NCJ

NATIONAL CONTEST JOURNAL

$4

May/June 2003

Volume 31 Number 3

- Station Profile: VE1JF
- A Double-Loop Antenna for 160 Meters
- Contesting from Borneo
- On A Mission to PJ2
- Results: February NAQP RTTY

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It all seemed innocent enough. Head up to the **Three Rivers Contest Club** station in the high desert of central Oregon and enjoy a weekend operating the 2002 IARU HF World Championship. Yes, there was a forest fire raging a few miles away, but that wouldn't cause a problem—or would it? Read the harrowing account by Ken Knopp, K7ZUM, in this issue.

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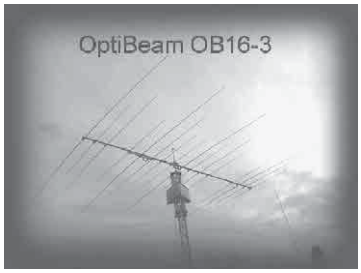

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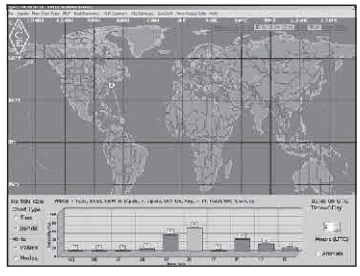

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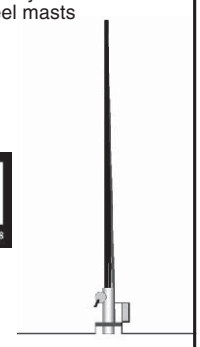

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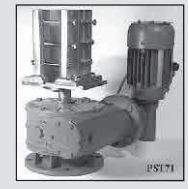

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TABLE OF CONTENTS

NCJ Advertising Index

Editorial

Carl Luetzelschwab, K9LA

Contest Season

Another contest season is winding down. I hope everyone met their goals and had fun in the process. May and June still offer many contests. For example, we still have CQ WW CW WPX, ARRL June VHF QSO Party, the biggest noncontest of all—Field Day (see the all-time records in this issue)—and Kid's Day (see the write-up in this issue). There are many other contests, to tide us over until next fall. Check out WA7BNM's "Contest Calendar" in this issue or on-line at the *National Contest Journal* Web site (**www.ncjweb.com**). And now is the time to start thinking about and making improvements to your station and to your antennas for next season's contests.

Dayton

The Dayton Hamvention is just around the corner. I hope to see many of you at the Contest Forum, at the Contest Dinner and at the ARRL booth. Please drop by and say hello. It's even okay to ignore me and talk to my wife Vicky! And if you have any topics you'd like to discuss, or any subject matter you'd like to see in *NCJ*, I'd be glad to hear about it.

VHF Enthusiasts

Join N0JK in his "VHF-UHF Contesting!" column in this issue as he discusses in detail the E_s opening on 6 meters during the January VHF Sweepstakes. A very interesting QSO occurred! Then read about W9GKA's experiences (also in this issue) during the same contest.

QRM

Recently the cq-contest reflector had a long thread about deliberate QRM to contesters during contests. Watch for more on this in the July/August *NCJ*.

March/April issue

ARRL Headquarters recently converted to a new computer system. Because of typical new-software glitches, several of you received two copies of the March/April issue. Please give those extra copies to prospective contesters and possible subscribers. And be assured that we won't shorten your expiration date by one issue because of this!

Subscriptions

Speaking of subscriptions, did you ever wonder why *NCJ* typically runs around 48 pages while our sister publication, *QEX*, is usually 64 pages thick? It's all in the number of subscriptions. *NCJ* has around 2000 subscribers, whereas *QEX* has 6000. To make ends meet (note that I didn't say to make a profit), *NCJ* needs more advertising to defray its production costs. This can easily be seen if one compares the number of ads in *NCJ* versus the number of ads in *QEX*. This also says the number of pages in *NCJ* can fluctuate with the economy—there are less advertisers when the economy isn't doing too well.

What's the point of this? For *NCJ* to grow, we need more subscribers. Then *NCJ* can bring you more interesting features and useful contesting information in each issue. Talk up *NCJ* with your contesting buddies. Encourage them to subscribe. With the on-line *Rate Sheet* (edited by N0AX) having 7200 subscribers, there's certainly an opportunity for *NCJ* to pick up more business (and the intent is to do so without duplicating *Rate Sheet* content). To refresh your memory, *NCJ* is only $20 per year via surface mail in the US ($28 for First Class), and you can even subscribe on-line for up to 3 years at a time (go to **www.ncjweb.com** and click the SUBSCRIBE link at the upper right).

Corrections

In the January/February issue in the results of the September 2002 *NCJ* Phone Sprint (page 28), the High Score High Power record belongs to K7SS, not N7SS.

In the same write-up, the Most Wins High Power listed N6TR and W7WA with 3 wins. KW8N also belongs in the 3-win category.

In the March/April issue, pin 5 of J4 in the schematic on page 36 should be tied to ground.

In the March/April *NCJ*, on page 29, we incorrectly identified "Environmental Solutions" as the manufacturer of the AR-16, a software-controlled relay bank. The actual manufacturer is Electronic Energy Control, 380 South Fifth St, Suite 604, Columbus, Ohio 43215-5491; tel 800-842-7714; **www.eeci.com**. NCJ

A Double-Loop Antenna for 160 Meters

J. V. Evans, N3HBX
jvevans@his.com

In an earlier article[1] I advocated the use of a vertically polarized, full-wave loop on 160 meters for those that have the space to put one up. I noted that neither a square nor a triangular loop yields the highest gain, but rather a rectangle with a height one third or less of its horizontal length. As has been pointed out by other authors,[2] this arises because as the two vertical sections are spaced farther apart, their separation begins to approach half a wavelength. This causes mutual cancellation of any radiation in the plane of the loop, and forces most of the power to be radiated normal to the loop. A rectangular loop affords the further advantage that the supports required at its ends do not have to be as tall as would be necessary to support a square loop.

The advantages of a full-wave loop over a shunt-fed tower or an inverted L are: (A) there is no need for a large field of radials, buried or otherwise, (B) the loop offers 2-3 dB of gain over a vertical, albeit in only two principal directions and (C) a loop is likely to exhibit greater bandwidth if designed to offer an input impedance close to 50 Ω. I will return to this point later.

In this article, I describe what I believe is a new type of antenna employing two loops. You may well wonder why this is not the familiar *quad* antenna. The answer lies in the relationship between the sizes of the two loops. The quad antenna was recently reviewed by Haviland[3] who demonstrates that the maximum gain is achieved with a reflector that is 10% larger than the (square) driven loop and spaced 0.15 wavelengths behind it. When I tried to model (using *EZNEC*[4]) a quad for 160 meters that employed two vertically polarized, *rectangular* loops, I found that I could not significantly increase the gain by simply making the reflector larger than the driven element. The key to making the two-loop antenna work came from the realization that, for a large rectangular loop, almost all the useful radiation is from the two vertical wires. The two horizontal wires can be viewed merely as phasing lines that connect them (see footnote). *Accordingly, to make the reflector work it is necessary to increase only the length of its vertical wires.*

In what follows, I first describe my efforts to design an optimum double-loop antenna. Ideally, one would approach this by varying all of the parameters simultaneously in an effort to converge on the true optimum. Lacking the software to perform such a search, I was obliged first to explore the optimum shape for the driven loop. I next varied the spacing between this "best" loop and a reflector loop whose vertical wires were 5% longer. Lastly, while holding the spacing between the two loops constant at the optimum amount, I modeled this "best" loop and a reflector to find the best reflector dimensions.

Such an approach does not guarantee that the resulting design is truly the optimum (defined perhaps as some combination of gain and front-to-back ratio over a span of frequencies). I could take comfort, however, in the fact that the gain varied only slowly by varying the spacing between the loops, suggesting that this is not an important parameter. Also, the effect of changing the reflector size was chiefly to alter the frequency at which the largest front-to-back ratio appeared. In the remainder of the

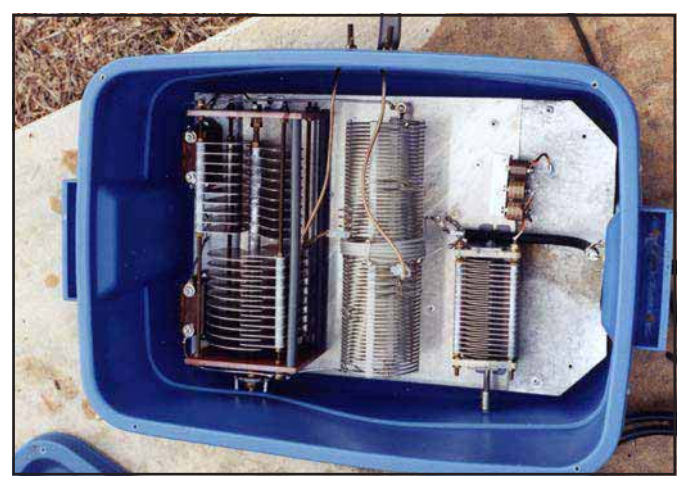
Footnote: Since writing this article, I discovered that the point that the horizontal wires serve only as phasing lines has previously been made by D. Handelsman in "The Rectangle Family of Antennas, Part 1: The Not-So-Simple Rectangle" *QEX* Mar/Apr 2001, pp 35-46.

Table 1

Parameters employed in the computer models described in this article.

Software: *EZNEC* v 3.07 written by Roy Lewallen (4).
Wire: #13 gauge
Wire losses: copper
Ground model: "Real/MININEC"
Ground type: "medium" (conductivity = 0.005 Siemens, dielectric constant = 13)
Number of segments per wire: 51
Feed point: 50% from the end of one of the vertical wires.

View of the 450-Ω ladder line feeding the driven loop. The box on the pad is the transmatch described in the text.



View of the interior of the transmatch box showing the components.

article I describe my efforts to build such a two-loop antenna for 160 meters.

The Origin Of The Idea

In the earlier article[1], I described the construction of a trapezoidal loop for 160 meters. This shape was necessitated by the fact that the supports (both towers) that I planned to use were only 120 feet apart, and the smaller one only 80 feet high. There was simply no way that a full-wave loop could be completely contained between the two supports, given that its total circumference would be about 540 feet. Accordingly, I chose to extend the two bottom corners beyond the two towers while keeping the shape symmetrical. To avoid bringing these bottom corners close to the towers, the plane of the loop had to be tilted out of the vertical, and this somewhat adversely affected the pattern.

I began my quest for a better solution by noting that some trees, about 250 feet distant, together with the 80-foot tower might afford an alternate pair of supports, and then trying to model an antenna that could fit between them. This led to an acceptable design in which the vertical wires of the loop were only 45 feet long. Table 1 lists the parameters employed in this and all subsequent models. The computed gain (3.7 dBi) was slightly better than that of my trapezoidal loop (~ 2.9 dBi), and, moreover, the pattern was symmetrical.

As will be discussed, this very elongated rectangle would exhibit a much lower input impedance (on the order of 25 Ω) compared to the trapezoid (about 50 Ω). This meant that it would be more difficult to match, and would have a narrower bandwidth. Despite these shortcomings, I proceeded to install this loop, temporarily supported at one end by a tree, and in listening tests compare it with the trapezoidal one. Unable to detect any significant difference between the two (and having established that, despite their proximity, they were not coupling) I took down the trapezoidal one.

My next step was to erect a 75-foot (Rohn 25) tower at the tree line as a permanent support for the far end of the new loop (a height of 75 feet was needed because the ground slopes away from the 80-foot tower to the tree line). It was then that I noticed that this new tower, together with the 110-foot tower that had supported one end of the original loop, were out of the plane of the new loop by an amount that might make them useful supports for a reflector loop. The resulting double-loop antenna would be aimed approximately in the direction of Europe, making this an attractive idea.

When I attempted to add a reflector loop to my model, I assumed that, as in

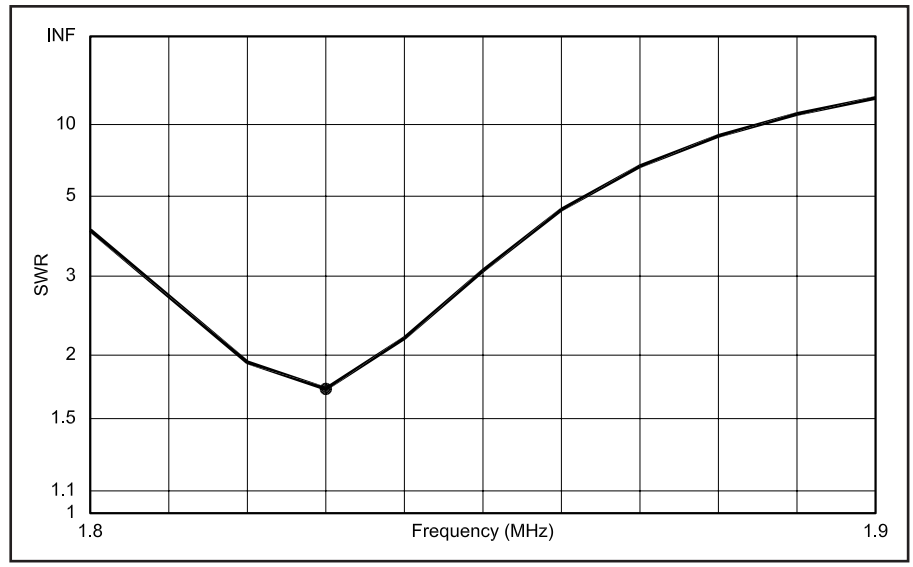


Figure 1—Plot of VSWR versus frequency for a loop comprising 222-foot horizontal wires and 50 foot vertical ones. The lower horizontal wire is 10 feet above the ground.

Table 2

Gain and input impedance computed for a 544-foot loop with different vertical sections.

Length of the spans (feet)		*Gain (dBi)*	*Input Impedance (Ω)*
Vertical	*Horizontal*		
90	182	3.35	92.7 + *j*3.1
80	192	3.56	73.0 + *j*1.55
70	202	3.73	55.9 + *j*1.3
60	212	3.86	41.4 + *j*1.8
50	224	3.88	29.5 + *j*3.4
40	232	3.70	20.3 + *j*3.7

Table 3

Gain, front-to-back ratio (F/S) at 20 degrees elevation, and front-to sidelobe ratio (F/S) of the two-loop antenna described in the text.

Frequency (MHz)	*Gain (dBi)*	*F/B at 20° (dBi)*	*F/S (dB)*
1.80	–4.31	0.98	0.98
1.81	5.01	2.52	2.52
1.82	6.64	11.46	11.32
1.83	6.80	17.64	12.87
1.84	6.30	8.68	7.93
1.85	5.84	5.75	5.44
1.86	5.50	4.26	4.07
1.87	5.26	3.36	3.24
1.88	5.09	2.77	2.68
1.89	4.97	2.36	2.28
1.90	4.87	.99	1.99

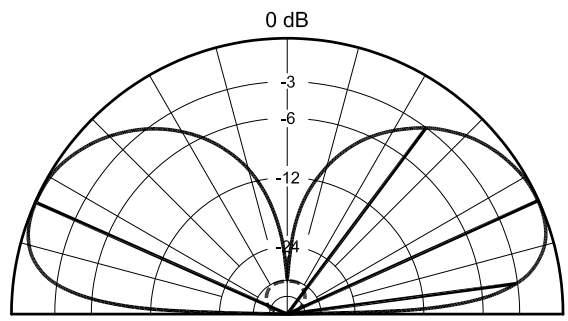


Figure 2—The elevation pattern of the loop described in Figure 1, calculated using the parameters listed in Table 1.

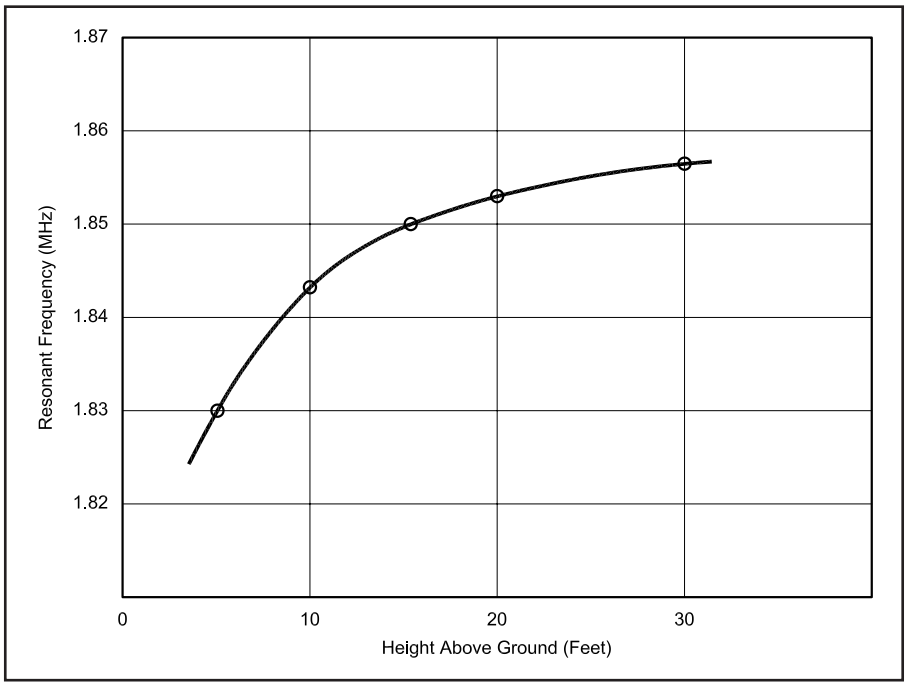


Figure 3—The effect of altering the height of a loop on the resonant frequency. Here the loop size was 220 feet x 50 feet and the height shown is that of the lower horizontal wire.

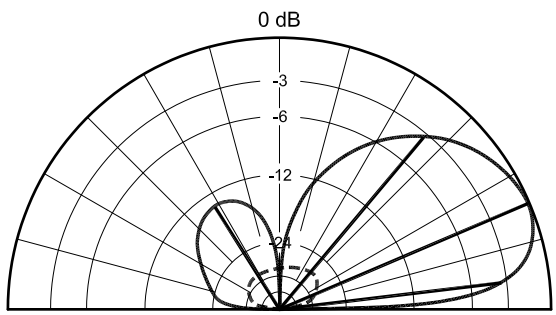


Figure 4—Elevation pattern obtained at 1.83 MHz with two loops spaced 120 feet apart. The driven loop is 220 feet x 50 feet and the reflector is 220 feet x 52.5 feet. Both have their lower horizontal wires 10 feet above ground.

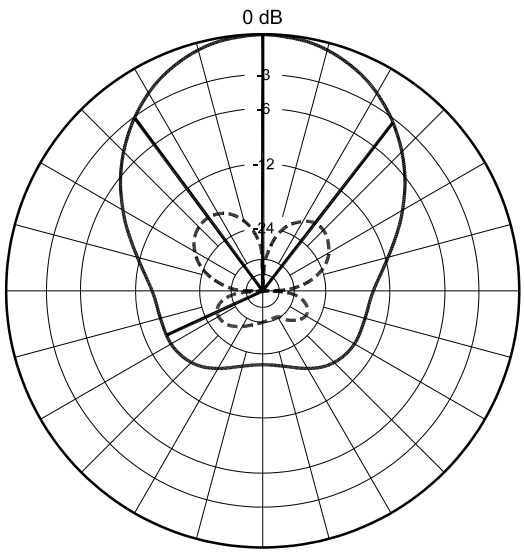


Figure 5—Azimuth pattern (for 20 degrees elevation) at 1.83 MHz. for the antenna described in Figure 4.

a quad, it would need to be about 10% larger than the driven one. However, adding such a loop to the model seemed to have little or no effect on the original pattern. Reducing the size increase to only 5%, and/or varying the separation between the two loops likewise had no appreciable affect. It was then that I hit upon the idea of maintaining the horizontal spans in the two loops the same, and increasing only the length of the vertical wires of the reflector. *Voila!* I now had an antenna with about 6 dBi gain at a take off angle of about 23 degrees.

Optimizing The Shape Of The Driven Loop

Handelsman explored the effect of loop shape on gain for loops made with # 10 SWG copper wire. As I was unaware of his work (and in any event planned to use lighter wire) I ran a series of calculations for loops having vertical wires that ranged from 90-40 feet long. In running the calculations the total amount of wire in the loop was held fixed at 544 feet, and the height of the bottom horizontal span held fixed at 10 feet. All other parameters were as listed in Table 1. The results are listed in Table 2, where the gain (at a planned operating frequency of 1.83 MHz.), is listed. It can be seen that the gain continues to increase as the loop is elongated up to a maximum when the length of the horizontal wires is about 4.5 times the length of the vertical ones. Thereafter the gain begins to fall off, presumably because the increased losses in the vertical wires overcome any increase in gain resulting from their greater separation.

Accompanying the changes in shape are large changes in input impedance. As the loop is elongated the input impedance decreases steadily, rendering the matching problem more difficult and lowering the bandwidth. For example, if fed with 50-Ω cable, the loop with the highest gain in Table 2 (with 50-foot vertical wires) would exhibit a VSWR of 1.7 at resonance (Figure 1). The radiation pattern at 1.83 MHz of this "best" loop is shown in Figure 2. I have not plotted the gain versus frequency, as this simply rises monotonically (reaching 4.0 dBi at 1.89 MHz.) owing to the fact that the gain of a large loop is proportional to the area divided by the square of the wavelength.

I next explored the effect of altering the height of a loop. For this exercise, the vertical wires were made 50 feet in length and the horizontal wires were 220 feet long. It was found that neither the gain nor the input impedance *at resonance* changed significantly, but that the resonance frequency is appreciably lowered as the loop brought closer to the ground. This is illustrated in Figure 3 where the height is that of the bottom

Table 4

Gain, F/B ratio (at 20 degrees elevation) and F/S ratio at 1.83 MHz for the two-loop antenna described in the text as the spacing between the loops is varied. Also given is the input impedance at 1.84 MHz (i.e., near resonance).

Spacing (feet)	*Gain (dBi)*	*F/B Ratio (dB)*	*F/S Ratio (dB)*	Z_{in} *at 1.84 MHz (Ω)*
60	6.26	12.48	10.85	40.1 + *j*12.7
70	6.50	14.21	11.72	42.3 + *j*11.2
80	6.68	15.93	12.38	44.2 + *j*9.4
90	6.80	17.64	12.87	45.7 + *j*7.2
100	6.88	19.3	13.21	46.8 + *j*4.8
110	6.92	20.67	13.42	47.4 + *j*2.3
120	6.93	21.57	13.51	47.6 + *j*0.3
130	6.91	21.72	13.49	47.4 – *j*3.0
140	6.86	21.19	13.37	46.7 – *j*5.5

horizontal wire. Practical considerations, such as avoiding interference for people (or tractors) are likely to dictate the minimum acceptable height of the lowermost wire, and in subsequent calculations this was held at 10 feet.

It needs to be recognized that where a loop is to be erected over very irregular ground (as in my case) the dependence of the resonant frequency on height will introduce uncertainty in the required size of loop for a given operating frequency. It then becomes prudent to err on the large side, and trim to bring it to the desired resonance.

The Effect of Adding a Reflector

Adding a reflector to the model loop was found to shift both the resonant frequency and the input impedance. For example, placing a reflector loop (with 52.5 foot vertical wires) 90 feet behind the "best" loop of Table 2 (50 foot vertical wires) caused the resonant frequency to rise about 10 kHz and the input impedance also to rise. The latter change is welcome, as it should ease the matching arrangements. The former requires that the driven element of a double-loop must be made slightly smaller than a stand-alone loop for the same operating frequency.

In this initial model the reflector loop had the same horizontal span as the driven loop (222 feet) and the bottom wire was also 10 feet above ground. The vertical segments were 52.5 feet long (a 5% increase). A larger increase (to 10%) caused the gain (at 1.83 MHz.) to decrease. Thus, I next modeled a two-loop antenna with horizontal wires of 220 feet (reduced from 222 feet, to again raise the resonant frequency) and vertical wires of 50 feet for the driven element and 52.5 feet for the reflector. With the spacing between loops set at 90 feet. the gain and front-to-back ratio now vary with frequency as listed in Table 3. The gain and front-to-back (F/B) ratio (measured at 20 degrees elevation) both peak at the desired operating frequency (1.83 MHz), while the minimum VSWR has moved to 1.835 MHz (z = 42.2 + *j*1.2 Ω). It can be seen that the front-to-back ratio diminishes considerably away from the design frequency – more rapidly below it than above. In general, the largest unwanted lobe is in the backward direction, so the F/B ratio is a good measure of the difference between the forward gain and that of the largest sidelobe.

This is not the case close to the design frequency, and hence Table 3 includes also the front-to-sidelobe (F/S) ratio computed by *EZNEC*. Interestingly enough, the gain remains somewhat higher than that of a single loop from 1.81 to 1.90 MHz. The minus sign before the gain at 1.80 MHz (Table 3) is there to indicate that the higher forward gain is in the reverse direction. *Evidently, when the wavelength exceeds the size of the reflector it acts instead as a director.* However, at this frequency the

Table 5

Gain, F/B ratio (at 20 degrees elevation) and F/S ratio versus frequency for different reflector sizes.

		Reflector Size		
	6% (53.0 feet)	*5% (52.5 feet)*	*4% (52.0 feet)*	*3% (51.5 feet)*
Freq (MHz)		***Gain (dBi)***		
1.80	5.19	-4.84	- 4.52	-4.33
1.81	6.45	6.06	5.60	5.17
1.82	7.10	7.01	6.77	6.40
1.83	6.75	6.93	7.07	7.10
1.84	6.15	6.33	6.53	6.75
1.85	5.65	5.78	5.93	6.12
1.86	5.29	5.38	5.49	5.62
1.87	5.06	5.11	5.18	5.27
1.88	4.88	4.92	4.97	5.02
1.89	4.76	4.78	4.82	4.85
1.90	4.66	4.69	4.71	4.73
		F/B (dB)		
1.80	1.60	0.90	0.34	0.07
1.81	5.51	3.90	2.53	1.53
1.82	15.08	10.66	7.51	5.26
1.83	15.91	21.57	21.47	14.68
1.84	8.60	10.00	12.12	15.71
1.85	5.67	6.32	7.24	8.30
1.86	4.15	4.49	4.94	5.48
1.87	3.24	3.42	3.68	3.98
1.88	2.62	2.73	2.90	3.07
1.89	2.19	2.26	2.36	2.48
1.90	1.86	1.92	1.99	2.06
		F/S (dB)		
1.80	1.60	0.90	0.34	0.07
1.81	5.50	3.92	2.54	1.54
1.82	14.71	10.55	7.49	5.26
1.83	11.75	13.51	15.93	14.34
1.84	7.66	8.63	9.90	11.58
1.85	5.30	5.85	7.07	7.43
1.86	3.94	4.24	4.65	5.13
1.87	3.10	3.27	3.51	3.79
1.88	2.52	2.63	2.78	2.94
1.89	2.11	2.19	2.28	2.39
1.90	1.80	1.86	1.93	2.00

pattern is almost symmetrical, so the practical consequence is small.

Varying The Spacing Between Driven And Reflector Loops

I next explored the effect of varying the spacing between the two loops. Both were held to their original sizes (i.e., 220 feet × 50 feet for the driven element and 220 feet × 52.5 feet for the reflector) with the bottom horizontal wires 10 feet above ground. The results of this exercise are listed in Table 4. It can be seen that at the design frequency (1.83 MHz.) maximum gain, highest F/B and F/S ratios are achieved at a spacing on the order of 120 feet i.e., about 1/4 wavelength. However, neither the gain nor the F/S ratio is very sensitive to spacing over the range 90 to 140 feet. This is fortunate, as it is highly unlikely that anyone attempting to build this antenna would have at hand four supports that provide both the best orientation and spacing.

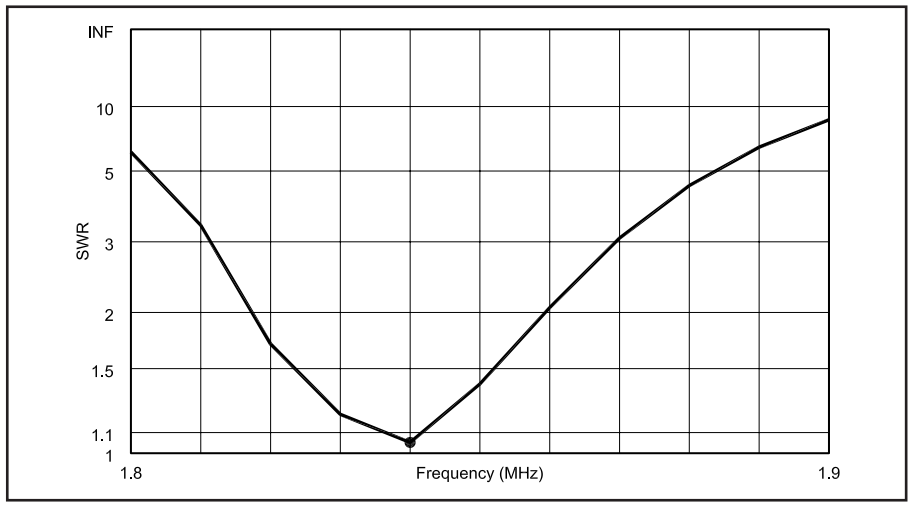


Figure 6—Plot of VSWR versus frequency for the antenna described in Figure 4

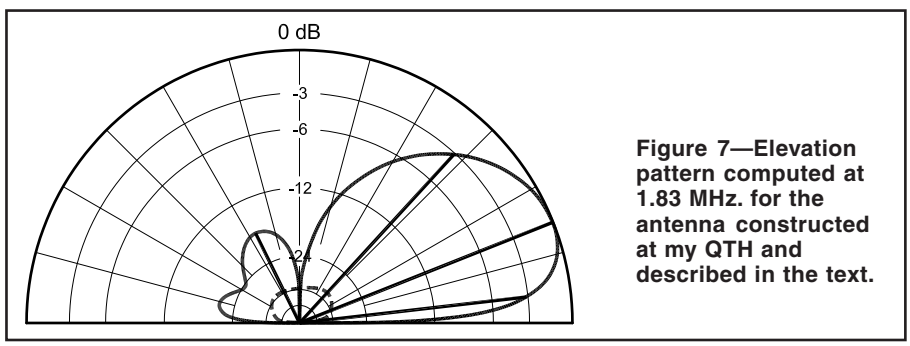


Figure 7—Elevation pattern computed at 1.83 MHz. for the antenna constructed at my QTH and described in the text.

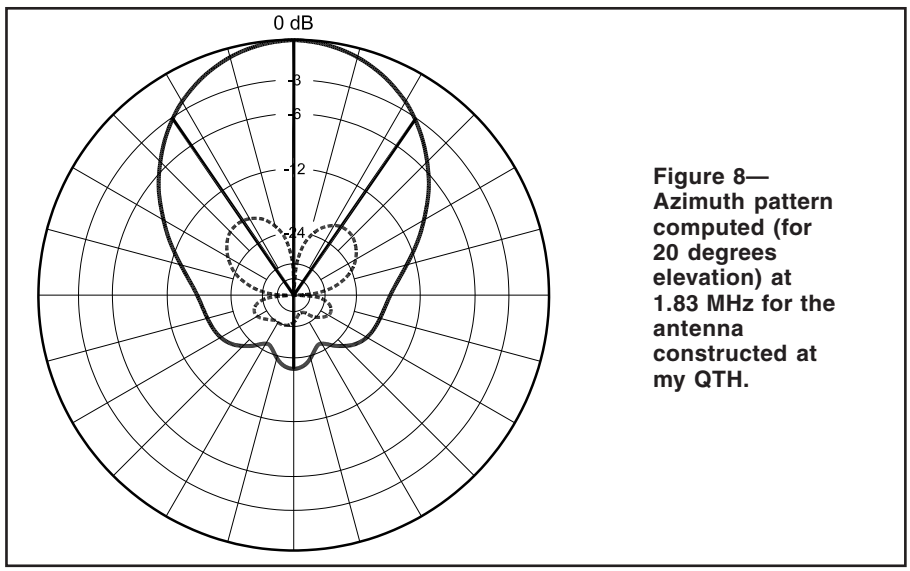


Figure 8—Azimuth pattern computed (for 20 degrees elevation) at 1.83 MHz for the antenna constructed at my QTH.

The variation of the F/B ratio is a manifestation of the disappearance of the backward lobe. This appears to depend critically on the size of the reflector as will be shown.

Figures 4 and 5 provide the elevation and azimuth patterns for the best case of Table 4, i.e., a spacing between the loops of 120 feet. Figure 6 shows the VSWR versus frequency, indicating a minimum at 1.84 MHz and a bandwidth (between points with 2:1 VSWR) of about 40 kHz. This is enough to cover the "DX window."

Optimizing the Reflector

My last study was to determine if a reflector having vertical wires that are 5% longer than those of the driven loop is the best choice. Accordingly, while holding the size of the driven loop fixed (220 feet × 50 feet) and the spacing between the loops at 120 feet, I varied the length of the reflector legs over the range 6% to 3%, with results that are listed in Table 5. It can be seen that there is little change in the variation of gain with frequency as the reflector vertical wires are shortened. There is, however, a small shift (to higher frequency) of the point where the best front-to-back ratio is achieved. This means that, even after the driven loop has been installed, one can optimize the pattern by choosing the appropriate size reflector.

I would caution, however, that large loops tend to be sensitive to metal objects (towers, wires etc.) in their vicinity (witness the effect here of adding a second loop 120 feet away!). Thus, in practice, it may be difficult to achieve the clean patterns of Figures 4 and 5, and tweaking the design for fractions of a dB is probably not worthwhile. Table 5 indicates that for optimum performance at 1.83 MHz, the 4% reflector provides perhaps the best combination of gain and F/B ratio.

We can summarize the findings of this study as follows. For optimum performance at 1.83 MHz:

Loop size = 540 feet (1.0047 wavelengths)

Vertical leg of the driven loop = 50 feet (0.093 wavelengths)

Horizontal span = 220 feet (0.409 wavelengths)

Vertical leg of the reflector = 52 feet (0.0967 wavelengths)

Horizontal span = 220 feet (0.409 wavelengths)

Separation between loops = 120 feet (0.223 wavelengths)

Height of lowermost horizontal spans = 10 feet

It should be noted that the antenna will resonate at 1.84 MHz (Figure 6). To build such an antenna one needs no less

than four supports appropriately spaced. However, none needs to be taller than, say, 65 feet. Shorter supports can be used without sacrificing too much gain, by reducing the length of the vertical segments. This proved necessary in my case.

One might well ask if it is not possible to achieve a more 'robust' design than presented here. By "robust" we mean one that is less sensitive to changes in element dimensions and/or frequency. To explore this I attempted to see what happens if the loops are made more dissimilar and modeled a 10% reflector. If the size of the driven loop (220 feet × 50 feet) is not changed, the effect of adding this large a reflector is to move the peak in the gain curve and the point of highest F/B ratio down to 1.81 MHz. To restore the gain peak to 1.83 MHz, it was necessary to reduce the length of the horizontal wires from 220 to 216 feet. This moved the minimum VSWR up to 1.87 MHz. but the variation of gain with frequency then differed little from that listed in Table 5 for the 3% reflector. Thus, it would seem that the greater the dissimilarity between the loops, the more the frequency of minimum VSWR is *shifted above* the desired operating frequency (where the gain and F/B ratio maximize). Accordingly, something close to a 5% increase for the reflector may well be best.

Building a Double Loop Antenna

As explained earlier, I did not start out with the idea of building a double-loop antenna, but rather of replacing my trapezoidal antenna with a slightly higher gain rectangular one that would be further removed from my Beverage antennas. Owing to a limitation imposed by the height of the tree that was to support one end of the new loop, its vertical wires could not be greater than 45 ft. long. This loop was to be built using #13 gauge stranded copper wire insulated with what was described to me as "dense poly." [5]

Haviland[6] has discussed the effect of insulation in electrically lengthening a loop and provided charts that permit one to calculate the effect. To use these it is necessary to know the conductor diameter, the diameter of the insulated wire, and the dielectric constant of the insulating material. Taking a guess at the nature of the latter, I concluded that the loop should be shortened from the size (544 feet) that the model results indicated would resonate at 1.83 MHz to 530 feet. This meant that the horizontal wires had to be 220 feet in length. Much to my surprise, this loop was found to be resonant at 1.737 MHz. I then shortened the loop to 500 feet by reducing the two horizontal wires by 15 feet. This raised the resonant frequency to 1.828 MHz, seeming to confirm that the effect of the insulation was to electrically lengthen the wires by about 9% (there is some uncertainty in this number, as it is not clear what the *effective* height of the antenna is above ground, as it is sited over large dip).

Accepting the 9% estimate meant that the electrical length of the vertical wires was closer to 49 feet rather than their physical length of 45 feet. This was fortunate in two regards. First it is closer to the "optimum" 50 feet used in my model studies, and second because the "temporary" tree support proved not to be as high as anticipated, the vertical leg nearest to it tended to coil on itself. To try out the double-loop antenna, the tree support would have to become permanent. Since the effect of the reflector would be to lower the resonant frequency, I needed to further shorten the loop, and I chose to do this by reducing the vertical legs to 42 feet (electrically 45.8 feet). This raised the resonant frequency to 1.847 MHz.

Given the location of my four supports, the greatest separation that I could achieve between loops is 90 feet. Accordingly, I modeled the addition of a reflector loop at this spacing that had the same horizontal span (electrically 223.45 feet), but with vertical segments that were 3 to 7% longer. The results obtained were similar to those presented in Table 5, i.e., the gain variation with frequency was little affected by the reflector size, but the maximum F/B ratio shifted from 1.83 MHz for the 6% reflector to 1.84 MHz for the 3% one. Figures 7 and 8 show the patterns at 1.83 MHz for the 6% reflector, while Figure 9 shows the VSWR curve. It is evident that reducing the length of the vertical wires below 50 feet has had only a small effect on the gain.

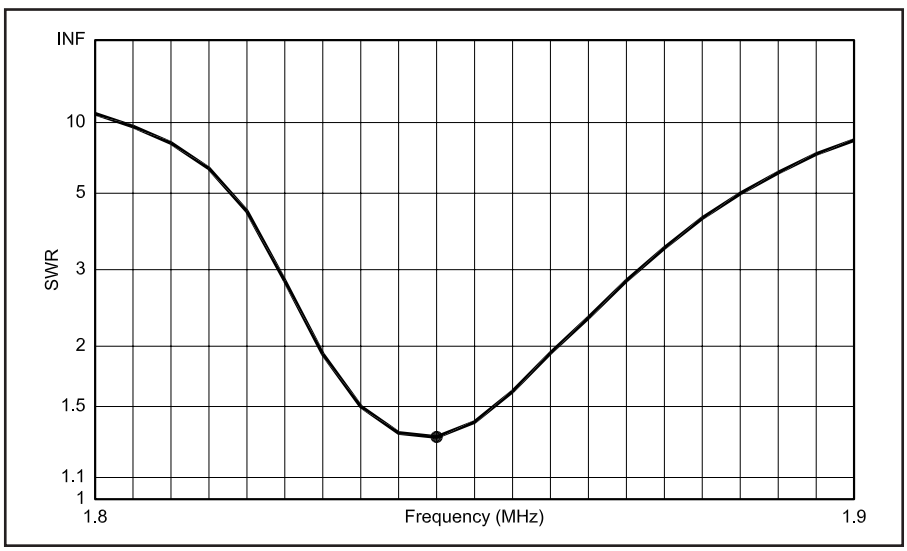


Figure 9—Plot of VSWR versus frequency computed for the antenna constructed at my QTH.

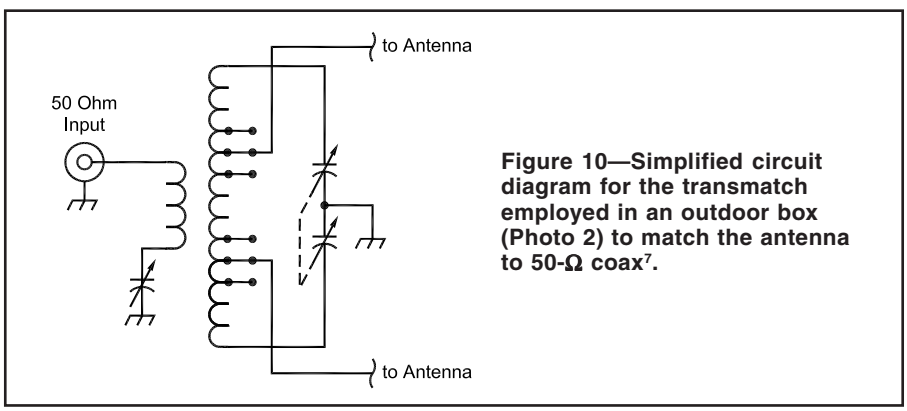


Figure 10—Simplified circuit diagram for the transmatch employed in an outdoor box (Photo 2) to match the antenna to 50-Ω coax[7].

Matching the Antenna

Anticipating that I would be feeding a loop with an input impedance of the order of 25 Ω, I built an outdoor balanced tuner in a Rubbermaid lidded container. The tuner matches the 50 Ω coax from

the shack to the impedance seen at the end of about 40 feet of 450-Ω ladder-line that feeds the loop (Photo 1), employing a circuit described by Lew McCoy[7] many years ago. This circuit uses a coupling coil and series capacitor to couple the 50-Ω line to a balanced parallel-resonant circuit, down which are tapped the two outputs.

The basic circuit is shown in Figure 10, omitting some fixed capacitors that were necessary for proper operation in my case. In building one of these units it is well to remember that large RF voltages will appear across the parallel (split stator) tuning capacitor, so one must be selected that has wide separation of its plates. Also, while a Rubbermaid container is cheap and easy to use, it is not a good long-term solution. From bitter experience I have found that UV causes their lids to crack so that the tuner fills with water during the next heavy rainstorm!

Conclusion

In sum, a pair of full-wave loops having different length vertical wires can be used to form an antenna with up to 7 dBi gain and 20 dB F/B ratio at its design frequency. The region of high gain and good F/B ratio is quite narrow, however, so that good performance (on 160 meters) is limited to a window of 30-40 kHz. Moreover, these results are achievable only over ground that is reasonably conductive (as defined in Table 1). Obviously, this is no match for a 'four square', but for those with suitable skyhooks it makes an attractive low-cost alternative.

Notes

[1]Evans, John, N3HBX, "A full-Wave Vertical Loop for 160 meters" *NCJ* Volume 28, No. 2 (March/April 2000) pp 14-17.

[2]Cebik, L. B., W4RNL, "SCV's: A Family Album" Part 3, *NCJ* Volume 27, No. 1 (January/February 1999) pp 16-20.

[3]Haviland, R. P., W4MB, "The Quad Antenna Revisited" Part 2 in *Communications Quarterly* Volume 9, No. 4, pp. 65-85, 1999.

[4]*EZNEC* by Lewallen, Roy, W7EL, PO Box 6658, Beaverton, OR 97007.

[5]The cable was obtained from The RF Connection; **www.therfc.com**.

[6]Haviland, R P., W4RNL, "The Quad Antenna Revisited" Part 1 in *Communications Quarterly* Volume 9, No. 3, pp.43-47, 1999

[7]McCoy, Lewis G., W1ICP, "A Completely Flexible Transmatch for One Watt to 1000" *QST* pp.39-42, June 1964.

NCJ

Contesting from Borneo

By Henryk Kotowski, SM0JHF
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Borneo is a large island in South East Asia, but it counts as Oceania for contest scoring purposes. It is divided into three DXCC entities: YB, V8 and 9M6/9M8. A vast part of the island belongs to Indonesia YB. The smallest entity is Brunei, V8, and it is surrounded by East Malaysia, 9M8/9M6. 9M8 is the state of Sarawak while 9M6 denotes the state of Sabah.

Some islands north of Sabah, claimed by Malaysia, are in the Spratly Archipelago (no official prefix). Sabah has been on the air in almost every major contest for the past few years mainly due to many short-term visitors and because of Phil, VS6CT, who took residence in Kota Kinabalu and became 9M6CT.

Many visitors are attracted to the well-equipped club station 9M6AAC in Keningau. It was completed some five years ago, and is in an inconspicuous resort outside of town called Hillview Gardens. Here the air is both clear and cooler, and the forest of antenna towers surprises visitors. Apart from bungalows, a swimming pool, a restaurant, and a live-performance stage, there is a spacious radio shack and the CQ Bar & Lounge.

It was an old dream of Alfons 9M6MU to have a place like this. With support from his wife, Doris, 9W6DU, his dream came true. Alfons is restless and already has a new project on the drawing board—The Eagle Plateau. To read more about Hillview Gardens and the new project, point your Web browser to **www.alfons.com**.

Why Are Cameroon (TJ) and Mozambique (C9) in the British Commonwealth?

The answer for TJ comes from World War I. In 1922 western Cameroon became a British mandate (mandated territories are colonies and territories that were taken from the defeated nation and placed under the administration of one or more of the victorious nations).

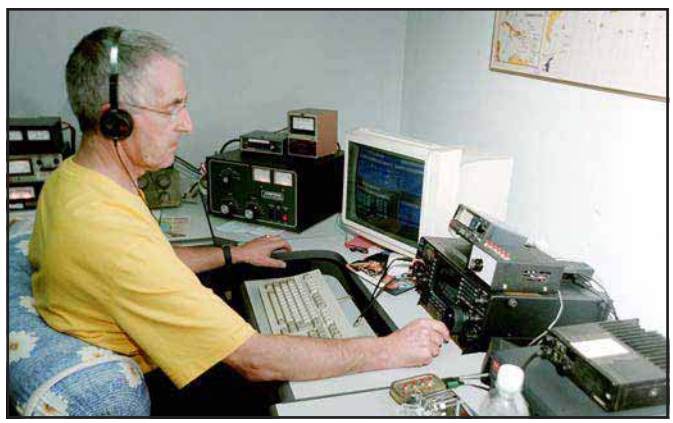
The answer for C9 is much tougher. Does anyone the answer to this one?—*SM0JHF*

My Journey to Hillview Gardens

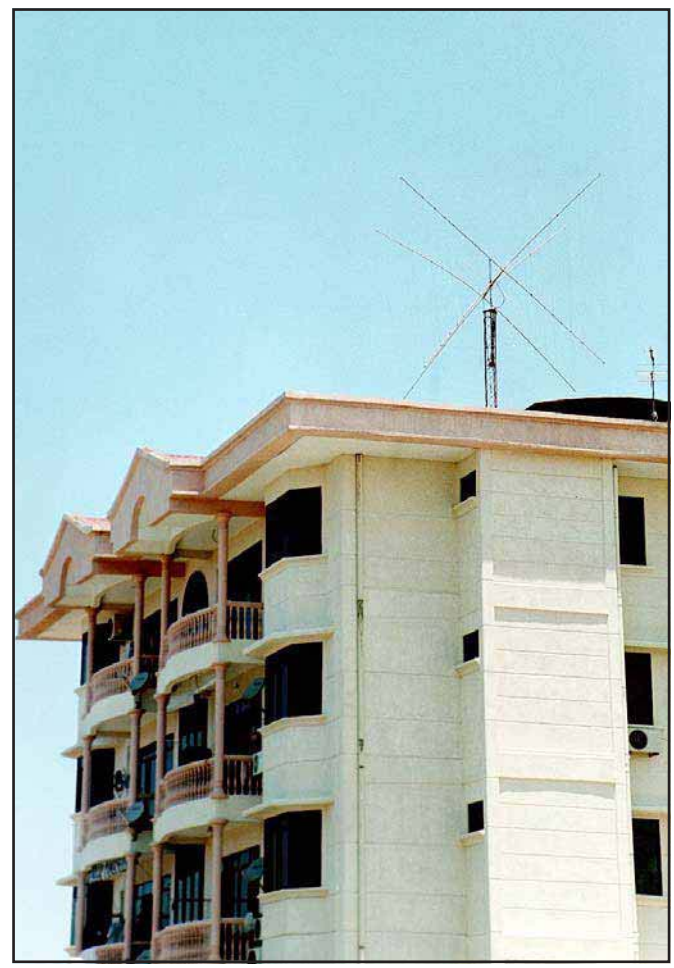
I was prompted to go to Hillview Gardens by sheer coincidence. When it's dark and cold in Stockholm, Sweden, I often check the last-minute flights on the Internet. Around the end of February 2002 I saw a $250 round-trip ticket to Kota Kinabalu offered by one of the local travel bureaus. That rang my bell. I found the 9M6AAC Web site (**www.qsl.net/9m6aac**), sent an e-mail query, and the next day I booked the ticket. Doris, 9W6DU, promptly responded to my e-mail. On the flight to 9M6, we made a stopover in Sharjah (A61) for refuelling and after some 16 hours of travelling I was met by Doris and Alfons at the airport.

I was not the only ham at the resort when I arrived. And I was not the only ham to depart two weeks later. Ralph, DK3GH, who spends winters in South East Asia, was at 9M6AAC when I came.

Doris, 9W6DU, Ralph, DK3GH and Alfons, 9M6MU, in front of the CQ Bar and Lounge at 9M6AAC.



Barry, VK2BJ, during the 2002 Commonwealth Contest from 9M6A (9M6ACC's contest call sign).



The home of Phil, 9M6CT, in Kota Kinabalu.

Doris, 9W6DU, at 9M6AAC.

A few of the 9M6AAC antennas.

I saw him plant a tree before departure, which is one of many ceremonies at Hillview Gardens.

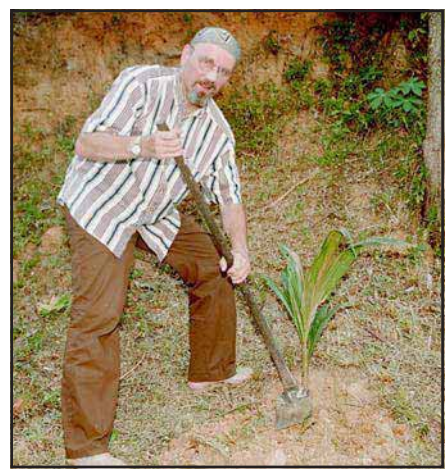
I had the company of Barry, VK2BJ, when I planted my tree. Barry arrived a couple of days after the 2002 ARRL DX SSB Contest. I am not very serious about contesting, but being in such a spot and having reasonable antennas at my disposal, I could not stay off the air. Propagation to the USA is sporadic from this part of the world. Or was it exceptionally poor that weekend? The West Coast path opens in the morning local time. In the evening and at night only Big Guns from the USA and Canada could be heard (barely). I made over 800 QSOs and I did send in the log. I swear!

A couple of days later Doris and Alfons again drove to Kota Kinabalu to meet Barry VK2BJ. He lives in a Sydney suburb and used to be G3PEK until some 12 years ago. Barry was very serious about the Commonwealth Contest (ex-BERU), which is one week after the ARRL DX SSB Contest. It is a neat contest for British Commonwealth countries (see the sidebar) only. That means there are a lot of juicy DX stations on. Sabah was British Borneo until some 30 years ago. But due to the Boston Tea Party, US stations are not included in this smorgasbord.

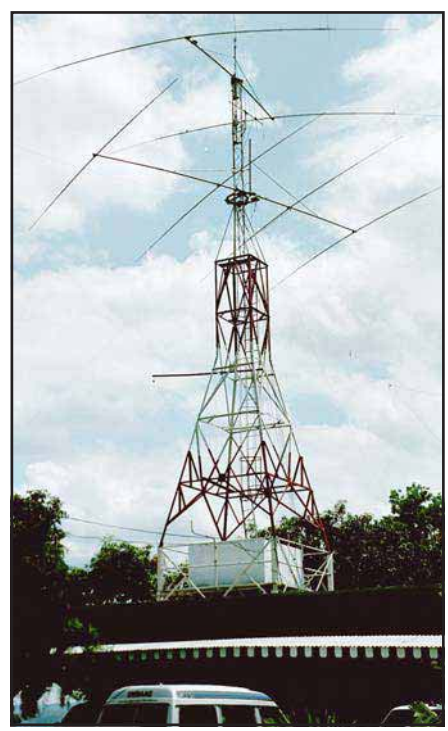
I dropped into the shack now and then to see Barry swiftly move rare African multipliers from band to band in between working the VK/ZL pack. He spent 24 hours in the chair by the rig and then slept for 12 hours straight. Next day I took him to town—radio is not everything in Sabah! A good massage, a pint of the local lager, and buying a souvenir for the wife are also parts of a contest expedition.

The Hillview Gardens is a commendable place. It has an exotic environment, a high degree of hospitality, a completely furnished radio station, and reasonable cost—that's just a few main factors. Propagation to the USA is not great, but in a worldwide contest you'll get three points for each of the one million Japanese stations! I'll most likely visit Hillview Gardens again, maybe in conjunction with the SEANET Convention in Perth VK6 during the first days of November 2002.

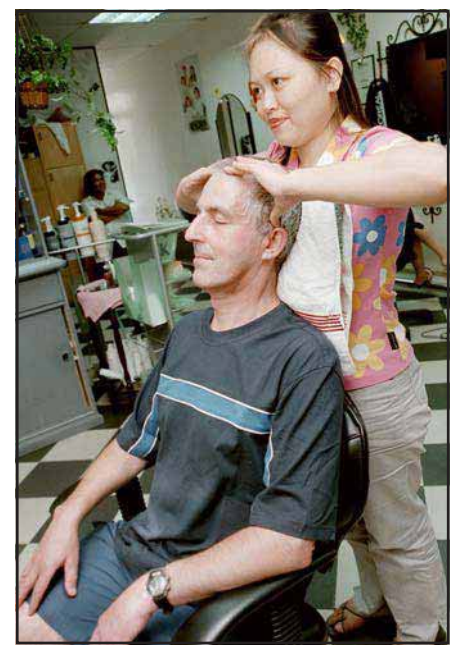
All photos by the author.



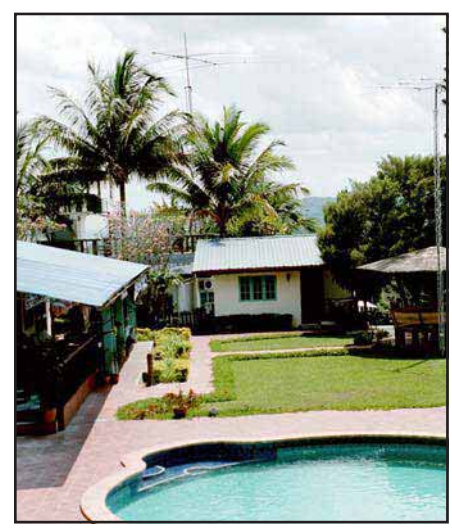
The author plants a palm at Hillview Gardens, Sabah.



The main tower at 9M6AAC.



Barry, VK2BJ, in post-contest mode at a beauty parlor in Keningau, Sabah.



The pool and more antennas at 9M6AAC.

On a Mission to PJ2

By Ed Sawyer N1UR
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I enjoy contesting and I like to be competitive. It doesn't matter if I actually have a chance to win, but I like to do the best possible with the station and location I have at the moment. I have seriously embraced two-radio contesting, although I would say that I am only at 50% of the level of accomplishment I would like to reach some day, especially at high rates in a DX location.

This year marked my first trek to Dayton and, as you might expect, I met a ton of people whom I had worked over the years (during contests, DXing, and just general operating). It was quite a lot of fun and added a new dimension to my ham radio experience. One of the people I met there was Jeff, KU8E, a Mad River Contest Club friend who was describing his recent experience at one of the new powerhouse Caribbean contest stations, PJ2T, in Curacao. I had seen information on it before on the web and knew those guys always had a great signal on the bands. It's located at the same spot that made the Radio Team Finland, PJ9W, a world record during CQ WW at the peak of the last sunspot cycle. My mind started wandering about doing a competitive SO2R effort from there for IARU.

I have been a low-power contester from my home station recently with a very enjoyable LP entry in the 2001 CQ WW CW as C6ARS. I like low power and the challenges that go with it. The IARU HF World Championship is one of the few contests that doesn't have a low power category, so if I was going to do a contest DXpedition, it would have to be at a place where I could be high-power, two-radio competitive. I'd need gain antennas on both radios, amps on both, etc. PJ2T fit the bill perfectly and rumor was that it was available.

Before I knew it, I was in detailed conversation with Geoff, W0CG, one of the station founders, to secure the slot. As it turned out, there hadn't been a serious SO2R effort yet from PJ2T. Their design so far has been primarily M/S. After my discussions with Geoff, I offered to bring it to the next level for SO2R and leave some of the interconnecting cables/equipment down there when I was done. I was also planning to leave a detailed setup description because I knew that the station was going to be used again as a M/S for the CQ WW season. I was booked for IARU and decided to do a CW-only effort, my favorite.

The PJ2T antenna farm.

The PJ2T house

Gathering the Hardware and Software

I have had excellent performance from the Top Ten DX Doubler SO2R interface box using *TRLog* as the software. I carry *TRLog* in contest-ready form on my laptop and it always goes with me.

The station did not have a software-driven SO2R box and Geoff and I made the decision to go ahead and get a DX Doubler that I would bring down with me. I also made up all of the connecting cables.

The station has band-pass filters, but only one set that is remote switchable. I feel that fast band switching is essential to a world-class SO2R effort, so I decided to bring one of my Dunestar sets for the contest.

I always bring my lightweight headphones for CW contesting. I find most people have the heavier headphones (a necessity for multi-op), but I have a hard time getting through a contest with them. I like the light (Walkman style) ones.

I brought some power and interface connectors, too. I wasn't sure what the station would have available and figured that I would make the final decisions on antenna distribution per radio when I got down there. Ideally, a 6 × 2 box would provide the most flexibility, but PJ2T was so well endowed with antennas I decided that, for the most part, I could just set up a "run" station and a multiplier station on radio #2 and leave the configuration "as is." Besides, the box was bulky.

Prior to departure, I applied for, and

received, PJ2E, which would be my call for the contest. The rest of the time, I would be PJ2/N1UR.

PJ2 Potential

I was really pumped that I had a real shot at a top five finish on this one. Curacao is a 5-point location into the States and Europe. The summertime favors the north/south paths into the Caribbean on 10 and 15 meters. I checked winning scores from the last three IARU contests and decided that you needed to run 95+ an hour for the 24 hours of the contest and have 240 multipliers to win. I set my goal at 100/hour and 245 mults, and would stay up for the duration. The rate would not be a problem for me, and the station should be very loud. The challenge would be predicting the optimum paths of propagation to keep the rate up for the 24 hours and working the second radio constantly for mults. I would also use the mult checking on the second radio to be sure I was aware of all openings in progress to Europe and Asia. Miss the opening (if there is one) on 10 meters into Europe and you can guarantee you will not win, nor be a top contender.

Arrival in Curacao

Happiness is being waived through customs while carrying lots of equipment and not generating a fuss. Popping out of the departure area 10 minutes ahead of schedule is a nice feeling as well. I was cheerfully greeted by Korra, the charming owner of INTAC, which is a local rental management agent for the club. She showed me how to get to the location, answered all of my questions and provided me with her personal local numbers should I have any questions during my stay. It is comforting to know that you have someone so capable who is there to help if you need it.

PJ2T at Signal Point is located on the south side of the island and is a half-hour drive from the airport. Curacao is surprisingly dry (kind of like a chunk of Arizona in the middle of the Caribbean Sea). Other than the capital Willemstad, which is populous, the island is sparsely populated, with numerous small villages that dot the landscape.

The directions were perfect and in very little time I was entering the property of the Sunset Waters Resort, which is adjacent to PJ2T. It has all of the resort amenities: pool, beach, water sports, bar, restaurant, casino, mini-golf, etc. That's quite a treat and a luxury to have all of that next door to such a great contest location. It makes the place a great family holiday/DXpedition possibility as well.

As you turn the corner down the coast road away from the resort, you immediately see it—there's PJ2T, sitting majestically on the edge of the sea with three towers looming overhead. Before you even get there, you know that you are going to be loud from this place and you soon discover that you will not be disappointed.

The house is modern with all conveniences, even a washing machine. As Geoff said before I got there, there is no need for a dryer in Curacao. He told me to simply let the trade winds dry my clothes, and he was right!

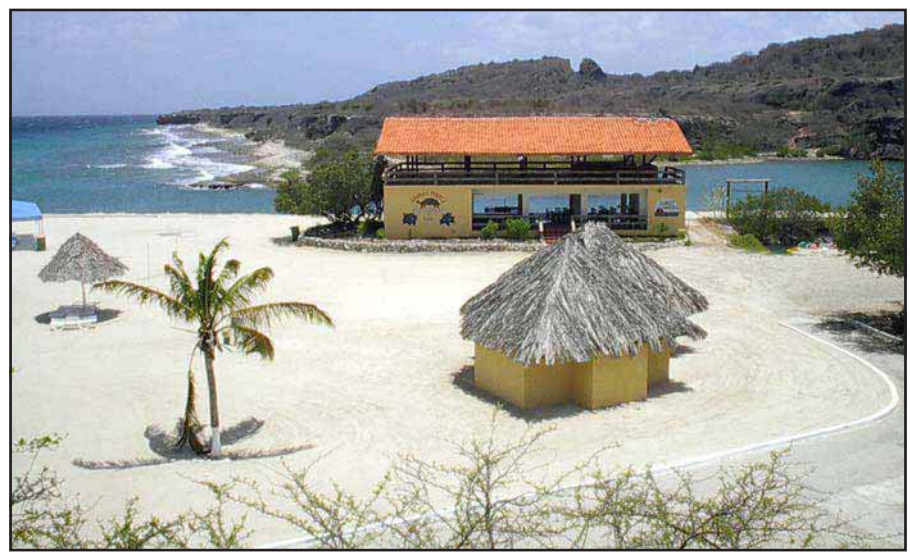
Radio is number one at this location, though. The living area is two-thirds contest set-up, one-third sitting area, and there are two sizable bedrooms with separate baths. A wonderful patio is great for taking breakfast or a break from the pile-ups. Top level equipment is presented in front of you: four solid-state transceivers, three linear amplifiers, networked computer logging, band-pass filters, and one of the best switching systems for multi-op that I've seen. All the accessories are there as well: keys, headphones—you name it.

The first thing I did was what I always do when arriving at a new station—a complete antenna checkout to see if anything is amiss. Luckily, all the antennas seemed okay from an SWR standpoint and the 10-40 beams all had the expected directivity. Rotators worked; radios came on. One of the linears was having an issue, but I only needed two and there were three, so I deprioritized that for now. With that check accomplished, it was time to set up the laptop, the SO2R box and the filters. Everything connected without a hitch and by eight that evening I was having dinner at the resort, ready to give a few of the antennas a work out and practice some of the band switching.

Antennas and Propagation

PJ2T has a great assortment of antennas:

The author's SO2R setup with DX Doubler, laptop and band-pass filters



There is a resort just a short walk down the beach from PJ2T.

• 160-meter inverted V at 90 feet
• 80-meter 3-element delta beam into Europe; tops at 80 feet
• 40-meter 2-element beam at 100 feet
• 20-meter 5-element beam at 90 feet for Europe along with a 5-element Yagi at 70-feet aimed at the US and Japan
• 15-meter 5-element Yagi at 80 feet for Europe
• 10-meter 5-element Yagi at 70 feet for Europe and another 5-element Yagi at 60 feet for the US and Japan

There is also a CL-33 at 80 feet and a Beverage. A WARC beam at 50 feet and a 30-meter inverted V finish off the HF assortment. Six meters is also available.

The Caribbean tends to have a great propagation path most of the time on the high bands and when it does, you really boom through with the PJ2T setup. You get a lot of "Wow, you're loud!" comments and it puts a smile on your face. The pile-ups are quick and constant as long as there is propagation, and most of the time there is. It was an early morning and long day, so I was off to bed early to check the pre-sunrise propagation tomorrow (the day before contest time).

Pre-sunrise is my favorite time on HF. Sometimes the entire world is open and the signal strengths vary wildly in short amounts of time. I remember my first encounter with gray line during a contest on 40 meters when I worked V8A on the first call at 4:30 AM local in Michigan with a delta-loop antenna. He was so loud I copied his call four times to make sure I was hearing it right.

Today was not disappointing, with Japan coming in strong on 40 meters. Twenty meters had European coming through loudly and by the time the sun was barely rising 15 meter was starting to come alive.

The day was spent getting everything conveniently within reach for the contest. I decided to swap the questionable amp for the two known working ones and work the paces of band switching so I wouldn't be fumbling around tomorrow. Meanwhile, I ran a few pile-ups to see how everything played. Great.

The afternoon, I headed out for provisions. The supermarket was all the way back at the airport, so my grocery run ended up taking over 2 hours. I was back in time to catch a European opening on 20 meters and try Japan after sunset on 15. The JA opening was there, but quite weak, not surprising in the summer. I decided to get to bed early and store up sleep. I wanted to get up about two hours before contest time to shower, have a good breakfast and make sure I knew where the propagation was happening before the starting bell.

The Competition Begins

My plan was to kick off on 15 meters if it was open to Europe like it had been yesterday and to look for mults on 20 meters with Radio #2, as the rate dipped. I wanted to maintain a rate of 110-120/hour all day long because I knew the rate would drop in the last few hours of the contest.

The view down the coastline from the back porch of PJ2T—looking east to Africa

It was off to the races on 15 meters at 12Z. The rate topped 100/hr within minutes and never dropped much off that until after 04Z. Activity was strong and the propagation on 15 and 20 was excellent into Europe and North America.

The predictions called for a possible 10-meter opening around 13Z and again at about 17Z into Europe. The 13Z 10-meter opening didn't happen, but I heard DA0HQ on 10 at 1645Z during a multiplier swing on Radio #2, and decided now was the time. Even though the European pile-up didn't start immediately, North America did and they are still all 5-point Qs so I figured I would sit there as long as the rate held and hope for the Europe opening. It came, big time, and for about 90 minutes I ran Europe on 10 meters at about a 135/hour constant rate. It was the longest sustained run over 120/hour of the contest.

Multipliers are somewhat weird in IARU. A number of juicy country mults in any other contest called in (7X4, TF3, P3, J73, V63, etc.), but in IARU they were just a zone, and in most cases not even a new mult by the time they called. Most of the mults found on Radio #2 were the HQ and IARU rep stations, although quite a few of them called into me while I was running as well.

I knew I was real low on mults as I crossed the halfway point, but I was way above my goal on rate (averaging 108/hour) and 99% of the Qs were five-pointers. I figured I would catch up on the mults on 80 and 160 at night and things would even out in the end. The rate would come down, but the mults would start piling up. I really felt good about a possible Top-3 finish as I turned into the second half of the contest.

Unfortunately, I forgot I was trying to defy Caribbean summertime gravity on the low bands. Boy, did I hit the wall at about 04Z when I decided to finally swing to 80 to grab the European mults before it got too late. First, I couldn't hear much, and that was a concern. Then I discovered that the stations I *could* hear were not hearing me. It was frustrating to be running a kilowatt on 80 meters and have an S7-S9 station call in your face without coming back to your replies. I even had to call a W6 three times to get a return just to pick up the Zone 6 mult on 80 meters. This was not part of the playbook!

To be honest, I struggled the last six hours of the contest. I knew that with the disappointing 80/160-meter results there was no way I could finish in the Top 3. Thankfully, I always have the last two year's results as a motivator and I realized that if I kept at it for the last few hours I still had a Top-10 world finish well within my sights, maybe even a Top 5. So, it energized me to finish it off. You need something like that to fight off the last few hour's overwhelming desire to sleep in a contest when the score isn't where you hoped it would be. That is what does it for me.

Results

How did I do? Too early to tell yet, but early unofficial results predict a Top 10 world but not a Top 5 (still my best high power standing ever in an all band effort). I'm very pleased.

What lessons did I learn? For starters, check *all* of the antennas. I didn't really check 80 and 160 meters that thoroughly and it turns out that the reflector was broken on the 80-meter delta loop beam. That would have helped, but wouldn't have radically changed the situation. All of the Caribbean stations were complaining about conditions on the low bands anyway.

I did a nice job with the runs, but still need to work the mult radio harder. I find it hard to pay adequate attention to the mult radio when the rate is above 90 unless it's smooth (like on 15 meters in the afternoon). It's very difficult to work it when running on 40 meters because of the heavy noise and interference. But hey, that's what practice is for!

Also, I learned not to be too cocky at the midway point. The rate is going to drop in the second half. The only question is "how hard?" The higher the initial rate, the better the total average when you cross the finish line.

Sunday was pretty much spent recovering, with not too much DXing going on. I went to bed early and got up for the pre-sunrise again. This time I was on 30-meter CW, one of my favorites when I am DX. I made quite a few Japanese amateurs happy that day and the next before I left. It is a very interesting band. Not nearly as many people have gain antennas and everyone is running 100 W.

Even though I did some DXing on Monday evening, I did want to get out and see some of Curacao for a few hours during the day. I enjoyed some snorkeling and hopping from beach to beach along the coast. Beautiful coral reefs and rock formations are to be found everywhere. I'm not a diver, but there were many people there on diving trips and everyone appeared pleased with the experience.

I was surprised how popular Curacao is as a DX location. It's not rare by any stretch, but generating reasonable size pile-ups was never a problem. I made sure I spent some time on the General portions of the bands in the hopes it would be "a new one" for some of the newer DXers in the hobby. Judging from the response, and the cards in my mailbox when I returned home, I know that it was for some. If you haven't sent your QSL yet, mail it to my home address: 3408 County Rd, Montpelier, VT 05602.

Every one of these trips is a continuing education for me, and a new level of accomplishment. Truthfully, I'm glad that I didn't do better in the contest results. Everything has to hit for you to win a worldwide contest and everything didn't hit for me on this one. I think when it does, I will know it and then let the chips fall where they may. NCJ

Diary Of A Mad Contester

By Paula Uscian, K9IR
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While waiting for the next VU4 operation so that I can cross off the last all-time new one standing between me and the top of the DXCC Honor Roll, what does a DXer do for an adrenaline fix? At first, I added some band countries and puttered around a bit with digital modes. The resurrection of my dormant membership in the Society of Midwest Contesters (SMC), however, illuminated the true, righteous path for living large—the one that leads to radio contesting.

But not just any contesting. My official baptism into the contest world immersed me in the maddening event known as Sweepstakes. As it aimed for a three-peat from the notorious Black Hole of RF radiation, the SMC called and I pledged—50 Qs or bust in CW SS.

I acquired my Amateur Extra license back before "the music died"—when you had to demonstrate the ability to copy code at 20 WPM, a speed I can manage comfortably to this day. I'm even on the CW DXCC Honor Roll, and regularly work the new ones on "both modes."

As I was soon to learn, though, sending and receiving "5NN TU" are a long way from dealing with the challenging exchange that is at the heart of SS. This is especially so when that exchange shoots through your headphones like bullets from a Thompson submachine gun at 40 WPM+ from seasoned contest pros running stations automated to do everything but work 'em using 2 cups and a string (an enhancement not available until next year).

To leave a record of my adventure into this world, I kept another log of sorts—just call it the Diary of a Mad Contester.

Dear Diary…

10/30/02 0300Z—Negotiate operating time with OM. Get 3 hours between 5-8 PM Saturday night (2300-0200Z) without having to trade anything in return. Am I good or what?

11/1/02 0200Z—Enter into Memory #1 of CW Sendin' Machine the basic contest exchange that follows the call sign and sequential number. Enter other standard exchanges (QSO B4, AGN? etc.) into other memory banks and test. Pray to CW gods, light candle, hang rosary beads from mike boom.

11/1/02 0230Z—Open N1MM logging program, make sure it covers SS, create new contest log for 2002 SS-CW. Realize I never will remember "precedence" is U and check is "76." Make up a paper cheat sheet with correct transmit values for entire SS contest exchange for use as "heat of battle" reference to request and provide fills.

11/2/02 1900Z—Tune up HF2V to do battle on 40 meters, set power on transceiver to 200 W. Use amp just to prop up cheat sheet.

2200Z—Start monitoring contest. Copy transmissions, run through mock replies to get chops down. Realize exchange is still as confusing as ever. Offer small mammal to CW gods.[1]

2300Z—POST TIME!—Verify with OM that all high-end stereo equipment is unplugged. Take deep breath and start to S&P. First Q is with K7BV. Realize that I need to coordinate better between manually sending the call sign and incremented number, and hitting the right button on CW Sendin' Machine to transmit remainder of exchange.

K9GY is 3rd Q. Briefly contemplate sending Eric a little friendly note ("Go SMC" or "Hi Eric"). Take a pass out of fear that he'll send something back I can't possibly copy at his contest speed.

Lots of SMC call signs, which I recognize mostly from the reflector. Seems like old friends week. I start to feel more like part of the team, but begin to wish fervently I'd taken that touch-typing class in high school.

0050Z—Work AA3B as #50. I've hit my pledge, so my body relaxes. My rate is rotten, but with operating time left, I now focus on getting at least 100 Qs.

Work K9PG at 0109Z, QSO #57. I am seven beyond my pledge (and an infinity beyond last year's anemic 4 QSOs). Paul mercifully dials down his keyer as he sends the exchange, followed by "88," something I can copy flawlessly. I respond in kind. We're havin' fun…

0127Z—I hear Jerry, K9BG. I'm feeling more confident now and boldly send "88" at the end of my exchange. Actually copy a "Hi Paula" in return. Vow to continue sacrificing small mammals to the CW gods.

0131Z—I nail the SMC "mothership," W9SMC, in the log.

0200Z—I work N9RV, QSO #83. My negotiated contest operating time is up, but now I am committed (or soon will be involuntarily committed by the OM) to break 100 if it kills me. Decide to go beyond the negotiated time, briefly contemplate whether this constitutes "grounds" under Illinois matrimonial law, but say to heck with it and continue contesting!

0236Z—I RULE! #101 is in the log. I begin to imagine where I will affix my ARRL CW SS pin. Exceeding all expectations, OM is still talking with me.

Lessons Learned

1. Get the rig wired up for software control. If I could hit keys to send vital info, I'd be more efficient.

2. Get CW speed up for next time using that practice program that grades your results. The numbers 3-4 and 7-8 are killing me trying to tell the difference. I'm running comfortably at 20+ WPM, but the big guys are at warp speed.

3. Negotiate for still more operating time—starting with SS SSB two weeks later! Which I did, scoring a clean sweep (coffee tastes so much better when it's sipped from my Sweeps mug). The OM even made me dinner that Saturday night. Life is good….

4. Take better advantage of packet spots to get more mults (only had 37 sections).

5. Up the pledge/QSO count for next year (at least double again?).

6. If I maintain another diary and run a frequency next year, can I refer to myself as "Run DMC?"

7. Most important lesson: Did we have fun? Absolutely! See you again this fall.

NCJ

[1]No actual harm was done to any mammals, small or otherwise, in the making of this contest operation.

Taking Contesting to New Heights

By Carl Luetzelschwab, K9LA

When I lived in the Chicago area in the mid 1970s, I always thought it would be neat to participate in the ARRL 10-meter Contest as an airmobile. Unfortunately, the weather in the Chicago area in December usually wasn't conducive.

A transfer with Motorola to the Dallas/Ft Worth area in the spring of 1979 set the wheels in motion for my dream to come true. After driving down over a weekend in early March with my worldly possessions in tow (which wasn't much at the time), I flew back up to Chicago the next weekend to bring my Cessna 170B (N1634D) to Texas. Owning an airplane sure helps if you plan to go airmobile!

The author and N1634D at Mangham Airport (Texas), circa 1979.

Problem Solving

I had done some 2-meter FM operating from the 170 (including the measurement of a 2-meter repeater antenna pattern), but doing an HF contest was formidable: what rig would I use, how do I power the rig, what antenna would work, who would come along to operate, etc.

The rig problem kind of solved itself. Prior to moving to Texas, all I had was a 5-W TenTec Argonaut transceiver. I wanted something bigger for a real station in the new house, so I bought a TS-120 transceiver, a VFO-120 and a PS-30 power supply. The TS-120 would be the prefect rig for airmobile work. It was small and relatively light, it generated 100-W output and ran off 12 V (which is what the electrical system in the 170 used). I temporarily installed a 2-pin connector below the 170's instrument panel on the passenger side, and wired it directly to the battery.

The 10-meter air mobile contest antenna.

The antenna problem took a bit more effort. I first considered removing the ADF sense antenna, which ran from the top of the fuselage to the tail. Once that was off, I could install a center-fed dipole in the same place. But that would mean a big effort to re-install the ADF sense antenna, so I dropped that idea. I ended up homebrewing a short center-loaded whip antenna that mounted on top of the fuselage about halfway between the cockpit and tail.

The 10-meter antenna was just under three feet tall, with the loading coil on a 1-inch diameter plastic form. I eventually made top sections for 15 and 20 meters, in addition to 10-meters. It was a pain to change bands during general HF operation—descend from cruise altitude, land, change top sections on the antenna, takeoff and climb back up to cruise altitude. It was the best I could do at the time while keeping the antenna as unobtrusive as possible.

With the rig, power and antenna issues resolved, I took everything for a test hop to make sure it worked. Indeed everything worked—after a fashion. The problem was ignition noise. It was horrendous and prevented any signals from being heard. The root cause was that the ignition harness for the Continental C-145 engine wasn't shielded. Money solved that problem—I replaced the old unshielded ignition harness with a shielded harness. Once that was done, I could actually hear many HF signals (1979 was near the peak of Cycle 21, so 10-meters was really rocking and rolling).

The last problem was finding an operator. Casual HF operation on 20, 15 and 10-meters by myself wasn't too tough, but it would be impossible in a contest. Fortunately, Charlie, WA8MYV/WB5TGK (he's now KC9LA—great suffix, huh?), had also transferred down with Motorola and he was more than willing to come along to operate.

Contest Take Off

Soon the 1979 10-meter Contest rolled around. We took off Saturday morning from the old Mangham Airport in north Ft Worth where I had 1634D based (and which has since been turned into a housing development). We flew to Ardmore (Oklahoma), and then flew back to Mangham. Charlie operated SSB, using the call sign K9LA/air mobile 5 and handing out the TX and OK multiplier as appropriate. We were at 2000 feet for most of the Qs.

How'd we do? Well, let's just say we had lots of fun taking contesting to new heights. It took just under an hour each way and Charlie made about 30 Qs during each leg. We certainly didn't break score records, or set any new run-rate records, either. Some notable calls in the log were K8LX, N6TR, W3LPL, W2YV, K2LE/1, K6AA and K5NW.

What did we learn? First, we learned that 100 W to a compromise antenna, even at a couple thousand feet, still couldn't beat a kilowatt and a beam. Second, we learned that the ergonomics of a contest station in a Cessna 170B are poor (now there's an understatement). Charlie had to write on the log sheet on his leg with one hand and key the mic with his other hand—all while holding the TS-120 tightly between his legs so he could twiddle the knobs with whatever hand was free at the moment.

Let's see—about 60 Qs for 2 hours of contest effort, plus a whole bunch of up-front effort. If I throw in the operating expense of the 170, it works out to…heck, I had better not calculate *that* cost. Let's just leave it at "we had lots of fun." NCJ

A 4-High Stack of 7-Element 10-Meter Yagis

By Cort Judd, K4WI
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In early 1999, I had to make a trip up my 110-foot Rohn tower that had a KLM 20-meter monobander on top. The KLM side guy wires had broken and needed inspection to determine what to do. On the way up, I noticed that the guys holding the tower were very rusty and corroded. I came down a lot faster than I went up and then did some serious head scratching to figure out how to deal with this big problem. Obviously, the antenna was going to have to come down to be repaired and all of the guy wires were going to have to be replaced.

After thinking about this for a while, I decided that this would be a great chance to put up a really big system for one band, which would be about all my wallet could stand. Since 10 meters is my favorite band and it would be easiest to build, I started looking for ideas. I already had three extra sections of Rohn 25 lying around, so that gave me 140 feet to play with. I got in touch with M² and WX0B. Everyone agreed that a 4-high stack on 10 would be a killer combination. The plan was on!

Work Begins

I ordered four M² 7-element 10-meter Yagis and a StackMaster from WX0B. Next, I contacted my friend at the local power company and made arrangements for three new anchors to be installed, about 60 feet further out from the existing anchors. My soil is extremely hard to work with; it is very heavy clay with a lime rock-hard pan underneath. The power company uses 11-foot anchors with a clamshell on the bottom. The only way these babies come out is with a backhoe. I lost two towers to concrete anchors coming out of the ground after a severe drought. The earth was cracked and then a rainstorm and wind hit—*zoop!* Out they came!

After all of the new hardware arrived, I got my friend Alan Thompson, KV4T, to come down and help with the newly planned array. Actually, "help" is not the right word, as he did the majority of the tower work while I did the groundwork. It took eight days from start to finish.

We had to replace the guy wires before even thinking about getting the 20-meter "Big Stick" down. We put two sets of new guy wires with torque arms at the 35- and 70-foot levels going to the original close-in anchors and a temporary guy at the 110-foot level going out to the new anchors. The 20-meter antenna was removed with no problems. Then we removed the top section with the rotator and went back up with three more sections. Thus, we ended up with a 140-foot tower guyed four times three ways at the 35-, 70-, 105- and 140-foot levels—all through torque arms.

The specifications on my M² Yagis show a gain of 10.25 dBd, a front to back of 25 dB and a beam width of E = 43 degrees and H = 50 degrees. The boom length is 44 feet, with a turning radius of 26 feet. The wind load is 6 square feet and each Yagi weighs 49 pounds. These antennas went together easily and the only qualm I had was the rope supplied to use as a boom support. I finally used

The K4WI home and antenna farm.

A close-up view of the Yagis and their side-swing arms.

small-diameter Philystran in place of the rope. Looking back, I should have gone with steel cable and not worried about pattern influence.

To make this system effective, I needed a way to rotate each antenna by itself. I talked to neighbor and ham friend K4UE who has a machine shop and he agreed to make me a set of three side-swing arms. These arms are quite shallow—only about 18 inches wide, but about 3-feet tall. I use Ham IV rotators on each one of the Yagis and that gives me approximately 300 degrees of rotation around the tower. Due south is neglected; I would much rather have coverage over the North Pole than the South Pole.

I went to RadioShack, picked up a bunch of 4PDT 12-V relays and made a box that I can use to switch all of my rotators on all towers remotely using just one control and one relay in the shack. I picked up a nice DCU-1 control box and will use it in place of the standard CDE box soon.

I had pre-wired each antenna for an equal length of RG-213 coax, exactly 80 feet long. This allowed each antenna to reach the StackMaster located at the 70-foot level. From there, I have a 200-foot run of LMR-600 coax going to the shack. The antennas went up without much trouble and all cleared the guy wires with no problem when rotated.

Grand Finale

After eight days, Alan and I were glad to have the job done. The stack performs out of this world. This system gives me the ability to select any one or any combination—and select any direction or same direction for any or all antennas. I had all four aimed at Japan one evening with the Alpha on and I accidentally set a mobile in downtown Tokyo on fire…just kidding!

I get unbelievable reports from these antennas. Last year in the ARRL Phone DX contest I noticed that my run rate to Europe had slowed from 250-plus down to about 200 an hour when an Italian station informed me that there was another USA station on the same frequency. I asked him how strong I was and the reply was "50 over 9." Then I asked him who the other station was and he replied, "KC1XX." I moved!

Most of the time I leave the bottom Yagi on South America and move the others between Europe and Japan as the day moves on in a contest. Being able to move and select antennas is a big advantage over trying to make one antenna work when different areas call you.

My biggest problem turned up this year just before the CQ WW Phone contest. I always try to get on and spend some time the week before any big contest to get everything sorted out. About a week before CQWW, I was working Asia when I noticed the StackMaster was stuck or would not switch any of the antennas…it simply stayed on the top antenna.

Well, I figured that my quick disconnects outside the shack weren't making good connections. I completely disassembled them and re-did each one to no avail. I climbed the tower to check the StackMaster relay box. It was fine. I figured that the control box in the shack must be bad so I drove 5 hours round trip to borrow a box from a friend. Got it home and installed it. Still no improvement.

By this time I had 10 hours of head scratching invested with no results! Finally, the little light bulb went off when I remembered that my 16-pound Siamese cat (Kitty Boy) had been napping behind the Alpha. Yes, the StackMaster has a protective circuit that prevents hot switching of the antenna relays. Kitty Boy had knocked the **Y** connector loose and grounded it. The StackMaster was doing its job.

Anyway, I have really enjoyed this system and it competes well from the south end of the Midwest black hole. If anyone has any questions or would like to stop in for a visit, please feel free to get in touch!

NCJ

IARU 2002: A Contest to Remember

Ken Knopp, K7ZUM
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On Friday morning, July 12, 2002, we didn't know if Bob Wruble, W7GG, was going to activate the Three Rivers Contest Club station for the IARU HF World Championship. He had come down with some sort of bug and was not feeling well. But being an intense competitor and dedicated to the hobby, Bob had gone to the doc and received a pocket full of medicine.

He gave me a call at my motor rewind shop at about 9 AM saying he was headed over to the station. Bob was going to give it a try with CW (his favorite mode), and my youngest son and I could do the phone part. That sounded good to me. He also wanted me to turn the volume up on my 2-meter rig because there was a small, lightning-started forest fire north of his contest QTH. Bob said that he'd give me a call on the radio and let me know the status of the fire after he got there.

Somewhere around 2 PM, I got a call on 2-meter simplex from Bob stating that the fire did not look bad. It was about 5 miles from the station with a light wind blowing to the north (away from the station). It was also several ridges over, on the other side of Lake Billy Chinook, which meant that it would have to jump a large canyon to threaten us.

The plan was set. I'd get off of work, pick up my youngest son Jordan, KC7TWZ, pack the truck and make the 2½-hour, 129-mile drive from GresHAM, Oregon to the Three Rivers Contest Club site. (We have made that trip so many times that I have literally worn "ruts" in the road, and no longer have to actually steer my pickup—just put the wheels in the ruts, give it the gas and go!) It promised to be a great time, and we were looking forward to see how all of the work we had done several months prior (re-stacking antennas on his big tower) would work.

I also got a hold of my DXpedition partner, Craig, AH8DX/W7, to let him know of our plans. I told Craig that he was more than welcome to stop by and use my station for the contest while I was away.

The W7GG Contest Station

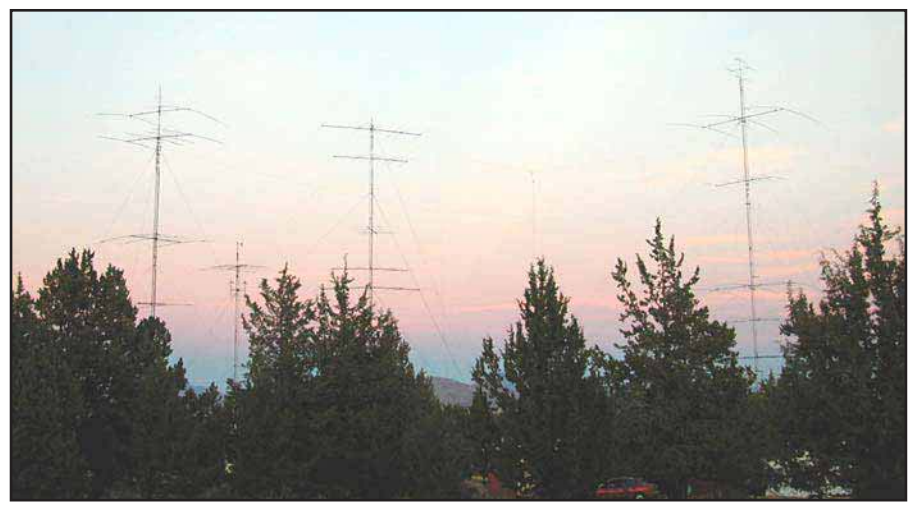
To those of you who have worked us over the years and have wondered about the big signal, let me give a little run down on the W7GG Three Rivers Contest Club station. Three Rivers is a gated community of about 7000 acres, way out in the "pucker brush" (literally) in the high desert of central Oregon. It is about 25 miles west of a small town called Culver (basically a vacation resort with approximately 200 homes, mobile homes, campers, tents, etc). Most property owners and guests come for the weekend, with a few living there all year round.

Bob and his wife Laverna own the nice doublewide mobile home that also serves as the Three Rivers "shack." Their property encompasses five gorgeous acres.

There is no running water, no commercial power (nearest commercial power is about 20 miles away) and no flushing toilets, except the ones you make for yourself. Water must be stored on site. Electric power at the station is provided by either solar, windmills, diesel or propane-powered generators.

Towers and antennas are many. The 190-foot rotating tower has two stacked full-sized 3-element 40-meter beams, stacked KT34XAs, and 80- and 160-meter wire 4-squares. The 165-foot tower has stacked 6-over-6 monoband Yagis for 20 and 15 meter fixed to Europe, and 5-over-5-over-5 monoband Yagis on 10 meters fixed to Japan. (I love working US stations with an antenna pointed at the US, hearing a "weak" JA station off of the back, selecting the

Looking to the West. That's Mt Jefferson in the background at 10,495 feet elevation with the 190-foot rotating tower to the left. The next tower to the right is the 165-foot guyed tower. The next tower to the right is the 100-foot guyed tower. The last tower on the right is the 110-foot guyed tower.



Looking East. The trees were scorched by another forest fire two weeks later, called the Black Butte fire, which was to the southwest of us.

The morning view, looking south-southwest

The view from 130 feet up the big tower. The shack is located to the left of the house on the driveway side. In the middle is the generator shack, housing the diesel-propane generators, the inverter, batteries and charge controllers, and the solar panels on the tower with three windmills.

10-meter JA "stack" and blasting their headphones off!) The 125-foot tower has several other Yagis. Finally, a 100-foot tower has another tribander, windmills, solar panels and an 80-meter 3-element wire beam antenna that is long path into Europe.

It is, to put it mildly, a very nice place to just retire to on a weekend and play radio. So when you hear W7GG on the air handing out Qs, believe me, it is at great dedication to the hobby—and at great expense to Bob.

Rising Concern

So, it was up over Mt Hood and south into central Oregon for what I hoped would be an uneventful drive. But my youngest son was driving, and anything could happen (nothing did happen—he did a good job on the way over). By the time we came up out of the Warm Springs Indian Reservation and onto the flats into Madras, the sun was going down over the Cascade Mountains and we got a good look at the small forest fire off in the distance. Smoke was drifting to the north, which was good because we were going to be south of it. You could also see a bit of orange flame at the front of the smoke, but from where we were, it didn't look serious. We continued driving to Madras, following the signs to Lake Billy Chinook and keeping our eyes on the fire.

By the time we got to the top of the canyon road that drops you down into Lake Billy Chinook, it was dark and that itty bitty forest fire was looking a little on the menacing side—and we were still 20 miles away. We drove into the canyon on a very narrow two-lane road (at least now it's paved!) and over two narrow suspension bridges before climbing back up out of the canyon. Once on top, we got our first real look at that little bitty forest fire. It was no longer just menacing, it was damn scary and we were headed right for it!

I called Bob on 2-meters and tried to describe what I was seeing. He sounded a little concerned, but said that it was still 4 to 5 miles northwest of him, with a very mild breeze blowing to the north. I said we'd be there soon and signed off.

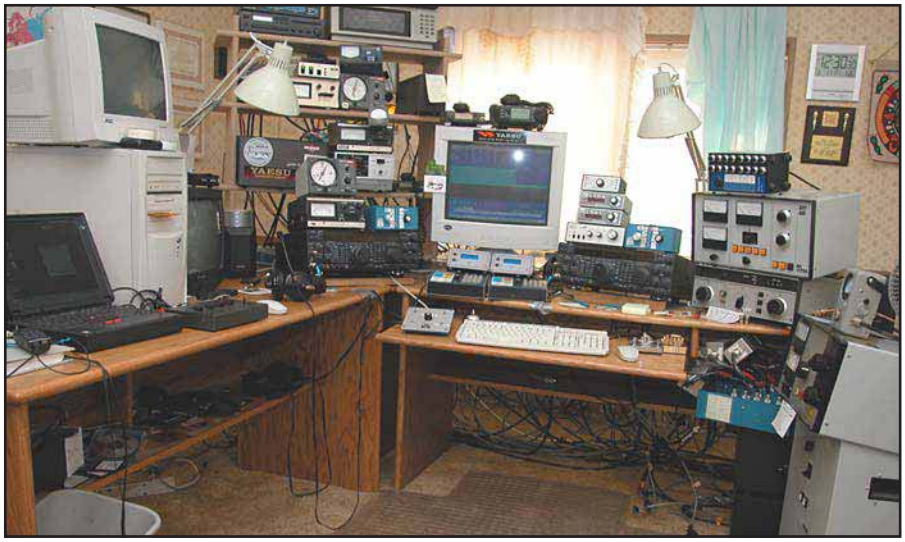
It was about then that I noticed that my normally lead-footed 15-year-old son was looking out the windshield at the fire in front of us, his mouth open wide and eyes even wider. And he was driving very slowly! I knew from the look on his face (and mine must have been a sight to see also!) that he was just as stunned as I was. Neither one of us had ever seen such a sight like the one directly in front of us! I just looked at Jordan and, as calmly as I could, said, "I really don't think were going to be doing much contesting this weekend. More than likely we'll be going to Bob's place, packing the trucks up, and getting the heck out of there." And you know, I don't think in the years that I have been lucky enough to have Jordan as my son, that I have ever seen him agree more quickly to anything I've said.

By the time we got to the main gate to pick up a pass to go onto Three Rivers property (you have to have a pass from a property owner to get on the property), the normally empty parking lot was full of fire trucks, heavy earth-moving equipment, fire fighters, etc. The entire night sky to the northwest of where I was standing had the most surreal, orange glow I have ever seen. I went in to get a pass, started to walk out of the office with pass in hand, and listened intently to the young woman gate keeper trying to calmly explain to some very frightened property owners on how and when it would be time to excavate, and also how they would notify people. Then I stepped outside of the office, stood in awe at the fire in the sky, made a few choice four letter "observations", and was already planning in my mind what I could pack in my little truck and how I could get it in…just in case they gave the word to evacuate.

We made the mile or so drive from the main gate to Bob's place. We met Bob outside, relaxed on the deck and discussed what we would do if we had to leave in a hurry, all the while looking to the northwest at the orange glow coming over the top of the trees. By now there was no breeze and some cloud cover. It was 10:00 PM.

Fitful Sleep

By 11:00 PM we decided to try to get some sleep, but was it was too hot to sleep in the house and it was still 94 degrees outside. Jordan and I made a bed on the deck and tried to sleep in just our shorts. By midnight I knew it was going to be a miserable, semi-sleepless



Inside the shack with it set up for SO2R. The clock with on the wall with the temperature gauge is the one I was keeping my eye on!

night. With every little breeze I found myself trying to determine the direction. Was the wind blowing north, south, east or west? Is there smoke on that breeze? My ears were straining to hear the telltale sounds of burning trees. All the while I could see the orange glow in the sky. It was reflecting off of the cloud cover and bathing everything—trees, grass, house, towers, antennas, gravel, vehicles etc

It was around 3 AM that I noticed that the glow had disappeared. I got up, looked to the northwest and could no longer see much of anything. I laid back down and finally fell asleep with the thought that the fire was finally dying out. I felt much better, and actually got about 3 hours worth of fitful sleep!

Dawn

Bob was up at 4:30, ready to start the test at 5:00 AM. He started out on 40-meter CW with JA5ING/1 first in the log at 5:06. By 5:55 there were 68 Qs in the log on 40-meter CW with YB6TI/5 being the last. Bob switched to 20-meter CW with NU1W/4 first in the log at 6:00. The first OJ station was OJ3A at 6:01 followed in quick succession by OJ7X, OJ1X, OJ8N, OJ2Y and OJ6C at 6:07. Those guys were speedy!

By 7:20 AM, there were 116 Qs in the log on 20-meter CW with OK7AZ being the last of a nice little run of Europeans.

Bob switched to 15-meter CW to see if there was a Euro opening. First in on 15-meters was K5WA at 7:23. ON4UBA was the first European on 15 at 7:31, followed by OI2HQ, EU2R, F5IN, PJ2E and RZ3AZ. It looked like 15 meters was starting to open up to Europe!

By the time I managed to wake up and get several cups of coffee into me there were 210 Qs in the log. I peeked around the side of the house to check on the fire and was greeted with clear skies and no flames in sight.

We traded seats and I started on 20-meter SSB, still in a sleep-deprived fog and trying to figure out how to get the radio to transmit. I just sat there dumbfounded trying to figure out which button to push. I finally got the radio to transmit, (still not knowing what button I pushed to make it work though!) and put N0NI in the log at 07:57. I made 13 Qs on 20 SSB and decided that was not the place to be. Bob called me in to the kitchen for a bite of breakfast and some more much-needed coffee. After our short meal, I headed back to the shack to try 15.

Fifteen meters sounded much better, with W6XR first in the log at 08:40 and DF7YU checking in right behind him. I worked another half dozen or so stateside stations, and then the band opened to Europe. Europeans were answering my CQs by the dozens! For the next hour and 40 minutes, I ran and ran. I watched the rate meter approach 185 Qs.

Bob strolled into the shack at about 10 o'clock and saw the rates I was enjoying on 15 phone. I could see by the look in his eyes (plus the drool coming out of the side of his mouth) that he wanted some of the action. So, with 363 Qs in the log, I took a break and let Bob run some CW. I walked into the kitchen, grabbed a cup of coffee and looked out the back door to check on the fire. Everything looked fine—no smoke, no clouds, no fire. I saw nothing but pure sparkling central Oregon air and sunshine.

Heating Up

By 10:30 Bob had put another 45 Qs in the log, mostly Europeans and a few US stations. I glanced out the south window of the shack and noticed that it was getting hard to see the big tower 200 hundred feet away. Just then I caught a whiff of smoke. I took one look at Bob, and he looked at me as I was putting down my drink. According to the thermometer on the shack wall, it was 90 degrees.

I picked up a set of binoculars and bolted out of the house. Grabbing a climbing belt at the pole barn, I headed out to the 125-foot tower. I climbed 70 feet, well above the tree line. By then there was so much low-lying smoke in all directions, it was hard to tell where it was coming from. With a little bit of squinting, I could see that it was advancing from the northwest, and as far as I could see, it looked like a smoldering campfire. I estimated the distance at 5 miles.

I went back to the shack and discussed what I had seen with Bob. We had heard nothing from the main gate about evacuation, so we decided not to worry just yet.

Thirty minutes later we noticed that there was a slight breeze coming from the south, and it had cleared out all of the smoke. Great! No clouds, no smoke and the Europeans were booming in on 15 meters. Things were looking up.

We traded off and I noticed that there were another 50 15-meter CW Qs in the log. I went to phone and I put SP8ZBX and 3Z6V in the log. Next in was our friend Jimmy, W7EJ. We exchanged numbers and I gave Jim a quick run down on the fire. I continued to run Europe for another hour or so, with occasional trips up to check 10 meters. The only thing heard was a single Argentinean station.

By noon the rates were starting to slow a little, but the Europeans were still very loud. The temperature in the shack was now somewhere around 94 degrees, and that was with two box fans going: one 20-inch box fan in the bathroom blowing toward us and another 20-inch box fan in the west window of the shack blowing on us.

Bob had joined me in the shack to listen on the second radio, and we both suddenly noticed that the fan in the window was speeding up and slowing down. This wasn't due to voltage variations from the diesel generator. Our slight southern breeze had changed directions and was now coming from the worst possible point on the compass—out of the northwest. The breeze had also changed to a strong wind.

We traded off again at 12:11 with Europe still booming in on 15-meter CW. I went to the kitchen to grab something cold to drink, find something to snack on and check on the fire. By now I could see some smoke rising above the trees,

Looking down the canyon in Lake Billy Chinook. W7GG's place is about 15 miles to the left from here.

Lake Billy Chinook is a man-made lake supplying electric power for the area (except for the Three Rivers recreation area).

but not coming at us, and the wind was really starting to pick up. It was also getting hotter.

I walked back into the shack and tuned around on 10-meter CW on the second radio. I told Bob there were a few stations on 10, and it might be worth an excursion up there. We tuned up and worked one Caribbean station, five South American stations and one very lonely US station!

Returning to the radios at 1:15, I noticed that the temperature in the shack was getting close to 98 degrees. Bob had changed to 20-meter CW and we were 8 hours and 15 minutes into the contest and had only 568 Qs in the log. The distractions outside were definitely affecting our performance inside!

We decided to stay on 20-meter phone and put in some much-needed Qs on that band. By 1:40 the band was not producing well, so we went back to 10 meter. I checked ten, heard two South American stations and one US station and decided that it was not worth the 10 minutes I would have to spend there.

I went back to 15-meter phone for a little search and pounce. First in was TA3D at 1:49 and I found my first JA, JA4DPL, at 1:52. It was time to reposition antennas: turn the TB-6 to the US, turn the rotating tower with the stacked KT-34XAs to JA land, and use WX0B's six pack box (the fun switch) to switch between the fixed European stack, the US antenna, and the JA antennas. Now we could really rock and roll!

Europe was still coming in, the US was booming in, there were a few South Americans, and the JAs were starting to bang through loudly. Right behind the JAs I knew that the deep Russians would soon be starting to roll in!

At 2:00, Craig, AH8DX\W7, checked in from my station in GresHAM. We exchanged numbers and info. He asked how it was going, and I stated that we were starting to worry a bit about the fire to the north of us. I was not sure how much longer we might be here. By then the box fan in the window was really howling from being pushed by the wind from the northwest and from my operating position I could not see out the window very well. But by the way that fan was howling, I was expecting at any moment to see flames lapping around the corner. It was nine hours into the contest and we only had at that time 614 Qs in the log. The temperature in the shack was now at 99.9 degrees, and it was much hotter outside.

Another 6 minutes went by and I had put another 8 Qs in the log. My son had showed up at my side, trying to talk to me while I was running JAs and a few US stations. I cocked one headphone to one side so I could hear what he was saying and continued to work stations. Apparently Jordan had been up at the front gate talking to a firefighter who had said that if he had any personal belongings, he had better start packing them and be prepared to get out. I had stopped and took a call on 2 meters from W7PYD, one of the other hams that live on the property. He replied that he had not heard anything from the front gate about evacuating.

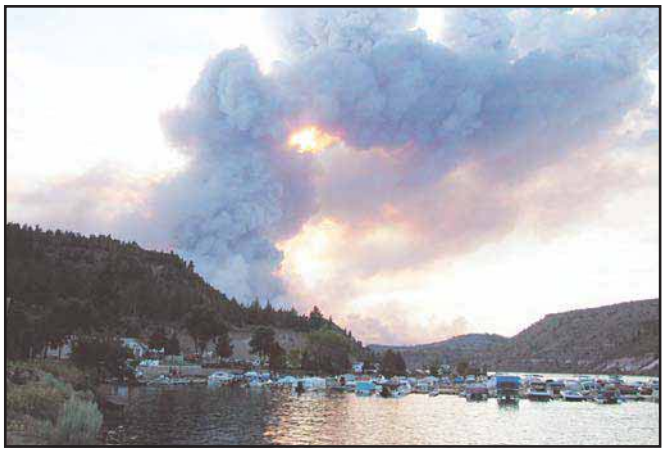
Fire!

Jordan went to look for Bob and I continued to work stations. Another 16 minutes went by and I had put another 32 Qs in the log. About that time, Bob and Jordan walked into the shack and we discussed what to do next. I thought that maybe the best thing to do for the time being was to grab the binoculars and a climbing belt and go back up the 125-foot tower for another peek at the fire. All agreed that this would give us some sort of go\no-go assessment.

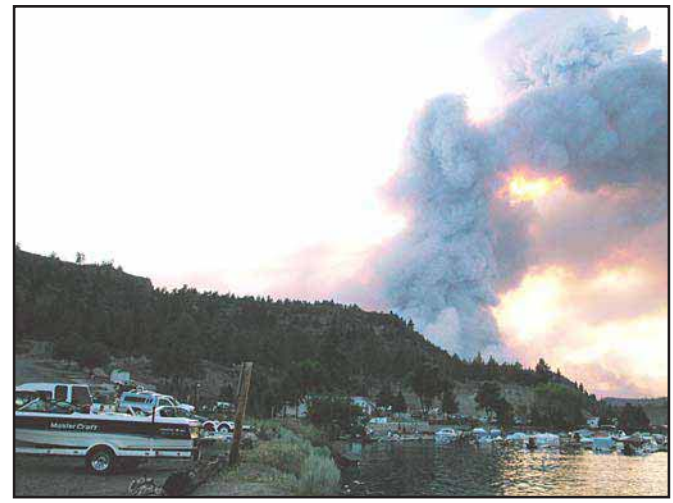
Back up the tower I went. On this tower there are so many coax cables on the south side that I can only climb up on the north face of it. At about the 70-foot I brought up the binoculars and looked. As it turned out, I didn't need them. What I saw sent a chill up my spine.

What I was looking at was no longer just a smoldering fire. It was a wind-whipped raging-out-of-control wild fire with billowing clouds of smoke. What was worse, it was no longer just 4 or 5 miles away. It was maybe 2 miles away and heading southeast, pretty much right for us. In addition, another fire had spread south of the main fire and was heading right for us! By this time, the winds were whipped up to around 30 miles per hour.

It's odd what you recall in times of stress. Here I was, clipped onto an antenna tower and watching a raging fire while recalling a TV interview I saw sev-



Smoke from the fire down at the lake. It actually burned to the water line and most of the homes are now gone. This picture was taken many hours before we had to get out.



Another picture of the same area

eral years ago with the commanding officer of Clark Air Force base in the Philippines after the nearby volcano had violently erupted. The reporter had asked what had prompted him to issue the evacuation order. He replied that he knew it was time to leave when he saw a young sergeant running past him and yelling, "General, I hope you got some jam in your pocket, 'cause we're about to be toast!"

As for me, like the General, I wasn't much interested in becoming toast (or a crispy critter). Bob barreled out of the back of the house, yelling that we had to evac. I unclipped and was back on the ground in a heartbeat.

Evacuation

It was now about 2:45 and we headed for the shack to try to save as much as possible before the fire reached us. We had maybe two or three hours, tops. I shut the computers off and noticed that at 9 hours and 36 minutes we only had 661Qs in the log, with JA6FMR being the last.

Bob, Jordan and I had a short conversation and set the priorities—the most expensive gear would be hauled out first. I started unplugging the FT-1000MP transceivers while Bob and Jordan started on all of the smaller radios, power supplies and brick amps. We stacked everything on the front porch. Next were the Titan amps and power supplies, then the Henry amps. Bob told us to leave the Henry amps and I said, Bull—t! We ain't leaving the Henrys!" I had figured out how to get them into my truck the night before, and besides, I had put many hours into fixing them and we hadn't even had a chance to put them to the test. I wasn't leaving the Henrys!

By then we had quite a pile on the front porch. The next thing to do was to back my little pickup up to the deck and start loading. The sweat was pouring out of us and that damn box fan in the window was still howling. I was also getting fire reports from my son Jordan and he said that it was spreading damn fast.

Don't ask me why, but for some reason there was a surplus of cardboard boxes and we used every one of them to store wallpaper, hard-won contest plaques, precious family memories, Stack Match boxes, Six Pack boxes, relay boxes, filters, Top Ten boxes, four-square boxes, monitors, computers, headphones, mics, footswitches and anything else we could shove in them. When we ran out of boxes, I found some plastic boxes full of linen. Out went the linen (forgive me Laverna!) and in went the good stuff.

In about an hour and a half we had that shack torn down to tables and chairs. The fire was no longer just to the northwest of us. It was still spreading towards us, but it was also traveling at a very high rate to the east, parallel to our position. The smoke clouds stretched from just about as far as I could see to the West to as far as I could see to the East. You could also see the orange glow from the fire reaching into the bottom of the smoke clouds. This fire line was maybe 6 or 8 miles long.

It was now about 4:15 PM and we started loading motorcycles into Bob's truck. We hitched up his boat, and proceeded to shove as much stuff as we could into his boat and into front of his truck.

Another 45 minutes or so had passed and we had pretty much decided that we had all we were gonna get. My poor truck was so loaded that it was almost dragging the rear bumper. It was going to be a long, slow ride home. Bob's truck was in the same condition.

As we were getting ready to leave, Jordan came up to me, and with some red and wet eyes, made the statement that this was just about the saddest day of his life. I could not help but think that he was probably right because for the last five years this has been our radio contesting home. Bob and his lovely wife Laverna have been gracious hosts to my two boys and me, and have treated us like family. We have made untold amounts of friends around the world and have had nothing but great times, great memories, and laughs-a-plenty at the Three Rivers Contest Club. To think at that it would all be reduced to ashes in a short while was too awful to contemplate. All I could do was give him a hug. It was time to go.

I wrote this story late Sunday evening on July 14, 2002, and at that time I still had no word about the fate of W7GG's station. They were not letting anybody into the area and the news reports are grim.

Epilogue

W7GG's QTH was spared from the fire. There were 18 nearby homes that were torched, however. It took another week to douse the fire.

Two weeks later I was able to return and take back all of the equipment. We reinstalled the station, and took the opportunity to do some clean up to the wiring and cabling.

I had a chance to chat with the young woman that takes care of all of the gate passes at Three Rivers. She had told me that at several times the fire had moved at a rate of 1 to 2 miles every 15-20 minutes. At one point it had actually traveled 5 miles in 20 minutes!

Needless to say, if the wind had shifted maybe 1 or 2 more degrees to the south, the radio QTH would have had it, and at 5 miles in 20 minutes, we might have had it, too. It's an experience we do not want to repeat.

NCJ

Kid's Day: June 21, 2003

By Jean Wolfgang, WB3IOS
wb3ios@arrl.org

For all the hams who believe Amateur Radio is for the over-60 crowd—watch out! It seems almost every day ARRL employees hear about more young people who have passed their test and received their licenses.

How did those young people become interested in ham radio? One way may be through youth activities such as Jamboree on the Air, School Club Roundup and Kid's Day.

Here is your chance to contribute to the growing number of youth who become interested in our fascinating avocation. The 2003 semi-annual Kid's Day will take place June 21. And this is a good way to introduce youngsters to contesting—maybe there are some future contesters in the group!

Jennifer Smith

The Pack 85 Wolf Den from Phoenixville, Pennsylvania enjoyed several contacts during the January 2003 Kid's Day.

Kid's Day Rules

Purpose: Kid's Day is intended to encourage young people (licensed or not) to enjoy Amateur Radio. It can give young people on-the-air experience so they might develop an interest in pursuing a license in the future. Kid's Day is intended to give hams a chance to share their stations with children.

Dates: June 21, 2003 and January 4, 2004.

Time: 1800 to 2400 UTC. No limit on operating time.

Suggested exchange: Name, age, location and favorite color. You are encouraged to work the same station again if an operator has changed. Call "CQ Kid's Day."

Suggested Frequencies: 28350-28400, 21380-21400 and 14270-14300 kHz and 2-meter repeater frequencies with permission from your area repeater sponsor. Observe third-party traffic restrictions when making DX QSOs.

Awards: All participants are eligible to receive a colorful certificate (it becomes the child's personalized sales brochure on ham radio). You can help ARRL keep track of the Kid's Day activity and responses. Please visit **www.arrl.org/FandES/ead/kids-day-survey.html** to complete a short survey and post your comments. You will then have access to download the certificate page or send a 9 × 12 SASE to: Boring Amateur Radio Club, PO Box 1357, Boring, OR 97009.

Soap Box from the January 2003 Kid's Day

This was our first Kid's Day. My daughter, Cheyenne (age 10), is studying for her Technician license right now, so the opportunity came at a great time. She invited friends and neighbors to participate and while they enjoyed it, too, Cheyenne was the one hanging in there until 2400Z trying to make last contacts.—*N7SHM*

My 8-year-old granddaughter loves Kid's Day and always asks when it's "CQ Kid's Day again." I can now let her operate the mic. She can call CQ and answer CQs on her own, but I control the radio and help her if she needs it.—*AD6WL*

I thought my son Mark, age 9, would be interested for about 20 minutes. What a surprise! After 4 hours he made 71 QSOs with 82 ops. He and I had a blast. This was his first Kid's Day contest and he is excited about the next one.—*K3OO*

My boys are 6 and 7 years old. We have participated in Kid's Day before, but this was the best year yet! Davis and Daniel are both ready to work on their tickets. I was impressed with how patient and gracious the hams were during this 6-hour event. Thanks to all involved in Kid's Day!—*AG6RT*

Although our time was very limited, the kids in my Cub Pack spoke to another station in Michigan and were thrilled to do so.—*WA2BSA* NCJ

The Question: Which amplifier—Acom 2000A or Alpha 87A?

A Response: from Dick Green, WC1M; **wc1m@arrl.net**

I use one of each in my SO2R station. Here are my thoughts:

They are both terrific amps—well designed and very well built. I'm sure you would be happy with either one.

The designs are similar, although the 87A uses the Eimac 3CX800 and the 2000A uses the Svetlana 4CX800. The latter is much less expensive, but may have more reliability problems. More on the tubes below.

The 87A uses PIN diode T/R switching, which is ultrafast and silent. The 2000A uses a Jennings-style vacuum relay, which is slower and generates a tiny bit of noise. More on the PIN diodes and relay below.

The 87A is programmed to trip on SWR greater than 2:1, while the 2000A is more forgiving and easily handles SWR as high as 3:1. It's not clear why the 87A trip level is so low. I've heard that it's because the PIN diodes can't take the reflected power, but I've also heard it claimed that other parts of the output network aren't beefy enough to handle the reflected power. The 87A's low trip point is definitely an annoyance. Unless you have very flat antennas or use a tuner, you will run into it.

The 87A blower is reasonably quiet—it sits on my desktop about three feet away from me. The 2000A blower is much quieter. It sits on the floor about five feet from where I sit and I can't hear it at all.

The 2000A has a remote control unit (RCU) that sits on the desk. It's about the size of a paperback book. The interface is excellent, easy to use and has great diagnostic information (text messages on an LCD screen). The 87A has front-panel controls that are also easy to use, but the diagnostic display is primitive (LEDs).

On the other hand, the 87A has a better computer interface. You can hook a terminal or computer communication program to the RS232 interface and get good diagnostic info. It's not quite as complete and informative as the 2000A RCU, but it's more than adequate.

The 87A also has *AlphaRemote*, which is a simple control and diagnostic program for *Windows*. It takes the RS-232 info and displays it on the CRT. It's a nice, easy program to use, but not terribly robust. There is a third-party control program called *Acom Tools* for the 2000A. It's okay, but somewhat clunky to use. It has some interesting features, like the ability to automatically retune the amp based on a frequency entered in a program. There's an interface to the *Writelog* contest-logging program for this. *Writelog* reads the frequency from the rig and sends it to the 2000A for retuning. Although both the 2000A and 87A have automatic retuning whenever you transmit, this feature allows retuning when you change the frequency on receive. Nice for retuning when you change bands for search-and-pounce.

This somewhat obscure feature is important for contesting with the 2000A, especially if you like to chase packet spots. That's because there's a major difference in the way the 2000A and 87A do their automatic retune. Both work such that if you send a dit or speak after changing the rig's frequency, the amp will automatically retune. The 87A will send the code element or speech at low power while retuning, but the 2000A shunts the input RF to a dummy load while switching. In other words, it's lost. So, if you change bands and then try to send your call to another station, there's a good chance with the 87A that the entire call will be heard at the other end. But with the 2000A, the first letter will be lost or clipped. If you use the *Acom Tools* control program and *Writelog*, the 2000A will retune when you change frequency on the rig (that is, you don't have to transmit). This way, nothing is lost the next time you transmit.

As you might imagine, chasing packet spots with these amps can be a lot of fun (provided you have *Acom Tools* and *Writelog* for the 2000A). All you do is click on the spots and send your call. The amps retune automatically. I've gotten the rate up to well over 100/hr in phone contests doing this (I never use packet for CW contests).

Speaking of tuning, the two amps are rather different in this regard. Both were originally designed to store tuning parameters for small band segments in memory. When setting up the amp, you select a desired antenna and tune it for each segment on each band. When RF at a particular frequency is detected, the amp selects the matching tuning parameters and uses stepper motors to retune the amp. The first difference is in setup. On the 87A, you do the tuning of each segment manually, using front panel TUNE and LOAD push buttons. A nice TUNE mode and procedure make this relatively quick and easy. When each segment is tuned, you push a couple of buttons to store the parameters in memory. The 2000A offers a more automatic way to preset tuning for each segment. You set the desired frequency on the rig, pick an antenna, select TUNE mode on the RCU and transmit about 20W of RF. The 2000A automatically optimizes tuning for the selected antenna on the selected frequency segment and stores the parameters in memory. Much faster and easier than the 87A and quite accurate. There's even a *DOS* program that will let you step through frequency bands for each antenna quickly or initiate an automatic sequence to tune the entire amateur HF spectrum.

It might sound like the 2000A is the winner in this department, but the 87A has something that may be even better—dynamic tuning. Using a feature called AlphaMax, the 87A can automatically optimize tuning on the amp while you are transmitting. When you first set up the amp, you go through the preset storage procedure outlined above. When you first transmit on a given frequency, the preset parameters are retrieved as normal. But thereafter the amp continually monitors the operating parameters and adjusts the tuning dynamically. This is especially useful if you have more than one antenna per band. When you switch antennas, any tuning differences are automatically made by AlphaMax. For more info, see my review of AlphaMax and AlphaRemote in the August 2000 issue of *QST*.

The 2000A doesn't have dynamic tuning, but it does allow you to store parameters for up to 10 antennas for each segment. So, if you have multiple antennas on a band, you do the preset storage procedure for each antenna in each segment (real fast and easy with the DOS program). When changing antennas while operating, you simply hit a couple of buttons on the RCU to select the desired antenna parameters. Not quite as automatic as the 87A, but adequate.

Both amps have an optional automatic antenna switch controller. The 2000A also has a compatible remote relay switch box. The 87A DAS can switch a number of popular remote relay switches (e.g., Ameritron RCS-8). When changing frequency, the amp instructs the switch to select the antenna for the appropriate band (87A) or band segment (2000A). This can be more of a hassle than a benefit if you have more than one antenna per band. An Acom user has built a device around the BASIC Stamp chip that supposedly deals with this. I think it allows you to select the appro-

priate antenna from the PC. I don't have the Acom switch, so I have no experience with this mod. I got the Alpha DAS unit back when I got the 87A, but stopped using it when I built my SO2R setup.

The DAS is not well designed for SO2R because the switch doesn't change antennas until you transmit or push a button on the DAS. In SO2R, you almost always want to change antennas when changing frequency on the rig, and most of the time that's to listen rather than transmit. The Acom switch has the same problem, unless used with the special *Acom Tools* and *Writelog* setup. For antenna switching, I use TopTen band decoders, which are driven directly from my Yaesu rigs. Bottom line, I don't think amp-based antenna switching is the way to go: way too expensive and not well designed for contesting. Better to go with rig-based antenna switching, especially if you sometimes operate low power.

As I mentioned, the build quality of both amps is superb. Service is excellent from both companies. There was a time when it was a bit difficult to get info from Alpha, but that has changed. I've been able to make repairs to my 87A several times with help from the factory (it's seven-plus years old). I found a firmware bug a number of years ago and the factory helped me patch it (not sure if the 2000A has any patching capability). I fixed a bad op amp on the low voltage supply that was making an IP current LED flicker annoyingly. I also replaced a pair of PIN diodes that went bad after about six years. I'm pretty comfortable working inside the 87A. Service from Acom has been excellent and very fast. They have answered every question in great detail and are willing to help me work on the amp. Several times, the factory has sent me detailed instructions for troubleshooting and component replacement. I've had e-mail correspondence with their top engineer about the amp's programming sequences and have gotten incredibly detailed responses.

Svetlana tube failures are among the more common problems reported on the Acom reflector, but I haven't seen an excessive number. I had a bad tube when my 2000A was new. Krassy told me that the screens in these tubes are somewhat susceptible to damage in shipment. The replacement has been fine for a couple of years. Tube replacement for the 2000A is considerably more complicated than for the 87A. For the 87A, about the only difficult part is getting the chimney and parasitic suppressor out of the way and being careful not to bend the tube pins. Other than that, you just stick the new tube in the socket. For the 2000A, in addition to some tricky moves getting the chimney, parasitic suppressor and temperature sensor out of the way, the bias has to be readjusted to set the plate idling current. You have to remove both the top cover and front panel to do this.

The task doesn't require any special equipment—the amp's computer has a built-in procedure and the display provides all the info you need. However, the procedure is not documented in the user manual. I got very detailed instructions direct from the factory via e-mail. It's my impression that they did not design this amp to have the tubes replaced by the user. I think the procedure is the reason why Krassy prefers that you send the amp in for service, even when a problem is very likely to be caused by a bad tube. Krassy replaced my bad tube, so I haven't replaced a tube myself yet. If it has to be done in the future, I'll do it myself.

The Eimac tubes in my 87A are the factory originals—7 years old with many miles on them. A couple of years ago, one of the tubes was causing a cathode current fault and I replaced it. After a contest or two, the amp started getting various faults—blown fuses, arc faults, power supply voltage faults and so forth. The faults became increasingly frequent, and I became quite worried that the HV or LV supply had a problem. Eventually, I started getting hard faults, which shut the amp down completely. Sometimes the amp would make it through warm-up, sometimes not. To make a very long story short, I tore the amp apart and checked every component on the HV and LV boards. I found nothing wrong with them. At one point, the small fuse in the step-start circuit blew and I got suspicious that the HV was shorting. I removed the tubes and, to my surprise and chagrin, the faults stopped. The new tube was bad!

My guess is that it had been slowly leaking, and the gradual buildup of air inside caused more and more arcs, which got stronger and stronger. At times, the arcs were so fast that a fuse would blow before the CPU could catch the fault. I've seen faults like this do severe damage to amps, but the 87A physical and software protective measures prevented that.

I reinstalled the old tube that I thought was bad, and the amp worked flawlessly. It's been back in the amp and working perfectly ever since. My guess is that the old tube had a pin that was not contacting the socket properly—possibly caused when I removed the tube when fixing a different problem. By the way, when I was packing the faulty tube for return to Eimac, the bad tube rolled off the table and the cooling fins got badly bent. How would I convince Eimac that the tube had been bad before this happened? I explained the situation to Alpha and they sweet-talked Eimac into replacing the tube anyway. Whew. Nice service from Alpha on that one.

My 2000A had a Kilovac HC-1 vacuum relay when new, and it failed (locked up) after a month or so. The factory told me that this was due to a bad batch of Kilovac relays. I happened to have a Jennings RJ1A, which is an exact replacement, and the factory sent me very detailed instructions for replacement (the president of Acom handled this himself!). It wasn't terribly difficult to do. The Jennings has been fine. Acom later sent me a Russian-made relay that is still on the shelf. Note that the HC-1 tested OK on the bench after I got it out of the amp.

There have been several reports of relay failures on the Acom reflector, two very recently. In one of those cases, it's a Russian relay that failed. This makes me suspicious that the failures could have something to do with the amp design—maybe they're running the relay at too high a voltage or there's a stray magnetic field affecting the magnet inside the relay.

In theory, the vacuum relay could wear out if you do a *lot* of QSK. I'd say you would have to CQ in many contests in QSK mode to do that. I never use QSK when CQing and rarely when S&Ping (too much noise!). But PIN diodes don't guarantee a lifetime free of repairs: I had to replace a pair of PIN diodes on my 87A and it was a little tricky.

Acom service might be a better choice for us New Englanders because when I needed to send my amp back (to diagnose and fix what turned out to be a bad tube), Krassy sent someone to pick up the amp at a Boston hotel at which I happened to be attending a convention (I live in western New Hampshire.) Krassy fixed the amp and delivered it back to me by the end of the day. Now that's service! Even if UPS had been used, shipping to Massachusetts is a lot better than shipping to Colorado. I've never had to send the 87A back to Alpha (knock on wood), but that's because I've been very stubborn about trying to diagnose and fix problems myself.

The 2000A has much better firmware and diagnostics than the 87A. Not surprising, since it was designed at least 10 years later. A number of times the 87A has reported faults that are way off the mark of what is actually happening. For example, I used to have a TS-950SDX transceiver that put out leading-edge RF spikes of nearly 250W, which would cause the amp to fault. The 87A always reported a gain-too-low problem instead of an overdrive problem. That's because the firmware

checked for abnormal gain before overdrive. Took me a long time to figure this out, and the factory confirmed the firmware problem (actually, Dick Ehrhorn did that on the Amps reflector!). My troubles diagnosing the tube arc resulted partly from misleading fault code reports. Since a tube arc can cause all sorts of havoc throughout the amp, I got all kinds of different fault messages. It's probable that these reporting problems are bugs that could be corrected, but my impression is that no changes have been made to the 87A firmware for many years. I think there's a lack of expertise at the factory. Even if they had it, there is no longer room in the firmware memory for enhancements and fixes. Actually, I believe only an interrupt-driven fault handler can correctly determine the cause of a fault. Without that, the timing sequence of multiple sensor alarms can't be known by the firmware. I'm not sure whether the 2000A is interrupt-driven, but the fault reporting I've seen so far has been 100% accurate.

For the 2000A, you have to be careful when using a rig that can put out 200W or more. The input circuitry is not rated this high, even when the amp is bypassing the rig RF directly to the antenna (both in standby mode and when the amp is shut off). If the RCU is getting power, it will report the overdrive—even if the amp is not running. Bottom line is that you can't use the full drive of a 200W rig even if you take the amp off line. I have an FT-1000D transceiver capable of 200W, so I use it with the 87A. I use an FT-1000MP with the Acom. I think this limitation is very unfortunate and probably the worst design flaw in the 2000A.

I almost always CQ on my 87A and S&P on the Acom. I certainly switch roles and CQ with the 2000A, but I tend to avoid this. Why? No good reason, I guess. Part of it is that my FT-1000D is much better for sorting out pileups and it's hooked up to the 87A (because of the <200W limit on the 2000A). Also, the 87A is slightly quieter—no relay noise to drive me crazy in the sleep-deprived wee hours. The 87A is a real workhorse—I've put many miles on it in the last seven years. I also feel somewhat more confident about repairing the 87A myself than the Acom. One dumb reason is that I have a spare 3CX800, but no spare 4CX800! The 87A's AlphaMax is convenient for dynamically retuning when I switch from a monobander to the tribander. I like that for the CQ radio, whereas I have a little more time to manually select the antenna tuning parameter on the 2000A RCU on the S&P radio.

The 87A is $455 more expensive. I'm sure that's due to the higher cost of Eimac tubes and higher labor cost in the US. Acom shipping to New England is probably cheaper, too.

As I said, you will probably be happy with either amp. If your antennas are under 2:1, SWR, you operate lots of QSK in contests, you have more than one antenna per band, and you don't mind spending more up front and more for replacement tubes, the 87A is a slightly better choice. Otherwise, the Acom is probably the better choice.

I realize that I haven't made the choice any easier, but I hope this helps!

NCJ

A Summary of the January 2003 VHF Sweepstakes

By Kevin Kaufhold, W9GKA

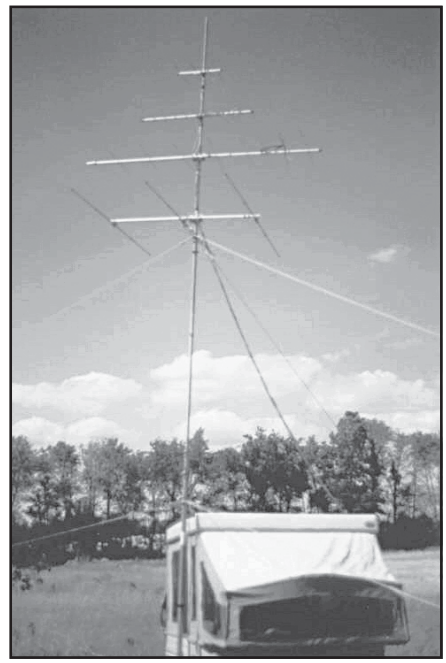
As reported in N0JK's "VHF-UHF Contesting!" column, 6 meters offered E-skip for the January running of the VHF Sweepstakes. Here are W9GKA's comments about the contest.

I have excerpted the portion of my log containing the 6-meter opening to the Northeast that occurred on Sunday afternoon of the contest. As you can see (Table 2), the opening into the 1s and 2s lasted around two and a half hours, between 2052 and 2220 UTC. One of the locals told me that it started about 15 minutes before my first contact. I was busy getting ready for a 6-meter schedule at 2100 UTC when I heard some interference farther down the band. I moved down to the calling frequency and there were several stations calling from the northeast. I quickly made a few contacts, then made my schedule, and then returned to the opening. I completed a contact with one station in grid square FN31, and another station in FN41 asked me to move higher to an open frequency so he could work me. Imagine, stations hearing me through all the interference, with all of 10 W. What a band opening this was turning out to be!

After that, I held onto the frequency for an hour. Most of the stations were giving me strong signal reports in spite of my QRP output. Around 2204 UTC, the skip started to go in and out. I was having a hard time working into the upper northeast by that point, so I opted to search and pounce. The skip shortened up, and I then worked FN12 and FN13. Signals were up and down for the next few minutes. I managed a few contacts back into the upper northeast again in FN44 and FN54, but they were telling me they could barely hear my signal. Then, the band went completely dead for a few minutes. I went searched and only heard (and worked) FM16 at 2224. I heard that station in FM16 for an hour as it faded in and out, but I heard little else. I then worked some locals on several bands. My last E-skip contact was at 2337 with N3DB into FM18. We were open to the mid-Atlantic coastal region off and on for that whole hour, but there was just no one out there on the other end of the pipe.

Tallying the Results

Overall, it was an amazing experience having a strong E-skip in the middle of January. After the contest, I received e-mail notes from WB9Z who indicated that he worked over 100 stations on 6 meters during the same time. He is in EN60, around 150 miles to my north past Champaign, Illinois. He has a large antenna system and was running a good amount of power as a single-op high-power entry, I believe. You may want to contact him for his log excerpts.



W9GKA's VHF QRP portable station.

I counted everything up and it appears that I worked 30 contacts via skip—23% of all contacts I made during the contest. I worked 16 new grids in the skip, and this was 36% of all grids worked on all bands during the contest.

I estimate that the midpoints during the strong part of the opening were over central and eastern Ohio. The midpoint of the contacts into FM16 and FM18 later in the opening was farther south, somewhere around the border between Kentucky and West Virginia. It thus appears that the E-cloud was initially concentrated over Ohio, but then drifted south, allowing a few contacts into FM16 and FM18.

Please note that my computer gave me output for local time, not GMT. I added 6 hours to all of the times to arrive at the times of contacts on the *Excel* spreadsheet. If my hourly indications are off from other logs, that is the reason.

QRP Portable

This is one tough class! I normally do not participate in the January Sweepstakes due to the bad weather conditions. There were three separate rovers based near Chicago that were planning trips into my area, so I checked the weather reports and it looked like decent temperatures were in store for the St Louis area on Saturday and Sunday with no rain or snow forecasted, other than what was already on the ground (about an inch here locally). I made the decision to operate in the last few days before the contest and actually set up the antennas the day before. I got up early on Saturday, and made sure the generator was working. I was off and running!

QRP portable is a lot like Field Day. In fact, I approach the event as if it were a Field Day operation. The planning, set-up and actual contest operation is much easier to pull off if the portable entry is viewed as a Field Day run inside a VHF contest. I heartily recommend that a QRP portable enthusiast get some solid Field Day experience before he or she sets off on a full-blown run as a portable entry. I have participated in more than 25 Field Days with four separate clubs, and one of those clubs continually finished in the top 10 of its class. Even with that experience as a background, I still make mistakes on VHF.

In terms of the set-up, I like to go to the same site year after year, and I want the site to be close to home for my own convenience. I can then return home at night to sleep before returning the next day. It also helps that local hardware stores and RadioShack stores are in the immediate area. Obtaining ongoing permission from the landowner of a nearby hill is perfect for a portable entry.

I try to keep everything simple. There is less to go wrong that way. I use a straight key instead of a keyer. I have receive-only preamps for 6 and 2 meters, but I don't often use them because signals can be so strong at times that the preamps are swamped out. I usually put them into the coax line, but switch them off when I have to. The preamp relays are prone to failure, however, especially if they are RF sensed. I use PTT control lines, but the transmit output is not sequenced. I have lost the preamps in the middle of a contest on two occasions in this manner.

I use a computer running *NA*, but it only keeps the log; it does not control the rotator or act as a keyer. The computer is not hooked up to packet spot-

Table 1

A History of W9GKA's VHF QRP Contest Scores

		Ranking		
Contest	*Score*	*Illinois Section*	*Central Division*	*National*
1998 June VHF QSO Party	22,515	1	1*	5
1999 January VHF Sweepstakes	518	1	2	12
1999 June VHF QSO Party	8320	1	1	7
2000 June VHF QSO Party	7190	1	2	10
2001 June VHF QSO Party	3072	4	6	14
2002 June VHF QSO Party	7853	2	2	7
2003 January VHF Sweepstakes	7065	——————— pending ———————		

*The 1998 score set a record for the Central Division, QRP portable class. It has subsequently been broken by K9PW, with a #1 score in the nation for the June VHF QSO Party.

Table 2

Excerpts from W9GKA's Log of the 2003 January VHF Sweepstakes

Time (UTC)	*Grid*	*New Grid*	*Comment*
2052	FN31	FN31	
2055	FN42	FN42	Worked eight locals on 6 and 2 meters
2114	FN31		
2119	FN41	FN41	
2120	FN31		
2121	FN41		
2122	FN43	FN43	
2123	FN43		
2123	FN31		
2125	FN42		
2126	FN42		
2129	FN42		
2136	FN54	FN54	
2137	FN22	FN22	
2139	FN34	FN34	
2146	FN32	FN32	
2147	FN24	FN24	
2148	FN32		
2155	FN23	FN23	
2155	FN43		
2156	FN23		
2158	FN12	FN12	
2204	FN13	FN13	
2211	FN44	FN44	
2215	FN35	FN35	
2220	FN54		
2220	FN44		
2224	FM16	FM16	
2225-2257			Worked locals on 6 and 2 meters, and 70 cm
2258	FM16		
2337	FM18	FM18	

ting clusters or Internet sites, either. There would be too many wires for all of the jazz associated with a full-blown computer-controlled station. That is for the permanent set-ups. I even use a microphone that comes with the radio. The headset/mic combos are great, but there is too much that can go wrong in the portable entry. So, I use the original mics and I have a good headset to maximize my receive side.

I also like to do most things the same for every contest, and then only improve one or two new things for the next contest. This repetitive process makes the run much easier to pull off and there are fewer mistakes. I always try to be aware of the marginal safety conditions I am operating under, so I do the good things repeatedly, and attempt to minimize the bad things. That gives me time to concentrate on one or two improvements for the next contest. In this way, I can make a gradual improvement in my contest capabilities.

As to the equipment and radios, I emphasize the antenna system. But being cheap, I try to keep the same radios in operation each year. Antenna height and gain are more important to the success of a VHF operation than having the latest and greatest transceivers.

It never ceases to amaze me that QRP portable entries can experience bitterly cold conditions in winter, but then have to put up with boiling hot temperatures in summer. I have come close to calling it quits during winter just from the cold weather, let alone the wind, rain, sleet and snow. In the summer, I will easily go through an entire gallon of water per day. It is common for me to lose five or more pounds over the course of a hot contest weekend. I sweat bullets in the summer and freeze my backside off in the winter. That is the QRP portable class in a nutshell. It is a bit of a dichotomy to experience 100-degree swings from winter to summer using the same antennas, radio equipment and physical location.

Local Support is Lacking

The one thing VHF contests lack in the St Louis area is local support. Several local hams have approached the radio clubs over the years to encourage the use of FM simplex frequencies in the contests. Efforts have also been made to run local club competitions, all to no avail. Either everyone is in an FM repeater club, or they are interested in a county type of radio club. There are about 50 or so hams that regularly monitor the VHF calling frequencies, but there may be only 2 to 5 locals actually running the VHF contests at any time. I may count 25 or so locals in my contest log during the June VHF when everyone is around.

Lack of critical mass in the St Louis VHF community is a major impediment to high scores in VHF contests. I feel that I could have won several of the VHF portable contests if I had enjoyed the local VHF activity that the East Coast experiences (or the FM simplex activity of Chicago—I am envious of K9PW's abilities to cultivate FM simplex contacts out of Chicago. Despite poor local participation, I am happy to score as high as I have in the class. A Sidewinders on Two net started recently on Monday evenings in mid-Missouri (run by N0PB and KB0PE). Maybe that will help.

YLs In Contesting— The January 2002 NAQP SSB

By Cheryl Muhr, N0WBV
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During a contest a phrase often heard is, "The YL, please. The YL." Many women enjoy contesting. Some only do the CW contests, others prefer SSB, but many enjoy both. The January 2002 North American QSO Party (NAQP) SSB contest is one that YLs love. A shorter contest than many (only 12 hours, with single ops limited to 10 hours), power is limited to 100 W for everyone. This year a number of YLs participated. For some it was their first solo contest; others have been contesting for quite a while.

Enjoyment is Key

Chris, KC0DKX, says, "The NAQP was the first solo contest I had ever run." She had participated in a few Field Day and multi-single contests with Jerry, K0DU. Chris used Jerry's call in the contest and adds "Being relatively new at contesting, I was nervous about running the NAQP contest alone. In fact, it wasn't until just a few hours before the contest began that I actually made up my mind whether to run at all. But once the contest got started and I got a good run going, I forgot about being nervous." She also enjoyed hearing the other YLs in the contest. Chris says she heard Becky, K6EY, on every band!

Many operators enjoy the NAQP exchange because you get to give your name in the exchange. Becky, K6EY, reports, "On SSB, they are expecting a woman's name, but in CW I get 'Name?' a lot and 88s are always welcome." Becky has been a ham for six years and a friend she met via CW encouraged her to try contesting. She was hooked! "There is such a buzz on the air during this contest [NAQP], it's addictive." With three out of four family members being hams, she can't always give her full attention to contesting. Becky says she doesn't worry about her scores too much, but "I know that just getting on when I can helps the serious guys."

This was also Becky's first time on a team. She joined a local contesting club (SCCC) and thought they were great. She looks forward to learning more about contesting from them.

Connie, K0GAS, also enjoys the NAQP SSB contest. She says, "It is a relaxed contest." Like Becky, she also enjoys the name exchange. Connie has been contesting for quite a while, including "maybe 40 years" of Field Day. She likes the state QSO Parties because, "They are fun and a good source of counties if you are a county hunter."

Chris, KC0DKX.

Vicky, AE9YL, at her keyboard.

Goals Vary

Many operators enter contests for a specific reason. Some love contesting, some love being on the air, and some are paper chasers. Many hams find regular hamming difficult with jobs, school, family and life in general. Contests are a great way to make a few quick contacts or hunt for things you need such as states, countries or counties.

Vicky, AE9YL, participated in the contest to work more states for her 5BWAS award. "NAQP is a short contest, so this was an added bonus" she adds. "Playing radio relaxes me and I also enjoy contesting."

Vicky claims she is not a serious contester but "I enjoy giving a 'serious contester' a point." She also worked a number of people she has met at the various radio gatherings and has heard several YLs in the contest.

Corliss, AL1G, who goes by "Kim" for the name exchange in the NAQP, enjoys the fact that during a contest or special event she will meet the same people time after time. "I wind up working many of the same people contest after contest and we usually say in addition to the report something like 'Hi Frank (or whoever), nice to see you again. Good luck!'"

Support and Encouragement

Many YL operators mention that they get better results in the sideband contests than in the CW contests, though women participate in both. YL voices get through pile-ups and generate runs on the air creating their own pile-ups.

Becky, K6EY, mentions that she has "…heard rumors about contesters being rude. Thankfully my experience has been just the opposite." She is not the only one to point out how nice contesters can be, even in a major pile-up. Chris, KC0DKX, found that what sticks out the most about the NAQP SSB contest is, "…how kind and patient people are. Others are more experienced, but despite the noise on 160, people waited in the pile-up." When she struggled to pick out a call or name, the other hams waiting were supportive and helpful. Her female voice helped because she didn't have to struggle to find a frequency, as other hams answered her CQ.

After the contest, Chris received several calls from other hams telling her they had heard her on in the contest and they encouraged her to continue contesting. She appreciates the vote of confidence "especially from the Grand Mesa Contesters!"

Diane, K2DO, does a lot of contesting, but mostly through group efforts. "It's still hard for me to do a contest by myself." She adds that once she gets going she's okay, but Diane really enjoys the multi-multi contests better. "Especially from other stations where they have stacks of antennas and good radio installations."

Many operators rent out stations or join groups to work the contests. The NAQP is a great contest because it is only 12 hours and everyone has the same power restrictions. If you are new to contesting, or aren't sure if it's something you want to do more with in the future, try one of these short ones! The NAQP has three different modes to try: CW, SSB and RTTY. Or try the North American Sprint in these three modes. A four-hour sprint is a great way to get your feet wet.

For more information on any of the North American QSO Party contests or the North American Sprint contests, please see the Jan/Feb 2003 issue of *NCJ*, the *National Contest Journal* (note that the corrected Sprint rules are in the March/April issue— *Ed*). NCJ

Station Profile

Conducted by Mark Beckwith, N5OT
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After our last column, operating 160 meters has just not been the same because every morning when I hear K9DX on the air, I know a whole lot more about his station than I did before. It doesn't feel so bad when he beats me in the pile-ups on weak DX stations any more!

Always on the lookout for the unusual, the Hardware Addict and I were hooked up recently with a hot spot of contesting interest in eastern Canada. We were happy to meet up with Jim Fisher, VE1JF, a long-time ham who has settled in Nova Scotia and is building a potent multi-operator contest station.

Only One Tower?

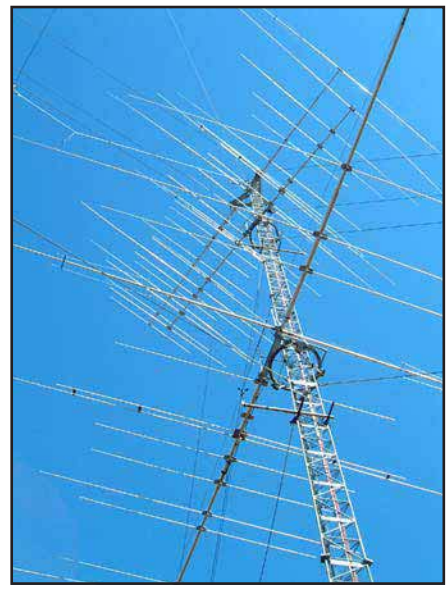
What is the angle that makes Jim's one-tower multi-op station an irresistible study? There are two things really: First, he's on a cliff overlooking the Bay of Fundy for about half of his horizon, so his antennas are much higher in those directions than in the other directions. This makes an interesting balancing act for take-off angles. The other thing is he uses a stack of three Force-12 antennas with separate feedlines for each band. He has three physical antennas but 11 different feedlines to chose for 10-40 meters.

Like many hardware addicts, Jim's operation hosts quite a team of operators who get up there to work the contests. Jim's roster includes: VE1AI, VE1DHD, VE1JS, VE1MOO, VE1OP, VE1RGB, VE1RM (W1VE), VE7SV, VE9DX, K1AR, NB1B, K1IR, W1WEF, K3AN, K6IF and K8CC. Though new on the air, this station hit the ground running. In 5 short years, VE1JF has hosted a number of serious contest operations. With a lineup like that, you know the ideas are flowing freely as Jim works to optimize his 3-Yagi station.

A Little Background

VE1JF was first licensed in Kansas in 1956 and has held his Amateur Extra since 1964. His US call is W8JF. He has always enjoyed working DX; he got into contesting originally to work additional DX stations. While living in Pennsylvania, he was invited to guest-op at FRC member station K3ANS where he experienced multi-op contesting in a station with a real ability to run. Jim was hooked.

After Jim and his wife Hannelore found and bought their present home in Nova Scotia in 1991, Jim passed his Canadian Amateur Radio exams. His intent was to build a potent DX and contesting station. When they moved up to Nova Scotia permanently in 1998, he brought along his FT-1000MP transceiver, Alpha 87A amplifier and Force-12/ComTek four-square antennas for 80 and 160.



Forty-eight Force-12 elements on four bands *can* work together in harmony on one tower.

Soon thereafter, Jim was doing some single-band entries on 80 meters, but the first big event was the arrival in November 1998 of Dale, VE7SV, who used Jim's rig and four-square to earn #2 in the world on 80 meters in the CQWW CW. In response for Jim's request for expert advice, Dale assisted in development of the vision for VE1JF as a six-band contesting station. A number of the station features today are the result of criteria Dale helped develop.

Location, Location, Location

VE1JF is perched on the edge of a 200-foot cliff overlooking salt water to the horizon. Despite the East Coast location of Nova Scotia, this salt-water horizon runs from approximately southwest to northeast. Jim is in southwestern Nova Scotia overlooking the Bay of Fundy—a bit like being in Western Florida overlooking the Gulf. The path south of 45 degrees (Scandinavia and the Middle East) and back around to the southwest is over land. Jim says that seems to work okay, possibly because from VE1JF it is the same number of time zones to London as to California!

Antenna Design Choices

The height over land vs the height over water drove the height of the tower and ultimately the design of the 3-stack. Jim wanted to be able to project low angle signals in all directions. That meant his top Yagi had to be more than 100-feet up (it's about 112 feet). It *also* meant that a stack was required to help manage lobes over the water because even the lowest 40-meter Yagi is about 80 meters (2 wavelengths on 40 meters) above the water, and the 20, 15 and 10-meter antenna range from 4 to 8 wavelengths above the surface. On the other hand, if the spacing were to be wide enough to be meaningful for a 2-stack on 40, it needed to be a 3-stack on, say, 10 meters to avoid excessively wide spacing.

Jim decided on Force-12 antennas because of favorable experiences with the 80 meter four-square construction and its survival during hurricanes. Steve, K7LXC (who sold Jim much of his original antenna and tower equipment), calls the exposed position of VE1JF "an antenna destruction laboratory." Jim is *very* enthusiastic about his choice, from a performance as well as survivability standpoint. "It has been over 5 years since the first ones went up. The winds and ice have caused some relatively minor damage, and I've kept Force-12 up-to-date on what failed and how." This has translated into improvements at Force-12. Jim originally ordered Force-12 D-series (110 MPH) four-square elements, but by the time he ordered his Yagis he decided to go with H-series (120 MPH).

While Jim was finalizing the vision for the 3-stack, Force-12 had recently launched the C31XR and C19XR and there were rumors about what has developed into the C39XR—essentially a C19XR with an added 2-element 40 meter linear-loaded Yagi. Jim considered this option, but was not satisfied with it, and asked Force-12 to create a similar antenna based on the C31XR, which showed greater ability to stack at the distances Jim wanted, as well as a bit more performance. Force-12 kindly developed the C51XRH that evolved into today's C51XRN (with N-series linear loading on 40 meters—Jim likes the N series much better for bandwidth and ice and wind survivability). One unusual feature Force-12 included was double reflectors on 15 meters; Force-12 had set the design objective so that the 10, 15 and 20-meter performance of the C51XRN would be at least as good as the C31XR, and the extra reflector more than overcame some degradation of pattern from the added 40-meter elements.

The modest stack setup today is:

2/2 on 40

3/3/3 on 20

4/4/4 on 15 (not counting double reflectors twice)

7/7/7 on 10

Maggie, VE1MOO, one of several promising new contesters being developed at VE1JF. Her energy and enthusiasm are obvious.

VE1JF and VE1RGB watch VE1AI (foreground) and VE1JS tear through their respective pileups

The Yagis are at 112, 75 and 37 feet. The top antenna is about 330 feet (100 meters) above the salt water.

Jim has experienced superb stacking results from using Array Solutions StackMatches on each band. "It's hard to understand how much improvement stacking can make in some situations, particularly on long-haul signals." Jim adjusts for the relative forward position of the longer C51XRNs vs the middle C31XRH by using phasing lines that are shorter by the physical distance multiplied by the velocity factor.

The Yagis are independently rotatable, with an Orion 2800 on top and TIC Rings in middle and bottom. "Because of the fierce winds multiplied by the airfoil characteristics of the cliff, the original TIC Rings have experienced some problems in dealing with asymmetric lift, and TIC has provided new, redesigned T32E rings which are on the ground awaiting the summer work season. My rigger has examined them and is really pleased with the improvements."

Coax on the tower and within the house is Davis RF Buryflex, plus short LMR-400 Ultraflex jumpers from tower to feedpoint. All coax (1100 feet) is brought to the bottom of the tower where it passes through the four StackMatches and through Array Solutions 1.5:1 UNUNS into CATV hardline (mostly 7/8-inch) that runs underground to the house a couple of hundred feet away. "One of the best pieces of advice I got was to put in oversized PVC pipes for ease of changing and adding buried cables."

At the shack, there is what Jim calls "the Doghouse," where the underground cables and control lines from the tower and the four-square field converge and pass through a PolyPhaser 10-port SPOE with tremendous grounding, as well as PolyPhaser coax and control line surge suppressors. Jim also employs a PolyPhaser whole-house surge suppressor system. "I consider this a thing of beauty." An Array Solutions SixPak 6x2 switch and stubs for 10, 15 and 20 meters are also located there. Feedlines and control lines cross the basement ceiling about 50 feet to the shack.

Jim tells us that for various reasons, the 160 meter array has yet to be erected, and three of the four verticals are still packed in the garage. Nevertheless, ON4UN and K4SQR provided invaluable advice by e-mail on the design and implementation of the 80 meter four-square.

Inside the Shack

Within the shack, VE1JF is primarily configured for two operating positions. This works for both Multi-Single and SO2R entries. Jim has tried to standardize both positions. "The only difference between the rigs is that the left rig features a MarkFive and the right one an MP. That *does* cause a bit of confusion with operators changing positions and long nights during a contest, but most of the operators are now quite familiar with both." The amps are Alpha 87As, and bandpass filters are DuneStar 600s. Writelog is the software of choice.

Results

Jim's efforts are beginning to pay off in the all-band multi-operator arena. "We now hold several Canadian records for DX contests and are standing ninth in the world (claimed) for CQWW CW multi-two, and fourth in W/VE for ARRL DX SSB multi-two."

Operating at VE1JF—Comments from Others

Let's close with comments by some of the local operators in Nova Scotia who have enjoyed opportunities provided by Jim Fisher as he works to ensure this multiplier reliably gets into more and more logs.

Maggie, VE1MOO, tells us, "I am not a contester in any sense of the word! But Jim has a very encouraging way about him, and enjoys sharing the things he loves with other people and wants them to experience some of the same enjoyment and excitement."

Howard, VE1DHD, really appreciates what Jim is doing. "Although I am relatively new to Amateur Radio—eight years this month—the excitement of contesting appeals to my competitive nature. Nevertheless, it was with some trepidation that I agreed to join Jim and colleagues in the ARRL DX SSB competition. The level of sophistication of the equipment—radios, amplifiers, computers and antennas—in this station was somewhat overwhelming at first. Jim, however, is a wonderfully patient teacher and quickly made me feel very much at ease with the technology. I would venture to say that this 'hands-on, short-course' learning experience was the best as far as the theory and practice of contesting is concerned. I am looking forward to next contest season and an opportunity to once again work from VE1JF."

Gary, VE1RGB, relates how Jim's opportunity has helped him develop as a CW contester. "I was invited to Jim's station as a guest operator during the 2003 ARRL DX CW contest in February. Ordinarily I run a K2 at 100 W into a multiband wire antenna. Hearing the description of Jim's setup, I couldn't wait to get my hands on a station of such caliber! I was flattered beyond words to get invited.

"Then the doubt set in. Yes, I had been the only CW operator for a couple of DXpeditions to Sable Island, but that was a few years ago and I was rusty. Yes, I have continued to play in every CW contest I could find time for, but that was on the basis of hunt-and-peck—no holding a frequency with my little operation—leaving precious few opportunities to complain about all the "pileups" I had created. Good thing Jim e-mailed me just a week before the contest. By the third day I was a basket case of worry, fear of failure reeking from every pore!

"So, I practiced. For five nights solid I tuned into the big guns who, by now, were set up around the world in preparation for the ARRL DX contest, and for five nights I listened to those guys running 35+ WPM and typed into my laptop every callsign I heard them send. Every now and then, I would hit the paddles, transmitter on standby, and try to match their speed. The day before heading to VE1JF, I was quite pleased by my ability to get things right on the first try. *But, I was no less nervous!* I hit bottom when I first spied Jim's tower in the dusk of a decidedly cold winter evening. It is intimidating to a country boy to see an amateur radio tower so tall that it requires aircraft clearance lights on it!

"Being the junior guy on the team, I assumed it was my duty to volunteer to operate all night the first night, so I did. Nobody disagreed so I thought 'hey, this is all right. At least these guys are not so serious that they won't let a newbie get his feet wet. That gave me some confidence.

"The opening bell sounded, the jitters slowly dissipated and I was able to settle in to that wonderful rhythm of running from a desired QTH: send a CQ, get a response; build up the call sign of the other station from fragments when conditions are rough; send the exchange; copy the return; key it all into the log; move on to the next customer; repeat as necessary. Oh, it was sweet!

"Three things stand out in my mind: Discovering that a good signal soon creates a hole where one can operate comfortably without being beaten up by QRM from all sides; hitting 247 QSOs per hour into Europe on 20 meters—a big speed for me; and the graciousness of both Jim and his wife Hannelore, whose ability to welcome strangers into their home and make them feel instantly comfortable is unsurpassed.

"Will I go again if invited? Darn right, I will! Will I repeat my pre-contest practice sessions? Most certainly; besides, it's fun. Will I be nervous? Of course! How many operators key up at the start of a big contest without some fear and trepidation? Would I expect to walk away thinking that I had just had the experience of a lifetime? You betcha!

"Don't lose my e-mail address, Jim, *please*."

Closing Remarks

Jim also welcomes guest operators individually or as club expeditions for the CQWW and ARRL DX contests. "So far, one or more operator on behalf of YCCC have been here three times, and NCCC was here for the WPX. MRRC is coming for Worldwide Phone and YCCC is coming back for Worldwide CW." Sounds like an ambitious plan.

It's always a great pleasure to meet station builders who have dedicated themselves to improving and enhancing our sport. Jim Fisher has managed to start an operation up in Nova Scotia to make sure this multiplier gets into more logs on more bands in more contests. Look at the comments from the operators to see how Jim's efforts are encouraging local operators and developing contest enthusiasm. Thanks, Jim. NCJ

Contesting for Fun

By Brian Kassel, K7RE
k7re@arrl.net

A Minimalist Is Born

During my 40+ years in Amateur Radio, it seems that I have always had the most fun when my station set up was minimal. During flush economic times, I was able to run down to the local radio "candy" store and pick up yet another must-have little box. Conversely, when times were lean, I took the opposite tact. The station shrunk in size, but the overall capability seemed not to follow necessarily in proportion.

When I first got into the hobby in 1961, hams still built much of their equipment. At that point, there were virtually no Japanese ham radio products to be found in the US. Names like E.F. Johnson, Drake and Collins were the predominant equipment suppliers. Like many teenaged hams at the time, I dreamt of someday owning a rig from one of those companies. Also, like the great majority of budding young hams at the time, there was no way my budget would accommodate my dreams.

The Heathkit Company was in its prime. It provided a shortcut to the goal of realizing a well-performing rig at an affordable price. I didn't relish the idea of building the radio. In fact, building the kit was just a means to an end. At the time, I felt CW was in the same category. I only had to learn enough to get my General, which enabled me to have voice (AM) contacts. In my teen years, I could see no real use whatsoever for CW. In my adolescent mind, CW must have been some kind of kickback to happier times for those old hams (over 30) who still used it. Of course, I think we can all remember that period in our lives when we had all of the answers.

Father Knows Best—Eventually

My dad strongly suggested that I build my own kit. I would get more for my money (and his), and have the great experience of operating a piece of equipment that I had crafted. He was indeed a good model craftsman in his own right. Very begrudgingly, I ordered a DX-40 and built it over the Christmas holidays. It didn't work at first, of course, and I was convinced that I had made a huge monetary mistake. I found a local ham and he agreed to look at it. In just about an hour he had it working just as specified. I had forgotten a few soldering connections, and had installed a resistor in the wrong spot.

I used the rig heavily for about a year, working the heck out of 40-meter CW in the Novice band. I saved up a few bucks every now and then so that I could buy a new crystal. Those crystals cost 2-3 bucks each, a mighty sum when the minimum wage tested at 50 cents an hour. I could only afford one crystal for the 15-meter band, and the frequency that I had chosen caused huge amounts of TVI. I lived in a row, or town house, near Philadelphia, and the population density was high. Antennas for 80-meters were too large to fit on the available real estate. Sound familiar? Forty meters was the lowest band I could operate. Still, even with these restrictions, each QSO was fun and I found that I could tolerate CW a bit more than before.

In my late 20s and early 30s, I finally had the ready cash to go out and buy the latest whiz-bang rig of the time. I didn't "have" to build it, and it was ready to go right out of the box. I felt very fortunate that I had reached this peak in my life. I put up a 3-band 2-element quad at my new house. After having used it for a few months, though, that shine really got dull in a hurry. Something was missing. This just wasn't much fun. Was I turning into that old guy that I had so denounced early in my life? Yikes!

The Seed is Planted

About this time, the QRP bug bit me hard. I built up a 2-tube rig that ran 10W in and was crystal controlled. I somehow wound up with a crystal for 7001 kHz. The first night I had it on the air, I was able to work a few Europeans stations from Texas. I was hooked!

The light finally went on. I have been known to be a bit slow on the uptake, you know. I actually had much more fun with that built-up stuff than with the latest multibutton rig from Japan.

I began building, and operating with a new fervor. I traded off most of my commercially manufactured equipment. Over the years, I have built many rigs. Most weren't fancy, but eventually I got them working and each QSO became a treasured experience. My current rigs include the Elecraft K-2, the ultimate kit radio. I also have a little K-1.

Rebirth…Again

Every year now since 2000, I have been traveling to Freeport in the Bahamas for the ARRL DX International CW contest with Bob Patten, N4BP. Our stations are minimalist by almost any standard. Our antennas consist of a simple 40-meters quarter-wave vertical and an 80-meter dipole, both supported by two collapsible 33-foot fiberglass poles mounted to the top of our hotel roof. With QRP the first year, I worked well over 500 US stations on 15 meters with 5W. I was lucky enough to win the SB 80-meter category one year, but with 100W that time. Bob has consistently won as well.

In February 2003, I didn't fare as well. Thunderstorm static and some mutual interference at our stations really dragged down our totals. When we returned I had hoped that some I could still pull off a top spot on 40-meter SB, but it wasn't to be. I became discouraged, even bummed out for several days following my arrival home.

Of course Bob tried to convince me that winning wasn't everything, and that I should just enjoy the operating time and the pileups on the WARC bands that we always create a few days before the contest. His advice didn't seem to ring true. I was still depressed.

A few days after my arrival back home in the Black Hills, I began receiving the mountain of QSL cards that always accompany this effort. Suddenly, the curtain began to lift as I read and replied to each card. I really *did* have a great time! I made 1500 contacts prior to the contest on the WARC bands and around 1100 contacts during the contest. Once again, I violated my own prime directive of Amateur Radio. I had taken my eye off the ball, so to speak. I forgot that it was all about having fun!

Would I have felt better if I had imported some huge towers, beams, amps, etc, and still come up short of the required number of QSOs to place number 1? Of course, I wouldn't have—most likely, I would feel a lot worse. Even if I would have placed number 1, I expect that the victory would have been somewhat hollow. Achieving the number of QSOs with our minimalist station was the challenge that we both had met. And, indeed, it was a lot of fun after all.

Isn't it remarkable that we always want what we can't have, and when we get it we seem to lose interest?

When it comes to Amateur Radio, there is a key question you should ask yourself: *Am I really having fun?* If you ain't havin' fun, you just ain't doin' it right! NCJ

Contest Tips, Tricks & Techniques

By Gary Sutcliffe, W9XT
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Unusual Antennas and Equipment—Part One

Hams are notorious for coming up with creative solutions for getting on the air when conventional methods are not practical. This issue of CTT&T looks at some unusual equipment and antennas used by our readers.

Just about everything in the contester's shack can now be hooked up to a computer, allowing automation of the operator's tasks. Unfortunately, a couple of COM and LPT ports just doesn't hack it these days. The award for the biggest upgrade to a PC goes to K1TTT. Dave had a 24-MHz 386 in a multi-multi set up with six stations. Each station had a dumb terminal for logging and an AEA Morse Machine for sending CW connected to its own serial port. Then there was the packet port and another terminal upstairs. To accomplish this he used a couple of eight-port Digiboards. That, along with the internal COM ports, gave him 18 serial ports. It is probably a good thing the radios were not PC compatible.

Scrounging Commercial Gear

If you don't have the equipment you need for the next contest, maybe you can use some commercial or research equipment. A few years ago N4OGW was doing graduate studies in physics at the Los Alamos National Lab in New Mexico. Tor was living in an apartment and didn't have a station to operate Sweepstakes. The lab had some research antennas, though. One was a discone good to about 5 MHz and a log periodic good for 20-10 meters. This all worked fine except he had to stop transmitting a few times so they could run an experiment with some low-Earth orbit satellites.

Keeping your voice intact over a long phone contest has been a problem since the first phone contests. In earlier days Rick, N6XI and Howie, K9KM, made spliced loops of reel-reel recording tape to use with a tape deck for CQ tape loops.

Solutions at Home

Sometimes the solution to getting on the air is right in front of your face. Back when he was 15, W0UN (then K0UTX) had his shack in the basement of his Kansas City home. John hung a roll of solder from the floor joists above his rig to allow instant access when he had to solder something. The free end of the solder would hang down to the table. One day he had the idea of sticking the end of the solder into his Globe Chief Deluxe to see if he could work anything on 20 meters. John didn't have an antenna on the band at that time.

John's solder antenna was a 4-foot vertical. It is unlikely the remaining solder on the spool gave him any top loading. It probably acted more as a small capacitive hat. Anyway, without a tuner he answered a CQ by KV4AA who promptly responded with a 579 signal report.

Check Your Work

Checking your wiring is always a good idea, especially if things don't work the way you expect them to. Dennis, K2SZ, sends along a story of a W2RQ/2 Field Day effort a number of years ago. They were serious about setting a new record. The 20-meter SSB station had a pair of four element Yagis stacked on an 80-foot tower. Before Field Day started, they decided to try it out to see how it played. A CQ was answered by UK9AAN and resulted in a 20 over S9 signal report. They worked a number of UA9s and UA0s and received good signal reports.

Of course, they were very happy with the performance of the stack. Next, they decided to try it towards Europe. Nothing happened to the signal levels when the antenna was turned. After checking around, they found someone had connected the feed line to the tower guy line and not the antenna!

That reminds me of a time back when I was in high school. A bunch of my school ham buddies and I used to rag chew on 6-meter AM. One day we went to a hamfest where one of the guys bought some strange 6-meter antenna. He was proud of the deal he got but the rest of us gave him a hard time about it on the trip home. Naturally, he wanted to prove us wrong, and he set it up that afternoon.

He called us up on the phone to get us on 6 meters and give him some signal reports. We could barely hear him. Of course, he thought we were pulling his leg, but he really was very weak. Finally, he believed us and checked it out. Sure enough, he had his rig connected to a dummy load. A quick switching of cables and his new prize antenna was connected. With the new antenna connected, his signal went down from the dummy load!

Mobile Improvisation

Many hams enjoy operating mobile, either on the HF or VHF bands. Antennas can be a problem for cars, especially on HF. Back in 1970, while still a Novice, K3FT decided to use his parent's car *as* an antenna. Chuck scraped the crud off a frame bolt and connected the center connector of the coax. The shield went to a ground rod. The tires acted as the insulator for the radiating element, a Rambler station wagon. It loaded up just fine on 15 meters. With his 90-W Eico 720 transceiver, Chuck made both domestic and DX contacts in the Novice Roundup.

Finding a good support for an antenna is always important. It should be solid, and finding a high spot helps. Back around 1965 K6LL and a few others including (now) W3LPL and K6IM decided to do the Massachusetts QSO Party. They were operating from the Barnstable County Dump. The gear was in the back seat of their car. They had an inverted V for 20, 40 and 80 meters. To get it up in the clear they mounted it on top of a 20-foot manure pile. According to Dave, the poor guy stuck with climbing it was persona non grata for the rest of the weekend.

Armstrong Rotators

Ed, N1UR, is currently renting a house in Vermont. He wanted to operate a contest so he put up monobanders for 10 and 15 meters on a 20-foot aluminum ladder. This used the Armstrong rotator method.

The Armstrong method of antenna rotation is a favorite at Field Day. K1TTT took it to a new level with a Cushcraft 40-2CD on a side arm. Two ropes had to be untied. Then the beam was pulled into the new position and the ropes tied up again. A 2 AM trek in sub-zero temperatures with a couple of feet of snow on the ground to rotate the beam to Japan was not a popular assignment.

We are out of space, and still have more stories to tell! If these tales bring back some old memories of unusual antennas or equipment you have used in a contest, pass them on for the second installment. Please get them to me by May 12.

Send your ideas on these subjects or suggestions for future topics to: 3310 Bonnie Lane, Slinger, WI 53086, or via e-mail to the address shown at the beginning of the column. NCJ

Contesting on a Budget

Paul Shaffenberger, K5AF

Recycled Aluminum

This issue's column brought quite a deluge of responses, with 15 individuals detailing how they save money by building or rebuilding antennas using recycled aluminum. The responses were highlighted by several innovative uses of recycled aluminum—not surprising from a group of competitive and innovative contesters.

Everything but the Kitchen Sink...

We seem ready to recycle almost anything aluminum that might be of use in future antenna projects. Some of us claim to never have met a piece of aluminum that we didn't like. Ed, K4SB, confides that he never throws a piece of aluminum away, and has a large box of used traps and an entire basement wall stacked with aluminum tubing. Gary, W9XT, is another admitted alumiholic and has a vast collection of tubing ready to be recycled. As Jim, K4OJ says, "By collecting good lengths of tubing, you eventually find you have enough to build entire antennas as well as have repair pieces on hand."

Our response was international this time, with Jukka, OH6LI, noting that almost *everything* involving his antenna system was recycled, from beams, towers and even hardline. Jukka mentioned that this was also the mentality in assembling the OH4A and OH0V stations. Jukka's input was so extensive that I've asked him to write a guest column on some of the budget "tricks" he has developed over the years.

The most interesting input, though, was from K4BEV, Don, who takes the handles off aluminum fry pans, cuts holes around the edges and uses them as a vertical antenna base for connecting radials!

Recycling Favorites

There seemed to be two standout favorites in the HF beam antenna recycling effort. By a wide margin, the TH-6 variants (and to a lesser extent the TH7) seemed to be the most popular to recycle. K3WW and K4ZA have used 3-stacks of these popular tribanders with great success. Contributors cited good availability of parts and ease of rebuilding of these antennas.

The KLM KT-34 variants were also very popular, but users cited the somewhat quirky construction, and availability of parts. Ward, N0AX, refers to them affectionately as "Konstantly Losing Metal." New parts are available for these antennas through M^2, but Bill, K4XS, finds used KT-34s are an inexpensive source of parts. Bill proudly notes that he is the owner of 25 KLM antennas!

There are other types of beams being rebuilt out there. Rex, K7QQ, has rebuilt TH-3s and A3Ss, for example. Whatever the antenna type, contributors have indicated that you can buy and perform a quality rebuild of a system for about one-third the cost of new.

Rebuilding Hints

Regardless of the brand or type of recycled system, there were very good suggestions for rebuilding.

Hardware: Mike, N2MG and Don, K4ZA, both provided details on rebuilding beams. They both recommended replacing hardware with stainless whenever rebuilding. Mike suggests cleaning all electrical connections with Scotchbrite pads, along with a sparing dose of antioxidant on the elements (too much might cause slippage). Mark, N5OT, puts the hardware and brackets in a tumbler to clean them off. Both N2MG and N5OT use small rivets at each tubing joint to hold elements in place, but Mike also makes small holes in the bottom of the boom to allow water drainage.

Mechanical considerations: K4ZA suggests never reusing bent or broken elements, as they are far more likely to fail. Jim, K4OJ, usually adds one or two sleeves of tubing on the inside of the elements where they meet the boom, as that reduces droop and also strengthens the antenna at the point of greatest stress. Don, K4ZA, accomplishes much the same result with the boom by using sleeves and also larger, stronger and heavier clamps and hardware at the stress points. K4OJ, along with others, recommends using 6061-T6 tubing and recommends against using unknown/lesser strength materials. Mark, N5OT, makes the common-sense suggestion of using the heavier stronger tubing in the middle of the element, and the lighter stuff on the ends.

Traps: Over the years, traps deteriorate and need to be checked and cleaned whenever a rebuild takes place. Fortunately, antenna analyzers now make quick work of checking the functionality of traps.

Tweaking: While we always want to improve on commercial designs, most respondents agreed that tribander tweaking was difficult at best, simply because of all the variables involved. Monobanders, however, make a great platform for optimization. Both physical modeling software like *YagiStress*, recommended by K4ZA, and antenna modeling software, such as *AO* and *YO*, recommended by N5OT, help in this effort.

Baluns: Forget recycling these, say K4GMH and others. It is far easier to build a coaxial balun, or use beads. These are generally cheaper and more effective.

Hybrids

Some of the more innovative among us realize that individual pieces of different antenna systems can be kluged together to create a working system.

VE3KZ created a hybrid using the driven element from a 1960s TH-6, a boom that is half TH-6, part 402BA and 3 feet of unknown aluminum, along with the 10- and 20-meter parasitic elements off another TH-6. It ends up being three elements on 10 and 20 meters, and a rotatable dipole on 15 meters.

The prize for hybrid creativity, however, goes to OH5UFO (OH1TN). His antenna truly looks like a UFO. It appears to consist of the two directors from a KT-34 ahead of a quad driven element and a quad reflector. This Quagi antenna works on 20-6 meters. It can be viewed at **gamma.nic.fi/~oh9ufo/KUVIA.html**.

Final Thoughts

The summary from Mark, N5OT, seemed to say it all: "I just try to learn from experience and mistakes. If it comes down, build it over again using bigger aluminum!"

There was more detailed information provided by the contributors than I could fit into a column of this nature, but I hope that anyone wanting additional information on a specific subject will contact the individual contributors or me. They are: OH6LI, VE3KZ, N2MG, N3WW, K4BEV, K4GMH, AA4LR, K4OJ, K4SB, K4XS, K4ZA, N5OT, K7QQ, W9XT and N0AX. Thanks, guys!

Topic for July-Aug

Freeware and/or low-cost software: Tell us about your favorite bargain software, whether it is for antenna modeling, logging, propagation, etc. We'll try to cover everything that might have applications useful to a contester. NCJ

DX Contest Activity Announcements

Compiled by Bill Feidt, NG3K
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If you want to appear in the July/August 2003 issue, the deadline is May 20. You can submit your data using the form you'll find at **www.ng3k.com/Contest/consub.html**. If you prefer to e-mail your information, please include:

Call sign to be used
- DXCC entity
- CQ Zone (for the CQ WW contests)
- Entry class
- QSL route
- Your call sign and e-mail address
- Operators and other information of interest.

Send your information to **bill@ng3k.com**. You can review what has been received to date at **www.ng3k.com/Contest/conasc.html**. This Web page is continually updated as new announcements are received.

CQ WPX CW Contest (May 28-30, 2003)

Call	Entity	Class	Operators
AL5A/NH0	Mariana Is	SOAB	JH0MGJ
BW4/UA3VCS		Taiwan	SOAB UA3VCS
D4B	Cape Verde	SOAB HP	4L5A
EA9LZ	Ceuta Melilla	SOAB	N6TJ
EN1U	Ukraine	SOAB	UX1UA
FY5FY	French Guiana	SOAB	FY5FY
LY1YK	Lithuania	M/2	LY2FY, LY2CO, LY3CI, LY4CW and others
RM0A	Russia (Asia)	Unknown	UA0ANW
SX1R	Greece	SO LP	SV1XV
T97M	Bosnia	SOAB LP	T97M
VP5MM	Turks Caicos	SOAB HP	YT6A

Thanks to: 4L5A, JH0MGJ, LY2FY, N6TJ, OPDX, SV1XV, T97M, UA0ANW, UA3VCS, UX1UA, YT6A
See **www.ng3k.com/Misc/wpxc2003.html** for further details.

RSGB IOTA Contest (July 26-27, 2003)

Call	Entity	IOTA	Operators
5W	Western Samoa	OC-097	DL2AH
9A/HA8KW	Croatia	EU-170	HA8KW
DF3UFW/p	Germany	EU-057	DF3UFW
DL4OK/p	Germany	EU-042	DL4OK
DL0KWH	Germany	EU-129	DL2SWW, DH7NO, DH2AX, DL6ATM, DL2RTK, DH1LA, DL2VFR and others
DP1POL	Antarctica	AN-016	DL5XL
G?	England	EU-120	ON5FP, ON4CJK
TM3ON	France	EU-068	ON4ASG, ON4AVA, ON4ON, ON5SY, ON6CX, ON7PQ, ON7XT, ON9CGB
VE2/VE9MY/p		Canada	NA-038 VE9GLF, VE9MY
VE8NET	Canada	NA-129	Western Arctic Amateur Radio Association

Thanks to: 425DXN, 9A6AA, DL2AH, DL2VFR, DP1POL, ON9CGB, OPDX
See **www.ng3k.com/Misc/iota2003.html** for further details.

Contest Calendar

Compiled by Bruce Horn, WA7BNM

Here's the list of major contests to help you plan your contesting activity through August 2003. 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** .

Please note that the SSB version of the MARAC County Hunters Contest has changed its name (US Counties QSO Party) and has moved to May 17 on the contest calendar.

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

May 2003

AGCW QRP/QRP Party	1300Z-1900Z, May 1
IPA Contest, CW	0000Z-2359Z, May 3
MARAC County Hunters Contest, CW	0000Z, May 3 to 2400Z, May 4
10-10 International Spring Contest, CW	0001Z, May 3 to 2400Z, May 4
Indiana QSO Party	1300Z, May 3 to 0500Z, May 4
ARI International DX Contest	2000Z, May 3 to 1959Z, May 4
New England QSO Party	2000Z, May 3 to 0500Z, May 4 and 1300Z-2400Z, May 4
IPA Contest, SSB	0000Z-2359Z, May 4
VOLTA WW RTTY Contest	1200Z, May 10 to 1200Z, May 11
Oregon QSO Party	1400Z, May 10 to 0200Z, May 11
FISTS Spring Sprint	1700Z-2100Z, May 10
CQ-M International DX Contest	2100Z, May 10 to 2100Z, May 11
US Counties QSO Party, SSB	0000Z, May 17 to 2400Z, May 18
Anatolian RTTY WW Contest	1800Z, May 17 to 2100Z, May 18
His Majesty King of Spain Contest, CW	1800Z, May 17 to 1800Z, May 18
Baltic Contest	2100Z, May 17 to 0200Z, May 18
CQ WW WPX Contest, CW	0000Z, May 24 to 2400Z, May 25
VK-ZL Trans-Tasman Contest, Phone	0800Z-1400Z, May 24
QRP ARCI Hootowl Sprint	2000-2400 local, May 25
MI QRP Memorial Day CW Sprint	2300Z, May 26 to 0300Z, May 27
Six Club WW Contest	2300Z, May 30 to 0200Z, Jun 2
Great Lakes QSO Party	0000Z, May 31 to 2359Z, Jun 1

June 2003

VK-ZL Trans-Tasman Contest, CW	0800Z-1400Z, Jun 7
IARU Region 1 Field Day, CW	1500Z, Jun 7 to 1500Z, Jun 8
ANARTS WW RTTY Contest	0000Z, Jun 14 to 2400Z, Jun 15
Portugal Day Contest	0000Z-2400Z, Jun 14
WW South America CW Contest	0000Z, Jun 14 to 1600Z, Jun 15
Asia-Pacific Sprint, SSB	1100Z-1300Z, Jun 14
West Virginia QSO Party	1600Z, Jun 14 to 0200Z, Jun 15
ARRL June VHF QSO Party	1800Z, Jun 14 to 0300Z, Jun 16
All Asian DX Contest, CW	0000Z, Jun 21 to 2400Z, Jun 22
SMIRK Contest	0000Z, Jun 21 to 2400Z, Jun 22
AGCW VHF/UHF Contest	1600Z-2100Z, Jun 21
Kid's Day Contest	1800Z-2400Z, Jun 21
Marconi Memorial HF Contest	1400Z, Jun 28 to 1400Z, Jun 29
ARRL Field Day	1800Z, Jun 28 to 2100Z, Jun 29
QRP ARCI Milliwatt Field Day	1800Z, Jun 28 to 2100Z, Jun 29
His Majesty King of Spain Contest, SSB	1800Z, Jun 28 to 1800Z, Jun 29

July 2003

RAC Canada Day Contest	0000Z-2359Z, Jul 1
MI QRP July 4th CW Sprint	2300Z, Jul 4 to 0300Z, Jul 5
Venezuelan Ind. Day Contest, SSB/CW	0000Z, Jul 5 to 2400Z, Jul 6
Kentucky QSO Party	1600Z, Jul 5 to 0400Z, Jul 6
DARC 10-Meter Digital Contest	1100Z-1700Z, Jul 6
IARU HF World Championship	1200Z, Jul 12 to 1200Z, Jul 13
FISTS Summer Sprint	1700Z-2100Z, Jul 12
QRP ARCI Summer Homebrew Sprint	2000Z-2400Z, Jul 13
Colombian Independence Day Contest	0001Z-2400Z, Jul 19
Pacific 160-Meter Contest	0700Z-2300Z, Jul 19
North American QSO Party, RTTY	1800Z, Jul 19 to 0600Z, Jul 20
CQ Worldwide VHF Contest	1800Z, Jul 19 to 2100Z, Jul 20
CQC Great Colorado Gold Rush	2000Z-2200Z, Jul 20
Russian RTTY WW Contest	0000Z, Jul 26 to 2400Z, Jul 27
IOTA Contest	1200Z, Jul 26 to 1200Z, Jul 27

RTTY Contesting

By John Fleming, WA9ALS
wa9als@starband.net

Winter 2003 RTTY North American QSO Party Results

While I'm up to my keyboards in local health department work, K7WM returns in this issue to rate the first-ever Winter NAQP RTTY. The winter edition was welcomed with open keyboards! Thanks to all involved for making another great RTTY contest possible. I enjoyed all the comments, especially that of a frustrated VA3PC who suffered "Contestus Interruptus." I'll be back next issue to suggest the RTTY mode as a great place for new contesters to test the (sometimes intimidating) waters.—John, WA9ALS.

The first-ever Winter RTTY North American QSO Party (NAQP) got started at 1800Z on February 22, 2003 and things couldn't have been better. Even though propagation could be considered strange, depending on where you live, it was great overall. Records were set in almost every category (shattered in some)! Participation was up, and reading all the comments coming in with the logs, many new RTTY contesters were in the contest. Several old timers who have been away from RTTY for a while took this opportunity to come back. With a score of 118,590, Don, AA5AU, still reigns as the SOLP operator to beat and this year in the NAQP was no different. From his shack in the bayou down in Louisiana, he was the top operator in score, total QSOs and mults.

However, another swamp rat from Louisiana, Charlie, KI5XP, who was operating from W5WMU, put a hard chase on Don and finished second with a score of 98,644. Now we move to the southwest desert for the third place finisher Dave, K6LL, with a score of 98,040. If you figure out the QSOs per hour for the top three finishers, that works out to 59 for AA5AU, 54.2 for KI5XP and 51.6 for K6LL. That's tight for 10 hours of operating.

For the first winter RTTY NAQP, there were 12 teams. This is up from a high of eight teams for prior RTTY NAQPs, and with the higher individual scoring, team scoring set all time records also. The "NITTY GRITTY RTTY" team of AE9B, AK0A, AA5AU, KI6DY and KU1CW finished first with over 90,000 points in front of second-place team "SWACC (South West Arizona Contest Club)" of K6LL, W7WW, W7ZR, WK6I and K7WM. Third-place team, the "1 x 4s", was made up of W1ZT, W4UK, WX4TM, K4GMH and K4WW. Many of the teams were missing scores from team members who either were unable to participate in the contest or declined to submit a log.

The District 4 call area holds the record for most logs submitted with the District 9 call area right behind. There were only four logs submitted from the District 2 area, which was a little strange as the 1 and 3 call districts had a good showing, so we know they weren't snowed in.

That's the contest in about a nutshell. The biggest reason for score deduction was violation of the off-time rule. It wasn't a one- or two-minute violation, but a 20 or 30 minute one. The second biggest reason was not recording Hawaii's QTH. They are a state with the abbreviation of HI. The remainders of the deductions were the nits and lice such as 8-letter calls, getting prefixes/QTHs wrong, etc. The submitted logs were great with minimum correspondence back to the submitters to straighten out the problems.

Look at the score-QSO-mult breakdown, as there is a fine line in the balancing of running rates and chasing mults. Of course, if you have a two-radio setup (SO2R), the problem solves itself as you can run on one and search and pounce on the other. Overall, I believe the first-ever Winter RTTY NAQP was a great success and with luck, the July (summer) one will be as great.

Soapbox

AA5AU: Great contest! Thanks for adding this February event for RTTY…AG4WH: first Contest, First time on RTTY.…AI9T: High winds and snow all during the contest. Lost power only once during my first break.…AK0A: fun contest. 10m dead here in KS but thanks to all who worked me.…K0BX: Lots of activity and nice to see 40 and 80 with activity.…K0FX: Condx good on low bands and lots of activity.…K0HZI: First RTTY contest in over 30 years and had fun. Computer lots quieter than the old model 15 teletype machine.…K4BEV: Rain and static was a bummer, but worked HI on 80m anyway. I really like LP contests and I could actually hole a frequency.…K4GMH: Bands were very noisy due to thunderstorms in area, weird wx this winter.…K4QD: Good contest with lots of participation.…K5ZD: Got on to support the contest and nice to see good condx and activity .…K6OWL: Enjoyed the new February contest very much.…K6UFO: My first

Top-10 Single Op and Multi-2 Breakdown

Single Op

Call	*Name*	*QTH*	*80 m*	*40 m*	*20 m*	*15 m*	*10 m*	*QSOs*	*Mults*	*Score*
AA5AU	DON	LA	88/35	145/46	151/48	155/49	51/23	590	201	118590
KI5XP	CHARLIE	LA	62/32	166/46	159/44	131/45	24/15	542	182	98644
K6LL	DAVE	AZ	64/27	96/40	141/45	137/47	78/31	516	190	98040
KU1CW	ALEX	MO	103/37	143/45	139/41	108/41	22/16	515	180	92700
W0LSD	KEN	CO	99/38	126/47	159/47	91/39	15/12	490	183	89670
N9CK	STEVE	WI	137/45	140/45	122/42	80/31	26/13	505	176	88880
AE9B	TOM	MO	86/33	128/43	172/46	103/35	22/13	511	170	86870
K7WM	WAYNE	AZ	47/22	122/44	100/42	162/48	47/25	478	181	86518
N0AT	RON	MN	91/38	137/43	125/41	105/37	32/16	490	175	85759
W1ZT	GEORGE	MA	75/34	86/36	128/42	118/42	35/24	442	178	78676

MULTI-2

Call	*Name*	*QTH*	*80 m*	*40 m*	*20 m*	*15 m*	*10 m*	*QSOs*	*Mults*	*Score*
N0AC*	BILL	IA	121/41	159/46	139/40	124/47	23/17	566	191	108106
N3XLS**	AL/JOE	PA	86/33	90/36	97/38	48/21	15/12	336	140	47040

*OPERATORS: N0AC, N0NI, W0WHV, W0OV
**OPERATORS: N3XLS, N3KAE

Top Ten Score, QSO and Multiplier Totals

Score		*QSOs*		*Multipliers*	
AA5AU	118590	AA5AU	590	AA5AU	201
KI5XP	98644	KI5XP	542	K6LL	190
K6LL	98040	K6LL	516	W0LSD	183
KU1CW	92700	KU1CW	515	KI5XP	182
W0LSD	89670	W0LSD	490	N9CK	176
N9CK	88880	AE9B	511	K7WM	181
AE9B	86870	N9CK	505	K6HGF	180
K7WM	86518	N0AT	490	KU1CW	180
N0AT	85750	K7WM	478	W1ZT	178
W1ZT	78676	K4QD	457	N0AT	175

Team Scores

Florida Boys	
K4QD	71292
WO4D	41762
KT4FY	
AF4Z	
WB4EQS	36285
Total	**149339**

1 x 4s	
W1ZT	78676
W4UK	42084
WX4TM	68425
K4GMH	55380
K4WW	68310
Total	**312875**

550 DX Club
K4RVH
KU4J
KD4BJ

Nitty Gritty RTTY	
AA5AU	118590
AE9B	86870
AK0A	63140
KI6DY	74358
KU1CW	92700
Total	**435658**

SWACC (South West Arizona Contest Club)	
K6LL	98040
W7ZR	57828
W7WW	78400
WK6I	24054
K7WM	86518
Total	**344840**

TCG Whole Earth Team	
K4BEV	33024
KS0M	20055
W9WI	16435
VE6YR	44616
W4LC	39000
Total	**153130**

Northridge Shakers	
N6EU	35108
AD6KA	
WA6BOB	16638
VK4UC	
K6HGF	75780
Total	**127526**

TCG Dirt Busters	
W4BCG	38383
WW3S	55200
KM4H	6649
W2GR	33108
KE4OAR	40506
Total	**173846**

TCG Dirt Dogs	
KE4KWE	51120
WA4CFG	
WQ0U	
N9CK	88880
Total	**140000**

TCG Dirt Devils	
W4GKM	40000
W4OX	55770
W0ETC	61070
K4RO	
VE1OP	63900
Total	**220740**

NCCC#1	
W6ISO	52281
W6ZZZ	11288
K6UFO	24805
K6UM	59092
Total	**147466**

Metro Monsters	
W9ILY	32606
N9TK	22154
K9PY	9120
K9TP	
W9IXX/4	1188
Total	**65068**

Complete Scores: 2003 Winter RTTY NAQP

Call	*Name*	*QTH*	*80 m*	*40 m*	*20 m*	*15 m*	*10 m*	*QSOs*	*Mults*	*Score*
KU1CW	ALEX	MO	103/37	143/45	139/41	108/41	22/16	515	180	92700
W0LSD	KEN	CO	99/38	126/47	159/47	91/39	15/12	490	183	89670
N0AT	RON	MN	91/38	137/43	125/41	105/37	32/16	490	175	85750
KI6DY	BOB	KS	101/38	108/39	145/43	86/28	19/14	459	162	74358
AK0A	BILL	KS	86/33	98/40	131/43	86/31	9/7	410	154	63140
W0ETC	LAR	IA	78/32	103/39	117/40	80/32	15/12	394	155	61070
W0HW	CHAS	MN	67/31	92/35	111/43	74/31	11/7	355	147	52185
K0FX	DON	CO	85/33	111/35	96/42	29/18	6/6	327	134	43818
NN0G	DANA	CO	50/23	84/36	85/33	65/24	1/1	285	117	33345
K0HW	JAMES	SD	28/17	20/15	96/35	65/31	8/7	217	105	22785
KS0M	DICK	MO	29/18	44/26	71/39	43/19	4/3	191	105	20055
N0AJ	JIM	MO	24/16	35/23	59/28	49/21	20/10	187	98	18326
K0BX	JOEY	MO	47/24	34/23	49/22	19/15	4/3	153	87	13311
WA0SXV	MIKE	MO	31/19	12/9	7/6	17/11	4/4	71	49	3479
K0HZI	JERRY	MN	0	9/5	47/26	0	0	56	31	1736
W0TY	TONY	MO	41/19	21/8	0	0	0	62	27	1674
N0UX	TERRY	CO	0	0	20/13	19/14	4/4	43	31	1333
AB0DX	JACK	MO	0	0	17/12	0	5/2	22	14	308
W1ZT	GEORGE	MA	75/34	86/36	128/42	118/42	35/24	442	178	78676
K1AM	JEFF	RI	70/31	68/31	85/32	41/24	40/20	304	138	41952
K7BV	DENNIS	CT	78/36	67/28	37/19	81/30	27/6	290	129	37410
WA1EHK	MAY	CT	43/23	61/30	83/35	68/26	26/18	281	132	37092
N1MGO	GORDON	MA	13/12	39/22	89/33	54/23	13/11	208	101	21008
K5ZD	RANDY	MA	17/13	60/32	60/29	45/24	8/7	190	105	19950
W0BR	BOB	CT	25/16	31/19	36/24	37/21	6/5	135	85	11475
K1US	JON	ME	0	10/9	92/33	41/21	0	143	63	9009
KC1YF	WAYNE	ME	0	0	69/30	50/25	6/5	125	60	7500
AB1BX	ANDY	RI	0	10/6	39/20	51/23	0	100	49	4900
N2DBI	STEVE	NY	68/27	98/34	68/33	46/23	24/12	304	129	39216
W2GR	MIKE	NY	28/20	100/39	72/30	53/27	14/8	267	124	33108
KA2D	TOM	NY	0	36/17	71/36	57/26	5/4	169	83	14027
N2AMG	RICK	NY	22/16	34/20	68/29	5/4	0	129	69	9301
WW3S	JAMIE	PA	74/33	80/36	63/34	72/32	56/25	345	160	55200
KB3IEO	DOUG	PA	54/31	59/25	66/31	51/19	5/5	235	111	26085
W3MEL	MEL	PA	56/27	73/30	86/32	24/13	2/2	241	104	25064
WF3M	BILL	PA	44/24	101/38	102/37	0	0	247	99	24453
N3FR	BOB	PA	19/15	0	75/37	35/18	23/12	152	82	12464
K3FH	MIKE	PA	11/8	43/28	23/17	29/15	7/6	113	74	8362
W3DSX	RANDY	PA	0	30/15	23/16	39/17	6/6	98	54	5292
AA0CY	NAVAAD	PA	0	24/17	35/21	25/17	4/3	88	58	5104
N3NZ	NOEL	PA	0	0	39/18	18/14	0	57	32	1824
KB3EAX	BILL	PA	9/7	10/8	12/7	1/1	0	32	23	736
W3FQE	LEE	MD	0	0	0	11/7	11/9	22	16	352
K3MZ	PAUL	VA	0	2/2	1/1	0	0	3	3	9
K4QD	JAN	FL	12/11	131/46	163/47	136/41	15/11	457	156	71292
WX4TM	TOM	AL	70/35	124/41	140/43	63/29	28/13	425	161	68425
K4WW	BO	KY	96/37	107/43	116/42	64/27	31/16	414	165	68310
W4OX	DOUG	FL	11/11	139/44	92/40	135/39	13/9	390	143	55770
K4GMH	MIKE	VA	87/35	123/39	118/37	47/19	15/12	390	142	55380
KE4KWE	TOM	AL	62/27	116/42	110/38	54/25	18/10	360	142	51120
W4UK	JERRY	SC	68/29	106/36	110/35	50/26	0	334	126	42084
WO4D	ORRIN	FL	34/22	91/36	116/39	68/32	5/4	314	133	41762
KE4OAR	CHUCK	TN	56/24	85/33	108/39	39/22	26/11	314	129	40506
W4GKM	NICK	TN	69/32	138/41	62/27	36/15	16/10	320	125	40000
W4LC	JIM	KY	91/32	78/40	73/30	44/21	14/7	300	130	39000
W4BCG	BILL	TN	73/32	79/34	99/42	29/15	13/8	293	131	38383
WB4EQS	RON	FL	29/16	56/29	131/41	63/28	16/9	295	123	36285
K4BEV	DON	TN	56/31	51/28	75/36	49/24	25/10	256	129	33024
W9WI	DOUG	TN	44/21	36/25	40/25	35/15	18/9	173	95	16435
WB6BWZ	MATT	GA	25/18	40/25	48/23	41/24	8/7	162	97	15714
W4UEF	RICK	NC	46/24	50/25	34/22	26/14	8/7	164	92	15088
AE4Y	KENT	GA	9/8	23/15	39/22	33/23	8/6	112	74	8288
N5SMQ	BUTCH	VA	47/25	12/9	41/21	11/7	2/2	113	64	7232
KC4WQ	BUDDY	KY	52/28	21/17	18/22	16/10	0	107	67	7169
KM4H	MIKE	TN	5/4	21/16	25/17	42/18	16/6	109	61	6649
N4IG	DAVE	FL	0	35/21	40/21	22/12	5/4	102	58	5916
N4AN	ROY	AL	0	24/19	29/18	26/16	7/5	86	58	4988
K0COP	DAVE	SC	0	0	0	10/8	0	10	8	80
AG4WH	GORDON	SC	0	4/4	0	0	0	4	4	16
AA5AU	DON	LA	88/35	145/46	151/48	155/49	51/23	590	201	118590
KI5XP	CHARLIE	LA	62/32	166/46	159/44	131/45	24/15	542	182	98644
K5KA	KEN	OK	77/36	99/38	122/39	85/31	7/7	390	151	58890
W5TZN	WYN	OK	60/31	76/36	69/32	62/28	18/15	285	142	42470
NI5F	BILL	MS	16/13	47/23	68/34	53/27	18/10	202	107	21614
N5VYS	OBIE	TX	0	4/3	104/38	68/30	31/15	207	86	17802
N5PU	LEON	MS	0	0	80/35	58/24	0	138	59	8142
WR5O	DAVE	TX	0	0	32/19	59/31	9/7	100	57	5700
K5PI	ROB	TX	20/14	47/27	0	0	0	67	41	2747
NE0P	JOHN	OK	10/7	10/9	8/6	20/12	0	48	34	1632
KS5V	ED	TX	0	8/7	40/23	0	0	48	30	1440
K5WW	GERT	TX	0	0	0	7/6	21/14	28	20	560
K6HGF	DOUG	CA	63/25	72/39	105/44	137/46	44/26	421	180	75780
K6UM	STEVE	CA	55/27	41/25	107/38	101/39	70/29	374	158	59092
AC6JT	BRYAN	CA	54/21	55/34	109/41	93/35	37/22	348	153	53244
W6ISO	KEN	CA	40/25	67/33	98/41	83/34	45/24	333	157	52281
N6PC	PAUL	CA	48/23	52/27	123/44	97/35	25/14	345	143	49335
W6FFH	DAN	CA	34/14	44/24	113/43	78/36	21/14	290	131	37990
N6EU	RUSS	CA	21/12	63/30	70/39	81/34	31/16	266	131	35108
AK6DV	CHUCK	CA	3/3	29/21	149/45	89/34	19/13	289	116	33524
N6CY	JAMES	CA	34/13	67/30	70/39	59/29	9/8	239	119	28441
K6UFO	MORK	CA	25/13	37/24	59/33	50/29	34/22	205	121	24805
WK6I	JEFF	CA	7/4	37/26	104/45	49/29	14/10	211	114	24054
N6VH	JIM	CA	11/10	29/22	88/38	49/26	21/15	198	111	21978
K6OWL	MARK	CA	18/6	40/26	83/38	57/31	7/6	205	107	21935
WA6BOB	BOB	CA	0	65/32	76/36	30/20	6/6	177	94	16638
W6ZZZ	MARK	CA	22/9	34/20	34/24	38/24	8/6	136	83	11288
W6IWO	DALE	CA	35/20	29/19	27/18	0	0	91	57	5187
KZ6O	LOGAN	CA	3/2	25/19	15/12	31/23	0	74	56	4144
W6OAT	RUSTY	CA	0	11/11	68/35	1/1	1/1	81	48	3888
NC6P	DAVE	CA	0	23/15	22/12	15/12	5/4	65	43	2795
KJ6RA	RICH	CA	0	0	25/16	31/23	0	56	39	2184
K6LL	DAVE	AZ	64/27	96/40	141/45	137/47	78/31	516	190	98040
K7WM	WAYNE	AZ	47/22	122/44	100/42	162/48	47/25	478	181	86518
W7WW	DAVE	AZ	67/29	98/38	124/43	111/43	48/22	448	175	78400
W7ZR	DICK	AZ	53/26	80/32	114/42	70/35	49/23	366	158	57828
WG7Y	BOB	WY	34/19	90/39	117/42	76/30	11/9	328	139	45592
W7AY	WILKE	OR	22/9	52/28	81/37	50/29	13/11	218	114	24852
KW7N	STEVE	ID	17/13	39/24	70/30	49/27	27/20	202	114	23028
K7JJ	DAVE	OR	10/5	37/26	58/30	46/26	26/17	177	104	18408
K7KAR	KEITH	AZ	21/11	24/17	44/24	3/3	17/12	109	67	7303
AL7CM/K7	WALT	WA	0	4/4	37/22	58/28	12/10	111	64	7104
KC7QR	BOB	WA	0	0	48/26	51/27	2/2	101	55	5555
W7DPW	DAVE	WA	6/5	0	54/28	31/18	6/5	97	56	5432
N7OR	BOB	OR	19/11	4/3	0	50/26	0	73	40	2920
K8IR	JIM	MI	78/29	66/32	68/33	39/24	17/6	268	124	33232
WG8Y	MARK	OH	45/23	58/28	64/32	35/16	17/10	219	109	23871
K8RT	JACK	OH	8/8	19/13	42/21	32/15	10/5	111	62	6882
AE8U	DAVE	OH	23/15	17/10	27/19	24/12	0	91	56	5096

Call	Name	QTH	80 m	40 m	20 m	15 m	10 m	QSOs	Mults	Score
N9CK	STEVE	WI	137/45	140/45	122/42	80/31	26/13	505	176	88880
AE9B	TOM	MO	86/33	128/43	172/46	103/35	22/13	511	170	86870
KE9S	JEFF	WI	71/34	108/41	143/41	54/20	21/11	397	147	58359
AI9T	STEVE	IL	69/31	95/38	115/35	68/27	29/18	376	149	56024
K9DJ	DUKE	WI	92/38	76/36	125/42	38/20	8/3	339	139	47121
W9HLY	VERN	IN	75/34	78/36	77/37	55/20	28/12	313	139	43507
W9ILY	JOHN	IL	39/22	67/31	102/38	49/23	17/5	274	119	32606
N9TK	JIM	IL	55/31	34/23	92/38	28/14	0	209	106	22154
N9SDL	KIM	WI	16/11	84/38	68/29	32/19	6/3	206	100	20600
K9BJM	LARRY	IL	27/18	26/20	63/32	20/9	4/3	140	82	11480
N2BJ	BARRY	IL	15/13	50/25	45/22	21/11	4/3	135	74	9990
K9PY	JERRY	IL	39/22	27/20	25/17	22/11	7/6	120	76	9120
W9/XE1XOE 8520	MIGUEL	IN	19/12	32/19	49/27	16/10	4/3	120	71	
N9KO	CALVIN	IL	6/5	51/27	35/22	19/11	2/1	113	66	7458
W9OL	WEASEL	IL	27/19	35/23	21/14	10/5	1/1	94	62	5828
K9JS	JON	IL	16/0	98/24	13/12	0	0	127	36	4572
W9THD	TIM	IN	24/16	24/15	17/9	11/8	0	76	48	3648
KA9VHG	JIM	WI	0	0	34/22	14/7	8/4	56	33	1848
WA9ALS	JOHN	IN	0	39/28	3/3	1/1	0	43	32	1376
KF9LI	GOR	OH	0	12/8	15/12	10/8	4/3	41	31	1271
KB9BVN	BRIAN	IN	0	1/1	25/17	18/9	0	44	27	1188
AH6OZ	WIZ	HI	0	25/19	73/32	103/39	119/44	320	134	42880
AH6HH	SNEIDA	HI	0	15/13	22/13	8/5	0	45	31	1395
KH6GMP	GARY	HI	0	5/3	25/18	0	0	28	21	588

Call	Name	QTH	80 m	40 m	20 m	15 m	10 m	QSOs	Mults	Score
KP4JRS	JOSE	PR	0	0	0	58/24	0	58	24	1392
VE1OP	SCOTT	NS	27/19	107/35	142/44	111/33	39/19	426	150	63900
VY1JA	JAY	NWT	0	0	28/16	25/17	7/5	60	38	2280
VE3GSI	ERIC	ON	50/27	78/36	93/38	57/23	20/14	298	138	41124
VE3IAY	RICH	ON	50/25	62/29	70/32	50/23	11/9	242	118	28674
VE3SB	DAN	QC	24/16	0	33/21	42/22	11/9	110	68	7480
VA3XRZ	JULIO	ON	16/13	36/20	20/16	27/16	7/5	106	70	7420
VA3PC	PAUL	ON	0	0	20/15	28/15	10/7	58	37	2146
VE6YR	BOB	AB	20/15	86/36	104/33	110/34	18/14	338	132	44616
VE7FO	JIM	BC	0	8/8	59/29	86/36	74/32	227	105	23835
VE7ASK	BUD	BC	33/16	46/24	80/33	30/12	2/1	191	86	16426
VE9DX	ANDY	NB	34/22	92/35	30/20	17/11	2/2	175	90	15750
ZF2NT	BRUCE	ZF	10/6	78/33	135/39	118/48	101/39	442	165	72930
CX7BF	WALTER	CX	0	0	105/43	93/38	0	198	81	16038
JA1XRH	TAC	JA	0	0	19/14	47/25	1/1	67	40	2680
UX0FF	NICK	UX	0	34/20	7/5	14/9	0	55	34	1870
YU7AM	ARPAD	YU	0	4/4	14/10	19/16	0	37	30	1110
JA1BHK	MASA	JA	0	0	12/11	24/15	0	36	26	936
VR2BG	ALEX	VR	0	0	1/1	11/7	0	12	8	96
OK2ZJ	ZDENEK	OK	0	0	0	9/9	0	9	9	81

Check logs: W9OL, K6KYJ, W9IXX/4, W3BUI

RTTY contest from home and my second RTTY contest ever. Lots of friendly operators made it enjoyable....K7KAR: A few hardware problems but a nice length contest....K8IR: Never thought 80m would be my best band in a RTTY contest....KB9BVN: My first RTTY contest and loads of fun on a snowy day....KE4OAR: My first serious SO2R effort of any kind and I apologize to the ops I QRMed by hitting the wrong key....KI5XP: No problems this time around. Thanks to Pat (W5WMU) for use of his station. See y'all in the next one....KS0M: A lot of fun. The 40 and 80-meter bands were the best I have found them in MO for long time. Ready for the next one....KZ6O: Not much time on the air but lots of fun....N3FR: Missed most of contest due to oldies concert ....N4AN: Had to repeat my names often. Folks had trouble with RROYY ....N5SMQ: My first shot at RTTY contesting and I am hooked!...N6EU: Fun contest. Thanks to the sponsors and to all who participated....N6PC: Thanks to NCJ for introducing the second NAQP. Good showing but bands tough all day....VA3PC: Contestus Interruptus. Gosh, I wish I could retire and enjoy my hobby....W0ETC: Wow! This was fun ....W1ZT: Better score than last year and new time of year to figure out band strategy. Lots of new call signs and great 80m activity....W3MEL: Great Contest with plenty of contacts and good condx....W4UEF: Thanks for sponsoring contest and to all participants, especially to those who made it to my log ....W6ZZZ: Thanks to KU1CW for my only 5 band contact....W7AY: Used the name "WILKE" in honor of the original owner (SK) of my new vanity call sign....W7DPW: Great Contest with good band condx. Nice wx to be indoors....W9ILY: Had a lot of fun. High winds caused vertical to go horizontal. Sure changes the SWR! TNX to all....WA9ALS: No time but wanted to show participation....WG8Y: This was my first time in the NAQP RTTY. Only my third stab at RTTY tests and think I'm hooked....WO4D: Nice contest. My best results as a part time player so far....K8RT: Great RTTY Contest ....K9PY:First time participating in this contest, very enjoyable. NCJ

VHF-UHF Contesting!

By Jon K. Jones, N0JK
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Lessons from the January 2003 VHF Sweepstakes E_s Opening

A major sporadic-E (E_s) opening occurred Sunday afternoon in this year's January VHF Sweepstakes. Hundreds of 6-meter QSOs were made between the East Coast and Midwest, and a Rhode Island-to-Hawaii contact occurred! This is a review of the contest opening, as well as some "lessons" I've learned that may be applicable as you make your preparations for the June VHF QSO Party.

Lesson 1: Stay in the Chair

The January VHF Sweepstakes E_s opening started around 2030 UTC on Sunday afternoon. This is typically a slow time in the January VHF Sweepstakes. The Sunday morning scatter has faded out. Many ops were watching the NFL playoffs. Others, like me, used the break for family activities. I thought any E_s would not happen until the evening. Boy, I was wrong! I ended up catching only the tail end of the E_s opening. WA0TKJ, K5TR and others have said you won't make any contacts if you don't "stay in the chair" (don't leave the radio). In a VHF contest, openings can pop up quickly and unexpectedly. If you were not at the radio, you missed out. Missing this opening could have cost some ops a victory. It is hard to keep going when conditions are slow. Many ops complain about VHF contests being boring. Those who kept at it this time were rewarded with good runs and real contest excitement during the E_s opening. Remember: Sunday afternoon can be slow in the June contest, too.

The first Sunday afternoon 6-meter E_s contacts were reported between KX9X (EN60) and N1MPT (FN42) around 2030 UTC. At 2039 UTC, KX9X reported "FN41 in big time!" Just a few minutes later, KX9X lost the E_s as it shifted to K0AZ (EM37-Missouri) working K1TR (FN42).

Lesson 2: Expect the Unexpected

At 2040 UTC, California utility communications on 45 MHz were reported into Hawaii. At 2045 UTC, NH7RO in Hawaii heard a station in FN20 calling "CQ Contest" on 50.130. At this same moment, AB4GG (EM75) was working VA3KA in (FN15). Success came for Jeff at 2049 UTC. NH7RO (BK29) worked W1JJM (FN41) on 50.135 MHz. What an amazing contact! Who would have predicted or "expected" a Hawaii-to-New England 6-meter contact in this contest? The opening only lasted a few minutes and NH7RO made no other stateside contacts. He was beaming direct path.

What was the propagation mechanism for this Hawaii-W1 6-meter contact? Even at the peak of solar cycle 23, Hawaii-to-New England 6-meter contacts were not common. Single-hop E_s was present from New England out west to Missouri. The AB4GG-VA3KA QSO locates the E_s cloud to EN91 at 2045 UTC. This cloud could be in the direct path from FN20 to Hawaii. If the cloud moves northwest (as is usual for E_s), a few minutes later it would be lined up for W1JJM to Hawaii. This correlates with KX9X losing E_s propagation to New England.

So there was an E_s cloud lined up in a direct bearing to Hawaii for W1JJM. But a single-E_s hop from Rhode Island to Iowa is still way short of Hawaii. And no Midwest stations reported working Hawaii via F2. Jim Kennedy, K6MIO/KH6, has postulated that sometimes an E_s hop can launch a signal to the F2 layer at an angle that raises the effective F2 MUF. Stations at the intermediate hop may not hear the F2 signal as it is going overhead, not refracted to ground. This may have happened with the W1JJM-NH7RO contact. I believe the single-hop E_s to the Midwest launched W1JJM's signal to the F2 layer, then on to Hawaii, right over Iowa. So, listen carefully and dig for those weak signals. You may be surprised at who is there.

Lesson 3: Not all E_s are Created Equal

Why did WA0KBZ (EM48) report K1TTT 59 plus and K1SIX "big signal" at 2110 UTC, and why was W9GKA (EM58) able to "run New England" with 10 W, yet N0LL (EM09) could barely hear the 1s and struggled to make contacts? From plots of the E_s clouds, it appears most were located over the third and eighth call areas (see Figure 1). That would put the E_s midpoint over EN80.

W9GKA, who was single-operator portable, was able to hold a frequency and *run* stations in New England for over an hour starting at 2100 UTC. Kevin reported most stations gave him strong signal reports. The MUF was certainly high enough for the W1-to-Kansas path, but the E_s clouds were located too far east. Most of the spots were for EN41/51/61, EM27/37 and EM48 working New England. N0LL was probably hearing signals from forward scattering/refracting off the E_s as opposed to a true specular reflection. Thus, Larry reported signals were much weaker for him, mostly "around 5 by 5." N0LL could hear K1SIX, W1JJM and others, but not raise them. Loud close-in stations from St Louis, Chicago, Little Rock and Memphis covered up Larry's relatively weak signal. Being one grid further east made a big difference on this opening. K0AZ EM37 had many loud 1s and 2s in. W0RT, one grid west in EM27, only heard a few, and those were weak.

The E_s opening expanded in geographical coverage as the afternoon wore on. At 2200 UTC VE1s were working W3s, and W5s and W0s were working New England. By 2300 UTC the opening was starting to dissipate, though

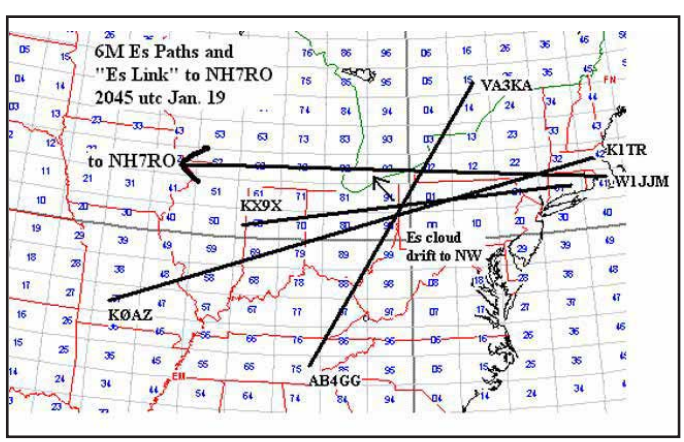
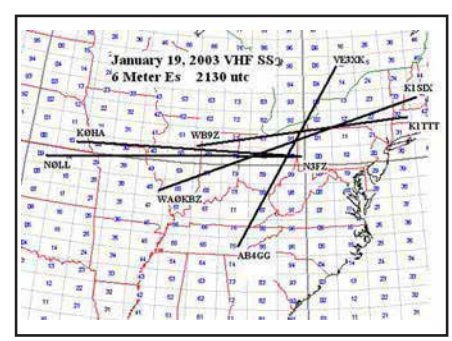
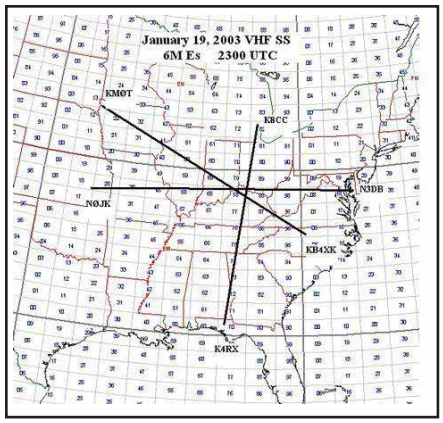


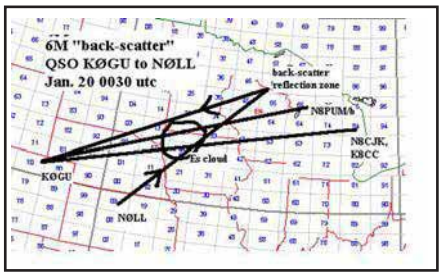
Figure 1—E_s QSOs at 2045 UTC on January 19.



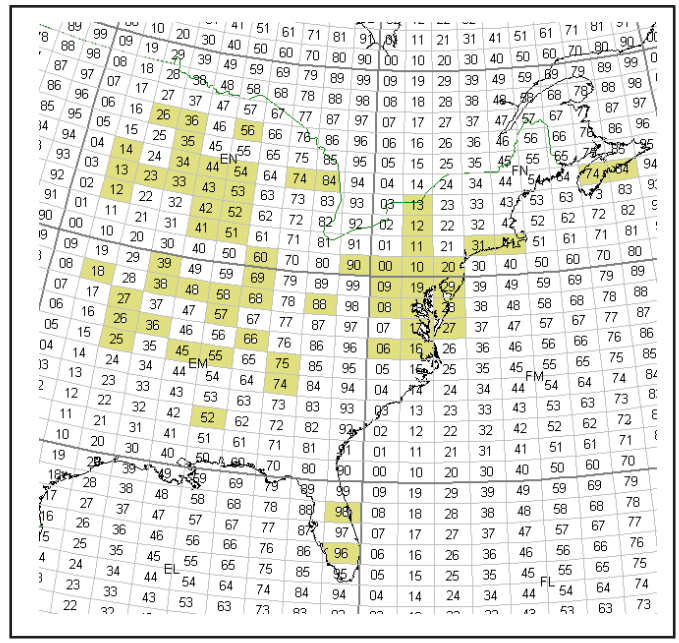
E_s QSOs at 2130 UTC on January 19.



E_s QSOs at 2300 UTC on January 19.



E_s QSOs at 0030 UTC on January 20.



Grid squares that N3DB worked in the contest.

contacts were reported between Florida-Michigan and Kansas-Maryland. At 2325 UTC, I worked N3DB FM18 for my only 6-meter E_s contact in the contest.

You can't change the location of the E_s clouds, but going to CW can help you make contacts when conditions are marginal. N0LL used CW to successfully work N3FZ EN90 and others during the opening. My QSO with N3DB was "cross mode"—my CW to his SSB. (I could not raise him on SSB.) CQing on CW between 50.090 and 50.100 MHz may be productive. You can also call SSB stations on CW. Cross-mode QSOs count in the VHF contests. Often a weak CW caller will get the attention of an SSB op.

Lesson 4: A Simple Yagi Beats a Whip or a Halo

While I was working N3DB, K0UO/rover pulled up beside me. I was using a homemade 2-element Yagi on a 15-foot mast. Steve had a quarter-wave whip. He had no copy on N3DB. Earlier, he was driving from Kansas City to Emporia and was monitoring 6 meters. He only heard a few E_s stations weakly and made no E_s contacts. Prior to working N3DB, I heard KN4SM and NG4C on my mobile whip, but could not contact them. So, if you are a rover, portable or operating from home, a small Yagi is often more effective than a whip or halo antenna on 6 meters.

Lesson 5: It Is Not Over Until It's Over

For most stations, the contest 6-meter E_s opening was over by 2340 UTC. The band folded for N0LL and me at this time. At 0012 UTC, K0GU (DN70) heard the N8PUM/b (EN65) via E_s. N0LL kept tuning and heard K0GU calling CQ "with a garbled signal" at 0029 UTC. Larry managed to work K0GU a few minutes later. N0LL's beam heading was northeast. About this time, K0GU worked N8CJK (EN84). At 0038, UTC K8CC worked K0GU. The propagation for the N0LL-K0GU contact may have been via FAI (field aligned irregularities) or E_s backscatter. The lesson here is sometimes FAI will appear after an E_s opening has died. N0LL picked up a nice multiplier by being persistent.

W9GKA Single op (QRP) Portable in the January VHF Sweepstakes

Kevin Kaufhold, W9GKA, operated in the single operator portable (old QRP portable) category from EM58 in the January 2003 VHF Sweepstakes. See his article elsewhere in this issue. Just setting up a portable station in the cold is a challenge, as I know first hand. Kevin did a great job in the contest, and has some interesting observations about the E_s opening as well as operating Single Operator Portable. N3DB was Kevin's last 6-meter E_s QSO at 2337 UTC, just a couple of minutes after I worked N3DB for my only contest E_s contact. Both Kevin and I were Single Operator Portable. W9GKA was N3DB's last E_s QSO as well.

VP9/N0JK June VHF QSO Party Entry

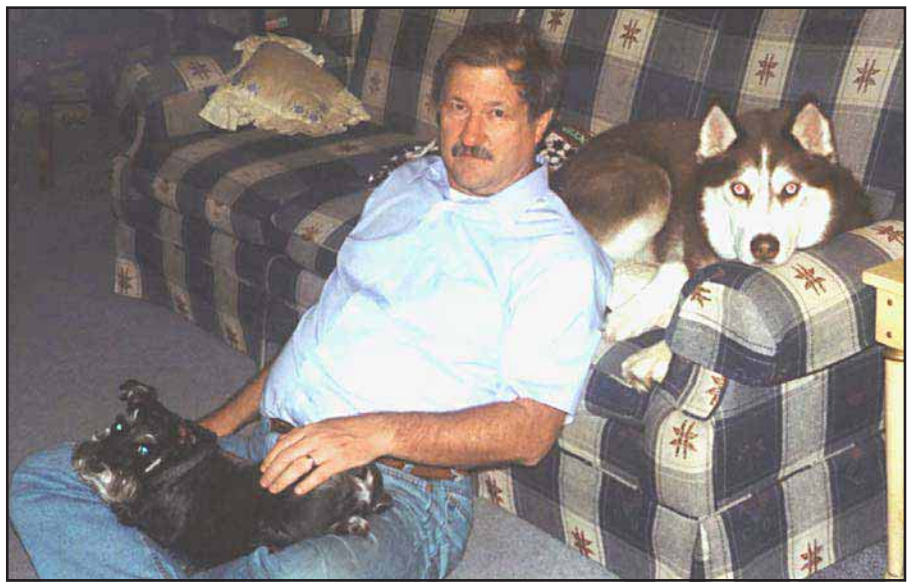
After years writing about operating a VHF contest from the DX side, I plan to operate from Bermuda in the 2003 June VHF QSO Party. Ed Kelly, VP9GE, will be my host. I plan to have 100 W and a 5-element M^2 Yagi on 6 meters, and 100 W and a 9 element M^2 Yagi on 2 meters. Hope to work you all from sunny Bermuda. NCJ

Adventures in Contesting

Last Column's Photo

The messy-looking contester in the March/April 2003 issue is Dave KM3T after a tower-climbing stint at HC8N for CQ WW CW in November 2001.

This Issue's Photo



Some contesters are destined for greatness. Other contesters go to the dogs.

80/75-Meter Vertical From Array Solutions

Array Solutions has added a full-size 1/4-wavelength 80/75-meter vertical antenna to their wide selection of antenna systems and related products.

The AS80-FS consists of a free-standing 70-foot (approximate) aluminum radiating element that's attached to a plated-steel fold-over base. A removable winch is available as an option. The bottom portion of the antenna is 4-inch diameter aluminum tube.

A predrilled radial plate—for connecting up to 120 radials—is included. The base assembly can be mounted in as little as one cubic yard of concrete, and the wind rating of the erected antenna is specified at 110 MPH.

The weight of the antenna, including the base assembly and optional winch, is around 200 lbs. The manufacturer claims that the power handling capability exceeds 15 kW continuous. Operation on 160 meters is possible with a tuner.

The AS80-FS is priced at $1340; the optional winch sells for $250. For additional information contact WX0B at Array Solutions, 350 Gloria Rd, Sunnyvale, TX 75182; 972-203-2008, fax 972-203-8811; **wx0b@arraysolutions.com**; on the Web at **www.arraysolutions.com.**

All-Time ARRL Field Day Records

By Denis Catalano, W4DC
catalanode@navsea.navy.mil

ARRL Field Day 2002 saw another eight records broken and two new records set (as indicated by bold type). Just a few hundred points broke many of the records. Field Day 2003 will have the new "F" class to set some new records.

The listing shows class, call sign, year record set, club or group name, number of QSOs, power level (5 = less than 5W, 2 = less than 150W, 1 = more than 150W), number of operators, and total score (commercial classes not listed). Good luck, be safe and have fun.

Class	*Call*	*Year*	*Name*	*QSOs*	*Power*	*Ops*	*Points*
1Abat	**K6MI**	**02**	**Chew's Ridge Gang**	**1044**	**5**	**7**	**11,350**
1A	N5RR	92	Albuquerque DXA	2870	2	28	8,550
2Abat	W0CQC	00	Colorado QRP Club	1688	5	12	17,410
2A	KP2N	93	Virgin Islands ARC	5252	2	16	15,580
3Abat	W0CQC	01	Colorado QRP Club	2310	5	10	20,360
3A	W0GG	00	Pikes Peak DX Group	5825	2	17	17,306
4Abat	WB8JBM	83	Northern Ohio ARS	2029	5	127	17,345
4A	**W2GD**	**02**	**Cherryville Rpt Assoc II**	**6626**	**2**	**57**	**20,112**
5Abat	W3VPR	84	Anne Arundel RC	2495	5	49	26,570
5A	W2GD	99	Cherryville Rpt Assoc	6566	2	42	20,520
6Abat	**VE3QDR**	**02**	**Durham Region QRP Club**	**1210**	**5**	**8**	**11,960**
6A	W2GD	00	Cherryville Rpt Assoc II	6694	2	43	20,628
7Abat	W4DW	89	Raleigh ARS	1236	5	12	11,215
7A	W3AO	99	Potomac Valley RC 1	9163	2	17	26,224
8Abat	N6WG	00	Alameda County Rpt Club	1305	5	25	10,850
8A	**W4IY**	**02**	**Woodbridge Wireless**	**7839**	**2**	**63**	**24,088**
9Abat	VE3NAR	95	Nortown ARC	1105	5	30	7,930
9A	W4IY	98	Woodbridge Wireless	6217	2	56	18,834
10Abat	N6R	01	Ventura City ARS	908	5	20	6,895
10A	W4IY	85	Woodbridge Wireless	5067	2	67	15,474
11Abat	VE3NAR	97	Nortown ARC	1170	5	36	9,465
11A	W4IY	90	Woodbridge Wireless	4669	2	60	14,688
12Abat	AA6CV	00	Conejo Valley ARC	1340	5	38	11,490
12A	W4IY	88	Woodbridge Wireless	4791	2	55	13,646
13Abat	AA6CV	99	Conejo Valley ARC	1142	5	30	9,880
13A	W4IY	99	Woodbridge Wireless	7329	2	65	22,780
14Abat	AA6CV	97	Conejo Valley ARC	1246	5	55	10,795
14A	W4IY	00	Woodbridge Wireless	8064	2	83	24,904
15Abat	K6CAB	94	Conejo Valley ARC	3460	5	34	30,150
15A	W4IY	01	Woodbridge Wireless	6572	2	68	22,056
16Abat	K8UU	01	Utica Shelby ECA	2111	5	153	19,015
16A	WY8M	94	Utica Shelby ECA	5917	2	295	21,468
17Abat	K6CAB	89	Conejo Valley ARC	3119	5	40	23,685
17A	WY8M	95	Utica Shelby ECA	3654	2	250	14,006
18Abat	K6CAB	90	Conejo Valley ARC	2569	5	30	21,275
18A	N1FD	00	Nashua Area RC	6246	2	100	19,614
19Abat	KK8M	98	Utica Shelby ECA	2233	5	177	18,650
19A	K2AA	86	South Jersey Radio Assn	4320	2	65	13,178
20Abat	KK8M	99	Utica Shelby ECA	2527	5	176	20,920
20A	N1NH	96	Nashua ARC	6738	2	85	21,756
21A	W2RJ	76	Englewood ARA	2845	2	55	10,186
22Abat	AD6T	91	Conejo Valley ARC	2962	5	52	23,500
23Abat	K5DX	89	Texas DX Society	3326	5	28	25,260
23A	N1FD	01	Nashua ARC	4484	2	80	15,740
24A	N1NH	95	Nashua ARC	6209	2	95	21,648
25Abat	K6CAB	92	Conejo Valley ARC	2343	5	62	20,255
26A	W3AO	01	PVRC & CARA	10141	2	40	31,760
27A	N1NH	97	Nashua ARC	6768	2	87	22,080
28Abat	**K8UO**	**02**	**Utica Shelby ECA**	**2193**	**5**	**17**	**20,595**
28A	N1FD	99	Nashua ARC	7902	2	96	24,358
30A	W3AO	00	PVRC & CARA	9908	2	50	31,534
35A	VA3RAC	00	Capital Region FD2000	1940	2	190	10,136
38A	**W3AO**	**02**	**PVRC & CARA**	**1015**	**2**	**45**	**33,442**

Class	*Call*	*Year*	*QSOs*	*Power*	*Ops*	*Points*
1B1bat	KW8N	95	945	5	1	8,975
1B1	W8TK	96	1460	2	1	6,586
1B2bat	**W8DL**	**02**	**1095**	**5**	**2**	**11,250**
1B2	W6UE	93	2097	2	2	7,412
2B1bat	**KW8N**	**02**	**727**	**5**	**5**	**7,525**
2B1	KW8N	00	1698	2	1	6,374
2B2bat	WB8JBM	81	953	5	2	8,965
2B2	W2GD	88	2560	2	2	8,814
3B1	W9WI	89	56	2	1	738
3B2bat	KW8N	97	962	5	2	8,695
3B2	K5TA	93	2137	2	2	7,000
4B2	KW8N	98	1720	2	2	6,040
5B2	W8TQE	89	272	2	2	1,212
1C	WA4YRN	91	934	5	1	8,080
2C	N6BT	80	1885	2	3	4,912
3C	WB4GQX	76	836	2	3	2,162
4C	WA5FRF	00	301	5	5	2,525
5C	AB3A	80	694	2	8	1,696
6C	VO1AA	78	30	5	8	715
1D	NA5TX	99	1450	2	1	5,800
2D	W4MYA	99	4019	2	14	10,758
3D	K1AR	78	3825	2	6	8,928
4D	N6TV	92	2253	2	17	5,708
5D	W1AW	91	1650	2	6	4,726
6D	W1AW	95	3200	2	16	9,290
7D	W1AW	94	2890	2	7	8,820
8D	N4T	00	2465	2	10	6,034
9D	N6OP	91	2849	2	22	8,206
1E	KR0B	88	1525	5	3	11,490
2E	KR0B	89	2000	5	5	13,975
3E	N0NI	99	4421	2	6	12,480
4E	W3PP	99	3720	2	8	10,504
5E	W6YX	00	3059	2	10	8,932
6E	W6YX	01	4722	2	22	13,902
7E	**W6YX**	**02**	**4304**	**2**	**24**	**12,570**
8E	WU8A	95	1963	2	21	6,474
9E	**K5PXP**	**02**	**1605**	**2**	**23**	**4,820**
11E	W4WVP	01	205	2	13	632
13E	AA5EQ	90	235	2	7	554
15E	K9GL	82	8179	1	25	10,541

For nearly ten years, when Filaments are dark, the feedlines are cold, and the operators are smiling.

All of the winners praise their Heil Pro Set!

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2nd Place

3rd Place

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.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.

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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

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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

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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

13B2/17B2	$139/249
A270-6S/A270-10S	$75/99
A3S/A4S	$449/539
A50-3S/5S/6S	$95/169/259
A627013S	$169
AR2/ARX2B	$49/69
AR270/AR270B	$85/99
R6000/R8	$319/469
X7/X740	$679/289
XM240	$719

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	$39/49

Please call for more Rohn prices

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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
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TMM541SS	$1499
TX438/TX455	$979/1579
TX472/TX489	$2459/4579
HDX538/HDX555	$1269/2269
HDX572MDPL	$5899

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 FT x .12" / 5 FT x .18"	$35/59
11 FT x .12" / 10 FT x .18"	$80/125
15 FT x .12" / 16 FT x .18"	$105/185
17 FT x .25"	$267
23 FT x .12" / 21 FT x .18"	$155/235

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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IC-PW1 1kW Linear Amplifier

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- *100% Duty Cycle*
- *Auto Antenna Tuner*

Can be used with *ANY* HF, 6M, or HF/6M transceiver.

PS-125 DC Power Supply

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- 13.8 V DC
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Smaller footprint - takes up less space, matches newer ICOM rigs.

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Equipped with four selectable audio filters. Can be connected to two transceivers.

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