a rambunctious ARRL CW multi-op at K3LR).

In one of the questions I put to Pat—and hence the title of this column—I mentioned the "Black Hole"—a *nom de plume* that is broadly applied to the 8, 9 and 0 call areas; Pat immediately challenged the conventional wisdom. "I don't accept the notion that W9 is in a black hole—at least not Indiana. My definition of a black hole is a place that won't allow its occupants to CQ into Europe on 20 meters in the afternoon. [West Coasters will agree.—*N0AX*] You can certainly do that from here, but you can't rip off a 140-hour at 1700Z like you can from K5ZD. But if we've got the spots, we'll be doing just fine on 15 at that time.

"However, it is getting tougher to be competitive from W9. For one thing, the New England economy is just doing too damn well! There are many, many more competitive single-op stations located in the W1 call area these days. Secondly, the tremendous growth in European activity and multipliers has given the East Coast an even greater advantage, especially on 80 and 160. Finally, we can't catch up by working JAs anymore."

What this means is that techniques that work just fine from farther east are no longer applicable once the Appalachians fade into the rear-view mirror. "I'll tell you what *doesn't* work from the Midwest. If you go to the highest band open at sunrise, point your antennas at Europe and turn your keyer up and wait for the band to explode, you're going to be disappointed. If you don't pay attention—or if you're not good enough to pick out the calls of the weak ones that are calling in—you'll suffer. You'll also hurt if you've got inferior hardware, especially on the low bands. Inverted **V**s on 80 and 160 **L**s with two radials won't cut it from here."

On the other hand, these unpleasantries—as our dads all used to say—"build character." As a result, this may lead to a breed of tougher, stronger operators. "To be successful from W9 you have to be much, *much* hungrier. Every hour that you have rate to Europe may be your last, and you have to milk it as if it were. If three people call at once, you've got to work them all before they drift off. By the time we get our good opening into Europe, the bands on the European operators' end are full of loud Ws, so you have to use your skills to work them faster."



N9RV operating 160 meters at K3LR.

Pat should know about this—he has operated from W8 or W9 for almost 35 years. "I started out as WN8YVR in 1967, at age 12, in Flint, Michigan. I became WA8YVR the following year. The best station I had included a Mosley MP-33 tribander on a roof tripod, an inverted **V** for 40 and an 80-meter dipole. I ran a DX-100 and an NC-300 receiver with a Johnson tube T/R switch that gave me QSK on 80 meters for NTS traffic, which is about all the radio I did for the first 3 or 4 years."

Pat followed a path popular with guys his age. "I got into contesting through traffic handling. One night, while waiting for the 8th-district Regional Net (8RN) to start, I heard all these guys with familiar calls sending 'CQ CD'—and joined in. Contesting immediately caused me to operate on bands other than 80 and made me realize that my existing antennas were totally inadequate. When I left for college at age 16, I had no contest mentors and little experience outside of the CD Parties. I could record all of the DX I ever worked on a couple of log pages." That soon changed.

"I got my jump start in serious contesting in 1971 at the University of Michigan, W8UM. Our ringleader was Tom Russell, N4KG. I was operating during a phone CD Party in October when Tom decided that I had potential. We ended up building up the station and participating in many multi-op events. It was a small group, but very intense. We were all very serious about winning, which, unfortunately, we almost never did. 1971 was also the year of the Mad River win in the Sweepstakes—and the infamous asterisk and subsequent disqualification. Some people back here still remember this with bitterness.

Those were the days when there were very active university club stations participating in contests: W1MX, W2SZ, W9YT and—our arch-nemesis—Michigan State, W8SH. These were also the glory years for Michigan contesting, with operators and stations like K5TM, K1ZZ, K7NHV, NA8V, K7GM, K8HLR and K8CH making lots of noise.

"During my years in Michigan, I worked with NA8V to build up a respectable station at his parents' house. There was where we really learned some of the toughest lessons about operating and station building. We did a lot of things wrong, but we eventually got our act together and started placing well in the DX contests. I finally made the Top Ten in 1982, fulfilling a lifetime goal."

In the Midwest, there are a lot of hams—and a lot of contesters. This helped keep Pat on an upward climb in the scores column. "After leaving Michigan for Indiana in 1985, I struck up a friendship with W9RE that remains strong to this day. Mike has an unsurpassed talent for building things. He very generously let me operate from his station in the late 1980s. Since returning to Indiana in 1993, I have gone back to operating from there for the WW CW contests."

Ohio is another place with lots of hams, as any Sweepstakes operator knows. "In the early 1990s I lived in Columbus, Ohio—it seemed like everyone was building stations, and the activity was terrific. I ended up buying K8RR's (ex-KN8Z) old house, and thus had the first station of my own since my high school days. I joined the North Coast Contesters, which was (and still is) a truly elite band of active operators who like to win and have fun. I made the mistake of driving up to K3LR's one contest to operate multi-multi and—to this day—I have found that a tough habit to break!"

With his first opportunity to build a competitive station, Pat has begun his climb up a long hill. But he's about to get on the fast track. "With just a 70-foot tower up, I have only put in serious efforts in domestic contests in the last few years. I currently have Telrex monobanders on 20 (a 4-element), 15 and 10 (5-elements each), dipoles for 40 and 80 plus an inverted **L** on 160 for the NAQP contests. That should change this summer. My 140-foot rotating Rohn 55 tower is now standing, and it will soon be populated with a 4-high stack on 15 and a 3-high on 10. Another 160-foot tower is assembled and awaiting a crane. This one will hold big 20 and 40-meter antennas.

"I have had an IC-765 and a homebrew 3CX1200 amp for years. Three years ago, I borrowed a TS-930 from W9RE

and used it with a Gap vertical for a primitive—but very effective—first attempt at SO2R. I got an Alpha 87 for the second radio last year, and should have a second IC-765 by this fall. I've also put a lot more work into SO2R switching and should be ready to rock.

"For me, the essence of ham radio contesting is the dream of building the ultimate station: laying out the antennas, building and assembling the hardware, etc. The operating is just the icing on the cake. Even when you're in a guest-operating situation—like with W9RE or K3LR in my case—the real fun is working with the owners to make the stations as good as they can possibly be. Operating is definitely the high point, but the contests themselves are the exclamation point on everything that goes before-hand. The irony is that operating has always come naturally to me, but building and working with hardware has always been a humbling experience.

"It is particularly satisfying to meet or exceed long-term goals. When we first started operating from K3LR's in the multi-multi class, winning the category seemed like an impossible task. It took years before we even got close, and still more years of frustratingly-close finishes out of the money before the seas parted and we earned a few victories. Winning is not always a realistic goal in all contests, of course, but you should always strive to be recognized as a competitor in every contest you enter—even if it is only among the people in your own backyard.

"The fall contests—the CQ WWs in particular—are the most exciting, because there are so many months of station preparation and anticipation before each event. Anyone who doesn't get a little pumped up tuning the bands the day before these contests isn't a true contester!"

Contesting doesn't thrive in a vacuum—and Pat recognizes this. "I live in a small city northeast of Indianapolis, and am on the fringe of several large contest clubs: Mad River, SMC and North Coast Contesters. I envy the guys in Cleveland, Boston or Philadelphia who have a lot of contact with local contesters. The more lasting high in contesting comes from the recognition and camaraderie among active contest operators. I think it is always exciting to be among people who are doing things—and successful contesters are some of the most active people you will find anyplace.

"The special people in ham radio for me are the really good operators. If you've ever heard K2KIR run a traffic net or listened to K1GQ work a pileup from KH6RS, you know what an inspiration it can be. I also live in awe of people like N4AR, who continue to build and experiment with antennas with the same enthusiasm that they had when they were teenagers.

"Unfortunately, I have been less successful in getting others on the air. The gap between hams that are active on HF and those who only know the world of 2 meters sometimes seems to be miles wide. I have had some younger hams out to my shack, but it's tough to get them over the point of being intimidated by the unfamiliarity of HF.

"I think that the marketing of ham radio—and contesting in particular—is something that requires attention. [ARRL President W5JBP will agree.—*N0AX*] This is something that I think a surprising number of contesters take for granted. The care and feeding of contest activity is very important. It requires consistent and fair administration, good exposure of results to both current and potential future participants, and effective communication of the overall message: contests are fun! Some publications seem to be almost embarrassed to say that.

"I think HF contesting is extraordinarily healthy right now. There are always threats and opportunities, of course. But thanks to computers, global economic growth, and the political changes in Europe, there is an incredible level of activity in the major contests. Many of the so-called problems of contesting are really just symptoms of its popularity: eg: the congestion on 40 and 160-meter SSB, frequency fights, etc.

"Having said that, I do think that there are some generational changes ahead in contesting. I find that my views on the essence of competition are not in tune with those who have come on board more recently, particularly regarding Internet and operating assistance. For me, the idea of unplugging Internet and packet and all the other modern distractions to spend the weekend working stuff on my radio is very thrilling and challenging. But newer contesters have other views, and the idea of setting up Web cams, real-time database exchanges, and other things that newer technology affords gets them excited. The trick to keeping me fired up about contesting is to be sure to have some new antennas and/or toys for me to play with for the next season."

Pat also echoes a theme that I'm sure many of us share. "When W3LPL said at Dayton recently that 'I can't imagine what I'd be doing if it weren't for ham radio,' I am sure he spoke for a lot of us. There certainly would be a large hole in my life if I weren't active." ■

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 October 2001. The Web version of this calendar is updated more frequently and lists contests for the next 12 months. It can be found at **www.hornucopia.com/contestcal/**.

Although the summer months generally offer fewer contests, there is still a variety of state QSO parties (from New Jersey to Hawaii), modes (SSB, CW, RTTY) and frequencies (HF to UHF) to match almost any type of contesting interest.

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

July 2001

RAC Canada Day Contest	0000Z-2359Z, Jul 1
MI QRP July 4th CW Sprint	2300Z, Jul 4 to 0300Z, Jul 5
Venezuelan Independence Day Contest, SSB	0000Z, Jul 7 to 2400Z, Jul 8
IARU HF World Championship	1200Z, Jul 14 to 1200Z, Jul 15
FISTS Summer Sprint	1700Z-2100Z, Jul 14
CQ Worldwide VHF Contest	1800Z, Jul 14 to 2100Z, Jul 15
Colombian Independence Day Contest	0000Z-2400Z, Jul 15
QRP ARCI Summer Homebrew Sprint	2000Z-2400Z, Jul 15
Pacific 160M Contest	0700Z-2330Z, Jul 21
AGCW QRP Summer Contest	1500Z, Jul 21 to 1500Z, Jul 22
North American QSO Party, RTTY	1800Z, Jul 21 to 0600Z, Jul 22
Georgia QSO Party	1800Z, Jul 21 to 0400Z, Jul 22 and 1400Z-2400Z, Jul 22
Six Club Sprint	2300Z, Jul 21 to 0400Z, Jul 22
Venezuelan Independence Day Contest, CW	0000Z, Jul 28 to 2400Z, Jul 29
Russian RTTY WW Contest	0000Z, Jul 28 to 2400Z, Jul 29
IOTA Contest	1200Z, Jul 28 to 1200Z, Jul 29

August 2001

10-10 International Summer Contest, SSB	0001Z, Aug 4 to 2400Z, Aug 5
European HF Championship	1000Z-2159Z, Aug 4
North American QSO Party, CW	1800Z, Aug 4 to 0600Z, Aug 5
ARRL UHF Contest	1800Z, Aug 4 to 1800Z, Aug 5
YO DX HF Contest	0000Z-2000Z, Aug 5
QRP ARCI Summer Daze SSB Sprint	2000Z-2400Z, Aug 5
WAE DX Contest, CW	0000Z, Aug 11 to 2359Z, Aug 12
Maryland-DC QSO Party	1600Z, Aug 11 to 0400Z, Aug 12 and 1600Z-2300Z, Aug 12
SARTG WW RTTY Contest	0000Z-0800Z and 1600Z-2400Z, Aug 18 and 0800Z-1600Z, Aug 19
ARRL 10 GHz Cumulative Contest	0800-2000 local, Aug 18 and 0800-2000 local, Aug 19
Keyman's Club of Japan Contest	1200Z, Aug 18 to 1200Z, Aug 19
SEANET Contest, CW/SSB/Digital	1200Z, Aug 18 to 1200Z, Aug 19
North American QSO Party, SSB	1800Z, Aug 18 to 0600Z, Aug 19
New Jersey QSO Party	2000Z, Aug 18 to 0700Z, Aug 19 and 1300Z, Aug 19 to 0200Z, Aug 20
TOEC WW Grid Contest, CW	1200Z, Aug 25 to 1200Z, Aug 26
SCC RTTY Championship	1200Z, Aug 25 to 1159Z, Aug 26
Ohio QSO Party	1600Z, Aug 25 to 0400Z, Aug 26
Hawaii QSO Party	1600Z, Aug 25 to 2200Z, Aug 26
South Dakota QSO Party	1600Z, Aug 25 to 2200Z, Aug 26
W/VE Island Contest	1600Z, Aug 25 to 2359Z, Aug 26

September 2001

All Asian DX Contest, SSB	0000Z, Sep 1 to 2400Z, Sep 2
CCCC Contest (23 Hz RTTY)	0000Z-2359Z, Sep 1
IARU Region 1 Field Day, SSB	1300Z, Sep 1 to 1300Z, Sep 2
MI QRP Labor Day CW Sprint	2300Z, Sep 3 to 0300Z, Sep 4
WAE DX Contest, SSB	0000Z, Sep 8 to 2359Z, Sep 9
SLP Competition (SWL)	0000Z, Sep 8 to 2400Z, Sep 9
ARRL September VHF QSO Party	1800Z, Sep 8 to 0300Z, Sep 10
North American Sprint, CW	0000Z-0400Z, Sep 9
ARCI End of Summer PSK31 Sprint	2000Z-2400Z, Sep 9
YLRL Howdy Days	1400Z, Sep 14 to 0200Z, Sep 16
AGB NEMIGA Contest	2100Z-2300Z, Sep 14
Air Force Anniversary QSO Party	0001Z, Sep 15 to 2359Z, Sep 16
ARRL 10 GHz Cumulative Contest	0800-2000 local, Sep 15 and 0800-2000 local, Sep 16
Scandinavian Activity Contest, CW	1200Z, Sep 15 to 1200Z, Sep 16
Washington State Salmon Run	1600Z, Sep 15 to 0700Z, Sep 16 and 1600Z-2400Z, Sep 16
North American Sprint, SSB	0000Z-0400Z, Sep 16
Tennessee QSO Party	1800Z, Sep 16 to 0100Z, Sep 17
SLP Competition (SWL)	0000Z, Sep 22 to 2400Z, Sep 23
Scandinavian Activity Contest, SSB	1200Z, Sep 22 to 1200Z, Sep 23
CQ/RJ Worldwide DX Contest, RTTY	0000Z, Sep 29 to 2400Z, Sep 30
Louisiana QSO Party	0000Z-2400Z, Sep 29
ARCI Fall QSO Party	1200Z, Sep 29 to 2400Z, Sep 30
Texas QSO Party	1400Z, Sep 29 to 0200Z, Sep 30 and 1400Z-2000Z, Sep 30
Anatolian DX Contest	1600Z, Sep 29 to 2400Z, Sep 30

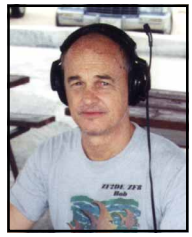
October 2001

TARA PSK31 Rumble	0000Z-2400Z, Oct 6
Oceania DX Contest, Phone	1000Z, Oct 6 to 1000Z, Oct 7
EU Autumn Sprint, SSB	1500Z-1859Z, Oct 6
California QSO Party	1600Z, Oct 6 to 2200Z, Oct 7
QCWA QSO Party	1900Z, Oct 6 to 1900Z, Oct 7
Iberoamericano Contest	2000Z, Oct 6 to 2000Z, Oct 7
RSGB 21/28 MHz Contest, SSB	0700Z-1900Z, Oct 7
10-10 Day Sprint	0001Z-2400Z, Oct 10
YLRL Anniversary Party, CW	1400Z, Oct 10 to 0200Z, Oct 12
ARRL International EME Competition	0000Z, Oct 13 to 2359Z, Oct 14
Oceania DX Contest, CW	1000Z, Oct 13 to 1000Z, Oct 14
EU Autumn Sprint, CW	1500Z-1859Z, Oct 13
Pennsylvania QSO Party	1600Z, Oct 13 to 0500Z, Oct 14 and 1300Z-2200Z, Oct 14
FISTS Fall Sprint	1700Z-2100Z, Oct 13
North American Sprint, RTTY	0000Z-0400Z, Oct 14
JARTS WW RTTY Contest	0000Z, Oct 20 to 2400Z, Oct 21
Worked All Germany Contest	1500Z, Oct 20 to 1459Z, Oct 21
Asia-Pacific Sprint, CW	0000Z-0200Z, Oct 21
RSGB 21/28 MHz Contest, CW	0700Z-1900Z, Oct 21
Illinois QSO Party	1800Z, Oct 21 to 0200Z, Oct 22
YLRL Anniversary Party, SSB	1400Z, Oct 24 to 0200Z, Oct 26
CQ Worldwide DX Contest, SSB	0000Z, Oct 27 to 2400Z, Oct 28
SLP Competition (SWL)	0000Z, Oct 27 to 2400Z, Oct 28
10-10 International Fall Contest, CW	0001Z, Oct 27 to 2400Z, Oct 28

■

Contesting For Fun

Bob Patten, N4BP
n4bp@bc.seflin.org



N4BP

Let's start out by separating the fact from the fiction in last issue's tale of the N4BP/K7RE Bahamas DXpedition:

True: My luggage was somehow lost on the *60-mile* flight from Ft Lauderdale to Freeport.

True: Antenna erection was delayed by one day.

False: No persons or property were harmed in the making of this DXpedition.

True: The fantastic European opening on the low bands caused us serious problems.

True: We both experienced cases of "lower intestinal distress."

False: No major difficulties were experienced with our station equipment.

False: Neither of us participated in any water sports—if you don't count the torrential rainfall.

True: Brian snores like a freight train!

True: The hotel roof is falling apart—but it didn't result in any difficulties.

False: Brian's return flight did not have problems with its landing gear.

False: Our motorcycle ride to Wendy's for lunch was very pleasant and resulted in no injuries.

And finally…

True: We plan to do it all again next February.

NorCal's QRP to the Field Contest

Each year, the Northern California QRP Club (NorCal) sponsors a Field Day-style sprint which they've titled "QRP To the Field" (*QRPTTF*). Aptly managed by Jan Medley, N0QT, this sprint follows a new theme each time. The premise for 2001 was—fittingly—"2001: A Space Odyssey." (Is there anyone alive who did not see the Stanley

Observatories

Call	*Operator(s)*	*Observatory*
W9GFZ	Paul, NA5N; Jan, N0QT; Rich, N5OBA	National Radio Astronomy Observatory Very Large Array (VLA). radio telescope in Socorro, NM.
W8IVF	Gary, W8IVF	National Radio Astronomy Observatory in Green Bank, WV.
N1IRZ	Dave, N1IRZ	Kitt Peak National Observatory at Kitt Peak, AZ.
AD6JV	Bill, AD6JV; Bob, W3CD	Lick Observatory on Mt Hamilton, in California.
W0RW	Paul, W0RW	Las Brisas Observatory in Florissant, CO.

"Special" Stations

Call	*Operator(s)*	*Station location*
K0EVZ	Doc	From "Suzie"—the world's largest model of a Jersey cow (36 feet tall).
KU4FL/KM4T	Tracy/Ward	Next to an Atlas-V rocket at the Huntsville Space Center.
K4FB	Paul, K4FB; Frank, NA4CW; Gary, N4DL; Fred, W2XN; Jack, K4BYF	In the "Rocket Garden" at Kennedy Space Center (aka Cape Canaveral).
KD5KXF	Mike	A UFO crash site in Aurora, TX.
W7TAO	Bruce and Scott	In the lava fields, near Flagstaff, AZ, where the lunar astronauts trained.
N1IE	Ward	Next to a 2000-foot TV tower in Walnut Grove, CA.
AA5TB	Bruce	From the Manzano Mountains. Bodies of the aliens from the Roswell crash are supposedly stored in the caves there.
WA5WHN	Jay	From the famous "cattle mutilation" site near Fenton Lake, NM.

Jim, N0UR, operated from beside these giant wind-powered generators near Lake Benton, Minnesota.

A mystery guest operator briefly took over the N0UR operating position. Jim's logging records include a nine-minute time period that has still not been accounted for.

Kubrick film of several years ago?!)

Extra points were awarded for working stations set up next to monoliths (defined as "large looming objects" in the rules—you might remember the recurring appearance of a looming black monolith in the movie). Bonus points were given for working stations that were assigned special names by the contest chairman (Hal, Dave, Moon, Mars, ET, UFO, etc). I was assigned "UFO" *before* I sadly discovered that the timing of the sprint conflicted with the Florida QSO Party. I was unable to participate.

A lot of hams had a lot of fun with this one, in spite of some pretty dismal band conditions! Several accounts are detailed below. But first, to indicate the flavor of the event, have a look at the partial list—compiled by Paul Harden, NA5N—of planned operations. This list was posted to the QRP-L Reflector. The date of the event corresponded with National Astronomy Day, so Paul began his list with observatories that were planning to be active.

QRPTTF 2001: A Space Odyssey Soapbox

K0CO—Monolith Mobile in the Rockies

I had a great time participating in the 'TTF while on the 3-hour drive from my Denver home to my mountain home in Como, Colorado. The radio conditions were nice from 2 miles up. Thanks to the 25 of you who generated signals that were strong enough to overcome the ignition noise in my GMC pickup truck.

My monoliths were several of the Rockies that I was driving by. Their elevations are around 9000 to 11000 feet. These included Squaw Mountain, Mt Evans, Mt Logan, South Twin Cone Peak, Mt Baldy, Boreas Mountain, Indian Mountain, etc. My rig was an IC-706 throttled back to 5 W. My antenna was a small Hustler resonator on a 3-foot mast mounted to my truck's bed rail. I was using a Kent key, and logged contacts using *GreasePencil Ver1.0* (on the inside of the window). Every so often I would pull over and transfer the contact information into a spiral bound notebook. I'm still trying to come up with a better mobile logging method. This was great fun! TU all!

Jack, K0CO/M

K4FB's Rocket Garden Party

My QRPTTF 2001 preparations began just after the announcement of this year's theme. Frank, NA4CW, is a NASA meteorologist at Kennedy Space Center. I contacted him about a possible operation from there.

Frank put me in touch with Heather Strickland in the KSC Visitors Center's Public Relations department. Heather was very helpful. She provided us with passes, and even managed to get us permission to stop by for an earlier visit and watch the launch of STS-100 from the Center. This facility is closed to the public during a launch.

Fred and Jack, two of the operators that manned K4FB for the 2001 QRPTTF. The stations were set up in the "Rocket Garden" at Kennedy Space Center in Florida. Stations located near monoliths earned extra points in this year's 'TTF.

Endeavor lifted off right on schedule for its journey to the ISS. We used our launch visit as an opportunity to scout out a location for our antenna and station positions.

We operated from the Rocket Garden, within short range of several monoliths. The closest being a 223-foot Saturn 1B rocket! Our operators were Frank, NA4CW (who had to leave early to participate QRP in the Florida QSO Party); Gary, N4DL; Fred, W2XN; Jack, K4BYF; and Paul, K4FB.

Station #1 consisted of an Elecraft K1 (#376) and a 20-meter dipole up at 25 feet. Later we switched to a 20-meter half square, but that antenna did nothing to overcome the poor conditions. Station #2 was an Elecraft K2 (#568) with a 40-meter dipole up at 20 feet. We used this radio on 10, 15 and 40.

We were on the air on 20 and 15 at 1530Z. The rate on 20 was okay, but 15 was a different story. After the first hour, Station #1 had 18 QSOs in the log, but Station #2 only had 5. We kept each operator's shift to around 1 hour. This allowed those not operating to check out the rest of the Visitors Center.

Fifteen meters would occasionally show some signs of life, but the signals would usually vanish just as quickly as they appeared. Ten was even worse. K1ZZ was our only 10-meter QSO. We ended up working him on 10, 15 and 20. Thanks Dave!

We had several visitors stop by during the day and ask what we were doing. We were tempted to tell them we were conducting classified tests for NASA, or communicating with the Space Shuttle, but we resisted the urge!

We did have one ham visit who was on vacation from 1-land. He was shooting video to send to his ham friends in ZD7. He spotted the dipole before he saw our operating position, and had commented on the tape that he wondered why there was a dipole set up there. Gary, N4DL, staged an impromptu on-camera interview and provided info about QRP and QRPTTF. Who knows, maybe we'll see some QRP operations from St Helena soon?

At the end of the 6-hour operating period our logs showed 1 QSO on 10, 21 QSOs on 15, 51 QSOs on 20 and 1 QSO on 40 meters. We collected a total of 42 "special" stations. With our location multiplier and bonus points, our claimed score is 153430.

We qualify for the "Worked All Daves Award," but Hals were rare. K0EVZ prevented us from being completely shut out in that category.

As promised, a special certificate is available for those stations that worked us on at least two bands. K1ZZ earned a 3-band endorsement! We've decided to extend the offer to stations that worked us on any band. Surely we would have had more certificate winners if conditions had been better. Please send QSLs (no SASE is required) with a return mailing label to: Paul Womble, PO Box 1207, Highland City, FL 33846-1207.

If you ever find yourself in Florida near the KSC, the Visitors Center is a great place to spend a day.

This was our first multi-op 'TTF operation. We've posted some photos of our operation on the Web. See: **www.qsl.net/k4fb**. We will be back!

73, Paul, K4FB

A Small Amount of Power from Near a Very Large Array

I have gained new respect for the European Space Agency. They accurately predicted the early arrival of May 26th's M7 shockwave! NOAA was calling for a 10% chance of geomagnetic activity.

When we arrived at the National Radio Astronomy Observatory Very Large Array radio telescope in Socorro, New Mexico, the skies were overcast—but not really threatening. We set up two stations near the center of the Y-shaped array—a beautiful location, I must say.

Just moments before the start of the event, we saw the flash of a lightning bolt, which was immediately followed by the rumbling of thunder. So there we were, standing out in the middle of the flat desert landscape surrounded by a million tons of giant steel antennas! It didn't take very long for us to realize that this was not a good thing. We rapidly dismantled the station and retreated to

the safety of the VLA Control Building. (There we were told that the lightning bolt had struck the array's antenna #11—located on the north arm of the Y).

A short time later, we reassembled the two stations on the VLA cafeteria patio, which has a bit of a covering in case it rained. We managed to get a few QSOs in the log before the wind came up. We rigged up a canvas shield for the wind, and then it started to rain. An hour later, the wind and rain finally died down.

Around noontime, about 50 Boy Scouts—who were on a tour of the facility—arrived at the cafeteria for their lunch break. Needless to say, we were the "show and tell" subject for the next hour. We didn't make many QSOs during that time, but it was lots of fun demonstrating Morse code in action.

About 4 PM, one of my co-workers—Kelly Gatlin—showed up. He's a professional photographer and had agreed to get some good shots of us. He took pictures of the stations with the VLA antennas behind us, and some "gag" photos. One was of Jan, N0QT—in the famous "Jodie Foster" pose—holding her Altoid can 49er plugged into a VLA antenna. Another was Rich, N5OBA, with the camera angle set up so that he looked like he was wearing the world's largest sombrero.

Finally at 5 PM, the skies cleared, the Scouts moved on, the photos were finished and the bands were decent. We had one heck of a good time for that last hour of the contest!

All in all, it was a pretty dismal performance. We managed to collect only 30 QSOs, but we did all have a blast. We'd definitely like to operate from the VLA again.

Doc's world's largest Jersey cow must have somehow added 12 dB to his signals, and W7TAO and NQ7X were blasting in from the lava fields in Arizona. I think we worked all the Colorado stations that were on, and they all had good signals. AA5B was the only other New Mexican station we worked. We heard lots of the other participants—but we were unable to raise them.

72 from the world's largest radio telescope! Paul, NA5N; Jan, N0QT; and Rich, N5OBA

N0UR, and the Ghost in the Machine

QRP To The Field has become one of my favorite "fun" contests. The yearly themes provide additional incentive for getting out and working this contest.

A couple of years ago, the theme was operating from state borders. I set up at the corners of Minnesota, Wisconsin and Iowa. Last year the theme was water—either on it, or next to it. I visited the north shore of Lake Superior for that one. For this year's "2001: A Space Odyssey," I went to the southwest corner of Minnesota and set up near one of the large wind generators. Planning for this one—and reading the e-mails posted to the reflector about other folks' plans—was almost as much fun as the actual contest!

All went well, with the exception of some software problems with my new logging program. I was using *HAL* contesting software by Odyssey Inc. I had my ICOM IC-735 interfaced with an older laptop that I saved from the junk pile. It had been forced into retirement when our company upgraded their hardware. I have used this setup many times before without any problems.

The 20-meter band was in fair shape, but 15 and 10 meters were suffering. I was CQing on 20 and things were slow, but steady. I decided to try 15 for awhile. It sounded dead.

I hit the F1 key to CQ and the computer jumped back to 20, taking the rig with it. I manually switched the rig back to 15, hit F1 again, and the same thing happened—except this time the system started sending CQ! To my surprise, a small group of stations immediately answered the call, and I ended up getting a nice little run going.

One of the stations was N4ROT, or so I thought. Every time I typed the letter T, the letter A would show up on the screen; it happened three times! He started to send his exchange, and I realized it was Dan, my old buddy from Virginia—a regular in this contest. His call *is* N4ROA, *not* N4ROT. Wow, that was weird!

Suddenly, instead of me not being able to switch bands, the system started to switch bands for me. It would jump down to 40, up to 15 meters, back to 20—sending CQ each time. Things were getting out of control! I decided to reboot. If that didn't work, I'd break out the paper log.

Then the keyboard went dead. Nothing I typed showed up on the screen. Wait a minute, the dang thing was sending my exchange! As I looked at the screen, a call popped up in the call field. Hey, I didn't type that in! To my amazement, the complete exchange was now in the log, and the system was sending QRZ.

This can't be. I punched the power switch on the computer, but nothing happened. It kept right on running. I tried to turn off the rig, but it came right back on, and picked up were it left off.

Had I been out in the sun to long? Could this really be happening? I got up and walked around to the cab of my truck for a rest and a drink of water. As soon as I sat down on the front seat and shut the door—"click"—the power door locks engaged. I was trapped! Could this possibly be happening?

Uh oh! "Open the truck doors HAL!" I yelled to no avail. As I looked through the back window at my operating position, I could see my old laptop working and logging stations as fast as they came back. From what I could tell, it seemed to be doing pretty well. It hung in there tough when it should, and then jumped bands—and was even moving stations to other bands!

At 7 PM sharp, the truck doors unlocked with a loud "kerchunk." The contest was over. Wow, the final tally on the screen was pretty impressive!

I'm just glad I didn't have this software set up last year. Lake Superior is a cold, deep lake, and they might still be searching for me. I'll let you know how I… er… I mean "we"… did this year as soon as I regain my composure.

My monoliths were wind generators near Lake Benton, Minnesota, about 5 miles from the Minnesota/South Dakota border. This was my first visit there. I was amazed at the sight of these white towers sprouting out of Buffalo Ridge for as far as I could see—both north *and* south; there are hundreds of them. My station location was at a "horse" camp, on top of Buffalo Ridge overlooking Lake Benton. There was a series of towers right there in my "backyard." It was perfect.

I walked over to get a closer look at one of the wind generators. These things are awesome! They are over 250 feet tall and have three huge blades that make a "swooshing" sound as they cut through the air. These are beautiful machines.

I made the mistake of taking my pickup truck instead of the family mini van. I set up on the tailgate and used a plastic tarp as a cover to shade my computer screen and to keep the rig cool. I now know why they picked this location for the wind generators—the wind was violent. Every time I stood up, my cap flew off and my chair blew over. The tarp was making so much noise flopping around I had to crank up the audio on the rig.

I had the equipment shaded, but there was no shade for me. After being mostly indoors for the last 8 months, I ended up with all of my exposed skin burned to a nice reddish pink. Perhaps it was wind burn?

I didn't have any trouble with ranchers or cattle mutilators. I did have a handful of visitors stop by and ask me what I was doing. They would usually want to hang around and talk for what seemed like forever. They were very nice people though.

The highlight of the whole adventure was when my old friend Norm, WA0OUR—whom I haven't seen in 20 years—decided to drive up from Sioux Falls. It was great to see him.

Thanks to all who participated.

72, Jim, N0UR ■

VHF-UHF Contesting!

Jon K. Jones, N0JK
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Let's continue with our "Rover" theme from last issue. This time around, Brian, ND3F, provides some great tips that you might find useful for improving your Roving operations. His suggestions are for the microwave bands. I found out first-hand—from my experiences in the January 2001 VHF Sweepstakes—that these bands can be pretty challenging to operate while Roving.

ND3F's "Rover Tips from a Grid Pirate"

By Brian Skutt, ND3F

I've learned quite a bit about microwave operation over the last several years by participating in activity days and operating these bands while Roving in contests. I thought it might be helpful if I share with you some of what I've discovered.

Number 1: Know That Your Gear is Transmitting and Receiving

I carry a weak signal source and a "relative power output indicator" for every band, so I can verify that I can receive and that I'm putting power out. The weak signal source is just a crystal oscillator with a diode multiplier. I use an oscillator running at 96.0000833 MHz. It multiplies to 2304.020, 3456.030, 5760.050 and 10268.090 MHz and is very consistent. For transmitter testing, I use directional couplers, crystal detectors and a milliammeter.

It's a drag to hear an operator say, "I don't know if I'm getting out or not"—especially after trying to complete a QSO with him for 10 or 15 minutes! I avoid being the "guilty party" by verifying that I can hear my own portable "beacon" and that I can see an indication that transmitter output power is heading towards my antenna!

Number 2: Use a Coordination Band for Microwave QSOs

W2FU (ex-W2HPF) taught me the value of keeping at least one coordination band open. The 432 MHz band is a good choice. The purpose is to coordinate timing (who transmits when), coordinate frequency, share results ("I hear you! Send the exchange!"), and most importantly to allow each station to relay the received signal back to the transmitting station for "self peaking" purposes.

Here's an example of how this works: I transmit to K1RZ on 1296 MHz, who can just barely hear me. He retransmits my signal back to me (in real time) on 432 MHz. I adjust my antenna to maximize the loudness of the audio that I'm hearing on 432 that's coming out of K1RZ's 1296 receiver! If necessary (it usually isn't), we switch roles. This exercise only takes a few seconds and virtually guarantees that we'll complete the QSO, even when signals are extremely weak. Good stuff!

Number 3: Know Your Frequency

Some guys use rubidium standards and claim to know their frequency to within a gnat's eyelash (an especially common boast made by the home stations). In my experience, there are two sides to knowing your frequency—"precision" (my definition: knowing your frequency to the extreme far right of the decimal point) and "accuracy"—(my definition: repeatability). I go for accuracy.

For a Rover, each site has a different temperature, humidity and barometric pressure. To make matters worse, we probably transported our gear over a rough road to get it there. I just can't take into account all the possible calibration variations. But I know that if I set my 10 GHz IF receiver to 433.0875 MHz, that K8GP will be there—every time—and he will say that he's on 10368.100 MHz *exactly*. So I keep track of a lot of offsets. I tune to the last actual display readout where I worked someone—and I use that as a benchmark. For that first contact, I often have to retune—sometimes by as much as +/– 100 kHz at 10368 MHz! But once I'm synchronized, I can use the recorded offsets to return to the same frequencies I've previously made contacts on and will be right on—especially when it's a home station on the other end!

In the September 2000 VHF QSO Party I made long distance 10 GHz contacts from 10368.062 to 10368.105 on my dial—and everyone claimed that they were on 8.100 (which is around .088 on my dial using my weak signal source to calibrate. [*Brian makes an important point here. Absolute frequency accuracy is more difficult as you go higher in frequency. This applies to home stations and Rovers. Thus WB0DRL's "3456.100" may read out on W5LUA's receiver as "3456.126." The absolute frequency is not important—but it is critical when signals are weak that everyone knows where to listen. If W5LUA knows that on the 3.4 GHz band ".100" on WB0DRL's radio is ".126" on his, he can tune there first with some confidence that WB0DRL will be calling him there. Using "offsets," as Brian suggests, is a good approach. Remember to tune quite a ways +/– when first trying to work a station on microwaves. Doppler shift from rain or snow scatter can complicate things further.—N0JK*]

Number 4: Pointing/Azimuth/ Direction

Some may be surprised to hear that I no longer carry a GPS receiver. For me, it's a time-consuming annoyance. Why? Because the GPS coordinates for any site that I go to are the same every time I visit it! Also, I've found that people take way too much comfort in using the bearings they get from their computer (I'm guilty of this). As is the case for most Rovers, my antennas are not perfectly aligned, my dish is dinged up, etc. Invariably, the best bearing is the direction in which the signal is the loudest. It's not always (or even often) what the computer says it should be! Example: When I had a 10 GHz antenna on my tower at home, surrounded by trees, tucked on the down slope of a hill and blocked to the west, I could work many stations who had no direct line-of-site path to me. For K1RZ, who is only 15 miles away, but due west through the hill, we almost couldn't communicate direct path. But when I turned my antenna southeast—towards a big microwave tower about 1 km away—he was 5 by 6 or 5 by 7. This is a crucial consideration when pointing! Get a friend to work you from your favorite site, and try all the various headings. You will likely observe a number of peaks and valleys in the signal strength. These are due to scatter, multi-pathing, side-lobes, etc.

There is one aspect of the direction/ location issue that could stand for some improvement. I wish someone would paint grid lines on major roads so we could more easily determine what grid square we are in (HI, HI).

Number 5: Timing

In order to complete a QSO, you not only have to know the frequency and the bearing, but the timing is critical as well. Too many times I have listened to two guys trying to work each other that are transmitting at the same time and listening at the same time. Spending an extra moment to coordinate timing is crucial. [*One method of assuring proper timing is to use "calling sequences." I*

have used 30- and 60-second sequencing. For weak signal microwave work, one station calling on even minutes and the other station calling on odd minutes is a useful technique. Minute-long sequences allow enough time for each station to tune in the other and make antenna aiming adjustments.—N0JK]

Bottom Lines

Verify that your stuff is working, coordinate well, be creative, focus on repeatability and precision, and familiarize yourself completely with your operating sites and equipment. These are the keys to having more fun and increasing you microwave QSO completion rate.

Thanks to Brian and the Mount Airy VHF Radio Club's May 2001 Cheese Bits *for allowing us to republish this article.*

Sources for Microwave Equipment

The major ham radio equipment manufacturers offer off-the-shelf equipment for VHF, UHF and 1296 MHz. But for the 222 and 903 MHz bands—and the microwave bands above 23 cm—where does an extreme-frequency contest operator looking to add multimode capabilities on new bands find gear? Down East Microwave is one manufacturer and distributor of VHF/UHF/SHF gear up to 10 GHz. They sell parts, kits, amps, antennas, preamps and "no-tune" transverters. Their Web site is **www.downeastmicrowave.com**. SSB Electronic also offers a great variety of products for these bands. See **www.ssbusa.com**. Advanced Receiver Research **www.advancedreceiver.com**—is a good source as well.

Another place to get your hands on microwave gear is at one of the VHF conferences. The Central States VHF Society Conference will be held in Dallas, Texas July 26th through the 29th of this year. On Thursday July 26th, Kent Britain, WA5VJB, has arranged to hold one of his world famous microwave surplus tours! The Dallas/Fort Worth area has more electronics manufacturing—and therefore more microwave surplus—than almost any other region of the country. I have built 3.4 and 5.7 GHz transverters and 10-W solid state 13-cm amps—for just a few dollars—from parts that I scrounged on one of these surplus tours. Lots of used gear and parts also show up at the conference flea market, which is held Friday evening.

Some of the world's Amateur Radio microwave experts will be at this conference, such as W5LUA, WA5VJB, WA5TKU, WD5AGO, N2CEI, W7CNK and AF8Z. If you have questions about microwave gear, antennas or operating, you should be able to find answers to them there. Owen Wormser, K6LEW, will give a talk about the K8GP VHF contest station on Saturday, July 28th.

The Dallas 2001 CSVHFS Conference is a good place to learn about microwave gear for contest operating and VHF/UHF in general. Visit **www.csvhfs.org** for more information. The Microwave Update 2001 is another great resource for information on microwave equipment and techniques. It will be held in Sunnyvale, CA on September 27th through 30th. For details, see **www.microwaveupdate.org**.

K-20 Keyboard Keyer Kit

CW is the preferred mode for making weak signal VHF/UHF/SHF terrestrial, EME and contest QSOs. Some newly-licensed VHF operators are just learning CW and may discover that using a keyboard keyer helps them to send properly. Contest pros might find a dedicated keyboard keyer useful for Roving, portable work and running EME sequences. As a Rover, you could let the keyer key your 1296 MHz transmitter for a couple of minutes while listening for a retransmitted signal on 432 MHz—as ND3F suggested—freeing up your hands for tuning and antenna pointing.

I spotted an inexpensive keyboard keyer kit in the April 2001 issue of the *Low Band Monitor* (**www.qth.com/lowband**). It is called the K1EL K-20. It offers more capabilities than even expert CW operators may ever need. The kits are available for $25 from Steve Elliott, K1EL. Additional parts that are needed are a PS/2 keyboard ($9.95 plus postage from MCM Electronics, tel 800-543-4330), a diecast enclosure, a phono plug and jack, and a coaxial power plug and jack. The total cost for the additional parts is about $22. For more information, check out **www.k1el.com**.

The ARRL UHF Contest: August 4th and 5th

All this talk about microwave gear has me ready to get on some new bands. A good opportunity to check out your new UHF and microwave gear is the ARRL UHF Contest. There have been some great tropo openings during this contest in past years. You can use the UHF Contest to exercise your microwave gear at home or while Roving. It's a great preparation for the September VHF QSO Party. A few years ago the ARRL almost scrapped this one due to low activity. If you wish to see this contest continue, please get on and send a log in. Complete rules are posted on the ARRL Web site: **www.arrl.org**.

Great Sporadic E Conditions for the 2001 50 MHz Spring Sprint

The 2001 50 MHz Spring Sprint was held May 12th and 13th from 2300Z to 0300Z. Six meters was open at the start of the Sprint, and by the end widespread Es extended across much of the lower 48 states and south to Central America and Panama.

The northeast US had some decent aurora into Canada. There was lots of activity this year. I made about 30 QSOs running 50 W and an attic dipole. Best DX for me was W0AMM/mm in all-water grid FM00 and TI5MMB in EK70! KM0T in EN13 reported "I was calling CQ contest and HP2CWB in FJ09 answered!"

Mike, K0AZ in EM37 found YS1RR at 0239Z. YS1RR was reported to be using a vertical antenna. WA4NJP in Georgia had the "big signal" here in Kansas for hours and was running 5s and 0s throughout most of the evening. Stations in Texas and Florida were favored with the best Es conditions, and several reported making over 100 contest QSOs.

The extensive Es opening allowed Es/TEP links, and K8LEE reported working several LUs. N6XQ worked FK1TK at 0101Z on May 13th. Florida stations had a "pipeline" into Central America, and K2RTH/4 in Miami reported YS, TI, and HR stations at 59++. Some of the DX stations that were reported to be active in the 50 MHz Sprint included: TI5MMB, HP2CWB, HR1BY, HR4/TI5KD, YS1AG, YS1RR, FK1TK, FK8FL, XE2EED, KH8/N5OLS and FO5RA.

Aurora delivered VO1BHK and the VE8BY beacon into the northeast US. I certainly hope that the great band conditions continue for the 2001 June VHF QSO Party. This year's contest could be a record breaker. For more information about the 2001 VHF/UHF Spring Sprints, visit **www.etdxa.org/vhf.htm**. ■

SHORTS

A couple of errors appeared in the diagram that accompanied my short article, "An Audio Controller for SO2R Contesting" (see *NCJ*, May/June 2001, page 13).

1. There should be no short across the relay coil.

2. All 4 audio inputs are labeled as "Right." The upper two are shown correctly, but the lower two should be labeled "Left."

I've posted the correct schematic on the Web. See: **http://w2up.home.mindspring.com/SO2R-audio-controller.doc**.

73, Barry Kutner, W2UP

[*Our sincere apologies to Barry and our readers. The schematic that he provided to us was accurate. The errors crept in at* our *end.—Ed.*]

RTTY Contesting

Wayne Matlock, K7WM
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K7WM

If you missed the March *NCJ* RTTY Sprint, you missed the best one yet. Propagation was great, activity was at an all-time high, and everybody seemed to be having fun. Some tremendous scores were turned in—there are some very talented dial-twisters out there. The next *NCJ* RTTY Sprint is scheduled for October. You'll find the rules and log submission information elsewhere in this issue and also on the *NCJ* Web site: **www.ncjweb.com**. Don't miss it! I'm betting that it will be bigger and better than March's event.

Last time, we began a two-part series written by Don, AA5AU, on his planning for and operation in the 2001 ARRL RTTY Roundup. Here's the final installment—aptly entitled "Sunday—A Day to Remember."

2001 ARRL RTTY Roundup—Part 2

Sunday—A Day to Remember

By Don Hill, AA5UA

As we pick up the story, it's 1300Z (7 AM local time) on Sunday. I'm about to return to the air after my off time.

Before going to bed, I had set up Station "A" on 15 meters (21.104) and Station "B" on 20 meters (14.100). I set my alarm for 1200Z, but ended up staying in bed and getting a bit more rest. I finally climbed out of the sack at around 1245Z.

Once back in the shack, the first order of business was to connect to the Internet and check the WWV report. I don't recall exactly what the numbers were, but I do remember thinking that they looked good. I knew 15 and 10 meters would be open early and that I shouldn't spend too much time on 20 meters.

At 1300Z, I slipped on the headphones and immediately heard a signal on 14.100 MHz. It was A52YL! She was calling CQ! My heart nearly jumped out of my chest. I called her immediately and she came right back. I couldn't believe my luck! Was this an omen of good things to come?

After logging A52YL, I went straight to 10 meters without even tuning the rest of 20 meters. When I flipped to 10, I just happened to land right on UW8I calling CQ. One call and he was in the log. In the meantime, I found LZ2PI on 15 meters and got him on one call. Things were starting out very nicely!

Results, March 2001 *NCJ* RTTY Sprint

Scores

Call	*QSOs*	*Mults*	*Score*
W2UP	299	39	11661
K3MM	284	34	9656
AA5AU	239	31	7409
W6/G0AZT	175	35	6125
K7WM	179	32	5728
W7WW	176	30	5280
4U1WB	167	29	4843
WA0SXV	154	29	4466
K5ZD	135	30	4050
W0ETC	146	25	3650
VE6YR	107	29	3103
K4MA	100	29	2900
W3SE	110	22	2420
WM3T	92	26	2392
W4AUI	64	25	2100
K5HDU	80	24	1920
WA6BOB	66	25	1650
KC4HW	65	25	1625
W6IWO	66	23	1518
K6EP	54	27	1458
N7GC	57	24	1368
WB5QLR	56	22	1232
WA9ALS	68	18	1224
WA9AFM/5	58	17	986
N6TQS	51	19	969
W9ILY	26	16	456
AA4NU	30	13	390
KS0M	22	13	286
VE7FO	18	14	252
SP5OXJ	5	3	15

Check Log: KF4SIR

My strategy before the contest was that once I dove back in on Sunday morning, I would keep Station "A" on 15 meters for the remainder of the contest and, with the small exception of a brief visit to 40 meters at about 2300Z, that's exactly what I did. My plan for Station "B" was to work 10 meters until the rate fell and then move it to 20. For the next six hours I pounded 10 and 15 meters with all my might. I ended up bagging 396 contacts including a nice pile of multipliers.

The Big Decision

Things were going well operating a combination of 10 and 15 meters, but there was something heavy weighing on my mind. I had to make the decision as to when to move Station "B" to 20. The rate was slowing down a bit on 10—Europe was just about gone at 1900Z—but stateside activity was still abundant, and I had already collected all the contiguous states except Georgia. (I had not worked them all in 1999 or 2000.) I knew that if I was going to take full advantage of multipliers, I needed to snag Georgia.

I realized that—with the exception of Georgia—10 meters was unlikely to yield any new multipliers in the middle of the day, so at 1900Z, I decided to move Station "B" from 10 to 20 meters. Twenty meters is typically not very good here in Louisiana at that hour, but I felt that I needed to make this band change. This would ultimately be the best move I would make during the entire contest.

Twenty was alive with plenty of signals. I found DJ7AA for my first contact. This was an especially good sign—I normally don't hear or work Europe this early on 20 meters. I collected a few more stations using S&P and then set up shop on 14.091 MHz. I ran that frequency for a good hour. I maintained a decent rate—62 per hour—and it increased as time went by. At 1945Z, N7HZQ called in from Georgia. He was my 1398th contact. I had finally gathered up all 48 continental states!

The Final Strategy

My strategy for the last five hours was to milk 15 and 20 meters for all they were worth. When the QSO count topped 1500, I set my sights on 1600. With 300 QSOs on 10 meters, I worked hard towards objectives of 500 QSOs on 15 meters and 400 QSOs on 20.

In the last hour, things really slowed down. But one by one I reached all of the "spur of the moment" goals I set for myself. I finished with 1611 QSOs.

Band	*QSOs*
80	145
40	262
20	402
15	502
10	300
Total	1611

If someone had told me ahead of time that I would end up with 1611 contacts—including all 48 continental states, 11 Canadian provinces and 70 DXCC countries—I wouldn't have believed it. But it happened! This contest will be forever etched in my memory as one of the greatest events of my RTTY contesting career.

The people that are really responsible for this achievement are all of the digital Amateur Radio operators that participated in the 2001 ARRL RTTY Roundup. If it were not for them, this would not have been possible. My heartfelt thanks go out to each and every one of them!

73, Don, AA5AU

Nice job, Don! That's all for this issue. There are lots of RTTY contests scattered throughout the year. Pick out the ones you like, get on the air, have some fun and help support the organizers. Participation is the key!

73, Wayne, K7WM ■

International Contests

Joe Staples, W5ASP
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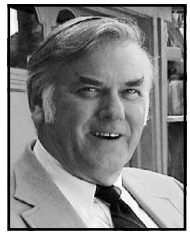
Sometimes Good Things Happen



In this year's March/April column I suggested that it would be interesting if those who are active in the various international contests could post their scores right after the conclusion of these contests—just as is regularly being done for the major domestic and DX contests. Apparently the idea has taken hold. Mike, N7WA, has recently collected and put up on the Contest Reflector some claimed scores for the Russian DX and the JIDX-HF contests.

I've taken the liberty of including these postings in this column in an effort to encourage others to make it a point to post such scores to the 3830 Reflector. Perhaps in this way we can avoid the long delay before we know "how things went" during some of the more popular international contests. If this begins to get out-of-hand, we may have to find someone who is willing to give Mike a hand... 'though that may take a while.

Although this scheme could conflict with subsequent listings of "official" claimed scores, I doubt that it's going to result in any serious conflicts anytime soon. We'll just have to see how things work out.

2000 CQ-M International DX Contest

Call	*Entry*	*Score*	*QSOs*	*Pts*	*Mult*
USA					
N4AF	SOMB-CW	129136	410	1153	112
N6AW	SOMB-CW	68761	300	893	77
K3WW	SOMB-CW	57600	272	768	75
K4XU	SOMB-CW	55152	271	766	72
K9NW	SOMB-CW	47552	261	743	64
N6ZZ	SOMB-CW	19536	163	444	44
KC1F	SOMB-CW	15912	157	442	36
WD4AHZ	SOMB-CW	15390	123	342	45
K4BHI	SOMB-CW	13244	111	308	43
N6JM	SOMB-CW	1815	41	121	15
K0COP/4	SOMB-CW	798	26	57	14
N1XS	SO-14-CW	70026	383	1061	66
K2SX	SO-14-CW	24472	193	532	46
WB4IHI	SO-14-CW	2074	41	122	17
W6AFA	SOMB-SSB	24605	515	665	37
WD5JMC	SOMB-SSB	885	22	59	15
N8WTH	SOMB-SSB	63	3	9	7
KD4PXN	SO-14-SSB	140	8	20	7
K4WMB	SO-14-SSB	132	11	33	4
K4IU	SOMB-MIX	10222	92	269	38
N4MM	SOMB-MIX	2875	42	125	23
Canada					
VA3UA	SOMB-CW	45144	245	684	66
VE3IAY	SO-14-CW	11655	109	315	37
VA3UZ	SO-14-CW	8155	86	233	35
VE5SF	SOMB-MIX	2300	47	115	20
VE4RP	WW2V	2553	35	111	23
Mexico					
XE1RGL	SOMB-CW	3496	66	152	23

2000 All Asian DX Contest

CW

Call	*Band*	*QSOs*	*Mults*	*Score*
USA				
Zone 3				
N6RO	3.5	138	38	5244
WA6FGV	21	206	86	17716
K6III	21	145	89	12905
W7/JR1NKN	21	60	42	2520
W6VNR	21	49	42	2058
W7WA	M	1349	420	566580
W7HS	M	266	157	41762
AC7AF	M	143	92	13156
W6NKR	M	130	92	11960
Zone 4				
K5NZ	21	104	58	6032
WA0OTV	21	20	20	400
AA8LL	M	78	63	4914
K0UK	M	68	49	3332
K8GT	M	44	32	1408
N0XW	M	15	15	225
W0TM	M/S	1161	369	428409
Zone 5				
W4BQF	21	189	95	17955
N4MM	21	41	31	1271
W4ZV	28	270	49	13230
K3ZO	M	690	261	180090
N2ED	M	496	188	93248
K3WW	M	520	170	88400
N4IG	M	228	157	35796
W2YC	M	211	142	29962
N3RD	M	226	104	23504
W7YS	M	188	123	23124
KC1F	M	138	101	13938
K4IU	M	64	50	3200
N4UH	M	54	46	2484
N4BP	M	50	42	2100
Canada				
VA3UZ	21	17	15	255
VE7UF	M	353	178	62834

Phone

USA				
Zone 3				
N6RO	3.5	138	38	5244
W7/JR1NKN	21	51	34	1734
KB7SCF	21	13	13	169
W6AFA	M	820	238	195160
K6III	M	106	74	7844
Zone 4				
K0DAT	14	13	11	143
KK0SS	21	71	37	2627
KG9N	21	23	21	483
KB8TWM	21	3	3	9
AB0MV	M	257	97	24929
K0JJ	M	113	85	9605
K0UK	M	113	71	8023
N6ZZ	M	79	54	4266
K7ABV	M	60	48	2880
K0CIE	M	59	37	2183
WB0YJT	M	13	13	169
N8WEL	M	14	11	154
W0TM	M/S	587	251	147337
Zone 5				
K3TW	21	5	3	15
K3ZO	M	557	244	135908
K3WW	M	256	124	31744
KS4YT	M	224	110	24640
N4MM	M	93	72	6696
K1JN	M	57	57	3249
WB4SQ	M	57	44	2508
N4UH	M	57	44	2508
K4BAI	M	29	25	725
K4IU	M	25	21	525
Canada				
VE7X	M	129	92	11868
VE5SF	M	77	37	2849
VE6ZT	M	58	42	2436

Score Rumors

(Claimed Scores for international contest participation posted to the 3830 Reflector. Compiled by Mike Dinkelman, N7WA.)

2001 Russian DX Contest

Call	*Power*	*QSOs*	*DXCC*	*Obl*	*Score*
SOAB/CW					
N2NT	HP	1338	172	204	3560720
W4SAA	HP	549	121	109	898380
VE3MQW	LP	373	96	88	505816
W8CAR	HP	353	70	77	340893
K1IB	LP	233	136		244120
SOAB/MIXED					
VA3UZ	HP	1894	195	210	5308335
K3WW	HP	1752	208	194	5055552
N9AG@N8NR	HP	549	96	103	756399
VA6LBI		430	75	58	414960
VE5SF	LP	346	70	73	337766
K8GT	LP	144	49	40	108580
R3/K3NA	LP	190	35	50	57120
SOSB/10 MIXED					
VE3KZ		549	54	62	422240
SOSB/20 SSB					
N4JN		26	9	12	3570

2001 JIDX HF CW Contest

Call	*Category*	*Mults*	*QSOs*	*Score*
SOSB/15				
N6RO	HP	45	430	19350
W7ZR	LP	38	159	6042
SOSB/20				
NR6O (N6RO) (NCCC)	HP	43	245	10535

■

Propagation

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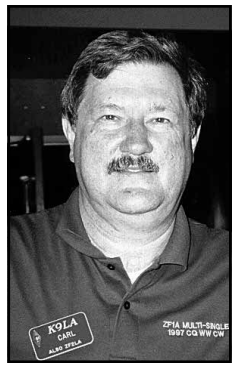
Cyclic Run Rates



K9LA

If you've ever spent time operating a run station in a contest, perhaps you've noticed an interesting phenomenon—your run rate is cyclic (periodic) in nature. For a while you'll be going along at, say, 120 Qs per hour, then a little later it's 80, then even a little later maybe it's 60, then it works its way back up to 120. What's going on? Is this just an "operator ability" issue—or is it simply a "not enough stations to work" issue? Or is there an ionospheric explanation?

Dave Fischer, NC7W, has been interested in this subject for quite some time. He's analyzed many of his contest logs by plotting run rates. But these aren't the typical plots of "the number of stations worked in an hour." He's investigated this in much greater detail by plotting the run rate for 12-QSO blocks. For example, a run rate is calculated for QSOs number 120 through 131. Then a run rate is calculated for QSOs number 121 through 132. Then for QSOs number 122 through 133—and so on.

What comes out of this exercise is a plot such as that of **Figure 1**. Dave extracted the data from his 2000 WPX CW Contest log. It's rather obvious that there is a cyclic nature to his run rate. The run rate data points are from 12-QSO blocks that occurred over periods that vary from about 10 minutes to a little over 30 minutes over the 3-hour window shown.

Is this variation in run rate due solely to operator ability? I don't think so, as the rates shown aren't in the extremely high category (greater than about 180/hr)—where missing just one letter in a call would result in a significantly lower short-term rate until it could be built back up with a period of error-less copy.

Are we just seeing periods when potential contacts are elsewhere working someone else? That certainly might be a consideration in smaller contests, but NC7W's plot is based on data from a major contest with a high level of participation, so I don't think that is what's happening.

Is there an ionospheric explanation? What we're most likely seeing is short-

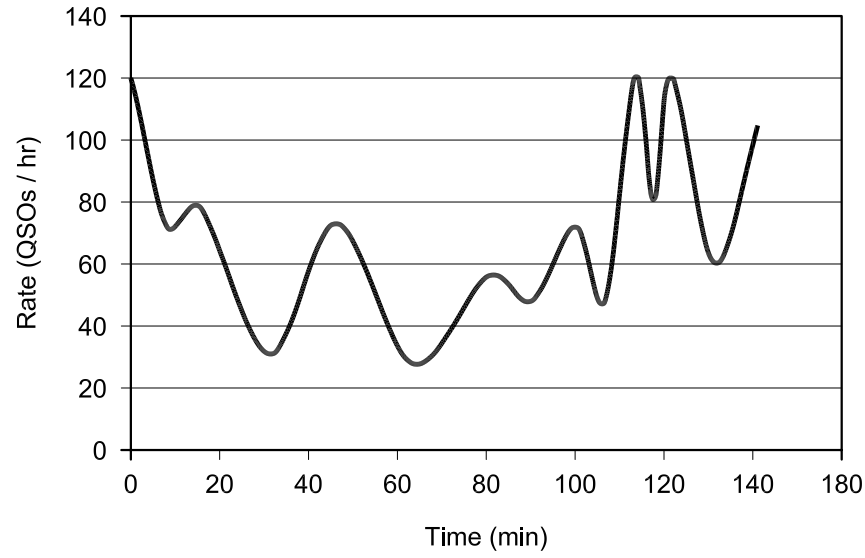


Figure 1—The cyclic variation of NC7W's run rate over time is readily apparent from this graph. The data for this plot comes from Dave's 2000 WPX CW Contest log.

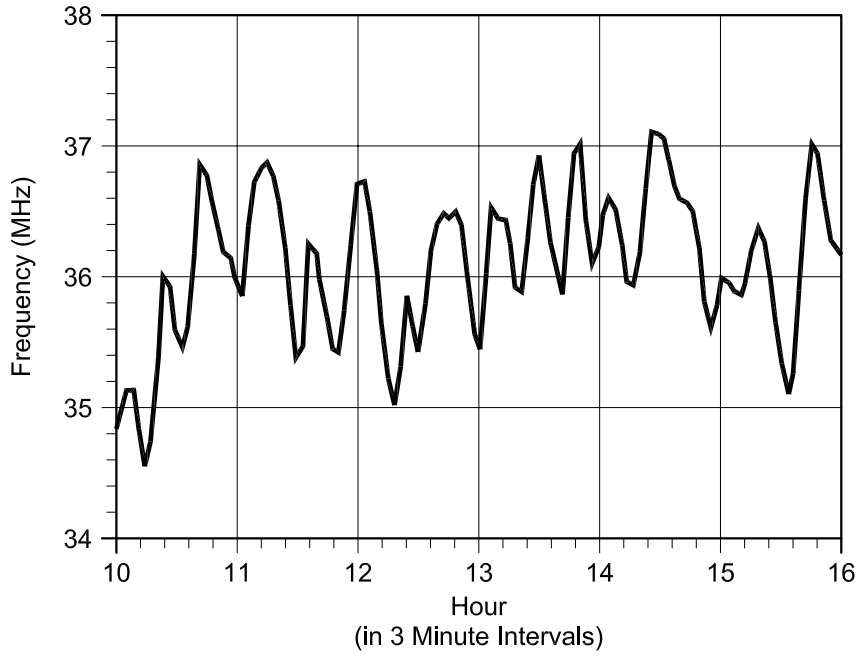


Figure 2—The maximum usable frequency of the F_2 region for a 3000-km hop taken at 3-minute intervals. The measurements were taken in Brighton, Colorado on February 16th, 1981 (from *Radio Science* May-June 1989).

term variations in the ionosphere due to atmospheric gravity waves (*AGW*). So what causes these short-term variations, and what are AGWs?

When we think of variations in the ionosphere, the shortest time period we usually consider is the hourly variation of the ionosphere throughout a 24-hour period. This comes from our exposure to and use of propagation prediction software. For example, *IONCAP* and its derivatives output monthly median maximum usable frequencies and monthly median signal levels for each hour of a day based on the input of the appropriate SSN for the month in question. These predictions come from a model of the ionosphere that's based on years of accumulated hourly ionosonde data.

But what's happening in between the hourly values? Can we simply linearly interpolate between a given hour and the successive hour, or is there something more complex occurring over this time span?

As you've probably guessed, there is indeed something more complex going on. This is an interesting topic that has been researched by many in the ionospheric scientific community. The best paper I've found on this was written by A.K. Paul and is titled "Medium Scale Structure of the F Region." It appeared in the May-June 1989 issue of *Radio Science* (Vol 24, No 3, pp 301-309). **Figure 2** is a plot of the maximum usable frequency of the F_2 region for a 3000-km hop taken at 3-minute intervals. **Figure 3** is similar to Figure 2, but is for the ionospheric parameter hmF_2—the height of the F_2 region electron density peak.

It's quite obvious from these two figures that the ionosphere was varying with a period of 20 to 30 minutes. Looking at the change from maximum to minimum for both plots suggests that the variation in hmF_2 might be the most critical parameter for propagation considerations.

What's assumed to be causing these variations is an atmospheric gravity wave. This is a propagating wave in the neutral atmosphere under the influence of gravity (acting downward) and buoyancy (acting upward). AGWs are usually classified as large scale (periods of 50 minutes to 3 hours), medium scale (periods of 20 to 45 minutes) and small scale (periods of 2 to 5 minutes). The cyclic variations in the plots shown in Figures 2 and 3 appear to be the result of medium scale AGWs.

One possible source of AGWs is a single energetic event in the auroral ionosphere that generates waves that propagate for thousands of miles toward the equator. Other possible sources are other ionospheric events, tropospheric

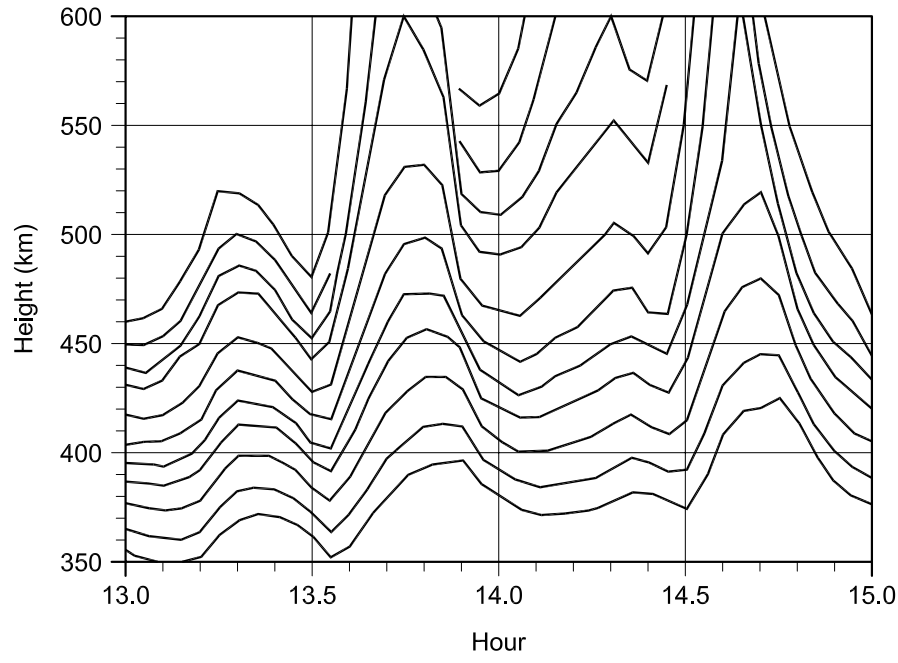


Figure 3—The variation in the height of the F_2 region electron density peak (hmF_2) for several different fixed frequencies over a 2-hour period. The measurements were taken in Brighton, Colorado on December 16th, 1980 (from *Radio Science* May-June 1989)

events and earth-surface events (volcanoes and earthquakes, for example). It is also believed that AGWs are more the norm than not.

The impact of all of this on our contesting efforts is twofold. First, we should expect to experience cyclic run rates, as suggested by Figure 1. Second, there's potential to miss marginal band openings if you make brief band observations at the wrong time. By revisiting the band, or remaining on it, for several minutes (or perhaps even tens of minutes), you may be able to take advantage of the propagation peaks. This is probably a more important consideration for those operating the multiplier station.

In closing, cyclic run rates certainly do result from operator skill, QRN, QRM, busted calls needing repeats, etc. But also be aware that there are ionospheric mechanisms that can cause them, and careful observations may show that those are the real culprits.

If you'd like to discuss this topic in more depth with NC7W, drop him an e-mail: **utahfolk@xmission.com**. ■

All Time ARRL Field Day Records

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W4DC

ARRL Field Day 2001 is history. Are you wondering if your club set a new record in your category? The answer to that question lies below.

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

Class	*Call*	*Year*	*Name*	*QSOs*	*Power*	*Ops*	*Points*
1A battery	WA1U	95	Above All Mtn Contest Team	1173	5	10	10960
1A	N5RR	92	Albuquerque DXA	2870	2	28	8550
2A battery	W0CQC	00	Colorado QRP Club	1688	5	12	17410
2A	KP2N	93	Virgin Islands ARC	5252	2	16	15580
3A battery	K4HAV	84	Chekaw ARS	1629	5	17	18610
3A	W0GG	00	Pikes Peak DX Group	5825	2	17	17306
4A battery	WB8JBM	83	Northern Ohio ARS	2029	5	127	17345
4A	W3AO	98	Potomac Valley RC	6697	2	15	19366
5A battery	W3VPR	84	Anne Arundel RC	2495	5	49	26570
5A	W2GD	99	Cherryville Rpt Assoc	6566	2	42	20520
6A battery	NA4G	91	Raleigh ARS	1340	5	30	11270
6A	W2GD	00	Cherryville Rpt Assoc II	6694	2	43	20628
7A battery	W4DW	89	Raleigh ARS	1236	5	12	11215
7A	W3AO	99	Potomac Valley RC 1	9163	2	17	26224
8A battery	N6WG	00	Alameda County Rpt Club	1305	5	25	10850
8A	N6ME	89	Western ARA	5390	2	55	14772
9A battery	VE3NAR	95	Nortown ARC	1105	5	30	7930
9A	W4IY	98	Woodbridge Wireless	6217	2	56	18834
10A	W4IY	85	Woodbridge Wireless	5067	2	67	15474
11A battery	VE3NAR	97	Nortown ARC	1170	5	36	9465
11A	W4IY	90	Woodbridge Wireless	4669	2	60	14688
12A battery	AA6CV	00	Conejo Valley ARC	1340	5	38	11490
12A	W4IY	88	Woodbridge Wireless	4791	2	55	13646
13A battery	AA6CV	99	Conejo Valley ARC	1142	5	30	9880
13A	W4IY	99	Woodbridge Wireless	7329	2	65	22780
14A battery	AA6CV	97	Conejo Valley ARC	1246	5	55	10795
14A	W4IY	00	Woodbridge Wireless	8064	2	83	24904
15A battery	K6CAB	94	Conejo Valley ARC	3460	5	34	30150
15A	N1NH	93	Nashua Area RC	5669	2	100	17322
16A battery	AA6CV	98	Conejo Valley ARC	1501	5	45	12840
16A	WY8M	94	Utica Shelby ECA	5917	2	295	21468
17A battery	K6CAB	89	Conejo Valley ARC	3119	5	40	23685
17A	WY8M	95	Utica Shelby ECA	3654	2	250	14006
18A battery	K6CAB	90	Conejo Valley ARC	2569	5	30	21275
18A	N1FD	00	Nashua Area RC	6246	2	100	19614
19A battery	KK8M	98	Utica Shelby ECA	2233	5	177	18650
19A	K2AA	86	South Jersey Radio Assn	4320	2	65	13178
20A battery	KK8M	99	Utica Shelby ECA	2527	5	176	20920
20A	N1NH	96	Nashua ARC	6738	2	85	21756
21A	W2RJ	76	Englewood ARA	2845	2	55	10186
22A battery	AD6T	91	Conejo Valley ARC	2962	5	52	23500
23A battery	K5DX	89	Texas DX Society	3326	5	28	25260
23A	K2KX	78	Englewood ARA	2666	2	40	9380
24A	N1NH	95	Nashua ARC	6209	2	95	21648
25A battery	K6CAB	92	Conejo Valley ARC	2343	5	62	20255
26A	N1FD	98	Nashua ARC	8744	2	87	26274
27A	N1NH	97	Nashua ARC	6768	2	87	22080
28A	N1FD	99	Nashua ARC	7902	2	96	24358
30A	W3AO	00	PVRC & CARA	9908	2	50	31534
35A	VA3RAC	00	Capital Region FD2000	1940	2	190	10136
1B-1 battery	KW8N	95		945	5	1	8975
1B-1	W8TK	96		1460	2	1	6586
1B-2 battery	AB7E	00		970	5	2	10000
1B-2	W6UE	93		2097	2	2	7412
2B-1 battery	N6VT	93		449	5	1	5135
2B-1	KW8N	00		1698	2	1	6374
2B-2 battery	KW8N	91		1148	5	2	8915

Class	Call	Year	Name	QSOs	Power	Ops	Points
2B-2	W2GD	88		2560	2	2	8814
3B-1	W9WI	89		56	2	1	738
3B-2 battery	KW8N	97		962	5	2	8695
3B-2	K5TA	93		2137	2	2	7000
4B-2	KW8N	98		1720	2	2	6040
5B-2	W8TQE	89		272	2	2	1212
1C	WA4VRN	91		934	5	1	8080
2C	N6BT	80		1885	2	3	4912
3C	WB4GQX	76		836	2	3	2162
4C	WA5FRF	00		301	2	5	2525
5C	AB3A	80		694	2	8	1696
6C	VO1AA	78		30	5	8	715
1D	NA5TX	99		1450	2	1	5800
2D	W4MYA	99		4019	2	14	10758
3D	K1AR	78		3825	2	6	8928
4D	N6TV	92		2253	2	17	5708
5D	W1AW	91		1650	2	6	4726
6D	W1AW	95		3200	2	16	9290
7D	W1AW	94		2890	2	7	8820
8D	N4T	00		2465	2	10	6034
9D	N6OP	91		2849	2	22	8206
1E	KR0B	88		1525	5	3	11490
2E	KR0B	89		2000	5	5	13975
3E	N0NI	99		4421	2	6	12480
4E	W3PP	99		3720	2	8	10504
5E	W6YX	00		3059	2	10	8932
6E	W0AIH	95		5040	2	10	12514
7E	W0AIH	96		4170	2	8	10292
8E	WU8A	95		1963	2	21	6474
9E	W8VND	98		1634	2	19	4192
13E	AA5EQ	90		235	2	7	554
15E	K9GL	82		8179	1	25	10541

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Contest Tips, Tricks & Techniques

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Station Layout—Part 1


W9XT

For the first installment of this two-part series on station layout, I'm going to take a departure from our usual format. This time around I'll get the ball rolling by offering some of my personal philosophies on this topic. In Part 2 we'll get back to the more familiar style, and let you share your thoughts and suggestions.

In laying the groundwork for this column, I began by taking a serious look at the way my station is currently arranged. I gave the layout careful consideration when I first set it up many years ago. Since then the station equipment has changed—and even more importantly—logging procedures have changed. I'm long overdue for a rework.

Time and Motion: The Therblig Analysis

Many of the principles that I applied when I originally laid out my operating position were based on what I had learned in a class on production management. My background is in electronic design—not manufacturing—but the course was a requirement. A portion of the semester was spent studying the process of production line development.

When you set up a production line, one thing that you want to do is to design each workstation along the line such that you minimize the number of wasted motions while performing a certain task. This allows the assembler to work at high speed with the least amount of fatigue. Just what you want to do when operating a contest! This course had some long-term value after all!

Blue-collar workers hate time and motion studies, but these can be a tremendous tool for identifying ways to increase the efficiency of a repetitive task, be it assembling coffeepots or—in our case—making QSOs. One method of time and motion study involves Therblig Analysis.

A husband and wife team of industrial engineers, Frank and Lillian Gilbreth, developed Therblig Analysis. You might know them better as the couple on which the movie *Cheaper by the Dozen* is based. ("Therblig" is "Gilbreth" spelled backwards. Well, *almost* anyway.)

A small task—such as frequency tuning in an Amateur Radio station—is considered an *element*. Each element can be broken down into a number of micro tasks called *Therbligs*. The Therbligs for tuning would include these: position the hand over the tuning knob, grasp the knob, rotate the knob, release the knob. The analysis is applied to all of the other elements as well—such as aiming the antenna, switching bands, tuning the amplifier, sending an exchange, etc. By studying the sets of Therbligs, you should be able to easily identify any inefficiency in the actions involved when operating your station.

Wasted Motions

There are some general guidelines for avoiding wasted motion. First, minimize the range of the motion required to perform an operation. Move as little of the body as possible for a given task. Move only the fingers instead of the entire hand if possible. Graceful arc-like movements are more efficient than jerky motions—such as those that include several changes in direction. Utilize both hands simultaneously—and even both feet if possible—to allow multiple tasks to be performed simultaneously.

As an example, let's look back at good old-fashioned paper logging. You would send CW by pressing on a key, then pick up a pencil, move your hand over to the log sheet, write the call and exchange, put down the pencil, move your hand to the key and start sending again. Picking up and putting down the pencil are wasted efforts. Most operators in the paper-log era quickly learned to send CW with a pencil in their hand, thus eliminating the steps involved with picking up and putting down the pencil. A few contesters even trained themselves to send CW—or write—with their non-dominant hand so that they could log and send simultaneously without the wasteful motions incurred by moving the hand between the key and log sheet.

Now let's consider a more up-to-date logging example: logging by inputting information through a computer keyboard. Obviously, touch typing is much more efficient than the hunt and peck method. Years ago my high school guidance counselor would not let me take the courses I wanted to because I was not doing all that well in Latin. She had me take typing (the only course I ever got a D in). It turned out to be another example of a class that I did not think would be very useful to me in later life, but that ultimately helped improve my contesting! Have you learned to touch type primarily to improve your contesting? (If so, please let me know before the deadline for the next issue.)

Where to Begin?

When designing a contesting station layout, a good way to start is to jot down a list of all of the repetitive tasks performed during the heat of the battle. These include running stations, S&Ping, aiming antennas, switching antennas, tuning amplifiers, switching radios, etc. Then order these tasks by the number of times you perform each during the course of a typical contest.

The next step is to come up with positions for the various pieces of equipment that minimize the motions required to operate each. This means that you will want the radio, amplifier, computer monitor, antenna switches, rotator controls and second radio all right next to your keyboard, right?

Obviously that's not possible, so it's time to prioritize. Tuning for stations is no doubt a higher frequency operation than changing bands, so the radio should be in easier reach than the antenna switches or amplifier controls. Your eyes will be moving back and forth between the computer monitor, the radio and most likely the keyboard (unless you are a touch typist). Find positions for them so that you only need to move your eyes—try to keep head movements to a minimum.

Do a Therblig Analysis on the most important tasks and see if some minor repositioning of equipment will result in further improvements.

My own station was originally laid out before computers were used for logging. The operating table was designed to hold log sheets and dupe sheets. Computer monitors and keyboards were not even a consideration back then.

A memory keyer was (and still is) in a prime location. I needed to press one or more of the memory buttons for nearly every QSO. Canned messages are now sent from the keyboard though. I still use a keyer wired in parallel with the computer keying line. I only occasionally need to adjust its keying speed. At this point, the space the keyer is currently occupying would probably be better utilized for something else. My clock is hogging prime real estate as well. These days the computer automatically logs the QSO times, so I no longer need it in clear view for each contact.

My antenna switches are way off to one side. When I designed my station I had one antenna per band, so I only had to switch antennas when I changed bands. The rotator controls are more conveniently located than the switches, but over the years I have added more antennas. I now

have as many as three antennas for each band. These days I switch antennas more frequently than I rotate them.

Over the years I have made significant changes in my station equipment. Along the way I've positioned equipment mainly based on where it would fit. I haven't taken the time to seriously re-evaluate operating efficiency. I'm sure a number of you have done this as well. It's a new century, and it's time for us to take a new look at how our stations are arranged!

In Part 2 we'll share some of your thoughts on this topic and descriptions of how you've set up your station for peak efficiency.

Topic for September-October 2001 (deadline July 4)

Station Layout

How do you arrange the equipment in your shack including radios, computer components, rotator controls, antenna switches, etc? Why did you do it that way? What do you consider the deficiencies of your station layout? How do you handle the cable rat's nest?

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**. Please be sure to get them to me by the deadline. ■

Contest Expeditions

Kenny Silverman, K2KW
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Behind the Scenes of a Rent-a-QTH


K2KW

Over the years, I've had the opportunity to get to know a number of individuals who own Rent-a-QTHs. These locations have provided many hams with their first experience of what it's like to *be* the DX. I thought you might like to know more about what's behind the development and ownership of these ham radio rental properties. Folks develop Rent-a-QTHs for a variety of reasons, but one thing's for sure, it's extremely unlikely that they will make enough money from one of these ventures to support them in retirement!

The Birth of a Ham Radio Rental Property

Sometimes these locations are created by a local resident who has a small cottage that they are already renting out to visitors. Occasionally a group of contesters will band together to purchase and develop a location that they would like to always have available for major contests. They will then rent the spot out to others during the off-season to offset the costs. In some cases DXers enter into cooperative agreements with an existing hotel or rental property. They install equipment that attracts hams to the resort, and then receive a small portion of the rental proceeds to help cover ham equipment maintenance. In other instances, these places are purchased primarily as second homes or as future retirement residences.

As you can see, the reasons behind the development of these properties are diverse, yet they all have one aspect in common: the resulting facility is available to the general ham population! As you may have noticed, none of these were initially conceived as a standalone for-profit ham radio rental property. There simply is not enough money in this business to purchase and develop property for the sole purpose of renting it out for ham operation. Any income generated will only partially offset the operating costs. These properties are an Amateur Radio labor of love.

The Money Pit

When a rental group walks in, sits down, flips on a rig, and immediately experiences an exciting pileup, most don't fully appreciate all of the behind-the-scenes effort that has taken place so that they can enjoy the luxury of being DX.

Ownership of overseas real estate can be very time consuming. Even with the assistance of a law firm, a professional tourist booking company and a paid caretaker, it still typically requires hours of effort each week for an absentee owner to keep everything running smoothly. Keeping track of the utility bills, cleaning, maintenance, bookings, insurance—and even just the logistics involved with paying the various bills—can be a huge burden.

Setting up one of these stations is no easy task. The difficulties encountered in obtaining building permits are not unique to the USA. In most cases, the permit process in foreign locations can be at least as difficult—and as expensive—as it is here. Often the owner/organizers of the property will spend many weeks setting up towers, installing sufficient electrical service, assembling the shack, etc. And this is just to get the station running. After that most will spend a few weeks to a few months each year on maintenance of the station and the associated rental property.

Rust Never Sleeps

Once construction is complete, maintenance, repair and replacement of the ham station equipment are usually the most expensive aspects of ownership. As most of these locations are in humid and saltwater environments, the toll on equipment is enormous. Rigs and amplifiers typically have a very high rate of failure. One contest station that I know of experienced 4 radio failures within 3 months. Just transporting the equipment back to the USA for repair can be expensive and time consuming. In many instances, if you intend to keep the station up and running at all times it will be necessary to keep backup rigs and amplifiers on hand. Often visitors are asked to help transport failed equipment back to the USA, although one owner I know uses FedEx to ship the equipment back to the states (at considerable expense).

Besides the high equipment failure rates inside the shack, antennas can also be problematic. The corrosive action of salt air is rapid and relentless. At locations near the ocean, most antennas will be dripping with saltwater condensation and caked with salt brine. Great care needs to be taken to protect all antenna joints and electrical connections or they will quickly deteriorate. Even well protected antennas will usually require an overhaul every 2-3 years. Antennas with traps can be especially susceptible to saltwater environments, as the wire inside the traps can corrode to a point that it cannot be repaired. Monobanders or multi-monobander antenna designs will typically last much longer than trapped tribanders.

Many of these stations are in high wind zones, so often times extra precautions are taken to ensure that the tower and antennas will withstand the elements. Sometimes Rohn 45 or 55 is used—even for short towers. If high-wind rated antennas are available, often they are employed. Ultraviolet (UV) light from the sun can be very destructive to coax and to any other exposed plastic items.

The Up Side

Renting to the ham population does have its benefits: Most hams will leave the property in as good as or better condition than they found it. Often renters will donate equipment, software or physical labor to enhance the station. Competitive contest ops usually like more/bigger/better antennas, so antennas are a popular item for donation. And it also seems that hams are an honest bunch, and will openly admit if they were responsible for blowing up a piece of equipment. Most owners indicate that ham visitors are courteous, self-reliant and reasonable in their expectations.

First Class or Coach?

The cost of developing a Rent-a-QTH varies widely. This will depend on the location, the ease of obtaining equipment and the complexity of the station. If equipment or antennas have to be imported, duty taxes and the expense of shipping can easily double the cost over typical US prices. Equipment selection varies from what's available locally to whatever the owners might already have on hand. Some choose to go with top-of-the-line equipment. Station owners who are contesters tend to employ top-of-the-line gear and efficient antennas, and thus often draw repeat clientele who are world-class operators. Some of the more competitive contest stations use

propagation and antenna modeling programs to optimize the station.

For the average first time DXpeditioner, nearly any of the current equipment will be sufficient to generate loads of unique ham radio memories. In many cases, the owners will simply install a moderate height tower of 30 to 50 feet topped with whatever tribander is readily available.

Guest Relations

Station owners tell me that visitors have a wide range of expectations. Some come to experience a new country, while others come specifically for the thrill of being DX! Most will have questions about the property, what equipment is available, nearby restaurants, places to visit and what they should bring. The personal time spent answering these questions is part of the cost of doing business. But as with every business, developing repeat clientele is important to the success of the venture.

Many times the Rent-a-QTHs are booked years in advance, and there are waiting lists for popular weekends—such as contest weekends. The occupancy rate will vary based on the geographic location, the available equipment and how nice the area is. The nicer properties—and those that offer a competitive edge in contests—are often booked 20 to 50% of the year by hams. Some of the smaller or off-the-beaten-path locations may only get a few visitors a year.

They've Earned Our Appreciation

Hearing of the difficulties that are involved in building and owning a Rent-a-QTH has given me a new perspective and appreciation for the people that make being DX as simple as walking in and turning on the rig and amp. It's easy to see that there are a number of issues that might easily stop the development of one of these locations dead in its tracks. Anyone who has ever operated from the DX end of a pileup knows how addicting these pileups can be. Owning a Rent-a-QTH is hardly a route to riches, but it's obvious that the owners enjoy (in a somewhat sadistic way) what they do. They are especially delighted when they hear of the excitement that was experienced by first-time DXpeditioners operating from their site.

Many thanks to: K4ISV, W0CG, WT3Q and VP5JM for their insights into Rent-a-QTHs. For more information on the places that are available, visit my Web site: **www.dxholiday.com**.

73, Kenny, K2KW ■

Results, February 2001 Phone Sprint

Rick Niswander, K7GM
niswanderf@mail.ecu.edu

In about three or four years, let's remember the good conditions we have been blessed with over the last few runnings of the Phone Sprint. Since February 1999, we have seen increasing participation, more logs submitted and new records set at a higher rate than in any comparable period in the past. In a few years, when 20 closes after about 15 minutes and when 40 goes long a few minutes thereafter, let's reflect back fondly on these times. It won't make things any better, but it will give us something to do.

For the 38th running of the Phone Sprint, we received 120 logs from 34 different areas. The log total is the second highest ever. Notice the huge number of entrants from 9-land. A total of 28 logs (23% of all logs received) are in this listing thanks—in very large part—to the efforts of the Society of Midwest Contesters and K9PG. Although I haven't been keeping specific records of the number of logs submitted from a single call area, a look back at the results for the last 10 years indicates that this total puts this year's group on the top of the stack. Nice work! Keep it up.

N6MJ just missed setting a CA record by a mere 19 points. He shouldn't be too disappointed though, as he ran away with the brass ring. This is the first time he has taken the number one spot. Dan was number one in band changes as well, using his two-radio setup to great advantage. The next four spots are tightly bunched, as are spots numbers 5 through 10. Last September, the Top Ten was very geographically diverse. Not so much this time. The Midwest (8, 9, and 0 call areas) took six of those ten spots—a feat that has been accomplished only once before in past Phone Sprints.

We received 41 low power logs. NA9D grabbed first among the LP group by a wide margin. As was the case with the high power Top Ten, the Midwest (plus VE5) took six of the ten spots. It sure does seem like the Midwest was the place to be. The 40-meter start—used by many midwesterners—seems to help quite a bit.

New records were set by a quartet of folks representing some juicy multipliers. W7UQ set a new ID benchmark, breaking the 1991 record. WB0O broke his 1994 ND total, W0SD clipped his SD record (set in 1995), and N0NI broke what had been the third-oldest record—the September 1984 Iowa standard. In case some of you were wondering, the oldest remaining records were set in the first contest—KY (11438) and KS (10880). They are old and tired. Someone please put them away.

In the team competition, the Dead Lizards traded with SCCC again, and posted the top club score (and the third-highest winning total). They had four scores from the overall Top Ten and an average score of over 15400. Yikes! SCCC and DLCT have been swapping spots for the last two years (DLCT in February and SCCC in September). How will this September turn out? I guess it depends on whether you believe history will repeat itself or whether we can think

Top 10 Scores

Call	Score
N6MJ	19635
KW8N	17787
K9XD	17376
K7RI	17325
W9RE	17040
N8VW	16464
K6LA	16121
K4XS	16074
K9NW	15888
WB0O	15525

Top 10 Low Power Scores

Call	Score
NA9D	13019
K7SV	11565
W7UQ	10780
WT9U	10406
W7ZRC	10290
K6ZH	9963
N0AX	9495
VE5SF	9165
W0ETT	8471
W9WI	8080

Top 10 QSOs

Call	Score
N6MJ	385
KW8N	363
K9XD	362
W9RE	355
WB0O	345
N8VW	343
K4XS	342
K9NW	331
K6LA	329
KU8E	328

Top 10 Band Changes

Call	Score
N6MJ	118
W4MR	107
KW8N	101
KT0R	97
K9XD	78
K6LA	75
W9RE	31
NA9D	17
N6RT	16
W9RM	15
KK1L	15

Top 10 Mults

Call	Score
K7RI	55
N6MJ	51
KW8N	49
K6LA	49
K9XD	48
W9RE	48
N8VW	48
K9NW	48
W0SD	47
KU8E	47
K8ND	47
NA9D	47
K4XS	47

Golden Logs (over 50 QSOs)

Call	QSOs
NQ4U	172
KG9N	52
W5XAS	51

Team Scores

1. Dead Lizards CAN Talk

KW8N	17787
K9XD	17376
W9RE	17040
K9NW	15888
KU8E	15416
W0SD	15369
KA9FOX	14950
W9RM	14536
NA9D	13019
K9SD	12728
	154109

2. Southern California Contest Club

N6MJ	19635
K6LA	16121
K6LL	14355
N6ED	13772
W6UE	13365
N6ZH	9963
W7WW	9812
K6NA	8897
N6RT	5772
	111692

3. Mad River Radio Club

N8VW	16464
K9TM	14030
K8DX	13950
K8ND	12643
ND8DX	12374
N8EA	10414
K8MR	144
	80019

4. Society of Midwest Contesters #1

K9ZO	12555
K0OU	11655
KG9X	11256
WT9U	10406
K9PW	9594
W9SMC	8073
AE9B	6840
KI0MB	6120
	76499

5. Grateful Dead, News Year's Eve 1969 (K7RI, W5GN, N0AX, W4PA, K3WU, K0EJ) 45446
6. Florida Contest Group (K4XS, N2NL, W7UQ, WC4E) 45196
7. Northern California Contest Club (N6RO, AE6Y, K6III, N6ZFO, K6EP) 43583
8. Windy Westerners (VE5SF, VE5MX, VE5CPU, VE7TLL, VA6RA, VE7FO) 40353
9. Tennessee Contest Group (N4ZZ, W0ETC, W9WI, KE4OAR) 30788
10. SMC #2 (KF9YR, K9JLS, WA9IRV, K9MI, K9CJ, KB9CRY) 24979
11. Texas DX Society (W5ASP, KN5H) 16926
12. Minnesota Wireless Association (KT0R, AC0W) 14139
13. SMC #4 (K9IG, NV8V, N9SE) 8613
14. SMC #3 (W9GIG, K9KM, KG9N) 7166

(and act) outside the box. MRRC picked up third, helping the Midwest log totals. The SoMWC group fielded five (count 'em, five) teams—a big reason why the 9-land list ran off the page. All told, we received entries from 14 teams, an historically-high number. The entire Canadian contingent banded together to participate for a first-time team entry: the Windy Westerners.

After 19 years, this is my last Sprint as your scribe. K4MA will be your able editor for the September 2001 contest and beyond. Thanks for the comments over the years, and thanks for your participation. It has been a blast. CU on the radio.

Soapbox

Computer logging, hand mike, QRP… It was fun.—*K9IUA*. I keep improving my Q total each contest, but at this rate I'll break the top ten when I turn 60.—*W4NF*. While I have to admit that I had a great time (except on 75), isn't it time to consider limiting this (all!) domestic contest to low power?—*K7SV*. Nice to have the NH and DE QSO parties on at the same time, but where was NJ?—*N0AX*. Haven't done a Sprint in a while and forgot how quick it is. Grab the mike and hold on.—*N3FR*. First Sprint. I won't use "Gas" as a name next time.—*WS7V*. My second try and still lots of room for improvement.—*VE7TLL*. For someone who had a stroke three years ago, this is a challenging event. Apologies to all when my brain didn't fire as fast as it should have on the exchange.—*W0ETC*. Didn't know I was going to be able to play until one hour before the contest.—*W6TK*. Need bigger antennas.—*W7UQ*. Never even heard NJ!—*K6ZH*. First Sprint entry. What a challenge.—*AE9B*. Like, twirly man... —*N0AX* [Don't ask me; I just copy 'em down.—*Ed.*] Had major band change problems from 0255 to 0305Z that cost me many Qs.—*W0SD*. My best ever score on SSB!—*KU8E*. 40-meter start is still helpful here in the Midwest.—*KW8N*. What a fantastic experience.—*K0GN*. Most QSOs I've made in any Sprint, but where were the mults?—*KA9FOX*. First time ever Sprint. Had a blast.—*K9JLS*. JEEEERRRRRYYYY! —*W4PA*. First Sprint for me, and it was amazing to hear the true masters at work. Hope to have a better showing next time around.—*K9MI*.

Scores

Call	Name	QTH	20	40	80	QSO	Mults	Score	Team
KK1L	Ron	VT	103	101	58	262	44	11528	
K5ZD	Randy	MA	72	91	62	225	40	9000	
K1HT	Dave	MA	57	49	44	150	36	5400	
K1TS	Mark	MA	55	40	6	101	30	3030	
K1PQS	George	ME	66	10	15	91	31	2821	
K3CR	Jim	PA	97	101	88	286	43	12298	
N3FR	*Bob	PA	63	50	61	174	41	6929	
AD8J	*John	PA	20	52	20	92	29	2668	
N8NA	Karl	DE	0	33	45	78	28	2184	
K3WU	Jim	PA	48	0	0	48	22	1056	Grateful
N3RM	*Randy	PA	34	9	0	43	23	989	
N3DEL	*Del	DE	7	0	0	7	7	49	
K4XS	Bill	FL	167	118	57	342	47	16074	FCG
W4MR	Will	NC	105	141	65	311	44	13684	
K4MA	Jim	NC	106	111	78	295	46	13570	
N2NL	Dave	FL	114	118	71	303	42	12726	FCG
K7SV	*Larry	VA	94	116	47	257	45	11565	
W4WA	Ron	GA	118	86	56	260	44	11440	
N4ZZ	Don	TN	74	86	80	240	43	10320	TCG
W4NF	Jack	VA	66	106	74	246	41	10086	
W9WI	*Doug	TN	71	75	56	202	40	8080	TCG
NQ4U	*Jim	TN	80	60	31	171	40	6840	
W4PA	Bobby	TN	56	51	55	162	40	6480	Grateful
NA4K	*Steve	TN	57	70	50	177	35	6195	
WC4E	Jeff	FL	66	26	64	156	36	5616	FCG
KE4OAR	Chuck	TN	53	60	0	113	36	4068	TCG
K4IU	*Fred	KY	20	64	13	97	31	3007	
K4BP	Jeff	TN	35	17	0	52	28	1456	
K0EJ	*TC	TN	0	29	9	38	18	684	Grateful
N4CW	*Bert	NC	5	0	5	10	10	100	
K5NZ	Mike	TX	120	108	84	312	45	14040	
W5WMU	Pat	LA	108	108	51	257	45	12015	
W5ASP	Joe	TX	101	99	57	257	42	10794	TDXS
W5GN	Keith	TX	94	99	49	242	43	10406	Grateful
K5AM	Mark	NM	101	64	39	204	35	7140	
N6NF	*Tom	TX	71	19	4	94	31	2914	
W5XAS	Frank	OK	11	22	18	51	24	1224	
N6MJ	Dan	CA	227	113	45	385	51	19635	SCCC
K6LA	Ken	CA	184	98	47	329	49	16121	SCCC
N6RO	Ken	CA	145	108	60	313	45	14085	NCCC
N6ED	Ed	CA	157	105	51	313	44	13772	SCCC
W6UE	Mike	CA	135	107	55	297	45	13365	SCCC
AE6Y	Andy	CA	135	97	44	276	44	12144	NCCC
W6TK	Dick	CA	121	89	47	257	45	11565	
W6EU	Jim	CA	138	94	23	255	43	10965	
K6ZH	*Jim	CA	122	92	29	243	41	9963	SCCC
K6III	Jerry	CA	141	57	5	203	44	8932	NCCC
K6NA	Glen	CA	81	75	61	217	41	8897	SCCC
N6RT	*Doug	CA	91	51	14	156	37	5772	SCCC
N6ZFO	Bill	CA	91	33	0	124	38	4712	NCCC
K6EP	*Eric	CA	80	14	12	106	35	3710	NCCC
K7RI	Jerry	WA	228	59	28	315	55	17325	Grateful
K6LL	Dave	AZ	155	103	61	319	45	14355	SCCC
W7UQ	*Dan	ID	147	80	18	245	44	10780	FCG
W7ZRC	*Rod	ID	105	106	34	245	42	10290	
W7WW	Dave	AZ	143	49	31	223	44	9812	SCCC
N0AX	*Pigpen	WA	133	67	11	211	45	9495	Grateful
KI7Y	*Jim	OR	105	40	7	152	43	6536	
KN5H	Hose	AZ	101	45	0	146	42	6132	TDXS
N7LOX	*Brian	WA	92	39	0	131	38	4978	
WS7V	*Gas	WA	66	48	0	114	33	3762	
KW8N	Bob	OH	125	142	96	363	49	17787	DLCanTalk
N8VW	Pat	OH	106	144	93	343	48	16464	MRRC
KU8E	Jeff	OH	101	134	93	328	47	15416	DLCanTalk
K9TM	Bob	OH	92	121	92	305	46	14030	MRRC
K8DX	Scott	OH	86	124	100	310	45	13950	MRRC
K8ND	Jeff	OH	98	105	66	269	47	12643	MRRC
ND8DX	Ed	OH	93	91	85	269	46	12374	MRRC
N8EA	Joe	MI	82	95	77	253	41	10414	MRRC
K8LN	John	OH	76	84	72	232	43	9976	
KW8W	*Barry	OH	37	77	46	160	35	5600	
K8MR	Jim	OH	0	18	0	18	8	144	MRRC
K9XD	Dave	IL	104	152	106	362	48	17376	DLCanTalk
W9RE	Mike	IN	123	124	108	355	48	17040	DLCanTalk
K9NW	Mike	IN	111	129	91	331	48	15888	DLCanTalk
KA9FOX	Scott	WI	101	118	106	325	46	14950	DLCanTalk
W9RM	Jay	IL	92	129	95	316	46	14536	DLCanTalk
NA9D	*John	IL	84	123	70	277	47	13019	DLCanTalk
K9SD	Sam	IL	99	104	93	296	43	12728	DLCanTalk
K9ZO	Ralph	IL	94	106	79	279	45	12555	SMC #1
KG9X	Fred	IL	84	110	74	268	42	11256	SMC #1
WT9U	*Jim	IN	76	91	75	242	43	10406	SMC #1
K9PW	Peter	IL	82	93	71	246	39	9594	SMC #1
K9BGL	Karl	IL	0	136	96	232	40	9280	
W9SMC	Matt	IL	54	94	59	207	39	8073	SMC #1
WI9WI	Jim	WI	50	79	75	204	39	7956	
KF9YR	George	WI	60	102	10	172	38	6536	SMC #2
K9JLS	John	IL	1	132	32	165	39	6435	SMC #2
WD9CIR	*Steve	IL	40	80	35	155	38	5890	
AG9A	*Mark	IL	52	94	0	146	39	5694	
WA9IRV	Ron	WI	41	72	35	148	37	5476	SMC #2
K9MI	*Mike	IN	18	80	29	127	36	4572	SMC #2
K9IG	*Ed	IN	19	46	54	119	35	4165	SMC #4
NV8V	*Rob	IL	7	66	40	113	31	3503	SMC #4
W9GIG	Dick	IL	16	57	29	102	33	3366	SMC #3
K9KM	*Howie	IL	43	10	30	84	32	2656	SMC #3
KG9N	Chuck	IL	12	40	0	52	22	1144	SMC #3
K9CJ	Bob	IL	0	49	0	49	23	1127	SMC #2
N9SE	*Marty	IN	37	8	0	45	21	945	SMC #4
KB9CRY	Phil	IL	0	25	24	49	17	833	SMC #2
WB0O	Bill	ND	134	121	90	345	45	15525	
W0SD	Todd	SD	127	119	81	327	47	15369	DLCanTalk
K0OU	Steve	MO	100	89	70	259	45	11655	SMC #1
KT0R	Dave	MN	70	108	57	235	45	10575	MWA
N0NI	Tony	IA	78	95	67	240	41	10080	
W0ETT	*Ken	CO	87	97	13	197	43	8471	
W0ETC	Larry	IA	59	91	58	208	40	8320	TCG
AE9B	Tom	MO	70	75	26	171	40	6840	SMC #1
K0GN	*Greg	MO	60	63	49	172	36	6192	
KI0MB	*Brian	MO	47	83	40	170	36	6120	SMC #1
AC0W	*Bill	MN	15	56	37	108	33	3564	MWA
NE0P	*John	IA	23	30	0	53	22	1166	
K9IUA	Kevin	ND	45	0	0	45	20	900	
KE0FT	*John	IA	0	21	30	51	15	765	
VE5SF	*Sam	VE5	104	95	36	235	39	9165	WWest
VE5MX	*Todd	VE5	107	53	36	196	41	8036	WWest
VE5CPU	Bart	VE5	82	86	18	186	38	7068	WWest
VA6RA	*Dave	VE6	96	38	10	144	35	5040	WWest
VE7TLL	Terry	VE7	119	31	14	164	41	6724	WWest
VE7FO	*Jim	VE7	96	12	12	120	36	4320	WWest

*Denotes a Low Power entry.

Operators: WA3FET at K3CR; N9GG at N3DEL; K5KA at W5XAS; W4EF at W6UE; KL9A at W7UQ; K7SS at K7RI; KI9A at K9SD; K9PG at K9XD; KB3AFT at NA9D; KB9UWU at W9SMC; WD0T at W0SD
Stations: K9PW from K9MOT ■

Results, February 2001
NCJ CW Sprint

Boring Amateur Radio Club
cwsprint@ncjweb.com

The 48th running of the CW Sprint was held on February 11th, 2001. Conditions seemed to be very good for almost everyone in the contest, but especially for those on both coasts—seven of the top ten stations were from one coast or the other. Three hundred QSOs wouldn't even get you past the 40th percentile in the W1 and W2 call areas.

We received a total of 147 logs—and again all but a handful of them were in electronic format. This really helps reduce the amount of manual labor required to compile these results.

The top score honors go to Tree, N6TR, who made an amazing 393 QSOs. Second place was won by Steve, N2IC/0. Third place was awarded to Dave, K5GN. The rest of the Top Ten was K5ZD/1, N2NT, N6TV (golden log), W6EEN, N9RV, K4AAA and K6LL.

In the low power category, Dan, N6MJ, collected 313 QSOs to take first place. All the rest of the top ten in this category—N0AX/7, K7SV, W7UQ, N5TJ, NA0N, KI7Y, N9CK, N7LOX and WT9U—finished above 10k. There was similar distribution across the country for the Top Ten low power scores, although there are more Black Hole stations here than in high power. This category is hot and the competition is pretty stiff.

We received two QRP logs this time. Dale, KG5U made, 212 QSOs to win the category.

In the team competition, the Southern California Contest Club scored an impressive 19th team victory with a total of 150185, well ahead of second place Northern California Contest Club #1. In the East, the Yankee Clipper Contest Club pulled ahead of their rivals in the Frankford Radio Club to secure third place.

There were three new records set this time. Congratulations to previous *NCJ* editor and 5-time CW Sprint winner Randy, K5ZD/1, who broke his own record for high score in MA. Andy, N2NT, did the same thing in NJ and N6TR in

Team Scores

1. Southern California Contest Club #1

W6EEN	17088
K6LL	16611
N6ZZ	15888
K6LA	15312
N6CW	15190
AC6T	14736
N6AA	14490
N6VR	14304
K6NA	13500
K6RO	13066
	150185

2. Northern California Contest Club #1

N6TV	17155
AE6Y	14256
N6RO	14085
NV7A	14014
W6EU	13348
AJ6V	12864
K6XX	12060
N6XI	11954
N6PN	9804
	119540

3. Yankee Clipper Contest Club

K5ZD	17850
NT1N	16167
K1KI	15974
K1DG	14976
K2UA	14076
K1HT	13860
W1WEF	2842
	95745

4. Frankford Radio Club

N2NT	17689
N2RM	16215
AA3B	15827
W2GD	15087
N8NA	12420
K3WW	3990
	81228

5. Mad River Radio Club (N8EA, K8CC, KU8E, KW8N, K8JM, K8ND) 75570
6. Southern California Contest Club #2 (W6UE, N6MJ, N6KI, K6ZH, W6MVW, N6ED, W7RF) 70697
7. Potomac Valley Radio Club (K7SV, N4ZR, K4MA, K4QPL, W4BQF, WJ9B, N4YDU)..... 59842
8. Texas DX Society (K5GN, N7FO, K5WA, KG5U, W5ASP) 57580
9. TCG+SECC (W4PA, W9WI, K3WU) 41461
10. Minnesota Wireless Association (NA0N, K0AD, KT0R, N0IJ, AC0W) 33754
11. Northern California Contest Club #2 (W6YX, K6III, K6CTA, K6LRN) 24683

Top 10 Scores

Call	*Score*	*Band Changes*	*QSOs Lost*	*00Z*	*01Z*	*02Z*	*03Z*
N6TR	19257	106	4	110	88	96	100
N2IC	18768	37	1	99	92	78	99
K5GN	18050	106	1	100	86	87	88
K5ZD	17850	58	1	109	79	83	86
N2NT	17689	168	4	98	92	81	90
N6TV	17155	2	0	99	85	88	93
W6EEN	17088	107	1	95	88	82	91
N9RV	16992	89	11	108	78	72	98
K4AAA	16685	32	4	90	83	97	85
K6LL	16611	52	2	100	81	82	77

Top 10 Low Power Scores

Call	*Score*
N6MJ	14085
N0AX	14016
K7SV	13920
W7UQ	13248
N5TJ	12432
NA0N	12298
KI7Y	11270
N9CK	11264
N7LOX	11044
WT9U	10965

Top 10 QRP Scores

Call	*Score*
KG5U	8904
N6WG	950

Top 10 QSOs

Call	*QSOs*
N6TR	393
N2IC	368
N6TV	365
N2NT	361
K5GN	361
K5ZD	357
W6EEN	356
K4AAA	355
N9RV	354
N2RM	345

Top 10 Mults

Call	*Mults*
N2IC	51
NT1N	51
K5GN	50
K5ZD	50
K9XD	50
N6TR	49
N2NT	49
K6LL	49
K1KI	49
AA3B	49
K5PI	49
N6CW	49
W6UE	49
NV7A	49

Top 10 Band Changes

Call	*Changes*
N2NT	168
W4PA	117
K9XD	116
W9WI	116
N6MJ	114
W6EEN	107
N6TR	106
K5GN	106
N9RV	89
KW8N	71

Top 10 Golden Logs (no QSOs removed)

Call	*QSOs*
N6TV	365
N5RZ	339
N6AA	322
W2GD	321
WB0O	314
AE6Y	297
W7UQ	276
N5TJ	259
N9CK	256
KG5U	212

Sprint Tip

It is important that each QSO is confirmed by the other station. It is all too easy to forget this while dumping in your call at the end of another QSO. Please remember to give both stations a chance to make sure they have all the information they need *before* you jump in.

Sprint-Related Web Sites

For Sprint rules and contest dates, visit the *NCJ* Web site: www.ncjweb.com. The list of submitted logs is also located there. A wide range of *NCJ* and contesting-related topics are covered on the site.

Seasoned veterans—as well as those interested in trying the Sprint for the first time—should also check out N6TR's Sprint Survival Web Page at jzap.com/n6tr/sprint.html. It explains the exchanges, provides examples and is loaded with good information, advice and contest strategies.

OR. There were 42 logs submitted with over 300 QSOs—another new record. N2NT also broke his old band change record with a new high of 168.

We are pleased to recognize the stations with perfect logs with no score reductions: N6TV, N5RZ, N6AA, W2GD, WB0O, AE6Y, W7UQ, N5TJ, N9CK, KG5U, K3WW, K9MOT, N4CW and W4NR. Of those, N6TV, N5RZ, N6AA, W2GD and WB0O had over 300 QSOs in their logs.

All logs were fully checked using the N6TR Sprint log checking software. You can receive a report showing how your log faired by sending an e-mail to **n6tr@contesting.com**.

The next CW Sprint will be held on September 9th, 2001 (UTC) at 0000Z.

Guidelines for Log Submissions

Please carefully read the rules for submission posted on the *NCJ* Web site: **www.ncjweb.com**.

The Cabrillo log format is now preferred and eliminates the need for a summary sheet. Otherwise, submit your ASCII log and a summary sheet via e-mail or diskette. E-mail your logs to **cwsprint@ncjweb.com** or via snail mail to BARC—CW Sprint, 15125 SE Bartell Rd, Boring, OR 97009. Check the received logs list on the *NCJ* Web site to verify that your log has been properly received. Team registration is done via the Web site.

Feedback on log accuracy is available via e-mail (send your request to **cwsprint@ncjweb.com**).

Scores

Call	Name	QTH	20	40	80	QSO	Mults	Score	Team
K5ZD	Randy	MA	133	137	87	357	50	17850	YCCC
NT1N	Dave	CT	135	120	62	317	51	16167	YCCC
K1KI	Tom	CT	116	114	96	326	49	15974	YCCC
K1DG	Doug	NH	115	121	76	312	48	14976	YCCC
K1HT	Dave	MA	106	121	81	308	45	13860	YCCC
KI1G	Rick	RI	108	109	69	286	47	13442	
K1PQS	Geo	ME	68	61	45	174	41	7134	
N2NT	Andy	NJ	125	147	89	361	49	17689	FRC
N2RM	John	NJ	146	110	89	345	47	16215	FRC
W2GD	John	NJ	103	131	87	321	47	15087	FRC
K2UA	Rus	NY	92	114	100	306	46	14076	YCCC
N2GC	Mike	NY	76	93	61	230	46	10580	
AA3B	Bud	PA	108	130	85	323	49	15827	FRC
N8NA	Karl	DE	94	112	64	270	46	12420	FRC
K3WU	Jim	PA	101	99	53	253	46	11638	TCG+
								SECC	
K3TM	*Roger	MD	69	55	44	168	43	7224	
K3WW	Chas	PA	6	45	54	105	38	3990	FRC
K4AAA	Bill	GA	121	130	104	355	47	16685	
W4PA	Scott	TN	114	142	85	341	48	16368	TCG+
								SECC	
K7SV	*Larry	VA	102	106	82	290	48	13920	PVRC
W9WI	Doug	TN	97	130	72	299	45	13455	TCG+
								SECC	
W4AU	John	VA	89	117	58	264	45	11880	
K4FXN	*Dan	KY	58	102	61	221	41	9061	
K4MA	Jim	NC	57	81	40	178	44	7832	PVRC
K4QPL	Jim	NC	70	75	39	184	42	7728	PVRC
W4BQF	Tom	VA	25	84	43	152	42	6384	PVRC
K5OT	*Larry	AL	59	99	7	165	38	6270	
WJ9B	*Will	NC	43	55	46	144	41	5904	PVRC
N4YDU	Nate	NC	62	47	35	144	40	5760	PVRC
N4AO	Dan	FL	32	75	34	141	40	5640	
W1WEF	Jack	GA	83	15	0	98	29	2842	YCCC
N4CW	*Bert	NC	0	18	13	31	23	713	
K5GN	Dave	TX	150	125	86	361	50	18050	TDXS
K3LR	Tim	OK	117	122	101	340	47	15980	
N5RZ	Gator	TX	145	129	65	339	47	15933	
N6ZZ	Phil	NM	131	128	72	331	48	15888	SCCC #1
K5PI	Rob	TX	116	121	74	311	49	15239	
N3BB	Jim	TX	114	122	66	302	48	14496	
K5NZ	Mike	TX	120	109	80	309	44	13596	
K5KA	Ken	OK	95	94	87	276	47	12972	
N5TJ	*Jeff	TX	123	113	23	259	48	12432	
N5DO	Dave	TX	107	94	48	249	44	10956	
K5WA	Bob	TX	101	102	48	251	43	10793	TDXS
KG5U	**Dale	TX	108	74	30	212	42	8904	TDXS
W5ASP	Joe	TX	93	65	54	212	39	8268	TDXS
K5TQ	*Gary	NM	39	61	45	145	39	5655	
K5TR	Geo	TX	17	70	15	102	36	3672	
N6NF	Tom	TX	22	29	8	59	23	1357	
W5NR	Art	TX	25	4	0	29	17	493	
N6TV	Bob	CA	141	134	90	365	47	17155	NCCC #1
W6EEN	Doug	CA	129	138	89	356	48	17088	SCCC #1
K6LA	Ken	CA	147	117	55	319	48	15312	SCCC #1
N6CW	Terry	CA	141	117	52	310	49	15190	SCCC #1
W6UE	Mike	CA	126	121	62	309	49	15141	SCCC #2
AC6T	Steve	CA	138	108	61	307	48	14736	SCCC #1
N6AA	Dick	CA	134	109	79	322	45	14490	SCCC #1
N6VR	Ray	CA	123	110	65	298	48	14304	SCCC #1
AE6Y	Andy	CA	135	114	48	297	48	14256	NCCC #1
N6RO	Ken	CA	135	99	79	313	45	14085	NCCC #1
N6MJ	*Dan	CA	132	136	45	313	45	14085	SCCC #2
N6KI	Tom	CA	113	120	58	291	48	13968	SCCC #2
K6NA	Glen	CA	117	127	56	300	45	13500	SCCC #1
W6EU	Jim	CA	117	112	55	284	47	13348	NCCC #1
K6RO	Lee	CA	118	90	70	278	47	13066	SCCC #1
AJ6V	Ed	CA	125	95	48	268	48	12864	NCCC #1
K6XX	Bob	CA	96	120	52	268	45	12060	NCCC #1
W6YX	Mike	CA	116	108	42	266	45	11970	NCCC #2
N6XI	Rick	CA	123	102	53	278	43	11954	NCCC #1
N6PN	Matt	CA	91	91	46	228	43	9804	NCCC #1
K6ZH	*Jim	CA	100	92	27	219	42	9198	SCCC #2
W6MVW	Dick	CA	111	103	0	214	41	8774	SCCC #2
K6III	Jerry	CA	123	56	18	197	42	8274	NCCC #2
N6ED	Ed	CA	62	62	21	145	39	5655	SCCC #2
W7RF	Dan	CA	101	1	0	102	38	3876	SCCC #2
K6EY	Becky	CA	56	21	0	77	32	2464	
K6CTA	Ed	CA	71	0	0	71	34	2414	NCCC #2
K6LRN	Dick	CA	0	64	11	75	27	2025	NCCC #2
N6WG	**Bob	CA	0	50	0	50	19	950	
N6TR	Tree	OR	165	123	105	393	49	19257	
K6LL	Dave	AZ	164	123	52	339	49	16611	SCCC #1
K7RI	Dan	WA	143	112	82	337	47	15839	
K4XU	Dick	OR	120	109	81	310	47	14570	
N0AX	*Ed	WA	145	107	40	292	48	14016	
NV7A	Tom	NV	128	106	52	286	49	14014	NCCC #1
W7UQ	*Dan	ID	144	88	44	276	48	13248	
N7FO	Oz	AZ	113	79	65	257	45	11565	TDXS
KI7Y	*Jim	OR	127	82	36	245	46	11270	
N7LOX	*Brian	WA	124	90	37	251	44	11044	
W7ZRC	*Rod	ID	91	117	45	253	43	10879	
N7WA	*Dink	WA	89	85	44	218	44	9592	
W7/	*Zuo	WA	69	19	1	89	32	2848	
JR1NKN									
N8EA	Joe	MI	87	114	94	295	48	14160	MRRC
K8CC	Dave	MI	92	122	93	307	46	14122	MRRC
KU8E	Jeff	OH	91	122	91	304	46	13984	MRRC
KW8N	Bob	OH	102	104	73	279	46	12834	MRRC
N4ZR	Pete	WV	94	121	47	262	47	12314	PVRC
K8JM	John	MI	75	80	75	230	46	10580	MRRC
K8ND	Jeff	OH	60	102	68	230	43	9890	MRRC
W8KW	Emu	MI	48	84	37	169	41	6929	
W8EDU	Jim	OH	37	60	54	151	40	6040	
K8KFJ	Gary	WV	31	75	32	138	37	5106	
N8BJQ	Steve	OH	17	38	0	55	26	1430	
KB8PGW	*John	MI	27	18	0	45	22	990	
N9RV	Pat	IN	117	147	90	354	48	16992	
K9XD	Dave	IL	103	140	79	322	50	16100	
AG9A	Mark	IL	97	137	99	333	46	15318	
K9NW	Mike	IN	94	136	88	318	48	15264	
WE9V	Chad	WI	97	112	84	293	48	14064	
W9RE	Mike	IN	108	102	104	314	44	13816	
KA9FOX	Scott	WI	85	118	89	292	45	13140	
K9ZO	Raf	IL	96	96	84	276	47	12972	
WI9WI	Jim	WI	74	97	70	241	47	11327	
N9CK	*Steve	WI	74	99	83	256	44	11264	
WT9U	*Jim	IN	73	97	85	255	43	10965	
K9MMS	*Gary	IL	58	84	85	227	44	9988	
K9GY	*Diva	IL	65	119	0	184	42	7728	
K9KM	*Howie	IL	53	70	29	152	41	6232	
K9MOT	Peter	IL	31	50	22	103	39	4017	
W9LO	*Bob	WI	25	26	47	98	37	3626	
K9IG	*Ed	IN	16	55	39	110	31	3410	
WA9IRV	Ron	WI	16	57	22	95	31	2945	
KB9UWU	*Matt	IL	0	5	12	17	12	204	
N2IC	Steve	CO	148	117	103	368	51	18768	
WB0O	Bill	ND	131	100	83	314	47	14758	
NA0N	*Pat	MN	94	104	88	286	43	12298	MWA
K0AD	Al	MN	99	102	63	264	44	11616	MWA
W0ZP	Wayne	CO	117	81	42	240	42	10080	
W0ETT	*Ken	CO	59	87	0	146	39	5694	
KT0R	Dave	MN	43	68	41	152	37	5624	MWA
AE9B	*Tom	MO	33	37	17	87	31	2697	
N0IJ	*John	MN	39	32	0	71	32	2272	MWA
AC0W	*Bill	MN	26	46	0	72	27	1944	MWA
K0CO	Jack	CO	32	13	0	45	20	900	
VA3UZ	Yuri	VE3	82	105	71	258	46	11868	
VE5SF	*Sam	VE5	90	95	40	225	44	9900	
VA3MO	*Norm	VE3	35	45	23	103	31	3193	
M0SDX	Ser	G	0	48	11	59	24	1416	
UA9ZZ	Alan	UA9	20	0	0	20	15	300	

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

■

2001/2002 *NCJ* Sprints Rules for CW, SSB and RTTY

Contest Managers:
CW—Boring Amateur Radio Club,
cwsprint@ncjweb.com
SSB—Rick Niswander, K7GM,
ssbsprint@ncjweb.com
RTTY—Wayne Matlock, K7WM,
rttysprint@ncjweb.com

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:
September/October 2001 Contests:
CW: 0000Z-0400Z September 9, 2001
SSB: 0000Z-0400Z September 16, 2001
RTTY: 0000Z-0400Z October 14, 2001

February/March 2002 Contests:
SSB: 0000Z-0400Z February 3, 2002
CW: 0000Z-0400Z February 10, 2002
RTTY: 000Z-0400Z March 10, 2002

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 kHz on CW; 3850, 7225 and 14275 kHz on Phone; and 3580, 7080 and 14080 kHz 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 CQWW 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," 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:
Send CW logs to: Boring Amateur Radio Club, 15125 Bartell Rd, Boring, OR 97009 USA; **cwsprint@ncjweb.com**.

Send phone logs to: Jim Stevens, K4MA, 6609 Vardon Ct, Fuquay-Varina, NC 27526 USA; **ssbsprint@ncjweb.com.**

Send RTTY logs to: Wayne Matlock, K7WM, Rt 2, Box 102, Cibola, AZ 85328 USA; **rttysprint@ncjweb.com**.

Entries must be received no later than 30 days after the Sprint to be eligible for trophies and awards. All logs containing more than 50 QSOs, which were generated with a computer program, must be submitted on a 3.5-inch floppy disk or via e-mail.

An entry consists of (1) a summary sheet showing the number of valid contacts by band, total contacts, total multipliers, 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 homemade 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 e-mail. 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 e-mail, send your logs to the addresses given above.

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 the BARC 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 e-mail 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 percent may be disqualified. Any entry also may be disqualified for illegibility, illegal or unethical 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. ■

2001/2002 North American QSO Parties (NAQP) Rules for CW, SSB and RTTY

Contest Managers:

CW—Bob Selbrede, K6ZZ,
cwnaqp@ncjweb.com
SSB—Bruce Horn, WA7BNM,
ssbnaqp@ncjweb.com
RTTY—Ron Stailey, K5DJ,
rttynaqp@ncjweb.com

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:

July 2001 Contests:

RTTY: Third full weekend in July (1800Z July 21 to 0600Z July 22, 2001)

August 2001 Contests:

CW: First full weekend in August (1800Z August 4 to 0600Z August 5, 2001)

SSB: Third full weekend in August (1800Z August 18 to 0600Z August 19, 2001)

January 2002 Contests:

CW: Second full weekend in January (1800Z January 12 to 0600Z January 13, 2002)

SSB: Third full weekend in January (1800Z January 19 to 0600Z January 20, 2002)

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: 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, RTTY only in RTTY parties.

8. Bands: 160, 80, 40, 20, 15, 10 meters only, except no 160 meters for the RTTY contest. You may work a station once per band. Suggested frequencies are 1815, 3535, 7035, 14035, 21035 and 28035 kHz (35 kHz up from band edge for Novice/Tech) on CW and 1865, 3850, 7225, 14250, 21300, 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 e-mail) 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 WF1B op at K1NG). 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 a 3.5-inch floppy disk or via e-mail. 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

Mode	*Category*	*Sponsor*
CW	Single Op, North America	Florida Contest Group
CW	Multi-Op, North America	Texas DX Society
SSB	Single Op, North America	South East Contest Club
SSB	Multi-Op, North America	Tennessee Contest Group
Combined (CW/SSB)	Single Op, North America	Southern California Contest Club
RTTY	Single Op, North America	Glenn Vinson, W6OTC
RTTY	Single Op, DX	Will Angenent, K6NDV
RTTY	Multi-Op, North America	*RTTY* by WF1B
RTTY	Multi-Op, DX	*Writelog* for *Windows*
RTTY	Best name in North America (name must be rated PG and contain no more than 10 letters)	Eddie Schneider, W6/G0AZT

location) sent during the contest; and (2) a complete legible log of all contacts.

Logs and summary sheets submitted on floppy disk or via e-mail 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 (ie 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; **cwnaqp@ncjweb.com**

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

Send RTTY logs to: Ron Stailey, K5DJ, 504 Dove Haven Dr, Round Rock, TX 78664 USA; **rttynaqp@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: Plaques will be awarded for the high score in each of the categories given below. 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. ■

World Radiosport Team Championship 2002

The Amateur Radio community owes a debt of gratitude to the energetic and ambitious amateurs in the fine country of Finland. Led by Jouko Häyrynen, OH1RX, Organizing Committee Chairman, the Contest Club Finland (CCF) and the Finnish Amateur Radio League (SRAL) have agreed to jointly host World Radiosport Team Championship 2002 from July 9th through 16th, 2002.

The on-the-air operating portion of the event will be held in concurrence with the 2002 IARU HF World Championship (July 14th and 15th). Amateurs worldwide are invited to come to Finland and experience the event firsthand—with all of its inherent excitement, goodwill and camaraderie.

It is our pleasure to announce our appointment as USA representatives. We are charged with assisting our Finnish friends with raising operating funds for WRTC2002.

We strongly urge everyone to support the Finnish effort by sending in a donation. The Northern California DX Foundation (NCDXF) has kindly agreed to assist in processing USA donations. Donations made by credit card or by check (made out to "NCDXF [for WRTC Project]") are tax deductible to the extent permitted by law for USA taxpayers. All cash, check and VISA/MC/AMEX donations from the USA should be sent directly to:

NCDXF, c/o Rusty Epps, W6OAT, 651 Handley Trail, Redwood City, CA 94062 USA (**w6oat@compuserve.com**).

All donations from outside the United States can be sent directly to a WRTC2002 bank account. See **www.wrtc2002.org/support.htm** for specific information.

For event information, please visit the WRTC2002 Web site: **www.wrtc2002.org**.

Thanking you in advance.

73 from the USA representatives,

Dennis Motschenbacher, K7BV—USA West (**K7BV@aol.com**)

Bob Allphin, K4UEE—USA South (**MAllphin@aol.com**)

Jeff, Briggs, K1ZM—USA East (**K1ZM@aol.com**)

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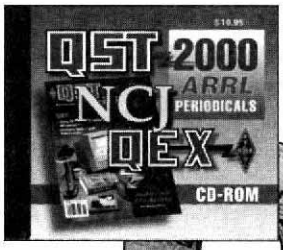

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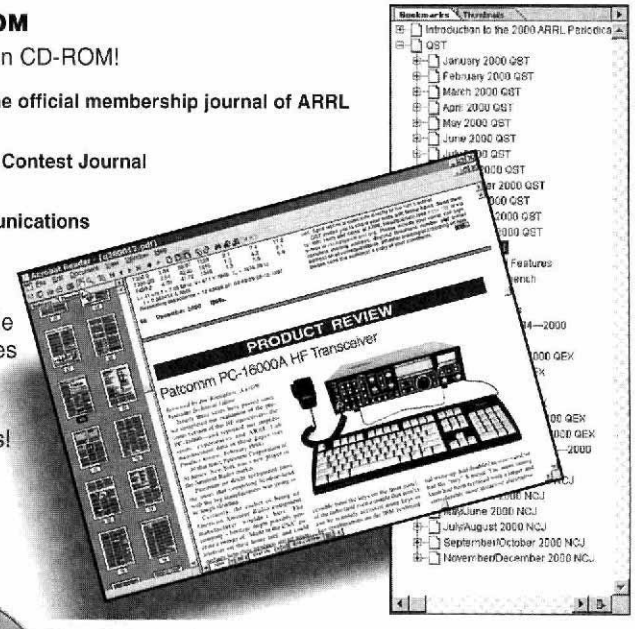

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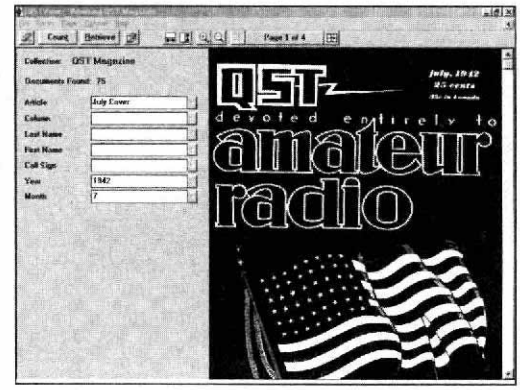

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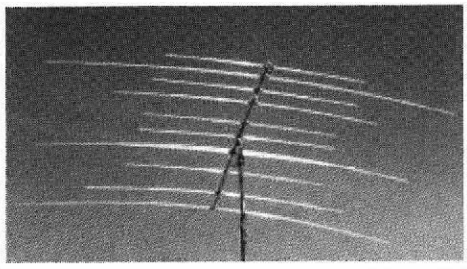

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Single coax feedline, 9.1 sqft windload, 58 pounds
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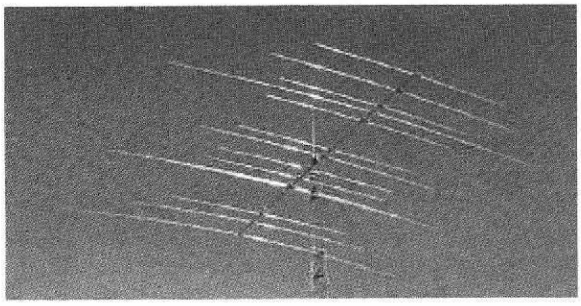

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31' boom with: wide spaced 3 element on 20 mtrs
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Single coax feedline, **OR** separate feedlines
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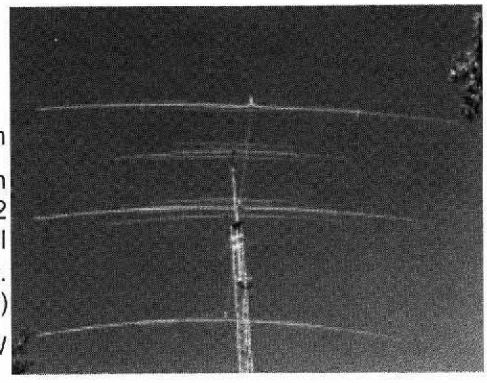

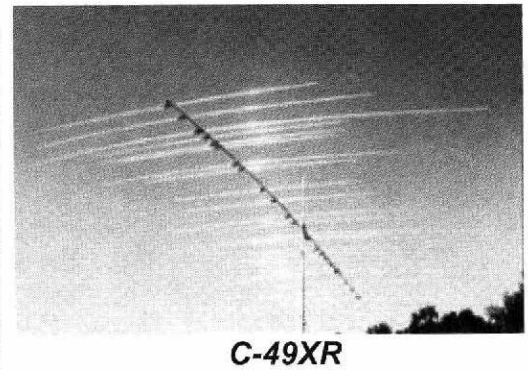

C-49XR

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RG8/U STRD BC FOAM 95% BRAID UV RESISTANT JKT 0.9dB/1350WATTS @ 30MHz	.34/FT	.32/FT	.30/FT
RG8 MINI(X)95% BRAID UV RESISTANT JACKET 2.0dB/875 WATTS @ 30MHz	.18/FT	.16/FT	.14/FT
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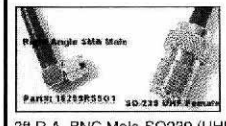

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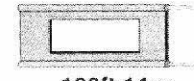

100ft 14ga "flexible" 450 OHM LADDER LINE

$32.00

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TELESCOPING ALUMINUM TUBING

DRAWN 6063-T832

.375	$.70/ft	1.250"	$1.55/ft
.500"	$.80/ft	1.375"	$1.75/ft
.625"	$.90/ft	1.500"	$1.95/ft
.750"	$1.00/ft	1.625"	$2.25/ft
.875"	$1.10/ft	1.750"	$2.50/ft
1.000"	$1.20/ft	1.875"	$2.75/ft
1.125"	$1.35/ft	2.000"	$3.00/ft
		2.125"	$3.50/ft

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

BENCHER / BUTTERNUT

Skyhawk, Triband Beam	$1129
HF2V, 2 Band Vertical	$219
HF5B, 5 Band Minibeam	$429
HF6VX, 6 Band Vertical	$299
HF9VX, 9 Band Vertical	$349
A1712, 12/17m Kit	$54
CPK, Counterpoise Kit	$129
RMKII, Roof Mount Kit	$159
STRII, Roof Radial Kit	$125
TBR160S, 160m Kit	$119

More Bencher/Butternut–call

COMET ANTENNAS

GP15, 6m/2m/70cm Vertical	$149
GP6, 2m/70cm Vertical	$139
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/X3200A	$129/210
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	$289
Challenger Counterpoise	$29
Challenger Guy Kit	$19
Eagle DX	$299
Titan DX	$329
Eagle/Titan Guy Kit	$29
Voyager DX	$409
Voyager Counterpoise	$49
Voyager Guy Kit	$45
Quicktilt Mount	$75

Please Call for Delivery Information

CUSHCRAFT ANTENNAS

X7/X740	$679/229
XM240	$719
R6000/R8	$319/469
A50-3S/5S/6S	$95/159/259
AR2/ARX2B	$49/69
AR270/AR270B	$85/99
ARX270N/ARX-450B	$219/65
13B2/17B2	$139/249
26B2	$389
A270-6S/A270-10S	$75/99

Please call for more Cushcraft items

M2 VHF/UHF ANTENNAS

144–148 MHz

2M4/2M7/2M9	$89/109/119
2M12/2M5WL	$149/189
2M5-440XP, 2m/70cm	$159

420–450 MHz

440-470-5W/420-450-11	$129/89
432-9WL/432-13WL	$169/219
440-18/440-21ATV	$119/139

Satellite Antennas

2MCP14/2MCP22	$169/219
436CP30/436CP42UG	$219/259

M2 ANTENNAS

50–54 MHz

6M5X/6M7JHV	$199/239
6M2WLC/6M2.5WLC	$419/449

10/12/15/17/20m HF

10M4DX, 4 Element 10m	$379
12M4DX, 4 Element 12m	$379
15M4DX, 4 Element 15m	$419
17M3DX, 3 Element 17m	$379
20M4DX, 4 Element 20m	$499

More M2 models in stock–please call

MFJ ANTENNAS

259B, Antenna Analyzer	$219
269, Antenna Analyzer	$299
941E, 300W Antenna Tuner	$109
945E, 300W Antenna Tuner	$99
949E, 300W Antenna Tuner	$139
969, 300W Antenna Tuner	$169
986, 3kW Antenna Tuner	$289
989C, 3 kW Antenna Tuner	$309
1796, 40/20/15/10/6/2m Vert.	$189
1798, 80–2m Vertical	$249

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	$149/189/209
G6-270R, 2m/70cm Vertical	$169
G6-144B/G7-144B	$129/179

Hustler Resonators in stock–call

FORCE 12–MULTIBAND

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

Please call for more Force 12 items

ROHN TOWER

25G/45G/55G	$89/189/239
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

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-2800PDC	$1099
Yaesu G-450A	$249
Yaesu G-800SA/DXA	$329/409
Yaesu G-1000DXA	$499
Yaesu G-2800SDX	$1089
Yaesu G-550/G-5500	$299/599

ROTATOR CABLE

R61 (#20)/R62 (#18)	$.28/32
R81/R82	$.25/.39
R83/R84	$.52/.85

TRYLON "TITAN" TOWERS

SELF-SUPPORTING STEEL TOWERS

T200-64	64', 15 square feet	$1099
T200-72	72', 15 square feet	$1299
T200-80	80', 15 square feet	$1499
T200-88	88', 15 square feet	$1769
T200-96	96', 15 square feet	$2049
T300-88	88', 22 square feet	$1989
T400-80	80', 34 square feet	$1939
T500-72	72', 45 square feet	$1879
T600-64	64', 60 square feet	$1799

Many more Trylon towers in stock!

US TOWER

MA40/MA550	$849/1399
MA770/MA850	$2359/3729
TMM433SS/HD	$1139/1379
TMM541SS	$1499
TX438/TX455	$1069/1599
TX472/TX489	$2649/4599
HDX538/HDX555	$1379/2399
HDX572MDPL	$6329

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

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'	$869/1289
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	$11/12
1/2"x9"EE / EJ Turnbuckle	$16/17
1/2"x12"EE / EJ Turnbuckle	$18/19
3/16" / 1/4" Preformed Grips	$5/6

Please call for more hardware items

HIGH CARBON STEEL MASTS

5 FTx .12" / .18"	$45/75
10 FT x .12" / 10 FT x .18"	$75/125
15 FT x .12" / 15 FT x .18"	$105/175
20 FT x .12" / 20 FT x .18"	$135/225
10 FT x .25" / 20 FT x .25"	$175/335

PHILYSTRAN GUY CABLE

HPTG1200I	$.45/ft
HPTG2100I	$.59/ft
PLP2738 Big Grip (2100)	$6.00
HPTG4000I	$.89/ft
PLP2739 Big Grip (4000)	$8.50
HPTG6700I	$1.29/ft
PLP2755 Big Grip (6700)	$12.00
HPTG11200	$1.69/ft
PLP2558 Big Grip (11200)	$18.00

Please call for more info or help selecting the Phillystran size you need.

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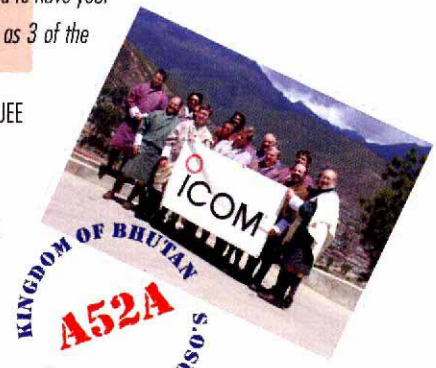
"Just back from K5K, Kingman Reef. The IC-756PROs again performed flawlessly and were a factor in our breaking 80,000 QSOs. I was a participant in FØAAA, A52A and now K5K, all in 2000, and your radios made a combined 237,000 QSOs. You must be very proud to have your wonderful radios used by these DX'peditions that are now ranked as 3 of the top 6 Dx-peditions in terms of QSOs in the history of our hobby."

- K5K member, Bob Allphin, K4UEE



3 OF THE TOP 6 DX'PEDITIONS IN HISTORY!

Three of the top six DX'peditions in history!

Three remote locations!

38 operators!

The radios?

IC-756PRO

Just listen to the guys who actually used them - they know better than anyone what the power of 32 bit DSP technology can do for ham radio. In fact several members were so impressed that they bought '756PROs for their own ham shacks. "It just doesn't get any better than this" - says Glenn Johnson, WØGJ. Is it any wonder - the world's top DX'ers choose ICOM.

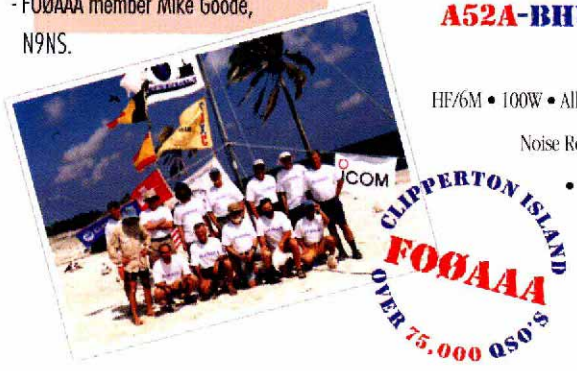
"All seven of the '756PROs worked flawlessly. We ran RTTY perhaps more than 50% duty cycle, and the radios never even got warm at maximum output. The digital filter controls were so easy to adjust and switch...a contester's dream! We had seven radios, most of the time with three modes at once on any given band. There was NO interstation interference. All of our antennas (except for the 160M & 80M verticals) were within a 75 meter circle."

- A52A member Glenn Johnson, WØGJ

" I was particularly impressed with the '756PRO's front end resistance to overloading. I never heard intermod noises or de-sensing even with the huge pileups we generated. Several times I listened carefully for such problems but they simply weren't there. On CW, once I had picked out a station, I could run the selectivity down to 50Hz and hear ONLY the station I wanted. I have worked pileups from several DX'peditions and have never encountered a radio that held up so well."

- FØAAA member Mike Goode, N9NS.

THE EXCLUSIVE RIG OF FØAAA-CLIPPERTON ISLAND, A52A-BHUTAN, AND K5K-KINGMAN REEF DX'PEDITIONS.



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