NCJ

NATIONAL CONTEST JOURNAL

$4

March/April 2000

Volume 28 Number 2

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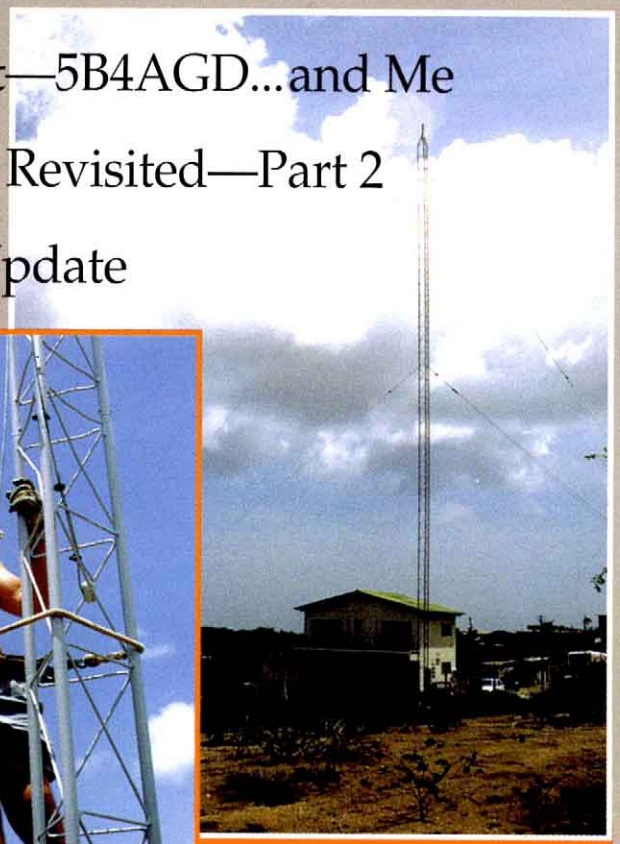

John Crovelli, W2GD/P40W, scaling the skyhooks in the bright Aruban sunshine.

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RG58/U 95% BRAID UV RESISTANT JACKET 2.5dB/400 WATTS@ 30MHz	.15/FT	.13/FT	.11/FT
RG58A/U STRD CENTER 95% TC BRD UV RESISTANT JKT 2.6dB/350 WATTS @ 30MHz	.17/FT	.15/FT	.13/FT
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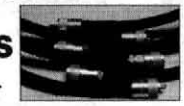

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CONNECTOR PRICES

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LDF5-50A	$73.00	$70.00

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Editorial

Dennis Motschenbacher, K7BV
k7bv@aol.com

It has been a busy time for the *NCJ* staff. We have all been working to implement several new processes and activities to improve the service the magazine offers its readers—we hope you will find them useful as the year continues to unfold.

We have several terrific articles for this issue—some that require a lot of space—so I shall keep this editorial brief. Please take a few moments to consider the information below that was provided by some of your fellow readers.

73, Dennis Motschenbacher, K7BV

Billy Lunt, KR1R, Tragedy

The 30 October ARRL Letter contained the following tragic news:

Former HQ staffer loses home to fire: Former ARRL Contest Branch Manager Billy Lunt, KR1R, lost his home in Tyringham, Massachusetts, in a fire September 8. No one was injured, and damage was estimated at $100,000, according to the Tyringham Fire Department. It's believed the structure was uninsured. A fund has been established to assist Billy Lunt and his family. Donations made payable to "Tyringham Fire Department" may be mailed to The Willard Lunt Fund, PO Box 319, Tyringham, MA 01264. For more information, contact Molly Curtin-Schaefer at the town office, 413-243-1749.

Billy did a lot of hard, not-highly-paid work on behalf of the contest community. It would be a wonderful gesture for contesters to put a portrait of Presidents Hamilton or Jackson in an envelope for this good cause on his behalf.

73, Ward, N0AX

Winning—Not the End

I read the May/June 1999 issue editorial with interest. I would like to share a thought or two with you on enjoying the hobby and obsession, etc.

The pursuit of enjoyment in contesting, as in other aspects of life, is the journey. Once the goal is reached the journey is over. For contesting then, the long-term goal needs to be more then just a victory.

Winning is a notable achievement and even a worthy goal but should be part of the journey—not the end.

73, Robert Wood, W5AJ

Cover Photo

John Crovelli, W2GD/P40W, is obviously enjoying some vertical sunbathing in the bright Aruban sunshine—but don't let his wide grin mislead you—keeping this hardware properly maintained in this salt air environment is no easy task. In this issue's *Contesting for Fun* column, John shares the story of the planning and preparations—and the operating—that led to a new QRP record in the 1999 running of the CQWW CW Contest. ■

The 1999 CQWW SSB Contest —5B4AGD... and Me

Kele Kecman, 4N6A, YU1AO, N2KAB
ham@sky-sat.com

Kele provides us with an entertaining glimpse of the challenges Rale, YT6A, and friends encountered getting on in the CQWW contests from this proven, contester's dream country. They also further prove that contesters throughout the world subscribe to the DXpeditioner's Golden Rule "Put the antennas up first; ask for permission—or forgiveness—later."—'BV

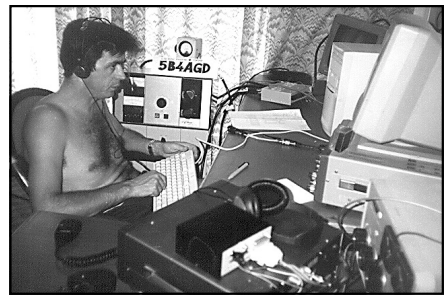
Rale, YT6A, had planned to operate from the 4O6A contest site for the 1999 CQWW SSB contest. Unfortunately, those plans changed when business matters required that he travel to Cyprus. After spending a week in Limassol, he decided to apply for a license and operate the CQWW contests from this Asiatic island, not too far from 3-point Europe.

The authorities promised us both a license and special contest call sign. We had just enough time to prepare for the operation. The designated QTH was the *Kanika Pantheon Hotel* in Limassol, a seven-story building surrounded by many higher buildings. The layout of the buildings offered several nice possibilities for low-band wire beams.

JAT (*Yugoslav Airlines*) had a flight to Larnaca that allowed us to haul in all of the following cargo: a 12-meter Clark stack-up tower, a PKW monobander for 10 meters, a Henry amplifier (yes, a console model), a Force 12 C4SXL and an abundance of cables and ropes. The total load weighed 350 kg. In addition, we had carry-on luggage—two radios, a toolbox, cameras, etc.

Rale, YT6A; Branko, YU1FW; Sava, YT6PSF; and me arrived in Limassol on Sunday, one week before the 'test. That evening would be the only spare time we would have, so Branko and I visited Marija, our friend Predrag's (YU1MV) daughter. She treated us to a nice meal at the *Pizza Plus* restaurant where she works. We savored every minute of that lovely evening, knowing that the rest of the trip would be filled with hard work.

Monday morning found us lying the ropes and wires across the patio of the hotel. We eagerly ran them between our hotel and the neighboring buildings. We put up the following wire antennas (all the time hoping that the other guests would not complain too loudly!): a 3-element 80-meter wire beam pointed northwest, a 6-element 20-meter wire beam, also fixed northwest and 80- and 160-meter dipoles.



Rale, YT6A, operating the 1999 CQWW Phone Contest from his 5B4AGD shack in Limassol. Room 717 in the *Kanika Pantheon Hotel* was set up as a contest operating position with radios, amplifiers and computers.

Kele, YU1AO, visiting Ivo, 5B4ADA (C4A), at his nice shack in Nicosia. Ivo was generous enough to loan Rale his SB-220 and TS-440.

The antenna farm on the roof of the hotel. The Force 12 C4SXL is in the foreground and the PKW 6-element 10-meter Yagi is in the background. Perhaps we should try to negotiate with Force 12 for some sponsorship in exchange for attempting to secure C4SXL as a contest call sign?

Soon, we had our 12-meter stack-up tower installed on the roof of the hotel—ready to accept the Force 12 C4SXL just as soon as Rale could put it together. Next, a PKW 6-element 10-meter Yagi was assembled and a search began for a suitable mast. We finally located a pole on one of the neighboring rooftops. It seems that one of the building's lightning poles was down for "some reason," so we borrowed it to use for a support. We had to lower it down the outside of a seven-story building with ropes—it was too long to carry down the stairway.

By excelling in the art of employing "local resources" and using plenty of imagination to make things happen, these ingenious guys join the ranks of other accomplished DXpedition teams. By the way, Kele assures me that the lightning pole was already down when they discovered it...—'BV

Friday antenna tests indicated that the C4SXL was not working properly on 40. We had to improvise a 40-meter inverted-V. We supported it with some PVC pipe above the 10-meter Yagi. We had 4 wire elements precut for 40 meters lying on the roof, but unfortunately we ran out of rope (we had already used up all 500 meters of it!) and also out of the time we needed to put those elements up.

Our original plan was based on Branko and I getting everything finished Friday morning so that we could leave Rale to operate in peace. We planned on then going over to visit the P3A team on the northern part of island, however...

We soon realized that the Henry 5K and the SB-220 (borrowed from Ivo, C4A) did not include 160-meter coverage. After a short phone call (in my poor Russian) to Elena and Alex, UA9YAB, I was off to P3A to borrow a TL-922. For some reason, I had it in mind that P3A was somewhere near Pafos, a town located on the west coast some 70 km away. It turned out to be 60 km further to the northwest. I didn't arrive there until 0130Z.

The contest had already begun. They were logging their 275th QSO on 20 meters. Nice run! I returned to 5B4AGD in the morning just before the sunrise openings, but by that time Rale was already on 20 meters and had a high rate going. He was not interested in hooking up the TL-922 and trying 160.

After taking a nap, I decided to spend some time making adjustments on the 6-element 20-meter wire beam (an OWA design by NW3Z) which appeared to radiate worse than the 2 elements on the Force 12. It had poor geometry and was resonant below the band—around 13.7 MHz. It took me the whole afternoon to get it to work better than the C4SXL.

I thought that Sunday would be my day off to relax in the pool and absorb some sunrays, but then the multiplier rig went up in smoke. So, Branko and I hit the road to Nicosia to borrow a TS-440 from Ivo. Secretly, we were glad to make the trip so that we could visit Ivo and see his very nice shack. He was the current Asian record holder, but he was generous enough to help his former countryman try to beat his record.

And it seems that that is exactly what happened. Rale managed to make 5500 QSOs and scored about 10.5M points for a new claimed record.

I finally had some free time on Sunday evening, so I used it to walk around the hotel. I could not get antennas out of my mind, though. I could easily envision a single rhombic with 70-meter legs fixed northwest—it would be a piece of cake to erect amongst these buildings!

Our return to Yugoslavia was not scheduled until Tuesday evening, so we were looking forward to a nice leisurely drive back to the P3A QTH Monday to return the amplifier. We reached the site in the late afternoon. Branko took several pictures of this fantastic location.

They have towers and antennas located on a cliff very near the beach. Obviously, we could not make comparisons between the results of this station and Rale's 5B4AGD effort. Unfortunately, none of the P3A operator team was present—a restaurant manager told us they had left for Russia already. We left the amplifier with him and headed back to Limassol.

Oh well, I thought, at least Tuesday would provide me with some time to relax and enjoy the swimming pool. Wrong again...

When we arrived back at the *Kanika*, the hotel manager wanted to see us right away. He sternly informed us that we would have to remove all of the ropes and wires from the buildings that were not part of the hotel. None of the antennas that we had strung between the buildings could remain up until our return for the CQWW CW contest. Some people had registered complaints... imagine that! So we spent Tuesday morning taking down the wire antennas. They are now resting on the roof of the hotel waiting for the CW weekend. The Force 12 was lowered and strapped low on the tower, the PKW 6-element Yagi was safely tied off, and we headed off to Belgrade.

Murphy did visit us while we were in Cyprus. None of the computers we brought worked properly. One had hard drive problems; the other caused interference in the receivers. Luckily, some Yugoslavians living in Limassol helped out by loaning Rale their PCs. As mentioned earlier, the TS-870 second radio went up in smoke and is now waiting for some repair work in the YT6A lab.

There was an occasion when the Force 12 Yagi slipped on the mast due to a loose upper U-bolt. We had to lower it down and tighten it. Too bad it didn't play on 40. The Force 12 dealer in Slovenia said it would not work properly if it is mounted above a concrete roof full of steel rods (although we question this explanation). The only other probable cause we could come up with was that the steel guy wires attached to the top of the tower immediately under the antenna were interacting with it. We intend to try replacing those with ropes or Kevlar cables.

I operated a little from the second radio as 5B/4O6A. It proved to be a tough call sign for some to copy. I actually had not checked to see if we were allowed to use ANY Cyprian prefix for HF while going portable; however, it certainly seemed easier to copy than the Five Bravo Four America Germany Denmark call Rale was using.

Speaking of call signs, we did have dinner with Andreas, 5B4LP, President of Radio Club Nicosia; Spiros, 5B4MF, the Secretary; and a few other 5B4s. We tried to persuade Spiros to issue a short call sign to Rale for the contest. They have a new policy regarding special contest calls—but 5B4AGD is still on the waiting list...

I close my eyes... The land is dry, its color is white as snow, but the climate is mild, with a warm autumn and no high winds. Multiple stacks, some day, on the northern coast, and a nice call—like C4O6A... Mmmm—pleasant dreams, indeed.

73, Kele, 5B/4O6A

Kele is Editor of SKY Contest Journal*, the periodical for the new energetic SKY CONTEST CLUB (4O6A) founded by Rale Boca, YT6A. The club is an international non-profit, and also an unofficial association of Amateur Radio operators whose aim is to join teams of friends willing to exercise contesting in major international DX contests from home or abroad. Pictures and stories are available at* **http://www.ham.sky-sat.com** *and the club has a DX and contest reflector:* **http://YUDX.listbot.com**. *For more information about the club, contact them via* **ham@sky-sat.com**. ■

State QSO Parties—*Fertile Ground for Future Contesters*

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Many accomplished contesters got their start operating in the various State QSO Parties that occur throughout the year. This article describes how one club made use of a good contest station during a lull between the "majors." We hope you will be inspired to open up your station in a similar manner, thereby creating your own training ground for new contesters.—'BV

This article is not the typical blow-by-blow tale of a contest operation in an exotic DX location. It is a story of a small-town radio club that has become a breeding ground for contesters and it is the account of their performance at a recent multi-multi contest station in the mountains of Pennsylvania. This operation was a milestone event for the club, for the operators, and for the contest involved—the Pennsylvania QSO Party.

The Carbon Amateur Radio Club (*CARC*) is a small, general-interest club serving the Carbon County area of Pennsylvania. The sport of contesting has long had a small—and usually casual—following in the club, but a serious, concerted contesting movement has been developing within the club's ranks. CARC members are beginning to have a significant impact on our sport, largely due to the inspiration and leadership of fellow member and contesting legend Jim Berger, K3II. Several CARC members now boast membership in the venerable Frankford Radio Club and some individual scores are creeping up in the standings. The Schreibmaier brothers, K3PH and W3MF, for example, are familiar calls in Top Ten listings with some first place finishes.

The Pennsylvania QSO Party is a contest with a unique character and it is one of the most popular of all state QSO parties. The contest boasts over 40 years of existence and drew well over a thousand participants in 1998 with 333 submitted entries. One attractive feature of this contest is the break everyone gets on Saturday night. You can be very competitive without enduring a grueling 48-hour marathon. Another interesting element, that adds a big dose of excitement to the event, is the Bonus Station. Every contact with the Bonus Station adds 200 points to your final score.

The Carbon Amateur Radio Club sponsored the Bonus Station during the 1999 running of the Pennsylvania QSO Party. Our club had been lobbying for this designation for a few years. In recognition of the club's growing interest in contesting and in the PA QSO Party in particular, the Nittany ARC awarded us the honor of providing the Bonus Station for 1999. We needed to assemble a strong multi-multi station if we were going to do justice to the reputation of the Bonus Station. The determined contesters in the club were eager to do such an operation so the planning immediately began in earnest.

We chose to use the club's call sign, W3HA. The club pursued this call in the initial days of the vanity call program to honor the man most influential in the club's 1948 formation, Dan Farren (SK). One of Dan's prodigies was Bert Rex, W3OWP, who was licensed in 1948. He joined the new club, and today is one of our most admired and most active members. Bert was instrumental in paying homage to Dan by working to see that Dan's call sign was assigned to the club he loved so dearly.

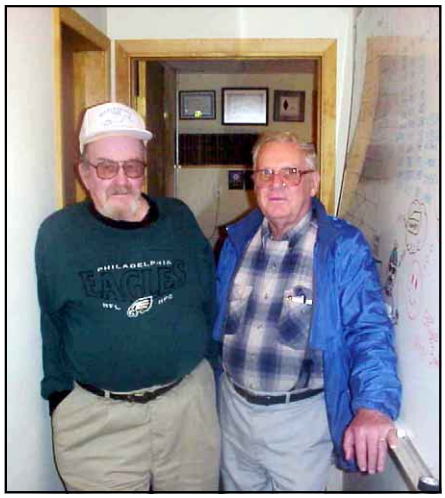
The PA QSO Party multi-multi category has heated up significantly in the last two years. In 1991, the team at NE3F set the record with 388,068 points. In 1998, a few Carbon ARC members made a serious attempt to finally break this long-standing record. Our choice for a station was an easy decision. K3II undeniably has the best station in the club, so five of us gathered to put Jim in the record book. When we finished, we had 2265 QSOs and the new record with 404,151 points. We expanded the K3II crew for the 1999 W3HA operation. For 1999, we set our sights on 500,000 points and a new record. K3YTL (the 1998 Bonus Station), the always dangerous K3ANS, and a possible showing by NE3F guaranteed some stiff multi-multi competition.

When the Carbon ARC was selected as sponsor of the Bonus Station, the hunt began for a suitable QTH. We felt an obligation to give out as many bonus QSOs as possible, but Carbon County had no stations properly equipped to host such a large-scale operation. We had enjoyed many terrific operations from K3II's phenomenal station, but he is located in Monroe County. The team decided that my QTH would be a good choice because of its hilltop location and the good results we achieved from my garage in Field Day.

While I've had decent success as a

The W3HA (K3PP) antenna farm

Some of the W3HA team (from left to right): Front row: K3TEJ, K3VA, K3CT; middle row: W3OWP, KA3NGH, N3CR; back row: W3MF, K3PP, K3PH, K3II, N3RXJ.



K3II and W3OWP—Heroes of the Carbon ARC

single operator in many contests, my QTH was never designed or equipped for a multi-op situation. We had a lot of work to do if we were going to assemble a sufficiently powerful Bonus Station. We immediately began planning antennas, equipment, operating positions, electrical power requirements, and, most importantly, operators. We knew we could top the record and establish a new mark above 500K if we had the right combination of these.

First, we had to decide what kinds of stations would be needed. Since this would be a state QSO party, the low bands would be especially important. But the high bands could not be ignored because they can net a lot of QSOs and the multipliers necessary for a big score. Recognizing these two facts, we planned to run five HF stations. During the day, they were to be on 10, 15, 20, and 40-meter CW, and 40-meter SSB. The evening hours would see 20, 40 and 160-meter CW, 40-meter SSB, 80-meter CW and 75-meter SSB. We also set up four VHF stations on 6 and 2 meters and 222 and 440 MHz FM. While 2 meters landed us a fair number of contacts, the other VHF bands had miserable levels of activity. The higher bands were no big surprise, but we really expected more from 6.

With this strategy in place, we identified the final set of operators. The team included some of the best talent in contesting, along with some new faces with potential for becoming common identities in contesting circles. The W3HA operators for the 1999 PA QSO Party were N3CR, K3CT, WB3IHF, N3MAV, W3MF, KA3NGH, K3PH, K3PP, N3RXJ, K3TEJ and K3VA. K3II was hosting the annual reunion of his WWII bomber crew "Ryan's Rascals," but he did stop by to visit the troops at W3HA. W3OWP also visited. It was nice to have these two living legends of the club spending some time with the operation.

Team members supplied an impressive collection of transceivers, amplifiers, and antennas.

Equipment

Kenwood TS-570S and Ameritron AL-80B amplifier: 40 and 80-meter CW, 1000 W
ICOM IC-775DSP and Acom 2000A amplifier: 40 and 75-meter SSB, 1500 W
ICOM IC-765 and Alpha 87A amplifier: 15 meters: 1500 W
Yaesu FT-1000D and Ameritron AL-1200 amplifier: 20 meters, 1500 W
Kenwood TS-850S and Alpha 91B amplifier: 10 and 160 meters, 1500 W
ICOM IC-736: 6 meters, 100 W
ICOM IC-706MkII and a military surplus amplifier: 2 meters, 400 W
ICOM IC-38A and homebrew amplifier: 222 MHz FM, 80 W
ICOM IC-706MkIIG: 440 MHz FM, 20 W

Antennas

160 meters: An inverted-V at 60 feet.
80 meters: A dipole for CW at 40 feet plus a dipole for SSB at 40 feet, parallel to each other, about 100 feet apart.
40 meters: A horizontal loop at 25 feet for CW, a dipole for SSB at 30 feet and a vertical.
20 meters: A Force 12 EF-420 4-element Yagi at 68 feet.
15 meters: A Force 12 EF-415 4-element Yagi at 76 feet.
10 meters: A Force 12 EF-410 4-element Yagi at 84 feet.
6 meters: A Cushcraft A50-3S 3-element SSB Yagi at 35 feet and a Cushcraft A50-3S 3-element FM Yagi at 50 feet.
2 meters: A 13-element SSB Yagi at 40 feet, a 12-element FM Yagi at 45 feet and a StationMaster at 40 feet.
222 MHz: A StationMaster at 40 feet.
440 MHz: A Comet vertical at 30 feet and a 7-element Yagi at 30 feet, pointed south.

The weeks leading up to the contest were hectic. The main operating room in the K3PP basement had to be converted from a storage room to a comfortable area for multi-op contesting. My XYL Bonita was a tremendous help with this!

We needed to make sure we had adequate ac power, so a separate 100A 240V sub-panel was installed with circuits dedicated to radios, amplifiers, computers and accessories. Extra antennas required installation. We needed two antennas for 40 meters and two for 80 meters so we could work both modes on each band. We also had to erect two towers with VHF antennas. We needed to ensure that we had updated the *NA* software with the latest improvements. K8CC has been wonderful with his support of *NA* for the PA QSO Party. Just days before the contest, he fixed a problem we noted with the serial numbers for multi-op stations. It worked like a charm.

Thankfully, the starting time of the PA QSO Party allows for adequate setup on Saturday morning. The contest starts at noon local time (1600Z), so we began setting up radios and amplifiers at 9 AM. Next, we verified that all computer interfacing was working well. We had some problems networking the computers at K3II the prior year, so we opted to not network the stations together. By noon, everything appeared to be working fine.

We began with a bang. After the first hour, we had 284 QSOs in the log! We started out with the 5 HF stations on 40-meter CW, 40-meter SSB, 20-meter CW, 15-meter SSB, and 10-meter SSB. Interstation interference plagued us the whole weekend, so we had to reduce power on some stations. Rarely did we have all five HF stations running full power at the same time.

We were hoping to achieve high rates on both modes on 40 meters right from the start. The rates were respectable, but we could have done significantly better without the severe QRM. Despite the interference, we maintained a good rate for most of the weekend. Being the Bonus Station, many stations came looking for us. We didn't do much Search-and-Pounce operating.

Conditions were excellent on Saturday. Ten meters was hot into Europe. The Europeans were also coming in strong on 15 and 20. We worked the last Pennsylvania county (Elk) at 5:23 PM EDT Saturday afternoon. K3TEJ's prediction of 2000 QSOs by shutdown Saturday night came true. When the contest broke for the night at 1 AM local time (0500Z), we had 2007 valid QSOs logged!

Sunday's conditions were less favorable. The expected morning opening to Europe never really materialized, so our prospects for a half million points seemed dim. We broke the old record at 11:23 AM Sunday EDT when we worked NY3A on 15-meter CW. As the end drew near, we knew we were close to the 500,000-point mark, but since the logging computers were not networked, we didn't know for sure.

After the final QSO, we tallied up the numbers to learn the good news. Even after cleaning the log, the final total was 2930 good QSOs and 502,497 ½ points! We had finally broken the half-million-point barrier and we shattered the record we set at K3II in 1998.

In all, we worked every ARRL section except VI and all the RAC sections except NB, PEI, YT, NWT and LAB for 145 total multipliers. Nobody has ever worked every possible multiplier in this contest. That elusive goal will have to wait at least another year.

We are elated with the results, although K3ANS posted a preliminary score of 509,665 points, apparently beating us by a bit more than one measly percent. The true winner may not be known until the contest sponsors check the logs. This one is way too close to call—congratulations to the Herculean effort by the team at K3ANS!

Here is the breakdown of W3HA QSOs:

Band (MHz)	*CW*	*Phone*	*Total*
1.8	25	68	93
3.5/3.8	233	300	533
7	293	457	750
14	106	489	595
21	127	305	432
28	28	296	324
50	1	37	38
144	0	134	134
222	0	10	10
440	0	21	21
QSOs	813	2117	2930
QSO Points	1348.5	2117	3465.5
Mults			145
Score			502497.5

We planned to award certificates to any station that worked us ten or more times. This must have been a pretty difficult task, since only ten stations were able to do it. The certificate winners are:

Call	*QSOs*
W3USA	17
KC2ZA	16
WD5BRP	15
KF3DI	12
K3CR	12
N3MV	11
W3DYA	12
W3OWP	10
K3ANS	10
N6MU	10

N6MU's effort is especially notable because he is in California! We may open the certificate program to those who made 8 and 9 QSOs also, but we will award the first ten before any of these others are printed.

We accomplished a great feat at W3HA. We tallied a score that had never been achieved before, but we also learned a lot about multi-multi contesting at K3PP. We learned that we need much more antenna separation. We learned that we need more directional diversity with our high band antennas.

But, most importantly, we learned that we could function very well as a team. Enthusiasm is contagious and the better operators inspired the rest of us to improve. We all learned something from each other and THAT is something we plan to exploit in future operations.

The soul of the operation is even more important than amplifiers and antennas. This intangible spirit is the binding force that keeps the team together as we continue to improve the stations we operate.

The 2000 PA QSO Party should be very exciting. The K3LR juggernaut will reportedly be hosting the Bonus Station W3P with 16 stations running high power! Tim and his crew could set a new record that may never be broken.

Please join us next year in the PA QSO Party. We will probably assemble another multi-multi team, but it would take a miracle for us to beat the W3P operation! Nevertheless, our team will be enjoying the thrill of the chase and we will continue to improve our skills and personal dynamics. We plan to have a ball. We hope you do also!

We thank everyone for the QSOs and we thank our fellow Carbon ARC members for their support in this historic event. The Carbon Amateur Radio Club may be small, but we have shown that we can pack quite a punch! Thanks to the efforts and inspiration of people like K3II and W3OWP, Amateur Radio and contesting are thriving in this semi-remote corner of Pennsylvania.

For more details on the 1999 W3HA PA QSO Party operation, please visit our Web site at **http://www.qsl.net/w3ha/paqso.html**. ■

Tall Tales, Tails, Nuts and Oaks

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This article appropriately appeared on the CQ-Contest reflector on April 1, 1999. —'BV

Many of you have commented on the improved signals emanating from W1NN lately. The fact is, I have found a way to get my antennas a lot further up in the trees than before. I am now ready to share my secret with my fellow contesters.

Like most lots in New England, mine is covered with large oaks and maples, some as tall as 100 feet. I have always longed to see my antennas in the very tops of these trees, but conventional methods (climbing, rock throwing, wrist rockets, bow & arrow, etc) just wouldn't hack it. The basic problem was that the trees are too dense and it's just impossible to get a wire (especially a long wire for 160) to rest straight and true in the very tops of the trees. This problem has vexed me since moving here in 1983. But two years ago a potential solution came into view.

The solution to my problem hit me in a very improbable way. In the summer of 1997, I visited a boat show in the neighboring town of Norwalk, CT. As a crowd-pleasing attraction, the show was presenting the performance of a water-skiing squirrel. What a wacky thing, I thought. Who would be interested in such nonsense? But when I saw this talented little rodent actually water-skiing in front of large crowds, I was really impressed. I hadn't realized that squirrels were so smart!

I should explain that my lot is simply covered with grey squirrels. I had always admired these busy little critters and envied their ability to climb to the very tops of the trees in search of food, but I must admit that I had never given them much thought. But after I saw that water-skiing squirrel (I'm sorry but I can't remember his name), I just couldn't look at my squirrels the same any more. If these creatures were smart enough to water ski, could they be trained to do other things? Like carry a string up to the top of a tree? You can probably see where I'm going with this.

The next six months were filled with excitement and adventure as I researched squirrels and started seeing what I could do with the residents of my own backyard. It's amazing what a squirrel will do to get a nut or seed. Any of you who have ever had bird feeders surely knows this. Those guys will stand on their heads, flip over, dangle from a thin branch, and go through all sorts of contortions to get food. They're actually a lot smarter than your average Toys-R-Us cashier.

I began to see whether I could make friends with my squirrels. I laid in a selection of expensive nuts and seeds and began coaxing them to the window. I found that it was quite easy to befriend these fellows and before long they were sitting in my right hand and eating seeds and nuts that I would offer from my left. Two squirrels in particular seemed to be smart and friendly. I named these above-average squirrels Scratchy and Shirley and I gave them little collars so I could identify them. (After a while I dispensed with the collars because I found I could easily recognize them. Not all squirrels look the same, you know.) They really seemed to enjoy it when I began to show them around the shack. I had trouble pulling Shirley away from the W1AW code practice sessions; she really seems to have a thing for high-speed Morse.

There followed a long, sometimes frustrating period of months of training Scratchy and Shirley to carry a thin string up to the top of the trees. Some days they were very cooperative and other days they just didn't seem to care. I quickly learned not to over-feed them. They seemed to become especially hard to deal with when they were given too many walnuts. On the other hand, they would do just about anything for a cashew. This turned out to be my best motivator. My nut bill soared.

My plan was to have them carry a thin string up, over the trees, and back to the ground. I would use this to pull a thicker rope and then use the rope to pull my wire up into the tree. (I decided early on that the squirrels did not have the strength to pull a #14 wire through the trees, smart as they might be.) Later I substituted a fishing line for the string, because it offers much less friction. Actually, it was quite easy to get my little friends to take the fishing line up the tree; the problem was in getting them to bring it back to the ground on the other side.

But patience conquers all and in time the guys began to understand exactly what I wanted them to do. While my ultimate goal was to have them pull a fishing line long enough for a half-wave on 160, I began with 15 meters and gradually built them up to the longer lengths. They graduated up to 40 meters without much trouble—but the step to 80 was a bear. After failing with 80 meters for several weeks, I gave in and tried 75 meters (not that I would ever *use* the band), and they were able to manage this. After that, it was easy to step them up to 80. The jump to 160 was surprisingly easy.

Today, all I have to do is give Scratchy (he is by far the better of the two) a fishing line that he will grasp in his teeth. Then I point to the tree I want and he will scamper all the way up to the top in a jiffy! I then point in the direction I wanted him to carry the line, and he merrily skips across the tops of the trees in the right direction. I merely stand on the ground holding a fishing reel to let the line out as he goes. I then walk to where I want him to come down to the ground and call him, and he brings the fishing line right down to my waiting hand! Good boy, Scratchy!

My outstanding performance in the 1999 CQWW 160 CW contest is almost entirely due to the extra 40 feet of antenna height I managed to gain that year.

Scratchy and Shirley eventually moved into our guest bedroom and they have become part of the family. Last summer we were blessed with a litter of the cutest little baby squirrels you ever saw. The new generation is completely used to living with us (after some hesitation, my XYL really warmed up to them; our kids are all practically grown up and the squirrels are very good company) and I have big things in mind for them when they get a little older. Scratchy has shown some interest in computers and I'm hopeful that Scratchy Junior might just become good enough to help me with multi-single operations. I am also considering the viability of renting these fellows out to help local hams with their antennas (but please do not take this as a commercial advertisement).

Those of you interested in duplicating this feat should begin by taking a look at a great home page on squirrels at **http://www.geocities.com/Yosemite/Rapids/4362/**. You can find pictures of my bunch and other information on my experience at **http://www.asquirrellystory.com**. Of course, I'll be happy to answer your (serious) questions.

73,
Hal, W1NN ■

The Monoband Log-Cell Yagi Revisited—Part 2: Element Phasing and Log-Cell Design

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Monoband log-cell Yagis have been designed using anywhere from 2 to 5 elements in the log cell itself. They may or may not use a reflector, and the number of directors has ranged from 1 to 3 in the designs that I have encountered. Some log-cell designs have been very casual, while others (such as the Rhodes-Painter array[1]) have adhered to rigorous LPDA design procedures. Since the key to a log-cell Yagi is the log cell itself, it may be useful for us to spend time exploring some facets of its design.

When the log cell has only 2 elements, one cannot distinguish it from a 2-element phased array. Indeed, one can build a successful beam by adding a director to a 2-element phased array—if the phased elements are properly designed. So let's begin with this simplified case and then proceed to more complex log cells.

The Phasing of 2 Elements

Element Phasing refers to the relative current magnitude and phase of each element in an array of elements. The current magnitude and phase are ordinarily read at the center of elements in symmetrical arrays in which each element length is in the vicinity of 1/2-wavelength.

By this accounting, a 2-element Yagi is a phased array, even though only the driven element is fed. The current magnitude and phase on the parasitic reflector is a function of coupled energy from the driver. We alter the current magnitude and phase on the rear element by varying the lengths of the elements and the spacing between them. For a simple 2-element driver-reflector Yagi, we have limited abilities to adjust the rear element relative current magnitude and phasing through modifying the antenna geometry itself. For example, the rear lobe gain of such arrays is rarely more than 12 dB below the main forward lobe.

By some judicious alterations of geometry, we can change the rear element current magnitude and phase to improve the depth of the rear null. One of the most remarkable designs in this regard is the Moxon rectangle. Folding the elements toward each other at the ends results in a rear element current magnitude and phase for the element spacing that yields a very deep rear null—often better than 35 dB below the main forward lobe at the design frequency.

As an alternative to the limitations of geometric means of altering the rear element relative current magnitude and phase, we can directly feed both elements of the array. Let's adopt the convention that the forward element will be set at a relative current value of 1.0 at a phase angle of zero degrees. With this constant, we may then focus on the current magnitude and phase angle of the rear element (always relative to the constant values of the forward element).

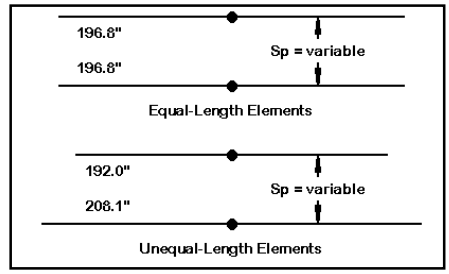

Figure 1—The two sets of elements used in the phasing experiments described in Tables 1 and 2.

The required current magnitude and phase on the rear element will depend upon several variables. First are the lengths of the elements. We may make them equal or unequal. Moreover, we may set the lengths close to resonance or distant from resonance. Each variation will show changes in either or both the magnitude and the phase on the rear element for a desired operating characteristic of the array. For example, if the elements, whether equal in length or unequal, show a feedpoint impedance close to resonance when only the forward element is fed, then the phase angles of equal length and unequal length element sets will be very close in value, although the current magnitudes will vary for a given spacing and operating condition.

Second, element spacing will have a major effect on the required rear element current magnitude and phase for a desired operating characteristic. Third, the desired operating characteristic will also alter the current magnitude and phase for any set element lengths and spacing.

As a little experiment, let's look at

Table 1

Phasing 2 Elements for Maximum Rear Null Using Equal and Unequal Element Lengths.

Equal-Length Elements (Two 196.8-inch elements at 28.5 MHz)

Spacing (wavelengths)	*Spacing (inches)*	*Magnitude (relative)*	*Phase (degrees)*	*Free-Space Gain (dBi)*	*Front-to-Back Ratio (dB)*
0.05	20.7	1.035	163	6.55	>50
0.1	41.4	1.07	145	6.46	>50
0.15	62.1	1.09	125.5	6.18	>50
0.2	82.8	1.09	106	5.76	>50
0.25	103.5	1.07	87	5.14	>50
0.3	124.2	1.045	69	4.26	>50
0.35	144.9	1.02	51	2.72	>50
0.4	165.7	1.00	34	0.31	>50

Unequal-Length Elements (192-inch forward element, 208.1-inch rear element, at 28.5 MHz)

Spacing (wavelengths)	*Spacing (inches)*	*Magnitude (relative)*	*Phase (degrees)*	*Free-Space Gain (dBi)*	*Front-to-Back Ratio (dB)*
0.05	20.7	0.925	163.3	6.57	>50
0.1	41.4	0.945	145	6.45	>50
0.15	62.1	0.955	126.0	6.19	>50
0.2	82.8	0.95	106.7	5.77	>50
0.25	103.5	0.94	88	5.16	>50
0.3	124.2	0.92	69.5	4.21	>50
0.35	144.9	0.90	51.8	2.73	>50
0.4	165.7	0.88	34.5	0.28	>50

Note 1: All forward element currents set at a relative magnitude of 1.0 at 0E phase angle.
Note 2: All values of rear current relative magnitude and phase angle taken when the rear null passed -50 dB relative to the forward lobe.
Note 3: Elements are 1-inch diameter aluminum.

[1]Notes appear on page 13.

Table 2

Phasing 2 Elements for Maximum Forward Gain Using Equal and Unequal Element Lengths.

Equal-Length Elements (196.8 inches, at 28.5 MHz)

Spacing (wavelengths)	*Spacing (inches)*	*Magnitude (relative)*	*Phase (degrees)*	*Free-Space Gain (dBi)*	*Front-to-Back Ratio (dB)*
0.05	20.7	1.02	173	7.32	7.64
0.1	41.4	1.03	165	7.35	7.19
0.15	62.1	1.02	158	7.23	6.90
0.2	82.8	1.03	152	7.03	6.00
0.25	103.5	1.03	147	6.76	5.03

Unequal-Length Elements (192-inch forward element, 208.1-inch rear element, at 28.5 MHz)

Spacing (wavelengths)	*Spacing (inches)*	*Magnitude (relative)*	*Phase (degrees)*	*Free-Space Gain (dBi)*	*Front-to-Back Ratio (dB)*
0.05	20.7	0.91	173	7.33	7.70
0.1	41.4	0.92	166	7.36	7.22
0.15	62.1	0.92	159	7.24	7.03
0.2	82.8	0.92	150	7.04	6.59
0.25	103.5	0.93	147	6.77	5.13

Note 1: All forward element currents set at a relative magnitude of 1.0 at 0E phase angle.
Note 2: All values of rear current relative magnitude and phase angle taken when the forward lobe reached a peak gain, beyond which gain fell off.
Note 3: Elements are 1-inch diameter aluminum.

what happens when we phase both elements of two different array pairs, shown in **Figure 1**. At a spacing of about 0.125-wavelength, the unequal element pair makes up a very workable 2-element Yagi for 28.5 MHz, when only the forward element is fed. At the same spacing, the equal-length pair is close to resonant, but with a typical dipole pattern.

Now let's set as our operating goal the achievement of a maximum rear null 180-degrees from the peak of the forward lobe. We can define the null as adequate if it exceeds -50 dB relative to the forward lobe. This value would exist only over a tiny bandwidth, but for study purposes, it is a goal that modeling programs, such as *NEC-4*, can easily show. We shall vary the distance between the elements in 0.05-wavelength increments. For each distance, we shall change the current magnitude and phase on the rear element until the desired null is achieved.

Table 1 shows the results for both element pairs. As predicted, the current phase for each step is virtually the same for both arrays, but the required current magnitude on the rear element is different according to whether the elements have the same or different lengths. Other element lengths we might have chosen would have resulted in other values.

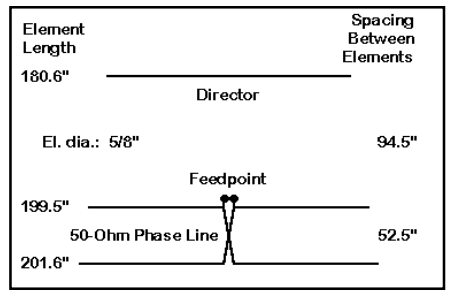

Figure 2—The outline and dimensions of a 3-element phase-driven array.

For each increase in spacing, the current magnitude changes very little with each array, but the required phase angle on the rear element shows a continuous decrease. In short, there is no single ideal spacing for achieving a deep rear null. Instead, for any spacing, there is a current magnitude and phase angle that will achieve the null.

Much of antenna element phasing theory is devoted to the achievement of rearward nulls. Little attention has been given to achieving maximum gain from the array. Let's look at **Table 2** to see what the effects of changing spacing might have on the required rear element relative current magnitude and phase for this goal. For spacings from 0.05 through 0.25 wavelengths, the required current magnitude for each array remains relatively constant. However, the required phase angle decreases with increased spacing, but at far less than the rate for achieving a maximum rearward null. Maximum gain does not occur with the closest spacing, but in the vicinity of 0.1-wavelength. As one might expect, the front-to-back ratio of two elements becomes mediocre (at best) when the goal is maximum gain.

The reason I have presented the table of values for maximum forward gain is simple: when designing an array with a pair of phased elements plus some further element—such as a director—the proper design procedure is to set the phased pair of elements for maximum forward gain. It will be the added element (or elements) that shapes the antenna's operating pattern to the desired specifications.

Let's examine a test array consisting of a phased pair plus a director, as shown in **Figure 2**. The phased portion

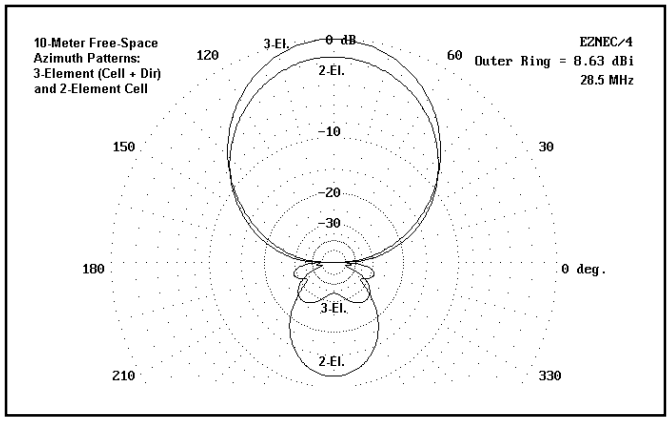

Figure 3—Free-space azimuth patterns of the phased elements and the entire array at the design frequency of 28.5 MHz.

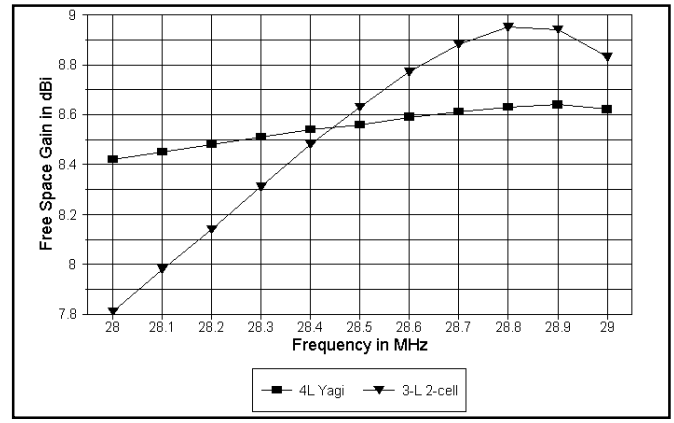

Figure 4—Frequency sweep of the free-space gain of the 3-element phase-driven array and a 4-element Yagi from 28 to 29 MHz.

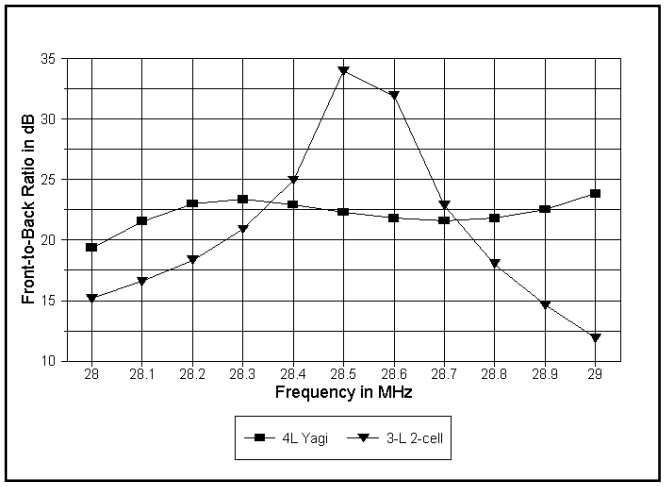

Figure 5—Frequency sweep of the front-to-back ratio of the 3-element phase-driven array and a 4-element Yagi from 28 to 29 MHz.

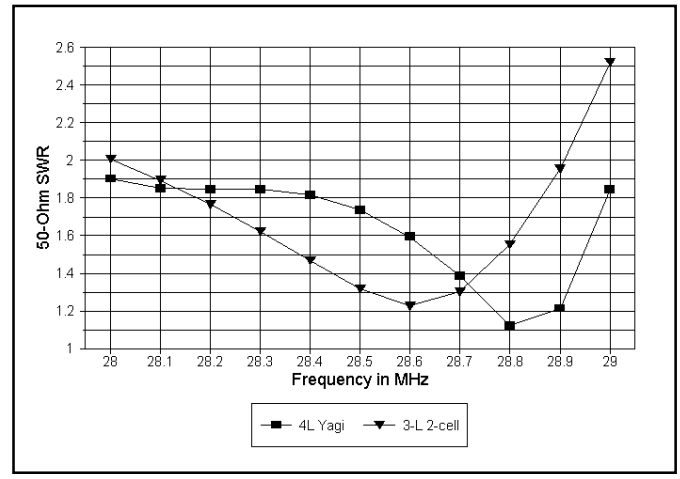

Figure 6—Frequency sweep of the 50-Ohm SWR of the 3-element phase-driven array and a 4-element Yagi from 28 to 29 MHz.

of the array consists of unequal-length elements. In this design, a 50-Ω phase line of about 69.3 inches (for 0.66 VF line) provides the requisite current magnitude and phase transformation. (Although 50-Ω parallel line is not possible using round conductors, parallel strips can be used, with the velocity factor adjusted back to 1.0. If the boom is RF transparent, then coaxial cable can also be used.) The design frequency for this test array is 28.5 MHz.

Figure 3 shows two things at once. One azimuth pattern shows what happens if we omit the director. The phased pair is set for maximum gain—or very close to it. Adding the director increases gain, but even more significantly, the director increases the front-to-back ratio to a very respectable level. (Even in pure Yagi design, reflectors do not control the front-to-back ratio nearly so much as do the directors.)

Let's look more closely at the performance of this antenna across the first MHz of 10 meters. **Figure 4** graphs the gain across the band, with the 4-element Yagi presented as a comparator in Part 1 as a standard for comparison. Both antennas are about the same overall length—a bit over 12.5 feet long. The 3-element array (labeled "3-L 2-cell" on the graphs) shows a very steep gain curve, especially when compared to the stable 4-element Yagi curve. At the design center frequency (28.5 MHz), the 3-element array actually shows slightly better gain.

The front-to-back curves appear in **Figure 5**. The 3-element array shows a very high peak value at the design frequency, but exceeds 20 dB for less than half of the bandwidth in the graph. The stability of the 4-element Yagi front-to-back ratio across the band is self-evident.

The native feedpoint impedance of the 3-element array is about 15 + *j*23 Ω. This value is amenable to a beta match using an open stub (instead of the usual shorted stub used when the reactance is capacitive). 2:1 SWR operation across all of the first MHz of 10 meters is not possible.

The narrow-band characteristics of this array illustrate in part what happens when 2-element phased pairs are operated too close to maximum gain. Nevertheless, scaled for any of the WARC band, this array might provide quite good performance with a minimum of elements.

More Complex Log Cells

Larger log cells are often designed exactly as one might design a full LPDA, except that the design will be for a single band and will also be considerably shorter than that of an independent LPDA, as illustrated in **Figure 7**. The design principles for LPDAs are fully described in *The ARRL Antenna Book* and in standard professional antenna compendia, so I shall not review them in detail here.[2] Most of the math can be passed through a computer design program, such as *LPCAD* by Roger Cox, WB0DGF.[3] To these resources, we can add only a few practical notes.

First, many LPDA and log-cell designers select too high a phase-line impedance to achieve maximum gain from the array. My experiences designing a monoband LPDA suggest strongly that the lowest practical phase-line impedance yields the highest gain and overall operating characteristics. This procedure may require careful rethinking of the mechanical aspects of the design, especially implementing a low impedance phase line with double-boom construction or other means.

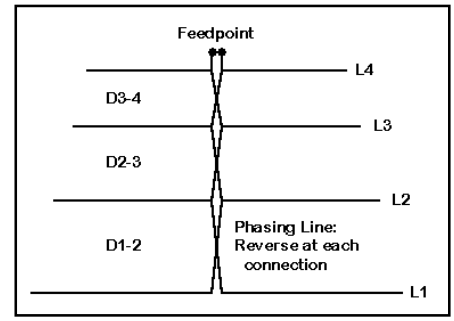

Figure 7—Outline of a typical log cell.

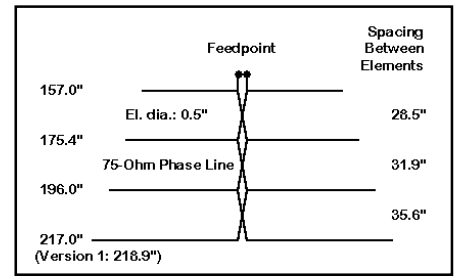

Figure 8—Outline of a 4-element 10-meter LPDA for 28 to 29.7 MHz (version 2).

Second, the fatter the elements, the higher the cell gain and the wider the bandwidth for the desired operating characteristics. For monoband cells and LPDAs at 10 meters, elements should be at least 0.5-inch in diameter, with diameters up to 1-inch desirable.

Third, the closer one attends to making the cell in accord with the LPDA principles in which both element lengths and spacings decrease together, the wider-band the resulting cell and array. One test of a good log cell—as we shall illustrate in more detail in Part 3—is that

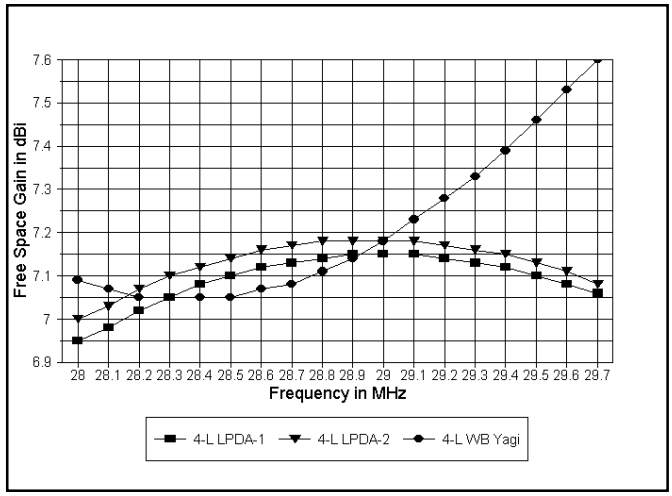

Figure 9—Frequency sweep of the free-space gain of the 4-element LPDAs and a 4-element wide-band Yagi from 28 to 29.7 MHz.

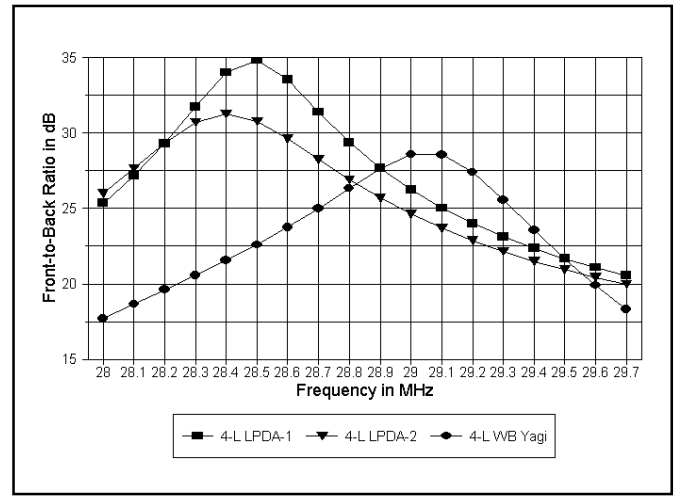

Figure 10—Frequency sweep of the front-to-back ratio of the 4-element LPDAs and a 4-element wide-band Yagi from 28 to 29.7 MHz.

the feedpoint impedance of the log cell without added parasitic elements should not radically change from the feedpoint impedance with those elements in place.

Even with these practical notes in mind, a good modeling program is a major aid to log-cell Yagi and LPDA design. Every cell design requires Tw[2] (*Twisting and Tweaking*), that is, final adjustment of element lengths and spacings, along with phase-line impedance value settings, to produce the desired operating characteristics of the antenna.

To illustrate this point, let's look briefly at an LPDA—a log cell without additional parasitic elements—for 10 meters. **Figure 8** shows the outlines of the antenna, which is given in two versions, one with a 217-inch rear element, the other with a longer 218.9-inch element. The 75-Ω phase line can be achieved with twin square booms or with facing aluminum strips. Although the basic dimensions emerged from LPDA calculations, the final dimensions are the result of considerable tweaking.

Because this antenna sought to combine smooth curves of both acceptable gain and an adequate front-to-back ratio, a ratio of about 0.90 was selected. That is, each element forward of the one to its rear is about 0.90 of its length. Moreover, the element spacing moving forward is also 0.90 of the spacing between the next elements rearward. As we shall see in Part 3, practical log cell design for log-cell Yagis employs a ratio closer to about 0.95.

The gain across the entire span of 10 meters appears in **Figure 9**, with the curve for the 4-element wide-band Yagi from Part 1 added for comparison. The LPDAs and the wide-band 4-element Yagi are both 8 feet long. Version 2 of the LPDA provides slightly higher gain than version 1. Both curves are more stable across the band than is the Yagi curve.

Although version 1 of the LPDA has slightly less gain than version 2, the first version shows an overall better front-to-back profile across the band, with a very high peak at 28.5 MHz, as shown in **Figure 10**. Both versions of the LPDA exceed the Yagi in average front-to-back ratio across the band.

In **Figure 11**, we have the 50-Ω SWR curves for all three antennas, none of which requires a matching network. With a peak SWR value of 1.35:1, there is little to choose among the antennas in this department.

A 4-element log-cell designed for 10 meters without parasitic elements is capable of better than 7 dBi free-space gain all

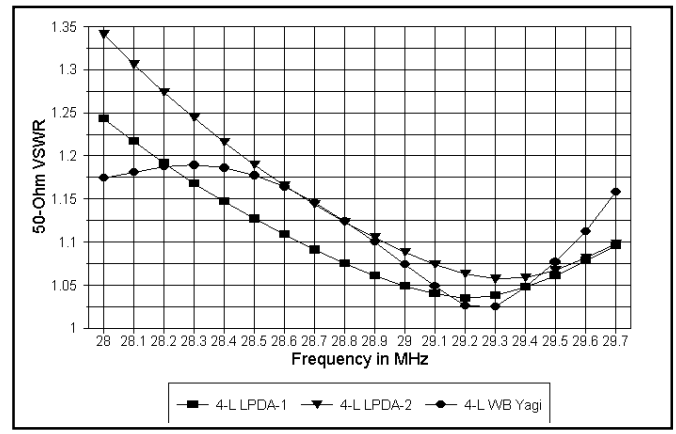

Figure 11—Frequency sweep of the 50-Ω SWR of the 4-element LPDAs and a 4-element wide-band Yagi from 28 to 29.7 MHz.

across the band with excellent front-to-back ratio values and an easy direct coax match—all on an 8-foot boom. This becomes another standard of comparison for log-cell designs by giving us a new question for our list: what advantages do parasitic elements give us?

A partial answer to that question showed up in the narrow-band, high-gain, high-front-to-back design we discussed earlier. We can add some gain and possibly improve the front-to-back ratio. We shall do that by designing our log cells to enhance gain rather than striving for a balance of operating characteristics. Parasitic elements will finish the job of tailoring the pattern.

We shall encounter some practical designs that casually design the cell and some that design it very carefully. The results of each practice will show themselves in the resulting antenna performance. But all of that is for Part 3.

Notes

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

[2]See *The ARRL Antenna Book*, 18th Ed, p 10-1 to 10-6, plus such professional references as John and Jasik.

[3]*LPCAD* has been available at many Worldwide Web archives, but availability may vary in this fast-changing medium. ■

A Full-Wave Vertical Loop for 160 Meters

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At a recent Dayton Hamvention I attended the antenna forum, where, following a presentation on his 160-meter antenna farm, Jeff Briggs, K1ZM,[1] asked if anyone was using a full-wave loop as a transmitting antenna. I was the only person in the (very large) audience to raise a hand. This has led me to the realization that these excellent antennas are little used on top band. It is not difficult to see why. One needs a fairly large amount of space, and dealing with 540 or so feet of wire can be a bit of a challenge.

On the other hand, vertical loops have some very compelling advantages. A vertically polarized loop has good low-angle radiation, albeit in two directions. However, bi-directional antennas are useful in many locations, such as the East Coast, where one wants to work both Europe and the rest of the US. In addition, there is no need for a ground screen or radials, which, in my case, was a major consideration, as my lot slopes steeply away at the back of the house. Next, vertical loops offer a modest amount of gain compared to a shunt-fed tower with anything less than a very extensive radial system. In this article I will show how it is possible to raise a full-wave loop for 160 meters, and discuss some of the design and construction aspects.

One of the virtues of a vertical loop is that, unlike other antennas, it does not have to be raised to a great height to be effective. In his book *Low Band DXing*,[2] John Devoldere, ON4UN, suggests a height for the bottom wire of only 0.02 wavelengths (say 10 feet at 160 meters). However, the size of a 160-meter vertical loop is such that there is usually great difficulty in finding supports for the top of the loop that are as high as needed. Unless one is the proud possessor of a 200-foot tower, or something similar, this means that a Delta loop (with a side length of around 180 feet) is out. Indeed, in all likelihood, a square loop probably requires supports that are much too high for most stations.

However, other shapes, requiring less in the way of "sky hooks" are feasible and can be better performers.[3] One can use a rectangle or (as in my case) a trapezoid to good effect. The main requirement is to make it as symmetrical as possible about a line drawn down the middle, and feed it one quarter of a wavelength from the middle of the top horizontal wire. While it is true, that, for small loops, the gain is proportional to the area enclosed, this is not the case for a vertically polarized, full-wave loop. A rectangle, having its long side parallel to the ground, can provide more gain than a square. This is a consequence of the fact that as the separation of the two vertical wires is increased, it 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 plane of the loop.

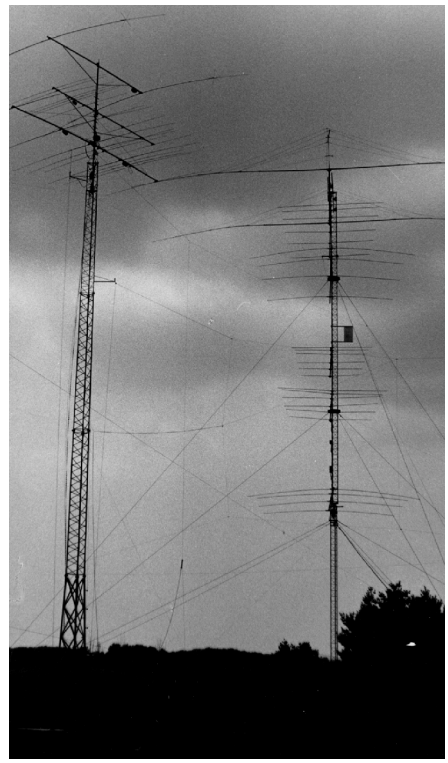


Figure 1—Photograph of the two towers at my QTH. The one nearer the camera is an 80-foot self-supporting tower, while the more distant one is a 110-foot tower, the top 70-feet of which rotates.

Design Considerations

In attempting to design a vertical loop that will fit the space you have at your disposal, it is a great advantage to have access to one of the many computer modeling tools that are now available inexpensively and are so easy to use.[4] My design was done with the aid of *EZNEC* written by Roy Lewallen, W7EL. The start of a design really is governed by the availability of the high points that can be used to suspend the loop. These could be towers or trees—or a combination of the two. In my case, the supporting points were to be my two towers (**see Figure 1**).

The larger of these towers is 110 feet high, the top 70 feet of which rotates. The uppermost guy ring is at 90 feet, and this could serve as one support point for the loop. The smaller tower is a self-supporting one, some 80 feet in height. Unfortunately, these two are spaced only about 120 feet apart. This meant that, if the bottom horizontal wire were placed just high enough to clear people's heads (or more realistically the tractor mower) at, say, 8 feet, then the vertical leg of a rectangular loop could be no more than 72 feet in height. A little math then showed that there is no way to fit a full-wave 160-meter loop *between* the two towers. Some model cases were next run with inductances introduced into the loop to provide loading in an effort to shrink the size.[5]

In order to have any appreciable effect on the length, inductances of several tens of μH are required, which, in practice, would tend to be large and heavy. Accordingly, these were located at the bottom corners, where they could best be supported. In the end, it was decided that insufficient reduction in length could be gained this way, without recourse to very large inductors and a major sacrifice in bandwidth. Building a full-length loop seemed the best way to go.

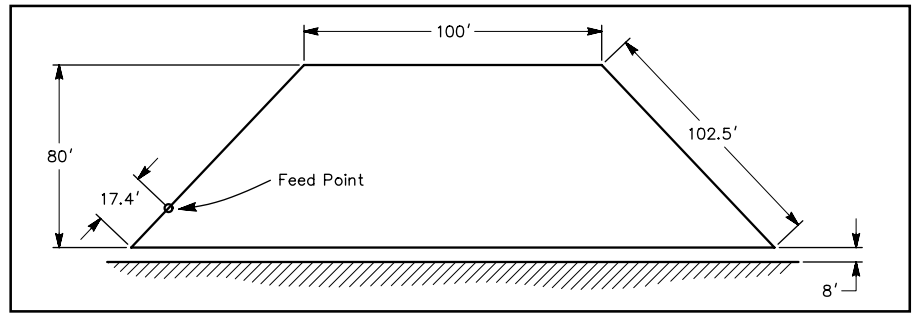


Figure 2—Model design for a 160-meter loop discussed in the text.

[1]Notes appear on page 17.

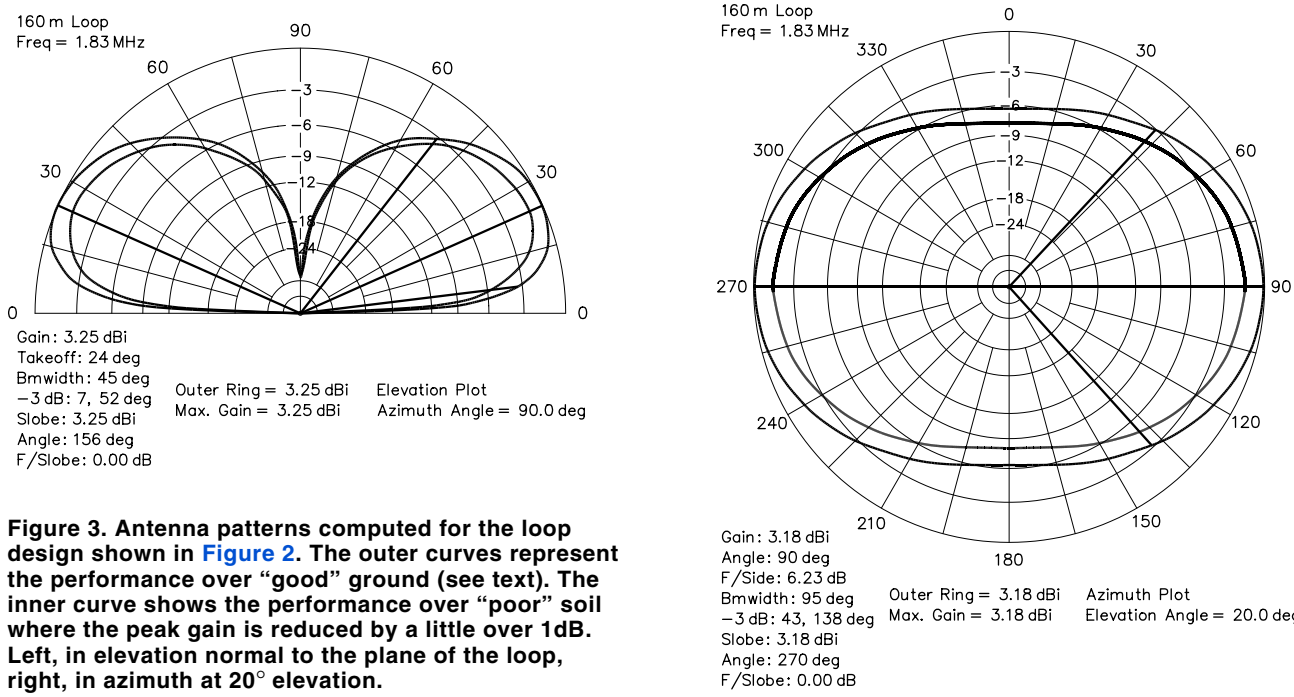


Figure 3. Antenna patterns computed for the loop design shown in Figure 2. The outer curves represent the performance over "good" ground (see text). The inner curve shows the performance over "poor" soil where the peak gain is reduced by a little over 1dB. Left, in elevation normal to the plane of the loop, right, in azimuth at 20° elevation.

The next approach was to model a trapezoidal loop (see **Figure 2**). The concept here was to place the top horizontal wire of the loop between the towers (necessary for its support), but allow the bottom horizontal wire to extend beyond either tower, in order to get a full wavelength of wire in the air. After some juggling with what could be made to fit, I eventually settled on the dimensions shown in Figure 2.

The feed point (for vertical polarization) must be 0.25 wavelengths from the center of the top horizontal wire. This provides symmetry for the current distribution in the loop, and hence in the radiation pattern. In the models I found that resonance is often achieved at a length that differs significantly from the usual formula, 1005/f, where f is the frequency in MHz. For the design shown in Figure 2, for example, the ratio turns out to be closer to 1010/f, and I chose to follow the model dimensions when actually constructing the loops.

This raises a question of where exactly *is* 0.25 wavelengths from the center of the top wire, and I chose a distance of one quarter of the circumference of the loop. One can, however, find the best feed-point experimentally via the model. It transpires that the radiation pattern *in the same plane as the loop* is quite sensitive to this. Thus, one can move the feed point until the right and left halves of the elevation pattern match. The feed point shown in the drawing of Figure 2 was selected this way.

The computed antenna patterns for the design of Figure 2 proved to be quite acceptable, as can be seen in **Figure 3**. Here are plotted the radiation patterns for two types of ground, namely "poor" (conductivity = 0.002 s/m), and "good" (conductivity = 0.005 s/m) using the "real/*MININEC*" model for ground reflections. (Unfortunately, the pattern for poor soil probably comes closest to representing the situation that prevails at my QTH.) For "good" soil the gain in the desired direction is 3.25 dBi at a take off angle of only 24°, with a 3-dB point at 7°. The front-to-side ratio is not large—only 6 dB, meaning that there remains some useful sensitivity off to the sides.

Moreover, the feed point impedance is computed to be close to 50 Ω, suggesting that it would be easy to match the antenna. In the case of the model depicted in Figure 2, the computed impedance at 1.83 MHz is 52.5 – *j*4.5 ohms, (which would yield an SWR of 1.1:1), and the bandwidth between points where the SWR reaches 2:1 is about 340 kHz.

In situations where the height of the available supports is limited, one can increase the ratio of the horizontal spans to the height without sacrificing a significant amount of gain, but the feedpoint impedance then drops below 50 Ω, making matching the antenna more difficult.[6] When constructing these models it is important to include the effect of resistive loss in the wire. One can get unrealistically large predicted gain (as much as 5 dBi) if this is set to zero. Here I assumed that 14 gauge copper wire was to be used.

It will be evident that by extending the bottom of the loop beyond both of the supporting towers, it becomes necessary to tilt it somewhat out of the vertical plane, in order to avoid interference between the bottom corners and the towers. Modeling showed that this introduces some asymmetry in the pattern normal to the plane of the loop. For a large tilt, there is an increase in gain on the side that is tilted upwards together with an increase in the takeoff angle. In addition, there is a significant decrease in gain on the side that is facing downwards, and some horizontally polarized energy is now radiated. Thus, it is best to maintain the plane of the loop as close to vertical as possible.

In my case, (despite the penalty involved) it proved expedient to tilt the plane of the loop by a rather large amount (about 20°) and accept the reduction in gain in one direction (namely, west). **Figure 4** shows patterns for the loop as actually built, computed as before and assuming "poor" soil. It may be noted that, rather than tilt the entire plane of the loop, one could "twist" it by having one leg pass in front of its supporting tower while the second leg passed an equal distance behind its supporting tower. This arrangement will tend to preserve the symmetry of the elevation pattern, but for a large twist will skew the pattern in azimuth. *This feature can be exploited if the direction normal to the plane of the loop is not exactly towards the desired path.*

I must confess that I did not arrive at the loop antenna without experimenting first with others. These included a dipole at 80 feet and several verticals. The latter all employed elevated radials, as

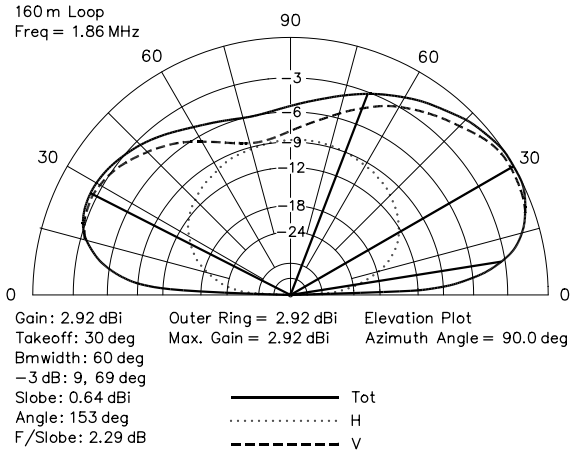
the steeply sloping nature of the back yard made ground radials not very sensible. I tried both exciting the 80-foot tower, and a (T-shaped) "Marconi" hung between the two towers. **Figure 5** shows model results for shunt-feeding the 80-foot tower against four elevated radials; this is probably representative of the performance achieved with any of the vertical antennas that I built.[7] While the elevation pattern is almost identical to that of the loop model (see **Figure 3**), the gain is less by about 3 dB in the directions favored by the loop.

In this model (and in the field), the radials were shortened to be somewhat less than a 1/4-wavelength long, and fed via an inductor to force nearly equal currents into them.[8] Also, a capacitor was placed in series with the vertical arm to balance out its inductance. The dipole, at only 80 feet high (see **Figure 6**), is a real "cloud burner" and therefore excellent for domestic contacts. Except off its ends, or at extremely low elevation angles, it offers more gain than the vertical. In practice, the vertical out-performed the dipole on only one notable occasion (when I worked Hawaii), thus spurring the quest for something better. The moral would appear to be that, if you intend to use a vertical, and can't locate it over salt water, best build an extensive network of radials!

Construction

Several things must be taken into consideration when constructing a loop this large in size. It is desirable to keep it as far away as possible from metal objects (eg, the two supporting towers), and also to try to make it as symmetrical as possible. In my case, there was also the need to make sure that it did not foul any of the antennas that are on the rotating tower (see **Figure 1**). Because the two middle ones are at heights where they just clear the uppermost (Phyllistran) guy wires, this meant that the sloping leg of the loop nearest the 110-foot tower could not be taken down at an angle any steeper than these guys.

To preserve the symmetry, I did not want the loop to actually be supported by the 90-foot high guy ring on the



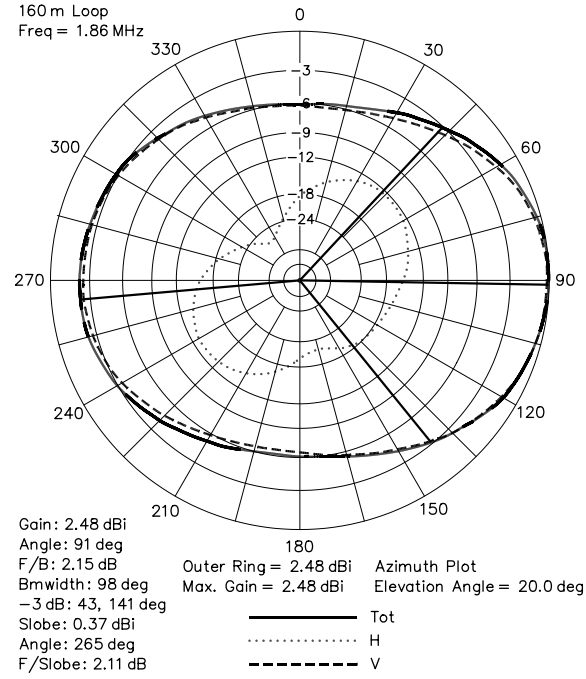


Figure 4. Antenna patterns computed for the loop as built, assuming it to be operating over "poor" soil. Here, the actual locations of the four corners (which do not lie in a vertical plane) were employed in defining the antenna's dimensions. Left, in elevation normal to the plane of the loop. Right, in azimuth at 20° elevation.

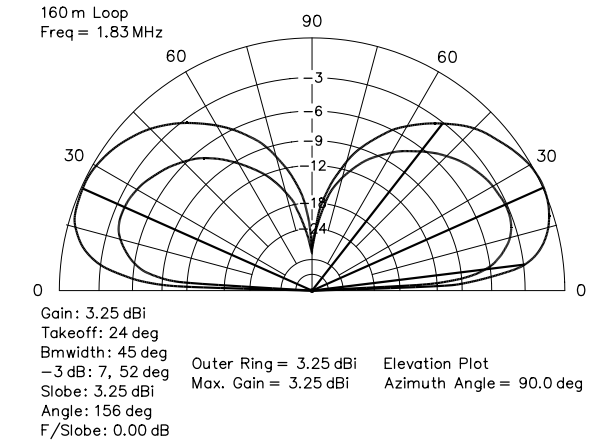


Figure 5. Comparison of the elevation patterns for the loop model (Figure 3) and a vertical antenna constructed by shunt-feeding the 80-foot tower (Figure 1), and driving it against four elevated radials.

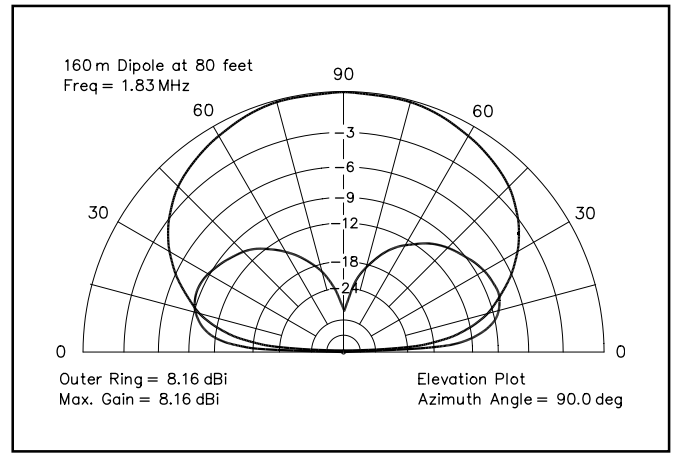


Figure 6. Comparison of the elevation patterns of the shunt-fed tower antenna (see Figure 5) and a dipole at 80 feet.

110-foot tower, since it would then be above the support point on the other tower. Thus, the actual support used was the guy wire itself at a point about 10 feet below the ring. It was then simplest to run that leg of the loop along the guy wire towards the 6-foot high steel guy post (see **Figure 7**), as this afforded a strong anchor point. That is, the slopes of the two wires at the sides of the loop were dictated by the slope of the Phyllistran guy to the 90-foot guy ring, while their length was limited by the height of the 80-foot tower.

As the length of the top horizontal wire had to be shorter than the distance between the two towers, the rest of the wire had to be placed in a long lower horizontal span forming the bottom wire. Not wishing to support this in its middle (and thereby create another obstacle to be avoided when mowing) I needed a strong anchor (which the guy post afforded) so that the bottom span could be pulled taut. This was done by running a line to some distant trees, in a direction that preserved the planarity of the loop.

I found that the loop was initially resonant close to 1.8 MHz, but by pruning the bottom horizontal wire by a few feet I was able to move it to 1.83 MHz. One wants to get as close as possible to the desired resonance frequency on the first try, since changing any of the lengths will remove some of the designed-in symmetry. However, changes of a few feet in the bottom span should have little practical effect.

My first loop was constructed of Flex-Weave stranded copper wire available from Radioware (**http://www.radioware.com**). Unfortunately, this did not survive the first ice storm, and is really not suitable for use in such long unsupported spans as found in the lower horizontal wire in this design. I next used some stranded copperweld cable supplied by The RF Connection (**http://www.therfc.com**). This survived the next ice storms, but after a year or two began to show signs of rust.

The present loop was built using insulated stranded hard copper wire, (also available from The RF Connection), and this is what I would recommend. I pondered the effect that the insulation might have on the proper length, but found nothing definitive in the literature on this point. In the absence of any guidance, I made the loop 5% shorter than before, and a further slight pruning was all that was needed to get back to the desired resonance. Since that time, charts for the effect of insulation have appeared in reference 6.

The loop is fed via a short length of RG8X coax and a choke balun to an outdoor matchbox. The slight mismatch is there remedied by an L-network consisting of a small series inductor (variable over a range of 20 μH) together with a set of (switch-selectable) fixed capacitors and a variable one of 500 pF. This is built into a waterproof box and attached to the 80-foot tower.

Conclusion

Well "*How does it play?*" you must be asking. My lot does not allow for a multitude of Beverage antennas in all of the desired directions. Thus, I am frequently forced to use the loop for both transmitting and receiving. This was the case in the last 160-meter (CQ SSB) contest I was able to enter, where I placed 9th in the US. In that contest I was plagued by power line noise, which further aggravated the receiving difficulties. (At one point I was called by a station in Rhode Island, who reported that several Europeans were calling me. As I could hear none of them, I allowed him to use my frequency and work them instead. Evidently, the antenna was getting out!)

If you have the space and a couple of high supports, I strongly recommend trying a loop for transmitting on 160 meters (and 80 meters for that matter). There is a lot of leeway on the choice of shape you can use. Try, however, to get the horizontal separation of the side wires to be in the range 2 to 3 times their length and make it symmetrical. The actual shape will affect the input impedance, but it should remain somewhere in the range of 40 to 100 Ω, and should not present undue matching difficulties. You will be spared the task of digging up the lawn to put down all those radials, and you'll also enjoy about 3 dBi of gain in a couple of directions!

Notes

[1]Briggs, Jeff, K1ZM, author of "DXing on the Edge" published by ARRL, Newington, CT. 1997, spoke about his new QTH on Cape Cod at the 1998 Dayton Hamvention.

[2]Devoldere, John, ON4UN "Low Band DXing" Chapter 2, pp 46-50, 1st Edition, published by ARRL, Newington, CT. 1988

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

[4]See, for example, Cebik, L.B. "A Beginner's Guide to Using Computer Antenna Modeling Programs" in *The Antenna Compendium* Volume 3, pp 143-155, published by ARRL, Newington, CT. 1992.

[5]Merschrod, Kris, KA2OIG/TI "Coil Shortened Quads—A Half-Size Example on 40 Meters" in *The Antenna Compendium* Volume 2, pp 90-94, published by ARRL, Newington, CT. 1989.

[6]Haviland, R. P., W4MB "The Quad Antenna Revisited" in *Communications Quarterly* Volume 9, Number 3, pp 43-73, 1999.

[7]Christman, Al, KB8I "Elevated Vertical Antennas for the Low Bands: Varying the Height and Number of Radials" in *The Antenna Compendium* Volume 5, pp 11-18, published by ARRL, Newington, CT. 1996.

[8]Moxon, L. A., G6XN "Ground Planes, Radial Systems, and Asymmetric Dipoles" *The Antenna Compendium* Volume 3, pp 19-27, published by ARRL, Newington, CT.1992.

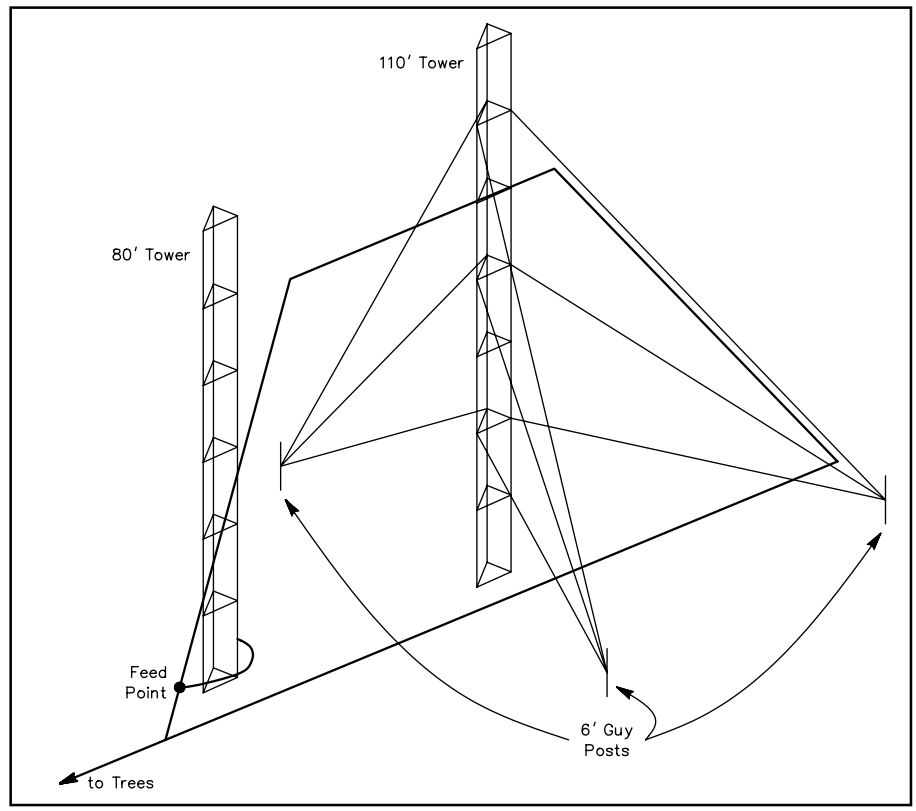


Figure 7. Diagram showing the method of supporting the 160 meter loop. The right leg is supported by one of the Phyllistran guys of the 110-foot tower. The top and bottom horizontal wires are then pulled towards the 80-foot tower and some trees, respectively. Other antennas (See Figure 1) have been omitted for clarity. ■

A Receiving Antenna System

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w7lr@aol.com

This article describes a remote switching system that provides antenna selection and directional control for multiple Ewe antenna arrays. For additional information on this simple and effective receiving antenna, see "Is this Ewe for You?" by Floyd Koontz, WA2WVL, in the February 1995 issue of *QST*.

The Ewe antennas in my particular application are designed for 160 meters, but the switching system can be used on other HF frequencies as well. I chose to use Ewes for their simple construction, good front lobe pattern and reasonable front-to-back ratio. I don't have enough room on my property for multiple Beverage antennas.

I set up three reversible dual Ewe broadside arrays. This allows me to select from six different directions (see **Figure 1**). One pair of Ewes can be directed towards New Zealand or Europe, a second towards Australia or Africa and a third towards Japan or South America. My switching system allows me to use a single coaxial feedline from the shack to a remote antenna selection/direction control box located out in the antenna field. A 4-conductor cable connects this distribution box to a remote switch box in the shack.

In the Ewe antenna (and many other receiving antenna designs), there is a matching transformer at the feedpoint of the antenna wire and a termination

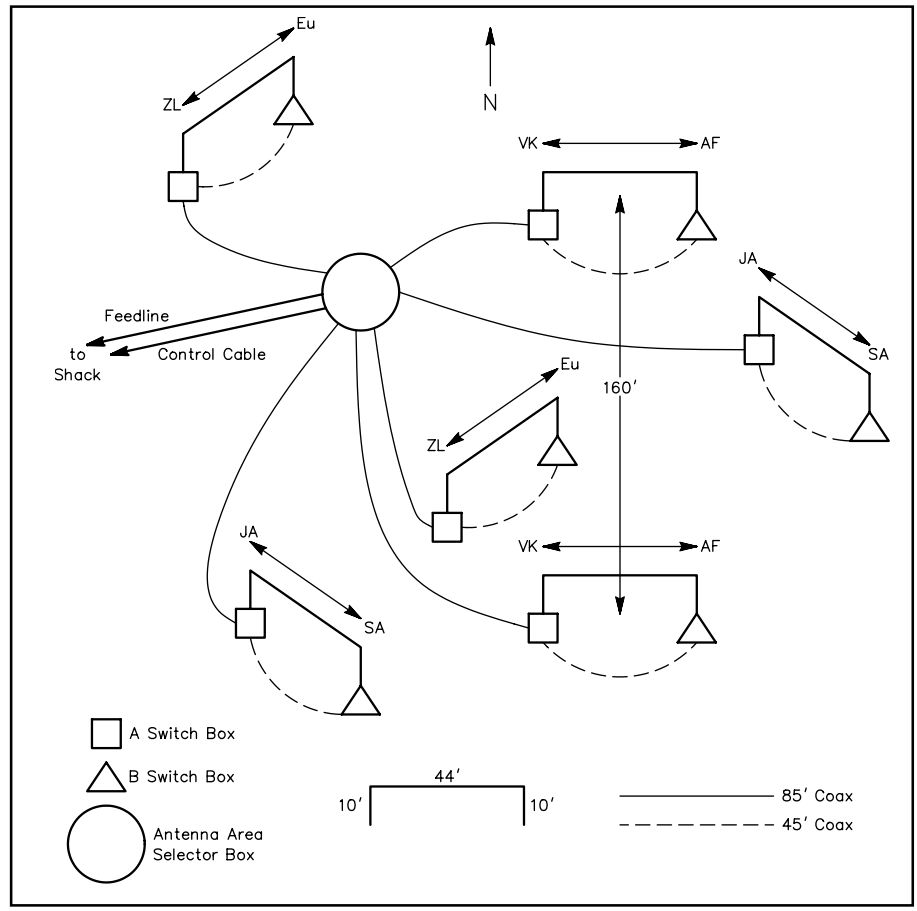

Figure 1—The W7LR Ewe broadside array receiving antenna system.

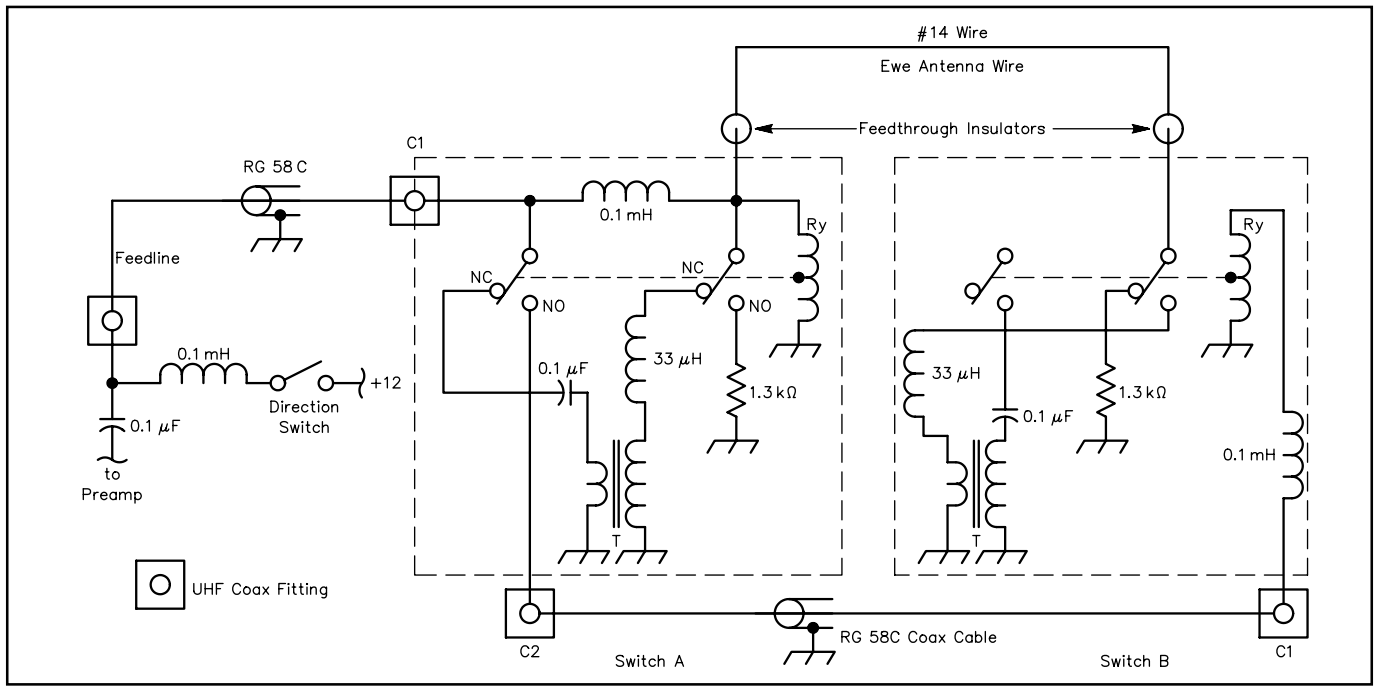

Figure 2—The schematic diagram of a single Ewe antenna direction switching system.

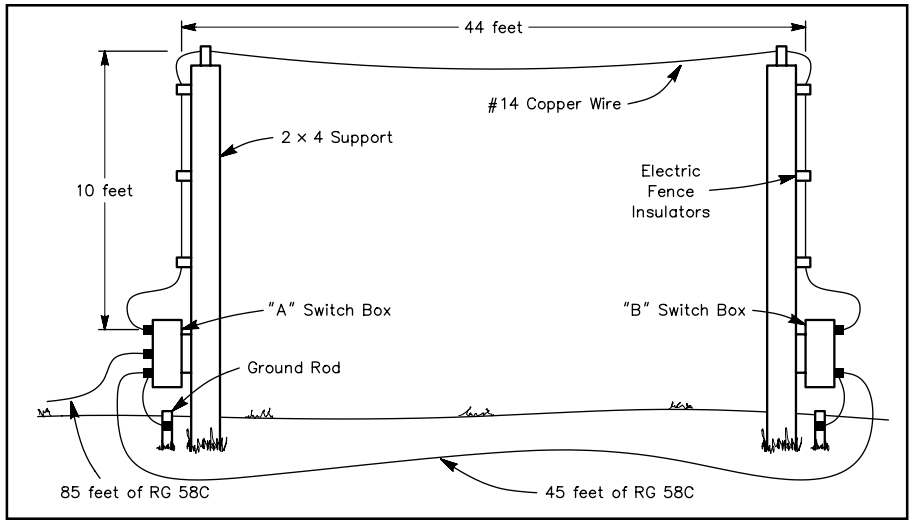

Figure 3—Detailed drawing of a single Ewe element.

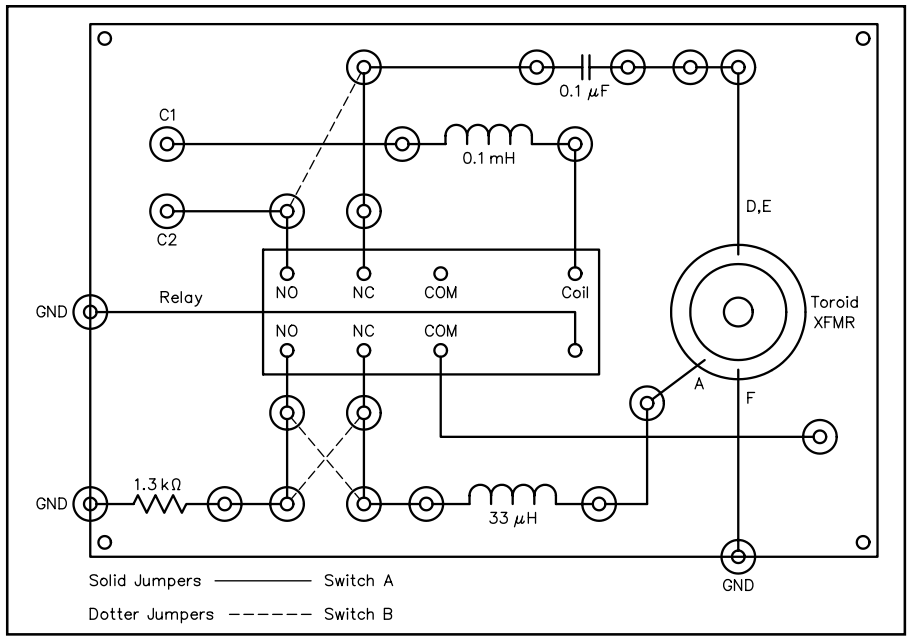

Figure 4—Trace and jumper details and component locations for a termination/feedpoint switch.

resistor at the far end. To reverse the direction of a single Ewe—obviously—you would swap the location of the feedpoint and the resistor.

In my system, each end of every Ewe in the array has an enclosure with a circuit board containing a feedpoint transformer *and* a termination resistor—and a relay that selects between them (see **Figure 2**). Reversal of the direction of each Ewe is achieved by applying a dc voltage to the relay windings—fed to them right through the coax feedline (a single Ewe direction-reversing arrangement is shown in the figure). When the voltage is present, the relays in the termination/feedpoint switch boxes at each end of the antenna wire select a feedpoint and termination circuit that causes the antenna to favor one direction. When the voltage is absent, the feedpoint and termination locations are effectively swapped, and the antenna favors the opposite direction.

In my multiple Ewe broadside arrays, the six Ewe feedlines converge at the remote antenna selection/direction control box.

The individual Ewe antennas are constructed of 64 feet of #14 wire (see **Figure 3**). The wire is supported by two 2×4 wooden posts erected 44 feet apart. At each end, the wire is connected to a feedthrough insulator on the enclosure of the termination/feedpoint switch boxes. The 10-foot vertical sections of the antenna wire are fastened to the posts using electric fence insulators. The two switch boxes are connected by a 45-foot length of RG58C; 85-foot lengths of RG58C run back to the antenna selection/direction control box.

Figure 4 gives details on the construction of the termination/feedpoint switch boxes. Note that each Ewe uses one type A and one type B—these type assignments are determined by the position of jumpers installed on the circuit board. **Figure 5** is a photograph of a PC

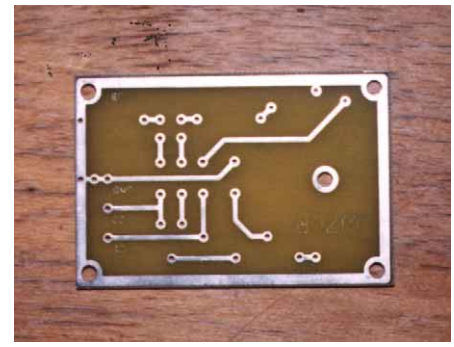

Figure 5—A photograph of the pc board for the termination/feedpoint switch. (Available from the author—see Table 1.)

Table 1
Parts for the termination/feedpoint switch boxes

Amidon Inc
240 Briggs Ave
Costa Mesa, CA 92626
800-898-1883
fax 714-850-1163
http://www.amidon-inductive.com/

Ferrite toroid core (for T) FT-82-43

Digi-Key
PO Box 677
Thief River Falls, MN 56701
800-344-4539; 218-681-6674
fax 218-681-3380
http://www.digi-key.com/

Instrument Box	700K-ND
Box Panel	2046K-ND
Relay	PB343-ND
33µH inductor	M8031-ND
100µH inductor	M8037-ND
0.1µF metal poly capacitor	EF1104-ND
1.3KΩ 1/4-W 1% tolerance resistor*	1.30KXBK-ND

Surplus Sales of Nebraska
1502 Jones St
Omaha, NE 68102
800-244-4567; 402-346-4750
fax 402-346-2939
http://www.surplussales.com/

Feedthrough insulators ICR-9545

Printed circuit boards for the termination/feedpoint switches are available for $5 each, including shipping, from:
Robert Leo, W7LR
6790 S Third Rd,
Bozeman, MT 59715
w7lr@aol.com

*See text. This value may vary depending on your local soil conditions.

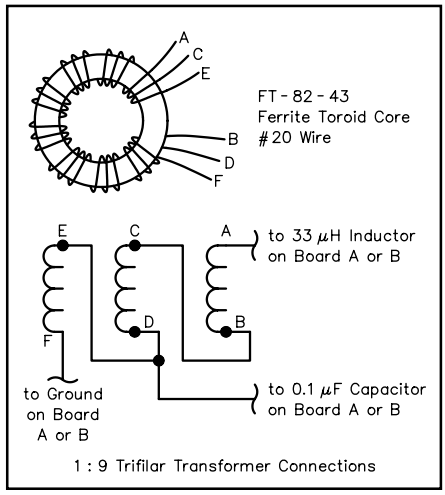

Figure 6—Winding details for the matching transformer T. Eight turns of windings are used.

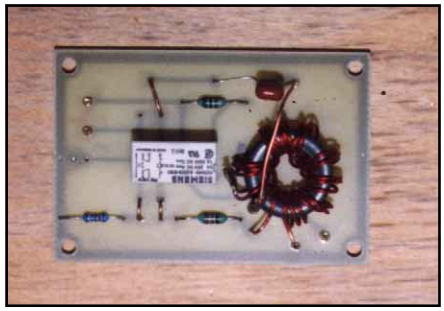

Figure 7—A completed circuit board for a type A termination/feedpoint switch.

Figure 8—A completed termination/ feedpoint switch box, type B, mounted at the base of one of the 2 × 4 posts.

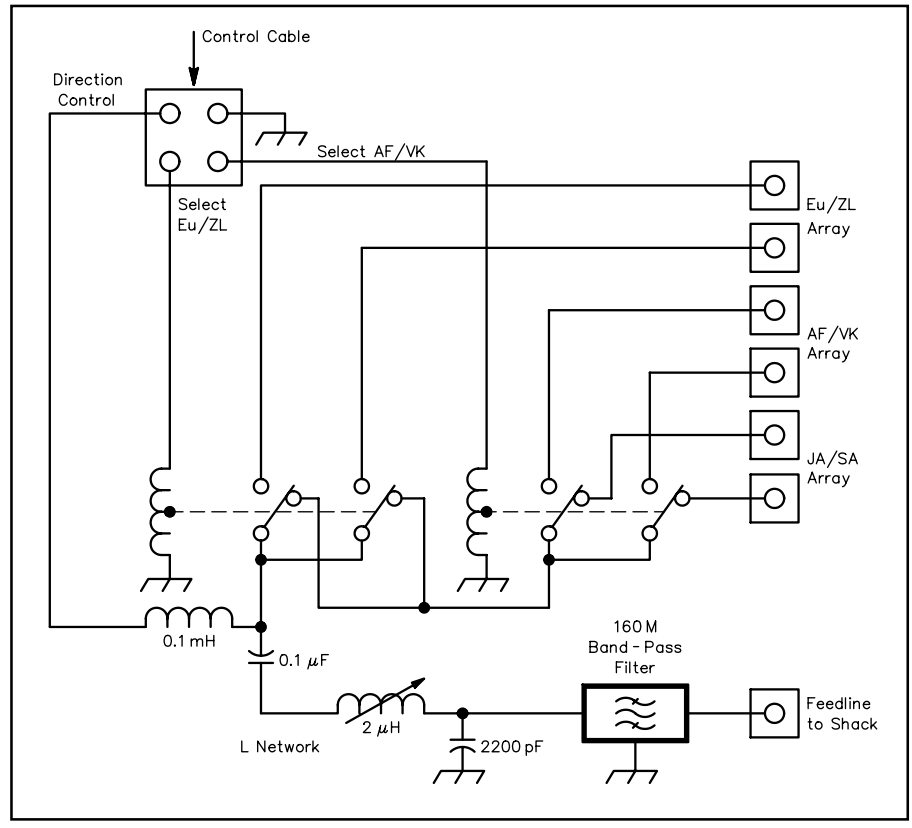

Figure 9—The schematic diagram of the antenna selection/direction control box.

board for the termination/feedpoint switch boxes that I have designed. I can supply these boards for $5 each, shipping included. Supplier contact information and part numbers for the other components are listed in Table 1.

From information given in the original *QST* article, computer models and email conversations that I've had with other amateurs, it is clear that Ewe performance is dependent on local soil conditions. Here in Montana (soil: "average") for the given Ewe dimensions the termination resistance required was determined to be 1300 Ω. (Refer to WA2WVL's article to compensate for your local conditions.) A feed transformer with a 9:1 ratio provides a good feedline to antenna match. Transformer construction details are given in **Figure 6** and the photograph in **Figure 7**.

The plastic boxes containing the switching devices are fastened to the posts with two screws that pass through the back side. The boxes come with aluminum cover plates that are used to support the coax fittings and the antenna wire feedthrough insulators. I used standoff hardware to mount the PC boards inside the enclosures.

Figure 8 shows a completed termination/feedpoint switch box, type B, mounted at the base of one of the 2 × 4 posts.

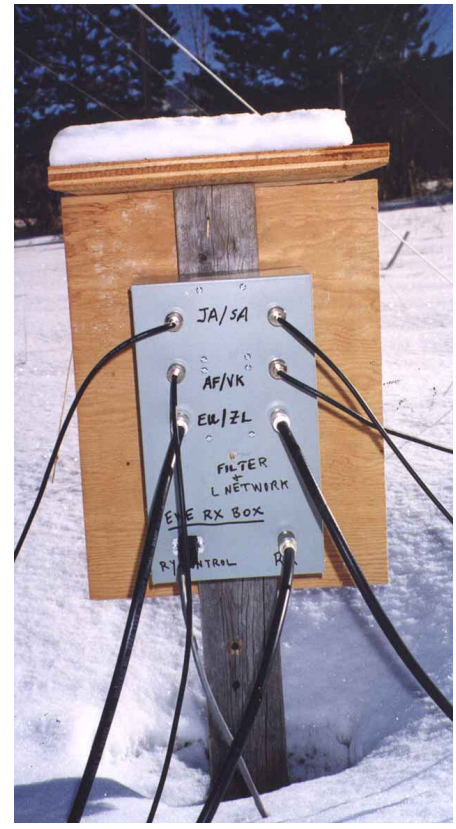

Figure 10—The completed antenna selection/direction control box.

The Ewe article that appears in *QST* describes endfire and broadside arrays of these antennas. The endfire configuration results in the best front-to-back ratio but is a bit more complex—it requires a 135-degree phasing system. The broadside array has a narrower front pattern and still exhibits a reasonable front-to-back ratio.

The termination/feedpoint switching circuitry described in this article can be used with single Ewe antennas or with endfire or broadside arrays. In my system I use three broadside arrays and an antenna selection/direction switching system to cover the 6 headings. Each array consists of two parallel reversible Ewe elements positioned 160 feet apart.

RG58C coax is used throughout. A preamp is installed in the shack to boost the relatively low signal level.

The schematic diagram of the antenna selection/direction control box is shown in **Figure 9**. On the feedline side of the selection relays I added an L network to match the arrays to 50 Ω. I also installed a band-pass filter for 160 meters. Ewe direction control voltage passes right through the antenna selection relay contacts. A photograph of my antenna selection/direction control box appears in **Figure 10**.

The system performs very well, and it's certainly convenient and satisfying to be able to select from 6 different receiving directions on 160 meters, all from the comfort of my shack. ■

WRTC2000 Operator Team Update

Dave Patton, NT1N

With WRTC only 4 months away, team selection is winding down. Hopefully by the time you read this, the wild card teams will have been selected and the rest of the regular teams will have been announced. The selection process has been long and involved in some cases, while other teams are repeats of the 1996 event (N6IG and K4UEE, N5TJ and K1TO, VE3EJ and VE7ZO/VE3IY, YT1AD and YU1RL, JH4RHF and JA8RWU). Other repeat contenders finding a slot in a team include: VA7RR (ex VE7NTT), RA3AUU/ON9CIB, F6FGZ, J47PKU, JH4NMT, DL1IAO, LY1DS, SP9HWN, WC4E, W0UA, N2IC, W2GD, N6TV, K5ZD and N2NT.

Naturally we are all beginning speculation and predictions on how this big horse race is going to turn out! Take some time and review the following list yourself to see who you think will finish in the Top Ten! In the next issue of *NCJ*, me and my group of "experts" will offer our own predictions of who will finish where and why! We'll also recap the competition rules and operating events that the teams will have to get through for a place on the medal stand!

National Teams and US Club Teams

Argentina	LU4FM operators
Asiatic Russia	UA9BA and RN9AO
Belgium	ON4WW and ON6TT
Brazil	PY5CC and PY1KN
Canada 1	VE3EJ and VE7ZO
Canada 2	VE7SV and VA7RR
Croatia	9A9A and 9A3GW
Czech Republic	OK2RZ and OK1RF
European Russia	RA3AUU and RV1AW
Finland	OH1EH and OH1NOA
France	F6BEE and F6FGZ
Germany 1	DL2CC and DL5XL
Germany 2	DL1IAO and DL2MEH
Hungary	HA3OV and HA3NU
Italy 1	IK2QEI and I2VXJ
Italy 2	I5JHW and I5NSR
Japan 1	JH7PKU and JM1CAX
Japan 2	JH4NMT and un-named op
Japan 3	JA8RWU and JH4RHF
Lithuania	LY1DS and LY4AA
Poland	SP8NR and SP9HWN
Slovakia	OM3RM and OM3BH
Spain 1	EA3NY and EA3KU
Spain 2	EA7GTF and EA7KW
Ukraine	UT1IA and UY5ZZ
United Kingdom	G3SXW and G4BUO
Yugoslavia	YT1AD and YU1RL
Florida Contest Group	WC4E and W0UA
Frankford Radio Club	N3AD and N3BB
Mad River Radio Club	K9TM and N2IC
North Coast Contesters	K8NZ and W2GD
Northern California Contest Club	N6IG and K4UEE
Potomac Valley Radio Club	K3NA and N6TV
Society of Midwest Contesters	K9ZO and K7BV
Southern California Contest Club	K6LA and K5ZD
Yankee Clipper Contest Club	K1ZM and N2NT
WRTC 1996 Winners	K1TO and N5TJ

■

NCJ Profiles—From a Very Suitable QTH in New Jersey—Doug Zweibel, KR2Q

H. Ward Silver, N0AX
hwardsil@wolfenet.net

"In 1976 I received a telephone call that changed my life. Dave Donnelly, WB2SQN (now K2SS), invited me to operate with him at the multi-multi station of K2GL, Buz Reeves. They needed help on 15 meters, had seen my scores in the magazines and thought I'd be a good addition to the team. Wow! What could I say but YES YES YES!" I think most *NCJ* readers can identify with Doug's reaction. That fortunate turn of events certainly had good results for this issue's Profiles subject.

KR2Q is well known for his work on the CQWW Contest Committee—he's a frequent commentator on log checking and accuracy in the WW contests. In this interview, I'd like to focus on what brought him to our attention in the first place—namely contesting.

Doug has been turning in big scores from New Jersey in the low power and QRP categories for years. "I spent every year at K2GL until Buz passed away, but what does a dyed-in-the-wool contester do when the ultimate ham fantasy station has been taken away? There was just no way that I was ever going to come close from home. How could I find a challenge to keep up my interest? I decided to try serious QRP contesting."

"Note that the emphasis is on 'contesting' and not just on QRP. I had been doing QRP DXing from home for decades, but this was going to be all-out QRP action. QRP DX contesting from KR2Q in New Jersey is probably like low power contesting from anywhere west of the Mississippi." [*Yeah, I've guessed—N0AX/QRP/7*]

"It took two years to select this QTH. You should have seen the realtor's face when my wife would stand in the street, looking at a compass and announce, 'No good for Europe,' and promptly return to the car without ever having even glanced at the house (…and no, she is not a ham)."

"Lots of folks talk about their rigs, coax and antennas—but nothing counts quite so much as a great location. I feel my QTH is worth up to 20 dB of gain for the majority of my contacts. If you are a serious contester, or want to be, you should spend lots of time looking for the ideal location."

"Being located in New Jersey is a major advantage for DX contesting (unless you compare it to most of New England … yes, even guys in New Jersey can complain). I would, however, be remiss if I didn't point out that in 1998, the CQWW QRP/USA section was won, *on both modes*, by N6MU on the West Coast. As for domestic contests, well, you know the drill."

Before the call to battle at K2GL, Doug put in a lot of contest time, primarily in DX contests. "At some point, I got hooked on 15 meters and ran into George, W2NIN (now K2UR). We had lots of fun competing against each other, especially in the CQWW. I was oblivious to the rest of the world; it was just the two of us. For those who worry that newcomers will be turned off by all the super stations and their own inability to compete from home, it sure wasn't that way for me. I didn't even know there was a serious world of contesting—I was just having fun competing against one guy."

"I just stumbled into some contest in early April of 1967 and fell in love. Looking back at that log, you can see how little some things change. My first contest QSO was with DJ6QT, followed by I4LCK and G2QT. I kept contesting from home, building up my station, and staying mostly on 15 meters. My favorite contest for a long time was the WAE. I really enjoyed sending QTCs."

After several years of interviews, I'm continually amazed at how often the ham radio and contesting bugs bite from random luck. "My interest in ham radio was really an accident. At the age of twelve, a classmate and I were passing a transistor radio back and forth when it fell to the floor and, well, smashed. He (sort of) put it back together quickly and we were both startled to hear what it was receiving—this was really interesting. Sometime later, my friend became WN2UFE, showed me his rig, what he could work, and I wanted to play, too. The ARRL license manual could be easily memorized, and that's just what I did, becoming licensed as WN2VYA when I was fourteen in 1966. I got KR2Q over twenty years later—which I really like on CW for the 'full rhythm.'"

What strategies work for Doug to keep motivated and enthusiastic? "Fun is really important. You can never do well at anything in life if you are not enjoying it. Even if you are not very good at something, you should still have fun learning and gaining experience. There are moments of frustration to be sure, but at the end of the day, it had to be fun to want to do it again."

"I like to plan first. I only have so much 'serious' in me with family considerations, so I pick my contests carefully. If it's the bottom of the sunspot cycle I do LP and probably won't even consider doing a contest with QRP because that wouldn't be fun."

"I always get background information. This includes finding out what were last year's scores, who were the heavy hitters for my intended category of entry, and what is the existing record in terms of number of QSOs and mults. I also check 'the next category up' to see what is possible."

"Once the contest begins, the first thing that comes to mind is 'running scared.' Throughout the entire contest, I am always telling myself that someone is right on my heels (or worse, ahead) and that if I don't maximize my score for every QSO, every minute, that I'm going to lose to them because of me. This

doesn't mean that I always have the mindset that I'm going to win the category, just that I don't want to lose to anybody because of my own actions."

"I never set up an hour-by-hour strategy; there is too much variability. If I chose an all-band category, I'll check the SFI and take a guess as to where I'm going to start the contest. But I always tune the bands for around 15 minutes ahead of time to get a feel for the conditions; and that is when I pick a starting band."

QRP is a different sort of animal—you can't just head for 14.001 and try to wade in. "Traditionally, being QRP in a DX contest means you do virtually zero running. In the past, I might 'run' 5 stations in 15 minutes. Considering that using S&P I can hit 70 an hour and usually maintain 30 per hour, 'running' has proven to be a waste of time for me."

"My current radio is a TS-940, which is great for QRP. I use no computer controls, no band map, no super-check partial—and don't even mention packet/Internet. On my one acre, my back tower is a 72-foot crank up with a 204CD over a 402CD. The front tower is a 54-foot crank up with a 154CD and about 36 inches down from that is a 103CD. There is just tons of interaction and the 10 has just about no F/B or F/S—it's a miracle it works at all. For 80 and 160 I have simple wires."

"I plan on doing a lot of work during Y2K on the outside. A new radio might cost four or five grand—but put that much money outside, and hey! After all, this year very well might be the peak of this sunspot cycle. I want to stick a 24-foot mast into the front tower with a pair of 10-meter Yagis and the 154CD in the middle. On the back tower, I'll also stick in a 24-foot mast with a 15-meter beam on top, the 204CD halfway down, and the 402CD modified to have a 3-element 10-meter beam on the same boom. Then down a section, fixed on Europe, will be another 15-meter beam. I will use hardline for the longer runs. I figure that my signal on 10 will be at least a full S-unit louder than before, based on free space gain."

Doug mentioned that packet is not used at KR2Q. "I strongly dislike spotting networks of any type. I have a nearly violent reaction to the use of databases, on-line or post-contest. Yeah, I think Super Check Partial type functions belong in the garbage, but I love computer logging. Either you copied the information correctly yourself or you didn't."

"I define the operator's job as, 'Accurately interpreting what you hear AND accurately recording that information yourself.' For most of us, that means using our fingers to log on paper or keyboard what we've heard by using our ears. Using computer prompts to 'get the call right' is a farce."

What types of technology are Good Things or Bad Things? "In my opinion technology breaks down into two categories. First is the stuff that helps you hear, get out better, and makes your life easier (such as big antennas, no-tune rigs or amps, antenna auto-switching, better IF filters/DSP, computer logging, etc). The other category is stuff that tempts you to give up on your abilities or circumvent the object of a contest, ie, to test the operator's innate abilities."

"Some contest clubs encourage their members to make packet spots even if they are in the unassisted category. What is the purpose of all of this needless environmental pollution? The idea is to get every club member to turn in the biggest score so their club can win. What efforts are being made to improve operator skill at contesting? Telling members to enter as assisted or multi-op, so that they can turn in a bigger club score, only denies the operator an opportunity to learn. Clubs are encouraging short term gains instead of investing in the future skill set of their members. And even for non-club types, who use packet or spotting nets, they are doing this to themselves. As a CQWW Contest Committee member, I can tell you that some entrants are just not listening."

Even with the distractions of mulling over the appropriateness of certain technologies, there is a lot to like about contesting's future. "I thoroughly enjoy the friendship and the espirit-de-corps among contesters. This is especially true at Dayton—It's just great. The number of entrants and countries represented (at least in CQWW) just keeps going up and up. The accuracy and extent of the log checking continues to improve and the feedback from the vast majority of entrants is absolutely positive."

There's also the constant change of the sport. "I'm always excited about turnabouts and upheavals. I clearly recall operating at K2GL/N2AA and being beaten by the guys at N5AU. Someone from another station asked me how it felt (to lose). I told them it was the greatest thing that ever happened to multi-multi contesting in the last 10 years. This was good for contesting."

"When N6MU wins QRP on both modes of CQWW from California, or when W4AN kicks dust in K1AR's face, I am just filled with renewed energy for contesting as a whole. When Ann, WA1S, sends in a 4th place claimed score, but after checking, ends up the winner, I am thrilled beyond words. Events like these show that anything is possible; that every entrant really needs to hone their skills, get on, and at least try." ■

Contest DX-Ventures

DXpedition Destinations

Sean Kutzko, KX9X
kx9x@uiuc.edu


KX9X

This month we take you to a continent we haven't visited before—Europe—for a look at the bed and breakfast of Jim Smith, G3HJF.

Jim and his wife operate a bed and breakfast in Barnet, about 45 minutes north from the heart of London. They have two main rooms available, one with a double bed and wash basin, the other with twin beds for the kids. There is a third, smaller room available for the toddlers, should you need it. Guests enjoy a private bathroom with bath, shower and toilet. Each room has a color television and a kettle for making coffee or tea. Each room also has its own electric heater, so no one will be uncomfortable. Your stay includes your choice of a full English breakfast or continental breakfast. Be prepared to enjoy the company of their two dogs, Echo and Morse. Both are well behaved.

The radio room consists of a Ten-Tec Corsair or a Kenwood TS-830S, with a Heathkit SB-221 amplifier for legal-limit operation (remember, legal limit in the UK is 400 W). The station is geared primarily for CW operation ("A microphone is available somewhere!" Jim says), and the antennas are aimed mainly for evening time operation. A 3-element 20-meter monobander at 50 feet is the station's big antenna. Wires are also available for 40 and 80 meters. A tuner is there to tune the wires should you want to operate on 10 or 15 meters. There is an Alinco DX-70 for 6-meter operation and a 2-meter H-T is available as well.

As far as licensing goes, there is no problem. Thanks to CEPT, US hams no longer need to obtain a special permit; simply sign G/<your call> and you're on the air! For more information on CEPT, visit the ARRL Web site at **http://www.arrl.org/field/regulations/io/#cept**.

Getting to Smith residence is easy. You can catch a train into central London from either Heathrow or Gatwick airport. A short bus ride later and you'll be in Barnet. "If you have had enough travelling by the time you get to High Barnet station, give me a ring and I will come and rescue you," Jim says.

While staying there, all the charms of London and the surrounding area are within your reach. In addition, be sure to spend some time in Barnet itself, whose history dates back to around 400 AD. "Coaches of centuries ago passed through on their way north to Scotland, and Barnet was the first stop to rest and change horses after their arduous task of pulling up Barnet Hill," Jim says.

While Jim does make the shack available, be sure to inquire before booking it for a full-blown contest operation. "Bear in mind that we offer bed and breakfast only, and that we expect visitors to be away for the day on their own account." Nevertheless, if your vacation or business plans take you to London, Jim's bed and breakfast offers very comfortable accommodations and a rig as well, all for a very reasonable price. Jim welcomes visitors all year round, " ...even Christmas and New Years if you insist!"

For further information or to book a stay, you may contact Jim at 'Baram', 64 Galley Lane, Arkley, Barnet, Hertfordshire, EN5 4AL, England. Phone (outside of UK) 44-181-449-7135. You may also e-mail him at **g3hjf@btinternet.com**.

Thanks as always for reading. If you have any information about rental QTHs to pass along, please e-mail me at **kx9x@uiuc.edu**. Be sure to visit the QTH Rental Page at **http://hobbes.ncsa.uiuc.edu/sean/qthlist.html** for a listing of many ham-friendly rental properties around the world.

73 and see you on the Other Side of the Pileup. ■

Contest DXpeditions List

Compiled by Dennis Motschenbacher, K7BV

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

Contest	*Category*	*QTH/Call*	*Operator(s)*	*Status*
2000				
CQ WPX SSB	SB10MLP	J68AS	N9AG	Firm
CQ WPX SSB	SB?LP	J68ID	W8QID	Firm
CQ WPX SSB	SB?LP	J68DD	N6JRL	Firm
CQ WPX SSB	SB?LP	J6/KD4YHY	KD4YHY	Firm
CQ WPX SSB	SOLPSB?	V31MX	K0BCN	Firm
CQ WPX SSB	SOABLP	VP5E	K6HNZ	Firm
CQ WPX SSB	SOABHP	WP2Z	W6XK, W6RD, W7MH, AD6E	Firm
CQ WPX CW	SOABHP	8P	YT6A	Firm
CQ WPX CW	SOABHP	WP2Z	N0KK	Firm
IARU HF	SO	WP2Z	AG8L	Firm
CQWW SSB	M/S?	FS/K7ZUM	K7ZUM + family	Firm
CQWW SSB	SOABLP	P4	KK9A	Firm
CQWW SSB	SB/160	PJ8/N7KG	N7KG	Firm
CQWW SSB	SOABHP	WP2Z	K6RO	Firm
CQWW SSB	M/S	8P	K4FJ, K3KG	Firm
CQWW SSB	M/M	GZ7V-Shetld Is.	North of Scotland CG	Firm
CQWW SSB	M/M	IH9P	IT9BLB + Intl team	Firm
CQWW SSB	M/M	PJ9B	N3ED +	Firm
CQWW CW	SOABHP	8P9Z	K4BAI	Firm
CQWW CW	SOABHP	WP2Z	WD5N	Firm
CQWW CW	SO	C6AKP	N4RP	Firm
CQWW CW	M/M	PJ9B	N3ED +	Firm
CQWW CW	M/M	HC8N	N5KO +	Firm
ARRL 10	M	8P9Z	K4FJ, K3KG	Firm

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

Propagation

Carl Luetzelschwab, K9LA
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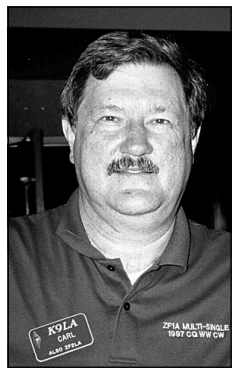
So How's Cycle 23 Doing?



K9LA

The focus of this issue's column is the status of Cycle 23. We'll also cover some related pertinent solar cycle topics. Along the way we'll have a look at where Cycle 23 appears to be headed, consider an explanation of why some of the early predictions of it were off, and take a broad view of what we might expect as Cycle 23 approaches its maximum.

Cycle 23 is considered to have started in October of 1996. The actual numerical minimum of the smoothed sunspot number (*SSN*) occurred in May of 1996, but there weren't any new Cycle 23 sunspots then. So the scientific community got together, discussed this issue, and then pegged October 1996 as the "official" start date.

The thick bold line of **Figure 1** shows the progress of Cycle 23. The latest SSN data is 94 for June 1999. Remember that the SSN is a 12-month running average, so the data is six months behind the current date, plus the lead time for publication of this column. Also included on the plot are the SSNs for Cycle 22 and Cycle 20. As can be seen, Cycle 23 now appears to be somewhat similar to or even a bit higher than Cycle 20, which had a maximum SSN of 110. If Cycle 23 continues the way it's going, the best guess is that it will reach a maximum SSN of about 120 in mid to late 2000. For a very detailed discussion of Cycle 23, check out **http://science.nasa.gov/newhome/headlines/ast16dec99_1.htm**.

Many of the very early predictions for Cycle 23 had it reaching levels as high as Cycle 22, which peaked at an SSN of 159. One of the most interesting predictions I saw was in the Winter 1998 issue of *Communications Quarterly*. The author, recognizing the known fact that solar cycles are really approximately 22 years in length when the magnetic polarity of the spots is taken into account, paired the even numbered cycles with the subsequent odd numbered cycle. The author noted that from Cycle 10 onward (oh, oh—here's a clue that things could go amiss—not ALL of the historical data followed the trend), each odd numbered cycle was bigger than its even numbered predecessor. Applying this to Cycle 22 and Cycle 23 says Cycle 23 should have been bigger than Cycle 22's SSN of 159. But as can be seen from **Figure 1**, this does not appear to be very likely now (nuts—I was really rooting for this particular prediction, too). Where did this, and other early predictions, go wrong?

Simply stated, the problem is that the physical process that generates sunspots is not known. Thus there is no model on which to base our predictions. We have to rely on historical data. On the surface, one might think that having 22 cycles worth of data (that's about 250 years) should be sufficient to allow us to accurately predict the future. But solar cycles have probably been going on for thousands, millions or even billions of years. That makes our 250 years of data a very, very, very small sample. Which means our predictions, especially those just made at the beginning of a solar cycle, can be very wrong.

Even though Cycle 23 isn't likely to be as big as Cycle 22, it's still going to be big enough for good worldwide F2 region openings on the higher HF bands. In fact, in the CQ Worldwide SSB and CW contests last October and November, respectively, 15 and 10 meters were loaded with signals from all over the world. As I write this, the ARRL 10-Meter Contest is going great guns and my wife Vicky, KB5EAM, is working the world as a Tech Plus Single Op Mixed Mode entry (another oh, oh—am I being phased out of my chief station operator position?). And I'm sure the ARRL DX contests this year will experience similar excellent openings on 15 and 10.

So we all know what to expect on the higher bands as we approach solar maximum—great 15- and 10-meter propagation. But what about the lower bands? What's going to happen to them as we approach solar maximum? Most of us have the notion that the lower bands will suffer. And indeed they will to a certain degree. Let's see why.

No doubt there will be less activity due to the migration to the higher bands. Why fight noise and weaker signals on 160 and 80 when you can get on 15 and 10 meters and work the world with big signals? In addition to this human issue, though, there are three ionospheric related reasons why the lower bands won't be as good at

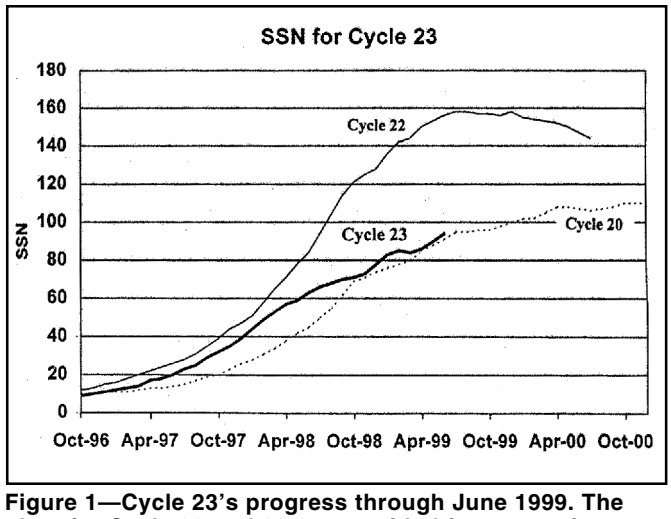


Figure 1—Cycle 23's progress through June 1999. The plots for Cycle 20 and 22 are provided for comparison.

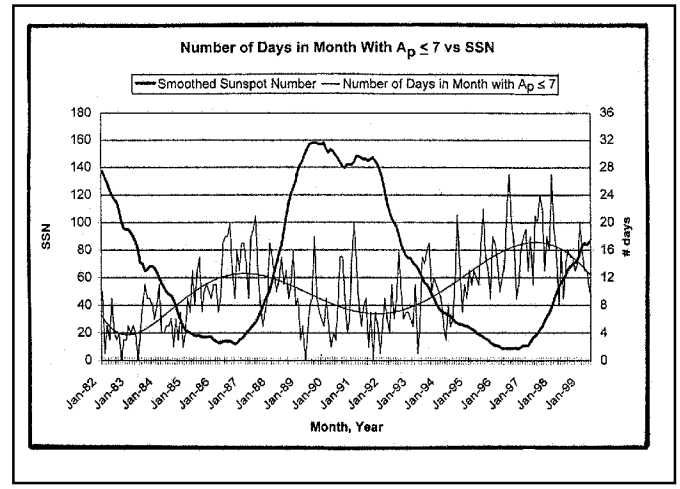


Figure 2—The variation of magnetic activity in relation to the SSN from just after the peak of Cycle 21 through June 1999.

solar maximum as at solar minimum.

The first is magnetic activity. **Figure 2** shows how magnetic activity varies over a solar cycle. The thick bold line is the SSN from the declining phase of Cycle 21 all the way through the rising phase of Cycle 23 (where we are now). The thin lighter line that goes up and down a whole bunch is the number of days in the month that the planetary magnetic index A_p was less than 7, signifying quiet conditions. Since this line is full of spikes, I added a trendline (I could have calculated the smoothed equivalent curve as is done for SSN, but it was easier to let the plotting software do the job with a trendline).

The trendline clearly shows how magnetic activity varies over a solar cycle. Magnetic activity is least where the trendline is highest (indicating the greatest number of days in a month with A_p less than 7). This minimal magnetic activity is at solar minimum and extends for a couple of years thereafter. Those of you who operated on 160 meters during the 1996, 1997 and 1998 seasons can attest to the great conditions then (thank goodness I decided in the fall of 1995 to start going after 160-meter DXCC). Magnetic activity then increases to maximum where the trendline is lowest (indicating the least number of days in a month with A_p less than 7). This is at solar maximum and for a couple years thereafter.

The second consideration for decreased low-band conditions is absorption. As a solar cycle increases, absorption increases. Since absorption varies as the inverse square of frequency, absorption will impact our lower bands the most as sunspots increase.

The third issue is kind of subtle and deals with the hop structure along a path. As a solar cycle increases, the nighttime E-region critical frequency increases. This means a higher elevation angle is needed to penetrate the E-region to get to the lower F-region. That means more hops —which means more loss due to ground reflection and absorption.

To summarize all of the above, as Cycle 23 continues to increase, the conditions on the higher bands will be nothing short of fantastic due to the increased sunspots. Sure, we'll have to put up with more disruptions due to magnetic activity, but you have to take the bad with the good. Conditions on the lower bands will not be as good as at solar minimum. But that doesn't mean you should abandon the lower bands. There's still lots of DX to work there—it'll just be tougher as the number of good days will be fewer and farther in between. And remember that paths that stay at lower latitudes won't be affected as much by magnetic activity, so they will still be usable. ■

Contest Tips, Tricks & Techniques

Gary Sutcliffe, W9XT
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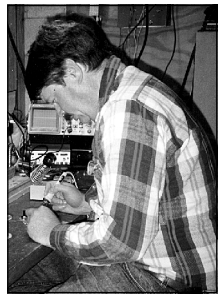
Measuring Improvement



W9XT

You participate in the same contests each year. You beat your score from previous years. Are you a better operator or has your station improved? Maybe your score is down. Are you starting to lose your edge or was it just conditions? With differences in propagation, activity levels and station changes, simple score comparisons with previous years don't tell the whole story. This month CTT&T takes a look at how some contesters evaluate their contest performance.

Although it does not tell the whole story, simple comparisons to previous efforts are a good starting point, and are used by a number of respondents including PY2NY, N3BB and K5ZD.

W4AU goes beyond year-to-year final score comparisons. John also looks at things like how the rates compare. He looks at best hours and best 10 minutes. He likes logging with *TR-Log* because he can keep track of those QSOs made by calling CQ and those made S&Ping.

N0AX and others suggested that you could account for propagation variations by including comparisons to other stations in your region. If you have improved compared to them, you can probably conclude that you have improved—even though your score may be down from previous years.

We have discussed the importance of setting goals before a contest in past installments of CTT&T. Several readers brought goals up again relating to this topic. You can set simple goals of total contacts and multipliers or you can get more complex. You can set QSO and multiplier goals by band, hour-by-hour rates, highest rates, etc.

You should set the goals to account for your best estimates on contest activity, propagation, station im-provements and the amount of time you expect to operate. These goals may be more realistic than simply using last year's score as a target. After the contest you can compare your actual results with your goals.

K9JY and W2GD monitor how long it takes to get through pileups. K9JY notes that you need multipliers to maximize your score, but too much time in a pileup breaks the rate.

With small children and a lot of travel, W3DQ finds it difficult to put in full-time efforts, but still is interested in improving his performance. Eric compares hours from previous contests. A secondary benefit is identifying the best time to put in additional hours, and figuring where the QSOs might come from and operating to maximize the opportunities.

Another way to judge your skill has appeared in the last couple of years. Better log checking by contest sponsors is now possible because of computerized logging and log checking programs. UBN (*Unique, Broken call, Not in log*) reports for your log are now available for some of the larger contests.

K9MA finds UBN reports a very rewarding way to measure performance. UBN rates are largely independent of conditions, geography and station sophistication. Scott feels that they are an excellent method of measuring operator skill. You can compare your efforts from the past as well as against other operators, regardless of differences in stations and locations. Scott gets great satisfaction in seeing improvements in his error rates.

K9JY also tracks his UBN rates. Scot notes that, besides personal satisfaction, the penalties from incorrectly copying calls and exchanges can make a huge difference in your score.

K9JY takes the ability to copy correctly one more step. He concentrates on getting the whole call the first time in a pileup. Scot monitors how often he needs repeats on calls. If he is asking for too many, he feels he needs to practice his pileup techniques. Repeats slow down the rate. His goal is to get every call right the first time.

A very subjective method of judging an effort is how you feel while operating. This was suggested by W4AU. As one example, John notes that after three contests operating SO2R he feels more relaxed and effective. He feels this translates into a performance improvement.

W2GD also uses his general feelings about the contest. He asks himself if he had fun or if it felt like work. He likes contests where he has the old thrill of feeling loud and consistently breaking pileups. Much of how he feels also depends on how well he met the goals he set before the start of the contest.

John looks for specific changes in the station or operating style that he wants to make next time. He makes mental notes of what went right and wrong, and often writes them down and compares them with others.

Station improvements can help in more ways than just improved signals. K5ZD relates to a saying—"Shiny wire always works better than old wire." Randy is referring to the natural optimism that occurs when you make a station improvement, especially in antennas.

K5ZD went on to relate experiences where things go well the first hour after 15 meters opens to Europe. He would get frustrated during the next two hours. Then Randy added a second antenna to form a stack. He noticed the frustration went away and could see the difference in the log. Yet, he rarely noticed much of a signal difference when switching between the different combinations of the stack antennas.

W2GD has an interesting method of rating his station. He notes if any of the equipment failed. Contests are hard on equipment, and a station that can consistently go the distance is something to strive for.

KB8N uses contacts between contests for rating his station. Paul notes the relative differences between the signal reports given and the signal reports received. He tries to give out honest signal reports, and he expects that he receives them over the long term. Paul also keeps his non-contest logs on the computer. He says that you tend to work many of the same stations over the years, and can look for trends in signal reports there. Finally, Paul keeps track of rare DX stations that call him. An increase in them can indicate that your station improvements are helping.

A couple of readers had humorous ways of checking their performance. Jim, K8MR, feels he has done well if his CQWW score from home was greater than 20% of K1AR's score. Ward, N0AX measures success by how often people try to steal his frequency. The better you are, the fewer try.

That wraps up this installment of CTT&T. Thanks go out to K5ZD, KB8N, K8MR, K9JY, K9MA, N0AX, N3BB, PY2NY, W2GD, W3DQ and W4AU for their comments on the topic of measuring improvements. Additional thanks to KB8N for suggesting this topic. If you have an idea for a topic that you would like covered in future CTT&T columns, please let me know.

Topic for May-June 2000
(Deadline March 4, 2000)

Design Your Own Contest!

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

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

Contesting for Fun

Ron Stark KU7Y
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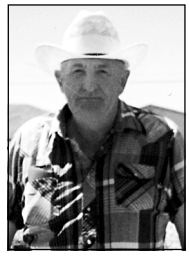
Setting a CQWW CW QRP Record from P40W

This issue we have a great story by John Crovelli, W2GD. It's all about how he came to set a new QRP record for the CQWW CW Contest. Finding out just what it takes to plan for and set a new record is fascinating and a real eye-opener!



KU7Y

John Crovelli, W2GD
w2gd@hotmail.com

John Crovelli, W2GD, at P40W

The Challenge

I think one of the greatest things about contesting is the wide variety of challenges this sport provides. Operators can choose to enter high power, low power, QRP, single band, multi-op, and variations of this list go on and on. Although most often I've chosen to slug it out for high power honors from both home and abroad, my most memorable contest experiences have been while operating QRP. After nearly 40 years of hamming, I'm still genuinely fascinated and amazed with how far a low power signal can travel. The challenge and excitement of working DX and breaking pileups running QRP is the type of thing I still find quite stimulating and satisfying.

But there is no substitute for operator experience, and this is especially true in what I call serious QRP contesting. In the early and mid-'90s, I regularly operated QRP in CQ WPX CW and ARRL SS CW. By using my New Jersey hilltop location and its assortment of monobanders, tribanders and wires to their best advantage, several of these QRP efforts turned out to be quite successful (two World High QRP scores in WPX CW and several second and third place finishes in ARRL SS CW QRP). Two years ago I piloted P40W to the current WPX CW QRP record. The challenge of QRP contest operating is something I look forward to, but it's definitely not for everyone. And having an excellent set of antennas certainly increases the enjoyment.

Last fall, with the rising sunspot activity, the existing CQWW CW QRP record set in 1991 by JA5DQH while operating from HI8A looked particularly vulnerable, especially from a "3 point" country in South America or Northern Africa. When I announced my intention to operate QRP from operating P40W in the 1999 CQWW CW, my fellow FRC members thought I had gone a little crazy. But I've wanted to do a QRP effort for some time, and this seemed the ideal opportunity.

Planning

The effort put into planning a QRP operation is probably more important than that needed for other classes of operation. Power can mask many station shortcomings. Attention to detail is especially important if you expect to achieve the level of station and antenna optimization needed to deliver the maximum possible signal on all bands. Likewise, operating strategies and expectations need to be adjusted to best address the smaller potential audience a weaker QRP signal commands. Special attention must be given to band selection, where to position your signal on a band for maximum "visibility," and setting general rules for switching between run and S&P modes. Finally, developing the right mindset is essential to overcoming the psychological challenges that are inherent in QRP operation.

I'm fortunate to have a proven contest location in a "3 point" country from which to stage serious QRP efforts. Bob, K4UEE/P40R and I have shared an Aruban station for nearly a decade. This past summer we invested 12 days entirely devoted to refurbishing the station's antennas and towers. Our original mast and 70 feet of badly rusted Rohn 25G were sandblasted down to bare steel, re-welded where necessary and painted with two or more coats of ZRC Cold Galvanizing Compound. A second tower of somewhat newer 60-foot Rohn 25G tower was added to the site and prepped with several coats of zinc primer as well. Virgin runs of RG213 coax were cut and attached to the set of Force 12 monobanders that we've been using with success on 40 through 10 meters for nearly 6 years on the 70-foot tower. Aruba is especially tough on antenna and tower hardware and careful preparation of all materials and connections is essential. In-spection of the towers upon my arrival for CQWW CW revealed that rust had already formed wherever we scratched the paint during our tower construction work just 4 months earlier. The salt air environment is totally unforgiving, and anything left exposed corrodes very quickly!

A high priority for this QRP effort was to have at least one gain antenna on every band—80 through 10 meters. A gain array for 80 was considered particularly critical, knowing from experience that it doesn't take much for a QRP signal to get lost in the QRM/QRN. A special antenna for 160 was never considered essential, figuring the potential reward didn't justify the effort. Operation on 160 would be limited to multiplier hunting.

After considering several possible 80-meter options—including phased verticals, multiple slopers, driven horizontal arrays, etc—the easiest solution seemed to be a 3-element parasitic array constructed with inverted-V wire elements that could be suspended from a rope catenary already strung between the two towers. More on this later.

Station Preparation

I purposely scheduled several extra days into this trip to allow sufficient time for station preparation, leaving New Jersey on the Saturday before CQWW instead of the more typical Tuesday departure. It seems there are always unexpected obstacles and never enough daylight hours to get everything working. This trip would prove to be little different. For those of you who haven't yet experienced an offshore operation, it invariably takes at least twice as long to accomplish almost anything you plan to do.

For instance, the weather in Aruba was anything but typical and made the work more arduous. Throughout the week the winds were very light and coming out of the west, making it feel very hot and humid. Normally the trade winds are blowing at 20 knots out of the east providing reasonably comfortable working conditions. Even though it had already been a week since Hurricane Lenny's odd trek through the Caribbean, the storm was still exerting its influence on the weather pattern. Normal conditions wouldn't return until the Sunday morning of the contest. Combating dehydration requires continuously consuming fluids, which in my case meant downing two cases of canned ice tea, two gallons of Gatorade,

various fruit juices and lots of ice water.

My informal schedule for getting the station ready for QRP operation went something like this:

Sunday: Fix the beverages, unroll the beverage feedlines, set up the equipment in the shack, test the Yagis.

Monday: Build, mount and tune the new 160/80 doublet on the main tower.

Tuesday: Prep the A4 tribander; wire and test the rotator on the second tower.

Wednesday: Build, raise, tune and test the new 80-meter wire Yagi.

Thursday: Raise the A4, and perform tower maintenance (eg: touch up painting).

Friday: Do as little physical work as possible.

Station equipment is simple and low tech (or is it low cost). The centerpiece is an aging Kenwood TS-930S trans-ceiver with stock 500 Hz CW filters and a very recently installed Piexx Digital Board for computer interfacing. An even older Ameco Nuvistor Preamp (yes, kids, this unit really has tubes inside) is still used to increase beverage signal levels on the higher frequencies (the preamp isn't needed on 160 and 80). A Daiwa watt-meter makes it easy to monitor power output and antenna performance. A Toshiba 386 laptop is loaded with *CT 3.17* for logging. After 20 years of competing from DX locations, I've found the bells and whistles offered on the newer and much more expensive radios unnecessary. And having a rig that is "field repairable" by a non-techie like me has saved the day on more than one occasion.

For the most part I was able to follow the setup schedule outlined above. The 160/80 doublet replaced two aging antennas that had amazingly survived nearly a decade of faithful Aruban service. Wire antennas must be constructed from insulated wire if you expect them to survive any length of time in this corrosive climate. As usual, the project didn't go very smoothly, the elements of the doublet kept wrapping around each other near the center insulator up at 70 feet, and I mistakenly cut the 80-meter elements about 3 feet too short for CW operation. Three trips up the tower, and numerous lowering and raising of the element ends to make length adjust-ments in the blazing sun took virtually the whole day. Afterward, I relaxed in the relative coolness of the shack with several cold cans of iced tea and a nice run on 15 and 10 meters that was easily started running between 5 and 40 W. It was my first chance to get an idea of what to expect running QRP during the coming contest weekend.

Most of Tuesday was consumed prepping the elements of a second-hand Cushcraft A4 tribander with plenty of No-Ox electrical grease and then wiring/testing the Ham III rotator system that would be used to turn this antenna up on our new Tower Two. It was maddening, because after several hours of attaching connectors and troubleshooting, I still couldn't get the rotator to turn on the floor in front of me. Somewhere a connection was not being made, but the cable connections on the 200 feet of heavy-duty cable all checked out correctly with a VOM. After the loan of another 9-pin cable connector from P43P the following evening, I was fortunate to finally resolve the problem (thanks, Jacob).

Early Wednesday morning I did the calculations needed to scale the plans provided by WX0B for a 75-meter array down to 3.525 MHz. A 500-foot roll of black No 12 insulated solid copper house wire (especially imported from Home Depot) was used to make the elements.

For those of you who might be interested (and have the necessary room and boom supports) here are the dimensions I used for a 3-element 80-meter wire Yagi cut for 3.525 MHz:

Director: 125 feet
Driven Element: 135.5 feet (+/-)
Reflector: 147 feet.

The boom is 95 feet long, 55 feet from the director to the driven element, and 40 feet from the driven element to the reflector. The driven element was fed with a 150-foot run of RG8X through a Bencher balun. Nylon string was attached to the ends of each element and they were pulled out away as far as possible, raising the tips to approximately 35 feet, high enough to create about a 135 degree angle at the apex point of each element. Care was taken to keep the elements parallel and properly spaced at the element tips. Pre-contest listening tests compared the beam to an inverted-V at 70 feet. It sounded like there was a marked improvement in signal strength on the few European signals heard. I was excited that this simple but relatively low array was actually delivering some gain.

By my standards Wednesday was a light work day, which afforded some time for an afternoon visit to the beach with P40J (WX4G) and later a little recreational operating time.

On Thursday the goal was to complete all the remaining antenna work. This meant getting the Cushcraft A4 up and rotating on the second tower. When P40J called me in the morning to say he wouldn't be able to come over and help, I quickly enlisted the assistance of my host Humphrey, a non-ham, but no stranger to ground crew duties after 6 years of having a ham station at his home. We managed to thread the A4 elements through the guy wires and the antenna was bolted on at 61 feet. Of course the reflector got bent cockeyed and required straightening. Then I noticed the rotator brake wasn't working; I could easily turn the antenna by hand. Fortunately the winds were so unusually light that the antenna was never blown out of the desired position during the contest.

With the A4 in place and rotating, all of the planned antenna work was completed and it wasn't even Friday! I celebrated by starting to paint the main 70-foot tower, working until well after the sun had set in the west. Following an untraditional Thanksgiving dinner of baby back ribs, the P40W shack was human-engineered for contest operation. Everything was in place and ready to go—almost.

As I mentioned earlier, the towers already had some rust spots and needed touchup painting to prevent further deterioration. Friday was my last opportunity to take care of this chore before departing Monday afternoon. Reluctantly I gave up what I'd planned as a beach opportunity. It took about 4 more hours to complete painting both towers, but it satisfied me that our investment was properly protected until the next visit.

About 3 PM Friday afternoon I helped Humphrey relocate a new 6,000 BTU window air conditioner from an upstairs bedroom to a recently created hole in the shack wall. In less than 30 minutes the unit was installed and operating. Given the rather hot and humid conditions, being able to operate in air-conditioned comfort proved to be a godsend over the contest weekend.

The tower painting must have made me especially tired because I had absolutely no difficulty falling asleep the afternoon before the contest, even in the afternoon heat of an upstairs bedroom. I awoke from a 3-hour nap feeling refreshed and somewhat anxious an hour before the contest bell.

The Contest

As mentioned earlier, considerable thought was given to operating strategies and band usage before the contest. The prior QRP operation from P40W had conclusively shown it was possible to run about 70 percent of the time, even on 40 meters. The big unknowns were how well the new 80-meter Yagi would work and who would be able to hear me on 160 meters. I expected to use 80 and 160 primarily as multiplier bands, and to otherwise operate on the highest frequency band that was open to either the US or Europe. This approach would be adjusted somewhat during the course of the contest but the key to success (and a new QRP record) would be to maximize 3-point W/VE contacts whenever possible. My "dream" pre-contest goals were to average 100 QSOs per hour, and operate about 42 hours. Sleep breaks were scheduled between European sunrise and local sunrise (0730 to 1030Z) both mornings. The QSO rate objective proved far too ambitious, but pre-contest estimates of Zone and Country totals were soundly exceeded on every band! Conditions on this particular contest weekend were nothing short of outstanding.

Another strategy followed throughout the contest was to CQ either up high or down low in the band, in theory avoiding

most of the QRM and maximizing "visibility." Favorite frequencies for CQing were anywhere 60 or more kHz up from the lower band edge or—when I got lucky—to park at the very bottom of the band on Double O One. As expected, most of the time CQing was more productive than S&P, and despite a less than dominant signal strength, there were few attempts to steal my frequency, especially while using the prime real estate on the low end.

That is not to say QRP operation doesn't create its share of frustrations. Having stations CQ in my face after calling them was a constant occurrence. I found shifting a few hundred cycles higher or lower and then trying 2 or 3 more calls seemed to get the attention of most operators. At times I'd have a relatively clear frequency and nice rate going when someone would move in close enough to give me discomfort or say "QRL" and then either not wait for a response or simply not hear my response. I knew it was totally useless to engage in frequency fights so for the most part I'd shift to another frequency when this happened. Looking for another clear spot was treated as another opportunity to go into S&P mode and find additional multipliers. Having the right mindset is important when operating QRP.

Breaking pileups, especially on rare multipliers, was the biggest operating challenge. I probably came across SU9ZZ a half-dozen times during the weekend but the size of the throng calling dashed any reasonable hope of working him. Sensing what is "workable" when operating QRP is very important. One technique I found to be particularly effective in breaking pileups was to call slightly off frequency and timing the call so it exactly coincided with the pileup's normal hesitation to listen for the DX station's response. In practice this meant waiting for the length of about one call sign before sending P40W. Sometimes it worked, sometimes not.

During the first 6 hours of the contest the rate equaled the envisioned 100 QSOs/hour goal. A 138-hour on 80 meters between 0500 and 0600Z brought the average up considerably. I was amazed by how well the 80-meter wire beam was working and adjusted the plan to include 80 as a "run" band.

Once European sunrise had passed I decided to keep operating rather than take the first scheduled rest break at 0730Z. I felt reasonably alert and the rate was holding between 50 and 60 an hour. When a strong urge to sleep would hit, I'd get up out of the chair and operate from a standing position. This got me through the worst periods of drowsiness and probably helped my overall blood circulation as well.

About 15 minutes after sunrise I moved from 40 to 10 meters. It seemed to be perfect timing since a run of Europeans was immediately established on 28.106. Activity from Europe was already spread out over 200 kHz, so a spot somewhere in the middle of the pack seemed to make sense. This is one of those magic periods when Caribbean stations have command of Europe, just before the band opens to the US. I managed a 150-hour, the best hourly rate up to that point, and ultimately my second best of the weekend. But at exactly 1200Z things changed dramatically, coinciding with sunrise on the US East Coast. I'd have sworn someone literally flipped a switch. My run almost immediately ended; it seemed as if no one could hear me anymore. With the rate nose-diving, I switched over to S&P mode for most of the next four hours, tuning up and down 10 and 15 meters working whatever I heard. At 60 per hour it certainly was not as good as CQing, but most stations were coming back on the first, second or third call. I suspect my antennas (at 60 feet or more) were too high for these wide-open band conditions.

The tide finally turned at 1600Z (noon local time). I was again able to run consistently on both 15 and 10, and managed to string together 6 consecutive 100+ hours. The peak was a 176-hour between 1800 and 1900Z on 10 meters, running mostly Ws. The old saying "there is no meters like ten meters" was proving to be true.

Beginning about 2100Z I started paying more attention to multiplier hunting and passing stations to other bands. This was especially productive between 2200 and 2300Z, when 33 new mults were added to the log in just one hour. 6V6U moved with me through 5 bands in less than 2 minutes. Several other stations were moved twice or three times. And I even managed to work some choice DX, like BD4ED, on 15 meters. WOW! That's real bang per watt!

The first day ended with 2032 valid QSOs, 433 mults, and roughly 2.6 million points in the log. The QRP record was already within easy reach.

It took only four more hours to equal the old QRP record of 3.3 million points. The score reflected the advantages of operating from a 3-point country in close proximity to North America combined with exceptional multiplier totals made possible by outstanding worldwide conditions. Another adjustment to pre-contest goals was made, deciding to shoot for a final score of 5+ million points, 400 or more countries, and a total QSO count of around 3300.

Conditions on 80 were extremely quiet Saturday night by Caribbean standards. Between 0235 and 0340Z I enjoyed another fabulous run of 122 contacts CQing way up on 3.573. Nearly every contact was logged on the first call without the need for repeats; it was that quiet. There was no longer any doubt that the 80-meter Yagi was working very, very well.

Immediately following the great 80-meter run, a chance tune across 15 yielded contacts with such far away goodies as V8A, JT1JA, 5N0W and UA0DC/Zone 19. WOW! Even after almost 40 years of contesting, experiences like these still get me "pumped!"

Another thrill was working CN8WW on 160 at 0534Z (their op came back on my first call, demonstrating how well those guys could hear!) But by 0730 I was having great difficulty staying awake and decided it was the right point to take a nap until local sunrise.

I only overslept about twenty minutes, returning to the shack at 1050Z. Ten meters didn't sound nearly as good as the first morning, and my attempt to get a European run going proved hopeless. Deciding to scan 20 meters I caught a lonely H44MX for a double mult (thanks, Paul). Like the previous day, a majority of the morning hours were spent in S&P mode rotating between 10 and 15 meters. I found OX/N6AA way up on 28.222 for a double and HC8N was smoking on 28.212. If you haven't been tuning for mults higher in the bands, it's time to change your operating style.

The remainder of the contest was spent trying to balance running with multiplier hunting. The rate stayed in the 50 to 85 per hour range with the exception of a fine 146 hour on 15 working mostly W/VE stations starting at 2000Z. A sampling of the great DX worked on Sunday: VU2PAI, TZ6DX, 9M2JI, 3B8/F6HMJ, A45XR, YB1SSG, S92CW, and VK6WR—to mention just a few.

Passing stations to other bands for multiplier credit is more typically a High Power operating technique, but even a QRP station can do it with success. About 50 multipliers were added to the P40W log as the result of band passing during the contest.

When the final bell rang, all of my operating goals had been achieved and the QRP record had been surpassed by more than 2 million points. I felt this had been one of the most unique, exciting and enjoyable contests I had ever experienced. The results were gratifying.

The continental breakdown confirmed

Table 1
The Continental Breakdown

	160	*80*	*40*	*20*	*15*	*10*	*All*	*Percent*
North America	20	307	346	357	426	460	1916	56.3
South America	4	7	9	15	22	16	73	2.1
Europe	0	111	186	129	305	472	1203	35.4
Asia	0	2	11	60	32	25	130	3.8
Africa	1	5	6	10	13	13	48	1.4
Oceania	1	0	6	9	8	8	32	0.9

that the strategy of working "easy" 3-pointers in North America had worked perfectly (see Table 1):

An hour or so later, P43P, P43E, P40E and I were enjoying the traditional Aruban post-contest dinner at our favorite open-air waterside restaurant. It was a chance to swap stories and decompress. Jose was raving about SO2R operation and how it had added so many additional multipliers to his P40E log. Jacob and Emily related how they had gotten their feet wet doing some slower speed CW operating during the contest. I added a few choice stories about the amazing DX that was worked running QRP.

The Aftermath

After dinner, it was immediately back to work in the shack disassembling the operating position in preparation for my departure the following afternoon. Fortunately I had had the foresight to prepare a detailed cleanup plan on Thursday evening knowing full well my mind would be mush after the contest.

I awoke early Monday morning to the sound of a pounding tropical rainsquall. More downpours would follow throughout the day, soaking me to the bone and slowing down my efforts rolling up and storing away about 1,300 feet of feedlines and control cables, disassembly of the 80-meter Yagi, relocating the ends of the wire antennas, pulling in the beverages, and putting a manual brake on the broken rotator up on Tower Two. So much work, so little time.

Overshadowing all of this was some uncertainty about how I would get to the airport later in the day. The hydraulic clutch cylinder on Humphrey's van had failed on Friday and he was in the process of repairing it. When time came for me to leave, the van was not fixed and the neighbor that Humphrey had hoped would provide my ride to the airport was nowhere to be found. It was now 45 minutes before flight time and counting down. Fortunately his sister-in-law responded to a last-minute telephone call and I eventually arrived at the airport just 25 minutes before takeoff time. Officially American Airlines had already closed out flight check-in but they were most accommodating. Airline personnel closely tracked my progress through airport security, customs and US Immigration. H-T equipped airline employees greeted me by name at several points along the route, reassuring me that I would make my flight to Miami. In the end, I was buckled into my seat less than 2 minutes before the scheduled departure. Whew, that was way too close. And yes, my luggage made the flight too!

Band	*QSOs*	*Zones*	*Countries*
160	26	7	18
80	424	17	61
40	555	25	77
20	574	28	81
15	788	32	90
10	971	30	94
Totals	3338	139	421

Claimed Score = 5,523,280 Points

I want to thank many special individuals whose efforts and co-operation helped to make this QRP operation so successful. First and foremost, my Aruban hosts Humphrey and Corrie, for their continuing hospitality and unfailing tolerance (think about how you would deal with a house guest who lays hundreds of feet of wire all over your yard). My new employer Bardess Group, Limited for agreeing to my request for a week's vacation after just 2 weeks with the firm. Jacob, P43P, for his ongoing counsel and supplying critical spare parts, tools and other resources. Jay, WX0B, for providing the 75-meter wire Yagi dimensions. Bob, K4UEE/P40R, for his efforts in preparing the station during his CQWW SSB visit. Jose, CT1BOH/P40E for helping with computer setup. Pete, NO2R, for installing the new Piexx digital board in my TS-930 on very short notice. K2TW, N2MM, N2VW, K3PH and W3BGN for supplying coax, rotor cable, spare keyers and other station equipment. Danny, K7SS, for continuing to encourage me (every year for the last decade it seems) to do a serious QRP effort from Aruba in CQWW. And finally many special thanks go to members of the Cherryville Repeater Association and the Frankford Radio Club for providing me with an unending stream of encouragement and technical assistance.

Next season, a QRP effort in CQWW SSB? I'm thinking about it. Hope others take the QRP challenge.

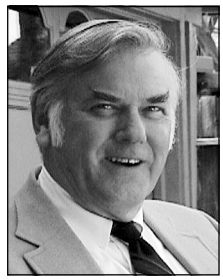
Thanks again John and good luck in your future efforts.

de Ron, KU7Y ■

International Contests

Joe Staples, W5ASP
w5asp@aol.com

Odds & Ends


W5ASP

It's New Year's Eve... really. I'm going to be gone in January when this column is due, so I decided to get it out now before anything goes "o o o p s" ... y o u know... those Y2K thingees. Kinda neat knowing that when you read this it will have been written during the last century.

Question... do you know what the Commonwealth Contest is? Yep, you guessed it—it's a contest for the folks in the British Commonwealth. I make it a point to include it in the Upcoming International Contests list for the benefit of our Canadian readers. What I recently discovered is that it is actually the BERU Contest. Give up? That's the *British Empire Radio Union* Contest. Turns out that there are over 125 call areas listed in the rules. Obviously the British Empire is not entirely a thing of the past. And according to the 1999 results the winning logs had more than 1000 Qs. Sounds like fun. Hope you guys in VE-land get involved during the Y2K event.

The BERU stuff was pilfered from Dave Goodwin's (VE2ZP) column in *The Canadian Amateur*. He's a good guy... he won't mind. While reading his write-up on the 1999 Commowealth Contest I also stumbled across an interesting link to John, VK4EMM's, home page. Turns out that John has a software package called *QuickScore* that reads a CT.bin file, and then scores it for the VK/ZL Oceania DX Contest, the JIDX Contests, the Commonwealth Contest and a couple of Australian contests as well (none of which are covered by *CT*). Sounds like a nice add-on. The site also has a bunch of other goodies, and is an excellent look at what's going on Amateur Radio wise "down under." Check out **http://www.uq.net.au/radiosport/news/software.htm**.

And there's more... still courtesy of Dave's column. Some of you may recall the old Can-Am Contest from the '80s. Well it seems that Yuri, VE3BMV (aka K3BU), who masterminded that event, has proposed a new contest—the "Tesla Cup." To quote Dave "there are some innovative ideas in his proposal." Surf

1999 YO-DX (Romania) HF Contest

Call	*QSOs*	*Mults*	*Pts*
United States			
K3ZO	197	85	97920
NO2R	83	46	24012
K6ZH	25	18	3024
WU4G	19	16	2432

Upcoming International Contests

RSGB Commonwealth Contest	11-Mar-00
Bermuda Amateur Radio Contest	18-Mar-00
Russian DX Contest	18-Mar-00
SP Polish DX CW Contest	01-Apr-00
JIDX CW High Band CW Contest	08-Apr-00
YU DX Contest	15-Apr-00
Holyland DX Contest	15-Apr-00
Helvetia Swiss Contest	29-Apr-00
ARI International DX Contest	06-May-00
CQ-M International DX Contest	13-May-00
Baltic Contest	20-May-00

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

1999 UBA (Belgium) Contest

Phone

Call	*Category*	*QSO*	*Pts*	*Mult*	*Score*	*Place*
N4MM	SO/10M	53	311	22	6842	10
VA3UZ	SO/15M	143	571	29	16559	23
XJ1HA	SO/AB	236	1050	93	97650	30
KS4XG	SO/AB	125	422	43	18146	90
K1BD	SO/AB	68	404	38	15352	96
W2UDT	SO/AB	46	260	28	7280	125
VA3IX	SO/AB	9	54	9	486	149

CW

K2YJL	SO/10M	56	300	21	6300	6
N4MM	SO/10M	54	286	17	4862	9
VE3KZ	SO/10M	61	195	10	1950	14
VA3RJ	SO/15M	15	28	4	112	35
W7DRA/4	SO/40M	10	19	2	38	31
N4AF	SO/80M	62	203	15	3045	27
XJ1HA	SO/AB	891	2159	95	205105	5
K2SX	SO/AB	375	1147	80	91760	26
K3ZO	SO/AB	314	1076	80	86080	27
VA3UZ	SO/AB	406	1144	74	84656	28
W3DAD	SO/AB	75	225	26	5850	90
VE2AWR	SO/AB	72	187	21	3927	95

CQ-M DX Contest 1999
North America
Single operator - Multi-band

CW		*SSB*		*Mixed*	
N4BP	303996	N8WTH	189	W7GG	105633
VA3UZ	247035	-		VE6JO	76275
N6AW	234899	-		N4MM	21070

Multi operator - Multi-band	KT0R	105800
Single operator - 7 MHz CW	KR1G	16308
Single operator - 14 MHz CW	N1XS	6156

1999 JIDX High-Band CW Contest

Call	*Category*	*QSOs*	*QSO Points*	*Mults*	*Score*
United States (Zone 3)					
K6XX	AB	418	543	110	59730
N6WS	ABL	405	525	112	58800
KF6GUH	ABL	57	57	79	4503
N6AW	28	79	158	29	4582
W7/JR1NKN	21L	26	26	18	468
United States (Zone 4)					
N0AC	AB	263	259	51	13209
W9RE	AB	113	115	42	4830
N7DR	AB	64	64	34	2176
K8NMG	ABL	41	41	30	1230
W9GXR	21	67	63	32	2016
K2YJL	21L	107	107	39	4173
KG4BIG	21L	26	26	22	572
K8UCL	21L	5	5	5	25
United States (Zone 5)					
KA2MGE	21	19	19	16	304
N4MM	21	10	10	10	100
W2YK	21L	52	52	28	1456
Canada					
VE7VF	AB	134	137	62	8494
VE6JO	21L	173	170	42	7140
VE5SF	21L	74	74	31	2294

on over to **http://members.aol.com/k3bu/TeslaCup.htm** and have a look.

Yeah… I know. This is beginning to look like a travel log of the Internet. Although I didn't intend to do an "isn't the Web wonderful" sort of thing, I'm here now so let me add a comment or two.

One of the more obvious obstacles to the continued health and happiness of contesting is the question of how to bring new players into the game. It occurs to me that if we could get potential contesters to visit some of the really good contest-oriented Web sites, these would provide them with an insight into contesting that our words could never convey. Between the photos, the audio clips, the operating stories, etc, it could be a powerful incentive to join in the fun. I'm pretty sure our esteemed Editor would entertain the idea of publishing a recommended site list now and then.

Where have all the old computers gone? If you're like me, they're stacked in the… (closet, attic, garage… fill-in-the-blank.) Just maybe they could be put to better use if they found their way into the hands of one of those who "aren't in the contest." Paper logging is the pits. But even an old 286/386 with a "freeware" version of logging software might get things started. (Heck, throw in a 2N2222 and a 1K resistor, and you might even get them on CW.)

'Nuff said from back in the last century. Have a happy next one!

1999 Canada Day Contest

Call	*Band*	*Score*
Single Operator QRP		
W3BBO	A	13340
NA3V	A	12540
K8CUL	A	9648
K3WWP	A	7446
K1RC	A	6948
Single Operator Low Power		
WA3HAE	A	64306
WA2LBJ	A	29808
K1QM	A	25200
W3SOH/1	A	23520
K5HP	A	23348
K2UK	A	15848
K4ORD	A	15120
W4YE/7	A	10800
W1PID	A	9600
K2EOB	A	8550
AA9KH	A	7980
N6RT	A	5408
N0WM	A	2500
AA6EE	A	1660
W7LQU	A	1380
N2NO	A	720
Single Operator High Power		
K4BAI	A	40544
N8II	A	19800
Multi/Multi		
N9DJ	A	50424
Single Operator Single Band		
W7DRA	80	1404
W9BZP	20	4950
K0COP	20	2220
N8LIQ	20	1742
N6NT	15	50692 (New Record)
N4MM	15	180

CQ-M DX Contest 1999, North America

Call	*Class*	*Total*	*QSOs*	*QSO Points*	*Mults*
Alaska					
WL7KY	SOMB-CW	55545	286	805	69
Canada					
VA3UZ	SOMB-CW	247035	683	1915	129
VE3UOL	SOMB-CW	41318	198	566	73
VE3IAY	SOMB-CW	32428	175	484	67
VE3ZT	SOMB-CW	25344	140	384	66
VE3VIG	SO-14-CW	3772	56	164	23
VE6JO	SOMB-MIX	76275	370	1017	75
USA					
N4BP	SOMB-CW	303996	750	2068	147
N6AW	SOMB-CW	234899	493	1459	161
K3JT	SOMB-CW	198616	586	1628	122
KM5G	SOMB-CW	178310	594	1621	110
K3WW	SOMB-CW	161880	499	1420	114
WD4AHZ	SOMB-CW	108000	364	1000	108
N4AF	SOMB-CW	90048	328	938	96
K2SX	SOMB-CW	55840	255	698	80
KE8M	SOMB-CW	40392	203	612	66
KR1G	SO-7-CW	16308	168	453	36
N1XS	SO-14-CW	6156	88	228	27
K9GY	SO-14-CW	3450	58	150	23
N8WTH	SOMB-SSB	189	9	27	7
W7GG	SOMB-MIX	105633	387	1067	99
N4MM	SOMB-MIX	21070	144	430	49
WO4O	SOMB-MIX	9193	119	317	29
N6RT	SOMB-MIX	4368	68	168	26
K3WWP/QRP	SOMB-QRP	4611	54	159	29
W7/JR1NKN	SOMB-QRP	345	16	23	15
KT0R	MOMB	105800	421	1150	92

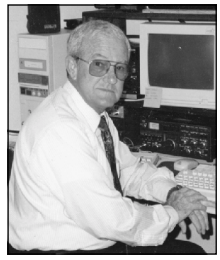
1999 Russian DX Contest

Place	*Call*	*Entry*	*QSOs*	*Points*	*DXCC*	*Obls*	*Total*
14	VE3KZ	A-MIX	294	1851	61	68	238779
22	W7OM	A-MIX	154	614	28	42	42980
24	N4BP	A-CW	696	3902	137	85	866244
31	N4AF	A-CW	439	2811	100	91	536901
49	AA3B	A-CW	300	1876	84	58	266392
105	K3WWP	A-CW	11	78	7	3	780
55	WA2NZA	A-SB	18	166	6	12	2988
57	N4MM	A-SB	9	72	5	6	792
58	VP5JM	A-SB	4	2	4	0	8
5	WL7KY	B-14	341	2007	34	51	170595
21	W5FO	B-14	175	663	33	35	45084
28	KS6A	B-14	44	278	5	24	8062
36	KC7WUE	B-14	7	38	2	6	304
18	N7DR	B-21	43	258	16	10	6708
23	WB0IWG	B-28	3	6	2	0	12

■

RTTY Contesting

Wayne Matlock, K7WM
k7wm@i10net.com


K7WM

First and foremost, I would like to establish the fact that I *do not* consider myself an expert or "Big Gun" contester. I relate more to a "little pistol"—of about .22 caliber with a somewhat bent barrel.

I enjoy RTTY Contesting and chasing RTTY DX. Over the years I have had the good fortune to participate in multi-multi, multi-single, and multi-two contest operations with some of the world's best contest operators. I would like to thank them for all the information, tips, sneaky tricks, experience, upset stomachs from too many polish sausages, camaraderie and fun that comes with contesting.

Continuing the tradition set by Ron, K5DJ, and Jay, WS7I, of submitting timely, informative, and interesting subjects and topics covering RTTY contesting, my columns will include articles from RTTY operators from all points of the globe. We will cover RTTY contesting from their QTH and perspective.

Future columns will carry articles about DXpeditions to exotic lands for RTTY contests, contesting using soundcards, 2, 3 and even 4 radios for single operator contesting, and articles about contest preparation from the gitgo. My goal is to encourage and provide the incentive for all hams to enjoy the digital modes—trusting they will give RTTY contesting a try, too.

Contest Preparation—*Before* Zero Hour

Several weeks or months prior to the actual zero hour, regardless of your level of experience and knowledge, contest preparation should consist of numerous steps, including: securing team members (if a multi operation is planned), accumulation of information, equipment check-outs, etc. Probably the first thing is deciding or determining if you are going to (1) Put in a serious effort, (2) Just give out your "rare" call to the Deserving few or (3) Hoping to increase your DX total.

Regardless of your decision, your personal comfort is paramount. The time you spend in front of your rig can become a nightmare if little physical annoyances turn into major burrs under your saddle. One can fine tune all you want, label all the coax fittings you have, and put up as many wires and Yagis as you can build or afford. What good is all that if three hours into the contest you are wishing it would hurry up and get over because you are sitting there in front of your rig feeling absolutely miserable.

Many years ago, when my eyesight was much better and my hands were much steadier, I shot big bore rifle competition. The individual World and Wimbledon Women's and Men's champions, Naomi and Milt, belonged to the same shooting club. They, like the radio operators I have operated with, were helpful by answering questions, and were most gracious in providing them.

Milt's shooting attire was old bib coveralls and Naomi's was a loose-fitting jump suit. On one particular day, Milt and I were pulling targets next to each other in the pits. I asked him why he wore those old bib coveralls. Between shots, he looked me in the eye and replied, "Because they are comfortable."

I learned more on the subject recently while taking part in a multi-multi operation. About one hour before the start of the contest, one of the top operators in the world made the statement that it was time to get dressed to contest. He then put on a cut off pair of lightweight sweats, a loose fitting tee shirt and then pulled a pair of slippers out of his ditty bag.

These were not ordinary slippers—they were bunny slippers, long ears and all. His foot size is about a 13½ so those slippers were bigger than a full-size bunny—more along the lines of a jackrabbit. I picked the operating position at the *far end of the table* where I had at least three ops between him and me… After about eight hours of operating things slowed down a little, so I asked him why he wore those funny looking slippers. Without cracking a smile, he said, "Because they kept my feet warm."

Both of the above clothing selections make sense. The goal is to get as comfortable as you can.

I wish I could say that after I got my own pair of bib coveralls I started shooting out the center of the target, but alas, that was not to be. However, I was a lot more comfortable and I did shoot a lot better. I am still resisting getting bunny slippers—even though I have to run the window air conditioner during the RTTY Roundup to keep the shack comfortable here in Cibola.

If you are just doing a two-hour sprint or just casually operating, you can do it in a suit and tie—but for the long ones, get yourself comfortable. Try a loose fitting pair of lightweight sweats or cotton shorts and a loose fitting top. I might suggest trying some old bib coveralls if it's cold enough. You will feel a whole lot better six hours down the road.

RTTY is gaining popularity around the world. I find myself in admiration of some of these individuals who are so far away from the maddening crowds, manufacturers, equipment outlets, information sources, etc. Despite all of these challenges, they persist in getting their RTTY signal on the air, not only for ragchewing but also for actively contesting.

I thought it would be interesting to hear from such a person. Our guest columnist this month is Nuradi, YB0UNC, who sent the following to me.

RTTY—An Alternative Mode for Contesting and Achieving DXCC

By Hendrarto Nuradi, YB0UNC
yb0unc@amsat.org, yb0unc@arrl.net

I have been a ham since 1986 when I obtained my Novice class license. At first, I was very fond of CW, especially since this is the only mode for chasing DX countries with low or QRP power. In 1987, I got my General class license, which allowed me to make DX QSOs. I was very active on CW until 1990 (I had obtained my Extra class license in 1988).

That year I met my senior, Robby, YB1BG, in our office, who told me about satellite communication. He was also active on RTTY at that time. From 1990 until 1993, I was active on the satellites (especially in data modes) and packet radio modes on HF, VHF and UHF. I was not very active between1993 and 1997, until the "political and economical" crisis hit our country. This "freed" my time up to return to my favorite hobby, Amateur Radio.

Getting Started in RTTY

I was very active on CW from 1997 until early 1999, when I read an article in the *NCJ* written by Randy, K5ZD, featuring a new *Windows*-based

Nuradi, YB0UNC

contesting software—*WriteLog*. I had been searching for some good contesting software—I planned to be more serious in contest events to increase my DXCC country total.

Last June, Ron, K5DJ, allowed me to download the latest version of *WriteLog* several days before the ANARTS RTTY 1999 contest began. I was able to install and arrange several windows in preparation for the contest.

My first RTTY QSO was with Allen, W7AM. This very interesting and enjoyable RTTY QSO made me fall in love with this mode. Later, still prior to the ANARTS contest day, I met Wayne, K7WM, also on RTTY, who told me about several interesting RTTY/PSK31 Web site addresses—as well as the RTTY reflector. I also met Glenn, AE0Q, who gave me my longest PSK31 QSO, around 90 minutes. In fact—that was the longest QSO that I have ever made. All of these contacts were made with only 20 W into a 5-element monoband homebrew Yagi at about 100 feet.

Later on, I worked Keppie, VK2DSG, using PSK31. Keppie worked me on three bands in a row. One contact was around 14.070 MHz—amongst big AMTOR signals. That proved to me that PSK31 is indeed one of the more interference immune HF digital modes—again with only 20 W RF power.

Those first days made it clear to me that RTTY and PSK31 offered another way to contest and achieve DXCC using moderate RF power and moderate station equipment—an HF transceiver, an antenna and a PC with a sound card. No TNC is required as long as you use appropriate software such as *WriteLog*.

Currently, only two stations from YB-land are active on this HF digital mode during contests, Anton, YB5QZ and me.

Happy RTTY and PSK31 QSOs. I will see you all in the contest events!

73, Nuradi, YB0UNC

That's all for this issue. A grateful thanks to Nuradi for the very fine article. Any input for future articles would be appreciated and can be sent to me at **k7wm@i10net.com**. See you in the contests.

Upcoming RTTY Contests

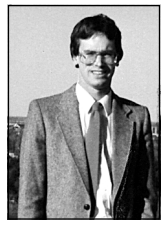
NCJ RTTY SPRINT	0000Z to 0400Z March 12	
BARTG WW RTTY	0200Z March 18 to 0200Z March 19	48 hours. Single op 30 of 48 hours
EA WW RTTY:	1600Z April 1 to 1600Z April 2	24 hours

■

VHF-UHF Contesting!

Jon Jones, N0JK
n0jk@hotmail.com

Contest DX-Ventures for the VHF-UHFer


N0JK

Operating a contest from a DX location is not just for the HF operator. I just got back from Barbados where I operated in the ARRL 10-Meter Contest. But the most memorable operating experience was working a major 6-meter F2 opening to the eastern US and Canada Monday morning after the contest on December 13, 1999.

Running a MFJ-9406 at 8 W to a 3-element Yagi I made 240 contacts from Florida north to New England and west to Kansas and New Mexico. What a thrill to be on the DX end of a F2 opening! Signals were loud both ways and numerous QRPers and mobiles were worked. At the peak of the opening I was logging 5 to 6 contacts a minute. (The on-line log check for my 8P9JO 6-meter operation is available at **http://dx.qsl.net/logs**).

This was a classic *disturbed solar conditions north-south enhanced F2 opening* as the K index had peaked at 6 earlier. This type of opening can occur during the January VHF Sweepstakes as well—imagine running 6 meters from a warm sunny island while stateside contest ops are knocking ice off their antennas. Tropo can be a major propagation mode in the January VHF Sweepstakes.

If you are interested in operating a VHF contest from a DX QTH, now is the time to do it; the peak of the solar cycle will occur this year through early 2001. It is not that difficult or expensive if you plan thoroughly and carefully.

How to Get Started

Sean, KX9X's, *DXpedition Destinations* and Joe Pontek, K8JP's, *The Contest Traveler* columns here in the *NCJ* provide a wealth of information. The *Contest DXpedition Planner* series by Dennis Ashworth, K7FL (see *The Contest Traveler*, May/June, July/August, and September/October 1999 *NCJ*), covered the generic details of how to plan an operation from a DX site. Read these as a start.

I would recommend that for your first DX VHF contest operation, rent a site that already has towers, antennas and a station set up. Trying to bring and set these up yourself is a daunting task. At least get some DX operating experience at a rental site first or go with a seasoned group. Sean's QTH Rental Web page, **http://hobbes.ncsa.uiuc.edu/sean/qthlist.html**, has many listings. While most of the choice operating sites are booked years ahead for the major HF contests, the VHF contest dates are often open. The Bahamas, Belize, Bermuda, Caymans, Turk and Caicos Islands, the US Virgin Islands, Aruba, Barbados, Antigua, Panama and Bonaire are good examples of potential sites and some have stations already set up that may be rented—some even with VHF antennas already installed.

What VHF Contest Should I Choose?

The answer is *any* of the major VHF contests. The June and September VHF QSO Parties and the January VHF Sweepstakes could see 6-meter openings from Central America and the Caribbean to the United States and Canada. Openings could occur to other parts of the world as well. The June VHF QSO Party usually will not have F2, no matter how high the solar flux is. But widespread sporadic E is common and many DX sites are within double-hop Es range, with the Bahamas and Bermuda just one hop from much of the eastern seaboard.

In the 1996 June VHF QSO Party, VP5H in the Turks and Caicos Islands, made over 600 contest QSOs on 6-meter Es. Just last year VP2E caught a spectacular all day multi-hop opening on July 4 working hundreds of European and stateside stations on 6 meters. For the more adventurous, CY9, CY0 and FP are occasionally activated during June.

Two-meter Es may appear within single-hop Es range and tropo is always a possibility. The June 1998 VHF QSO Party saw strong tropo from Cuba to the Gulf Coast and on May 10, 1998, HR6OGS on Roatan Island off the north coast of Honduras popped up on the New Port Richey, Florida 146.640 MHz 2-meter repeater.

The September 2000 VHF QSO Party could see some 6-meter Es, but more likely F2. North/south paths may open during minor/major solar storms and sometimes even during quiet solar conditions if the flux is high enough. F2 backscatter is another mode for making contacts if the direct path is not open. I had Trans-equatorial propagation (*TEP*) almost every evening into South America from Barbados last December. Signals were often strong and there are many South Americans to work on 6 meters. Unfortunately, the ARRL rules for the VHF Contests state "foreign stations work W/VE amateurs only." Tropo may occur across the Caribbean to the East Coast of the United States. There have been tropo openings from KP4 and KP2 to the East Coast reported during the early fall months. A major tropo opening could see hundreds of contacts into the States on 144, 432 MHz and higher.

The January 2000 VHF Sweepstakes will be history by the time you read this, but there could be some interesting DX possibilities in the 2001 running of this contest. For starters, it will be warm in the Caribbean while cold back home during this contest. A 6-meter F2 opening is possible during disturbed solar conditions. Tropo is possible to the Gulf Coast and Florida. Double-hop Es, though not frequent, does appear during the winter months and make possible contacts from Central America and the Caribbean into the states.

I made about a half-dozen double-hop Es contacts from Barbados into Arkansas, Illinois, Missouri and Texas on December 10. On January 3, 2000, ZF1DC worked double-hop Es all the way to the US West Coast. In January 2000 there was a major tropo opening from the 10th through the 12th with many 2-meter contacts between Texas and Florida. On the 12th, W0EKZ in EM17 (Kansas) worked into EL95 in south Florida, and XE2OR in DL98 worked stations in Texas and on the Gulf Coast.

EME is another mode that can be utilized in any of the VHF contests. Bringing a complete high-power EME station to a foreign country is a major undertaking—although it can be done—as K6MYC has shown time and time again. Mike operated 2-meter EME last fall with Jimmy, W6JKV, from St Lucia, making over 70 contacts in 19 countries. Their antenna was a 4 × 2MXP20 (40 elements in both planes with polarity diversity.) The gear was a Yaesu FT-100, a homebrew 8877 amplifier and an ARR 0.5 dB noise-figure preamp.

EME contacts are possible with much less. Several of the "big guns"—such as W5UN and KB8RQ—are workable at moonrise and moonset with 160 W and a 3.2-wavelength Yagi on 2 meters. If you want to try working these guys from a DX location, let them know in advance that you are going and set up a sked.

What VHF Gear Should You Bring?

While some of the DXpedition contest QTHs have HF gear on site, most will not have VHF/UHF gear or antennas. For 6 and 2 meters, one of the HF/6/2 radios such as the ICOM IC-706MkII would

work well to start with. This would put you at the 100 W level on 6 meters, and with a brick amp you could have 160 W on 2 meters. I would strongly recommend bringing a backup radio. You will have gone to too much trouble and expense to have your trip ruined by a failure in your only radio.

While in Barbados my primary 6-meter rig and amplifier failed. I had an MFJ-9406 along as a spare radio and it certainly "saved the day," allowing me to make many contacts during the F2 opening. The Ten-Tec 6 and 2-meter transverters can be used with a HF rig so they are potential backup components. A kW amp for 6 meters is great—but heavy and difficult to transport.

A 3 or 5-element Yagi for 6 meters and a 2.2 or 3.2-wavelength Yagi for 2 are suitable DXpedition antennas. If the antenna is "UPS shippable," I have found that a ski bag is a good way to bring them on overseas trips. The antennas have traveled fine. Curious custom agents are used to tourists carrying water skis and camping equipment and have ignored the bag so far.

Check with the QTH rental owner regarding how you may put up the antennas *before* you go. Verify the availability of VHF quality coax, too. Joe, K8JP, notes the Pelican 1650 carrying cases are rugged, waterproof, and a great way to transport your precious radios. To quote from one of his earlier columns "They are not cheap, but may 'save the day' while your equipment sits outside in a tropical downpour while you are negotiating with an irritable grass shack-sheltered Customs agent."

Check to see if you need to bring a 12 V power supply. Are there reliable power sources at the station? Is there a backup generator? Any potential TVI concerns? Power line noise?

Bring a laptop computer for logging, a tape recorder, a VHF SWR meter, jumper coax cables and spare connectors. Licensing is unique to each country but your rental contact should be able to provide helpful information. Some countries require that you apply for a license months in advance. Others, such as Barbados, require you to show up "in person" and pay a fee. Be sure to bring a copy of your US license.

Allow plenty of time to get to your destination, get set up and comfortable with the place and the radio conditions in that area. Traveling and dealing with customs/license agents can be exhausting, and most things seem to take longer than planned. Again, read the information in previous issues of the *NCJ* and, when possible, speak with others who have operated from foreign countries. Proper preparation will serve as a promise that your trip will be memorable and enjoyable!

VHF Contest Preparation

By Mark Wasserbauer, N2YB
(*From The Rochester VHF Group "*Contest Corner*"*)

Pre-contest

Make an operating plan and make your best effort to meet it.

Post it where you can see it while operating.

It's OK to be optimistic, but be realistic.

Based on your target Q and grid count, determine your target score.

Reach at least 50% of the target score the first night.

Set milestones during the contest and reward yourself with breaks. (Some will disagree with this because if you don't "stay in the chair in front of the radio" you may miss contacts and short openings.—*'JK*)

Know your station and weaknesses and develop some work-arounds.

New Projects

Work to completion on each—it is better to have one improvement completed and working than three half finished and not working. Clear a weekend for this if possible.

Operating Ergonomics

Complete control within arms reach.

A 24-hour clock set to WWV right in front of your face at the operating point.

Think about what you need or want at your control point and set it up.

Rest the body *and* the mind.

Get plenty of rest the night before the contest, especially if you intend to operate aggressively.

Never underestimate the value of a good night's rest.

Eat nutritiously—fruit, vegetables—you know.

Skip alcohol until after the contest.

The day of the contest should be free of stressful activities prior to the contest.

Saturday Morning

Fire up the station and make a final check of all your equipment, including the rotators.

Start your logging program, set your clocks and enjoy the morning doing something other than radio.

30 minutes before the start, check for unusual propagation.

2 meters is probably the most popular band for single ops to start the contest. 6 meters is also a good choice. (Especially in June.—*'JK*)

I think the best frame of mind to be in at the start of the contest is being relaxed and focused on the operating plan you have made for yourself.

—73 and Good Luck, Mark, N2YB

Web Hot Tip

The Down East Microwave Web site has an extensive library of microwave related articles and information that may be of interest. Titles include "*Generic Transverter Interfacing*" by Steve Kostro, N2CEI; "*GaAsFET Biasing*" by Al Ward, W5LUA, and "*2304 and 3456 MHz No-tune Transverter Updates*" by Steve Kostro, N2CEI. See **http://downeastmicrowave.com/library.htm**

Next Issue

Tips for contest operating. ■

Contest Calendar

Compiled by Bruce Horn, WA7BNM

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

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!

March 2000

ARRL International DX Contest, Phone	0000Z, Mar 4 to 2400Z, Mar 5
World Wide Locator Contest	0000Z, Mar 11 to 2400Z, Mar 12
Southern African HF Field Day	1000Z, Mar 11 to 1000Z, Mar 12
RSGB Commonwealth Contest, CW	1200Z, Mar 11 to 1200Z, Mar 12
QCWA QSO Party	1900Z, Mar 11 to 1900Z, Mar 12
North American Sprint, RTTY	0000Z-0400Z, Mar 12
UBA Spring Contest, CW	0700Z-1100Z, Mar 12
Wisconsin QSO Party	1800Z, Mar 12 to 0100Z, Mar 13
High Speed Sprint, RTTY	1800Z-2200Z, Mar 12
Bermuda Contest	0001Z, Mar 18 to 2400Z, Mar 19
BARTG WW RTTY Contest	0200Z, Mar 18 to 0200Z, Mar 20
Russian DX Contest	1200Z, Mar 18 to 1200Z, Mar 19
Virginia QSO Party	1800Z, Mar 18 to 0200Z, Mar 20
CQWW WPX Contest, SSB	0000Z, Mar 25 to 2400Z, Mar 26

April 2000

SP DX Contest	1500Z, Apr 1 to 1500Z, Apr 2
EA RTTY Contest	1600Z, Apr 1 to 1600Z, Apr 2
Japan Int. DX Contest, 20-10m	2300Z, Apr 7 to 2300Z, Apr 9
QRP ARCI Spring QSO Party	1200Z, Apr 8 to 2400Z, Apr 9
His Maj. King of Spain Contest	1800Z, Apr 8 to 1800Z, Apr 9
UBA Spring Contest, SSB	0700Z-1100Z, Apr 9
Australian Postcode Contest	0000Z-2359Z, Apr 15
YU DX Contest	1200Z, Apr 15 to 1200Z, Apr 16
EU Spring Sprint, SSB	1500Z-1859Z, Apr 15
Michigan QSO Party	1600Z, Apr 15 to 0400Z, Apr 16
Holyland DX Contest	1800Z, Apr 15 to 1800Z, Apr 16
SP DX RTTY Contest	1200Z, Apr 22 to 1200Z, Apr 23
Helvetia Contest	1300Z, Apr 22 to 1300Z, Apr 23
Six Club Sprint	2300Z, Apr 22 to 0400Z, Apr 23
Florida QSO Party	1600Z, Apr 29 to 0159Z, Apr 30 and 1200Z-2159Z, Apr 30
Ontario QSO Party	1800Z, Apr 29 to 1800Z, Apr 30

May 2000

10-10 Int. Spring Contest, CW	0001Z, May 6 to 2400Z, May 7
Indiana QSO Party	1400Z, May 6 to 2300Z, May 7
ARI International DX Contest	2000Z, May 6 to 2000Z, May 7
VOLTA WW RTTY Contest	1200Z, May 13 to 1200Z, May 14
FISTS Spring Sprint	1700Z-2100Z, May 13
CQ-M International DX Contest	2100Z, May 13 to 2100Z, May 14
Major Six Club Contest	2300Z, May 19 to 0300Z, May 22
EU Spring Sprint, CW	1500Z-1859Z, May 20
Baltic Contest	2100Z, May 20 to 0200Z, May 21
CQ WW WPX Contest, CW	0000Z, May 27 to 2400Z, May 28
QRP ARCI Hootowl Sprint	2000-2400 local, May 28
MI QRP Club Memorial Day CW Sprint	2300Z, May 29 to 0300Z, May 30

June 2000

WW South America CW Contest	0000Z, Jun 3 to 1600Z, Jun 4
IARU Region 1 Field Day, CW	1500Z, Jun 3 to 1500Z, Jun 4
ANARTS WW RTTY Contest	0000Z, Jun 10 to 2400Z, Jun 11
Portugal Day Contest	0000Z-2400Z, Jun 10
Asia-Pacific Sprint, SSB	1100Z-1300Z, Jun 10
TOEC WW Grid Contest, SSB	1200Z, Jun 10 to 1200Z, Jun 11
ARRL June VHF QSO Party	1800Z, Jun 10 to 0300Z, Jun 12
All Asian DX Contest, CW	0000Z, Jun 17 to 2400Z, Jun 18
Marconi Memorial HF Contest	1400Z, Jun 24 to 1400Z, Jun 25
ARRL Field Day	1800Z, Jun 24 to 2100Z, Jun 25

■

Results, August 1999 NAQP CW Contest

Bob Selbrede, K6ZZ
k6zz@ccis.com

Sorry for the delay in reporting the August 1999 results folks. Pressing work assignments got the best of me this time around. This running of the NAQP CW Contest was typical of the Summertime events although activity was slightly above par compared to last Summer. When the dust settled and the logs were checked, Bill, W4AN, wound up on top with Tom, K5RC—last January's winner—coming in second. Following close behind were frequent Top 10ers, K3MM and K6LL. Checking into the Top 10 for the first time were N6RT (at W6EEN) and W2UP. Nice to see some new call signs in "The Box." Finishing on top for the first time in the Multi-Two category was W5NN. Congrats. They've been working hard for the top spot for several years and I'm glad to see that they finally made it.

The venerable Team Competition was lively as usual with my SCCC brethren finishing on top again. It never ceases to amaze me how popular the Team Competition has become. It adds another dimension to the contest and helps stimulate activity thanks to clubs like the Tennessee Contest Group sporting upwards of 4 to 7 teams; and they all submit their logs!! Dave, K6LL wins the Combined CW/SSB Award for the 4th time in the last 4 years. Way to go Dave. I heard Dave was adding a wing to his house to display his collection of NAQP Awards. I've expanded the listing to the Top 10 to give more depth into this portion of the contest.

As most of you are hopefully aware, there have been some changes in the NAQP Rules that took effect with the January 2000 contests. Most notably was the reduction of the maximum power level to 100 W. Please take a moment to read through the new rules, published in the Jan-Feb 2000 issue of the *NCJ* and on the *NCJ* Web Site, and note the

Top 10 Combined Scores

Call	*CW Points*	*SSB Points*	*Total Points*
K6LL	404	496	900
AD6DO	336	500	836
N6RT	393	399	792
KB3AFT	321	376	697
K4WX	329	365	694
K9DX	263	330	593
N0AV	267	320	587
W5WMU	255	330	585
N6KI	219	344	563
XE2DV	219	338	557

Top Score Breakdowns

Single Op Breakdowns

Call	*Score*	*QSOs*	*Mults*	*160M*	*80M*	*40M*	*20M*	*15M*	*10M*	*Team*
W4AN	193,185	795	243	65/26	125/40	231/46	226/53	101/43	47/35	SECC #1
K5RC	175,980	838	210	17/7	99/34	186/47	289/57	217/46	30/19	NCCC #1
K3MM	160,083	693	231	51/22	94/34	196/47	162/53	122/42	68/33	PVRC
K6LL	156,148	758	206	5/3	42/26	165/48	298/54	203/50	45/25	SCCC
K5GN	154,812	679	228	43/20	104/36	173/49	190/52	117/41	52/30	Armadillo CG
W6EEN (N6RT)	151,872	791	192	10/6	94/32	215/44	230/52	229/49	13/9	SCCC
W2UP	146,046	723	202	41/21	132/40	216/46	233/52	93/37	8/6	
AD6DO	129,646	781	166	8/4	46/20	215/44	302/52	205/43	5/3	SCCC
VE3EJ	129,570	617	210	61/27	112/38	182/40	139/44	89/37	34/24	
WC4E	129,030	690	187	31/18	85/29	194/46	243/51	115/31	22/12	FCG #1

Multi-Two Breakdowns

W5NN	218,085	1005	217	20/10	138/37	319/50	314/54	178/44	36/22	
W0UO	136,374	714	191	32/15	131/37	255/49	194/47	85/31	17/12	
KT4ZX	46,500	375	124	16/12	61/26	128/36	121/34	49/16	0/0	

Team Scores

1. Southern California Contest Club		2. Tennessee Contest Group #1		3. South East Contest Club #1	
K6LL	156,148	K4WX	127,218	W4AN	193,185
W6EEN (N6RT)	151,872	W4PA	120,521	K4NO	99,882
AD6DO	129,646	K4RO	114,100	AA4S	80,017
W6UE (W4EF)	88,183	K1KY	89,358	W4OC	78,029
N6KI	84,781	K1AO	75,920	K4BAI	54,384
Total	610,630	Total	527,117	Total	505,497

4. Potomac Valley Radio Club (K3MM, WP2Z, K4MA, W2CS, NT4D) 433,616
5. Ozark Contest Club #1 (K5GO, KM5G, W5YM, AB5SE, K5OY) 346,707
6. Armadillo Contest Group (K5GN, N7FO, W5ASP, K5WA) 334,962
7. Tennessee Contest Group #2 (W9WI, K4LTA, NA4K, N4IR) 301,902
8. Northern California Contest Club #1 (K5RC, K6AW) 296,692
9. SMC Full Timers 1 (K9DX, K9MMS, W0UY, W9RE) 274,112
10. Kentucky Contest Group (N4GN, K4FXN, AA2GS, K4FU) 260,070
11. Florida Contest Group #1 (WC4E, N4BP, KL7/WD4AHZ) 247,694
12. Palestine Ohio Lib Org (W7G, N8BJQ, KU7Y, N9AG) 245,424
13. Minnesota Wireless Association (N0KK, NA0N, K0AD) 228,942
14. Mad River Radio Club (K9TM, KU8E, K8MR) 198,786
15. Weekend Warriors (K3CR, WA3HAE, WA3SES) 187,046
16. Tennessee Contest Group #3 (K3WU, K0OU, KE4OAR, K4BEV) 164,554
17. SMC Full Timers 2 (WT9U, KJ9C, KI9A) 124,503
18. Tennessee Contest Group #5 (W4NZ, WO4O, AC4ZD, KD4BAM, N4PQV) 109,398
19. Tennessee Contest Group #4 (N4VI, N4DW, N4KN, N5NW) 107,086
20. Northern California Contest Club #2 (K6ZM, K6CTA) 100,728
21. Potomac Valley Radio Club - JV (K2YWE, NX9T, KI7WX) 93,561
22. South East Contest Club #3 (K4IQJ, AA4GA) 88,250
23. Team PED (W7NX, WL7KY, KI7Y) 70,241
24. Ozark Contest Club #2 (W5KI, KJ5WX, K5FUV) 66,522
25. South East Contest Club #2 (W4NTI, N1CC, AA4LR) 39,410
26. Tennessee Contest Group #6 (K3CQ, KU4LL, N3DEL) 16,263
27. SMC Part Timers (K9BG, N7IN) 15,486
28. QRP SWAT (K3WWP, K8UCL) 7,079

NAQP Plaque Donors and Winners

The following plaques are awarded to the winners of August NAQP Contests. Congratulations to the winners and a very special thanks to the Contest Clubs who made these awards possible.

Award	*Winner*	*Donor*
Top Single Operator CW Score	Bill Fisher, W4AN	Florida Contest Group
Top Multi-Two CW Score	W5NN (N5TU, K1OJ, K5NZ)	Texas DX Society
Top Single Operator SSB Score	Dan Craig, AD6DO	South East Contest Club
Top Multi-Two SSB Score	N5RZ (N5RZ, KT5E)	Tennessee Contest Group
Top Combined CW/SSB Score	Dave Hachadorian, K6LL	Southern California Contest Club

changes. Also, please take note of the NAQP Plaque Winners and Donors information I've included in this column. Next time you have the chance, be sure to thank these fine organizations for their support. It would be difficult to maintain our FB awards program without the help of our plaque sponsors and the American Radio Relay League (*ARRL*) who provide the NAQP Certificates for all three modes of the contest. Until next time, 73 de K6ZZ.

Soap Box

Conditions on the high bands were poor for me but once we moved onto 40/80, we were in business.—*AA2GS*. First try at this contest. Conditions could have been (a lot) better on the high bands. Great being able to run barefoot with shack A/C straining and 100 degrees outside!—*AA4S*. This was my first ever NAQP CW contest. I had a lot of fun but wish 10 and 15 had been better. Can't wait 'til the next one!—*AA5AU*. My first NAQP in 3 years because I decided to focus on college 100%. I enjoyed being QRV again in such a great contest. No contacts on 10 and 160 meters hurt my multiplier total—*AC4WO*. Thanks to Jim, WA3FET, for the use of his station. Hope conditions improve for the next summer running of NAQP CW!—*K3CR*. Conditions were pretty poor overall as many have noted. However, fearing a trouncing on 10 meters, I sat down and called CQ there for a while and gradually worked a bunch of multipliers on some very weak and mostly skewed paths. Too bad the Qs didn't follow! I saved a little time for 80 and 160 at the end, but was disappointed as nothing really developed there late. As usual, NAQP is always fun and NEVER the same! It's one of my favorites... short and sweet like our new baby girl Tayler!—*K3MM*. Murphy wiped out the CW filter in the IC-736, so ran the contest wide open. I'm sure that lowered the score a bit, but all in all had a lot of fun. Ten meter conditions were pretty bad, with heavy QRM from the South American CBers. Creativity in the name department continues. Believe I copied all of the off the wall ones okay. Looking forward to January—*K4LQ*. Really poor conditions from Western Arkansas. Had really good fun, though. The conditions allowed for a more leisurely pace and, after 10 hours, I was not fatigued at all. The 45 minute shortage was for a fish fry that took precedence over the noise and QSB!!!—*K5OY*. Had to bail out of this one hours before the end. Hope I can put in a much better effort in January 2K. Like many others, this too is one of my favorite contests. As usual, it was fun working some of the country's best CW Ops.—*K8KFJ*. As always, a very enjoyable contest. Of course, "cooperation" of 10 and 15 meters would have considerably enhanced the experience.—*K9MMS*. Second shot at NAQP—expect to be on from AL in January better prepared.—*KC3QU*. Conditions were very bad. Noise levels on 80 and 40 meters were extremely high. I had hoped to top my January NAQP score but no such luck. The QSOs and multipliers were down. I was able to test a short 80-meter loop, mounted vertically and found that it does work. Hope to improve in January.—*KG8GW*. My first contest as part of a club and I did LOUSY! Had lots of distractions including the birth of a new Grandson!—*KJ5WX*. Very bad noise the first few hours. Over S9 on 10 and S7 on 15 meters. By late afternoon it was better but still had static crashes that made copy of stations below about S4 very hard. But it was nice to work so many friends. Nothing heard on 160 meters.—*KU7Y*. Band conditions were poor this time around. 20 over QRN made for very slow going on 80 & 160. I expected 10 to be non-productive but 15 too?? Still love the 10-hour format.—N0AV. No prop on 10 and 160 meters was very noisy. A pleasure to work a bunch of top-notch operators! No thunder storms, strange…—*N4BP*. Got off to a terrible start with poor conditions, so took my off times early, then got hit with four short power outages! Obviously a big difference in noise floors, with some guys easily able to copy weak back-scatter signals, and some who just CQ in your face. No matter what, this is still one of my favorite contests!—*N4GN*. QRP from the apartment part-time player. Need to get some real antennas up at some point! The long wire through the QRP tuner was a real bear. Had fun, and beat my score from August last year, though. Ran 5 W, and needed every mW. Tried a QRP rig with a tighter receive filter, but the 2.7 W out didn't work well. Stayed with the TS-50s at 5 W—*N5NW*.

The static won!! Tremendous static on the low bands. At times S meter was +20 dB—*N8BJQ*. First time in the QSO party… Sure to do it again.—*N8LM*. Both rigs blew up within 20 seconds and both from the same cause. Put a big kink in my NAQP plans. My apologies to the other POLO team members for letting them down. Until the fizzle, the SO2R effort was working pretty well. Thanks to Bob, N8NR, for letting me blow up his radio for a change!—*N9AG*. Enjoyed the contest but with a 6-week-old baby and 2-year-old toddler, I often heard the sound "Honey, can you give me a hand?" Of course we all know that there really is no question mark at the end of the XYL's statement. 3-hour pizza dinner from 5 to 8 PM, then in and out most of the time resulted in approximately 6 hours on the air. Sure need more practice w/ CW! Seeya all in a couple weeks for the flipside of this one.—*NX9T*. QRN made things tough… thanks to all who called and those who took time to QSY to other bands to help make the multiplier respectable.—*VE3EJ*. First time ever on 160 meters. Put up a temporary slant wire vertical. It produced 18 QSOs and 11 multipliers in 20 minutes—I'll be back.—*W4NZ*. Bands were not outstanding but I didn't have trouble except for storm static on a 160-meter horizontal loop that bounced over some of the guys I could hear with the beverage on 160. I like the short format that prevents domestic distress.—*W9YS*. Not the best score I've had! Band conditions were lousy. For those who wondered what happened to me on occasion, RF was getting into the computer and locking it up. Fixed the problem at 0300Z—better late than never!—*WA3HAE*. Just goes to show you… even though I just got married, I can still contest (okay, okay so it was only part time).—*WE9V*. My first time participating in the NA contest. With the amount of time of operation I feel my QSO count should be much higher. I just wasn't able to generate runs. I had a good time and hope to be more competitive next year.—*WK4Y*. Who killed the bands? Please stop it. Thank you.—*WL7KY*. Conditions were tough! I got off to a good start and then Murphy went overboard. But it was loads of fun and I'm sure glad to be more active. One of these days I'd love to break 100k, hi! I had a big problem with the software that I could never overcome. Sometimes, and unpredictably, the exchange was not sent complete and it took me some QSOs to realize what was occurring and send the rest by hand. My apologies. It's time to clean out my laptop, hi! Many thanks to XE1MD, Mic, for the loan of his station.—*XE1/AA6RX*.

Single Operator Scores

Call	*QSOs*	*Mults*	*Score*	*Section*	*Team*
K1VUT	575	158	90,850	MA	
K1HT	386	128	49,408	MA	
AA1SU	220	102	22,440	VT	
W1FJ	198	70	13,860	MA	
K1TS	142	49	6,958	MA	
K5FUV	115	59	6,785	CT	OCC #2
W1WIU	104	32	3,328	RI	
W4ZGR *	56	24	1344	ME	
W5KI	347	131	45,457	NJ	OCC #2
W2HCA	201	100	20,100	NJ	
WA2VQV	59	30	1770	NJ	
K3MM	693	231	160,083	MD	PVRC
W2UP	723	202	146,046	PA	
K3CR (KB3AFT)	627	198	124,146	PA	Weekend Warriors
AA3B	639	172	109,908	PA	
K3WU	552	141	77,832	PA	TCG #3
WA3HAE	470	133	62,510	PA	Weekend Warriors

Call	*QSOs*	*Mults*	*Score*	*Section*	*Team*
K2YWE	413	131	54,103	MD	PVRC-JV
N8NA	279	127	35,433	DE	
W3CP	200	84	16,800	MD	
K3WW	127	67	8,509	PA	
KC3QU	138	55	7,590	PA	
K3WWP *	113	47	5,311	PA	QRP SWAT
K3ONW	89	46	4,094	PA	
AA3GM	80	44	3,520	PA	
WD3P *	63	27	1,701	MD	
WA3SES	26	15	390	PA	Weekend Warriors
N3DEL (N9GG)	25	14	350	DE	TCG #6
W4AN	795	243	193,185	GA	SECC Team 1
WC4E	690	187	129,030	FL	FCG #1
K4WX	699	182	127,218	TN	TCG #1
W4PA	631	191	120,521	TN	TCG #1
N4BP	694	170	117,980	FL	FCG #1
K4RO	652	175	114,100	TN	TCG #1
K4NO	537	186	99,882	AL	SECC Team 1

Call	QSOs	Mults	Score	Section	Team
W9WI	552	173	95,496	TN	TCG #2
N4GN	525	181	95,025	KY	KCG
K4FXN	536	174	93,264	KY	KCG
K1KY	562	159	89,358	KY	TCG #1
K4IQJ	500	165	82,500	AL	SECC Team 3
K4LQ	419	192	80,448	FL	
AA4S	497	161	80,017	NC	SECC Team 1
W4OC	497	157	78,029	SC	SECC Team 1
K4MA @AA4NC	498	156	77,688	NC	PVRC
K1AO	520	146	75,920	KY	TCG #1
K4LTA	516	144	74,304	TN	TCG #2
K1TO	458	153	70,074	FL	
W2CS	473	145	68,585	NC	PVRC
NA4K	472	145	68,440	TN	TCG #2
N4DU	460	139	63,940	GA	
N4IR	458	139	63,662	TN	TCG #2
W4NZ	439	135	59,265	TN	TCG #5
K4BAI	412	132	54,384	GA	SECC Team 1
AA2GS	369	121	44,649	KY	KCG
AC4WO	352	115	40,480	GA	
AJ4Y	325	103	33,475	FL	
NT4D	269	118	31,742	NC	PVRC
N8LM	300	104	31,200	GA	
W4NTI	303	102	30,906	AL	SECC Team 2
N4DW	285	108	30,780	TN	TCG #4
K4BAM	281	107	30,067	VA	
K4FU	238	114	27,132	KY	KCG
W4AU	280	92	25,760	VA	
WK4Y	233	102	23,766	VA	
WO4O	255	91	23,205	TN	TCG #5
NX9T	208	107	22,256	NC	PVRC-JV
N4KN	221	84	18,564	TN	TCG #4
KI7WX	183	94	17,202	NC	PVRC-JV
AC4ZD	196	84	16,464	TN	TCG #5
K3CQ @WO4O	213	73	15,549	TN	TCG #6
KE4OAR	147	75	11,025	TN	TCG #3
K4BEV	149	69	10,281	TN	TCG #3
KD4BAM	135	64	8,640	TN	TCG #5
N1CC	152	55	8,360	SC	SECC Team 2
AA4GA	115	50	5,750	GA	SECC Team 3
KF4OAD	93	39	3,627	NC	
K4AT	62	35	2,170	KY	
K4JYO	57	34	1,938	AL	
N4PQV	57	32	1,824	TN	TCG #5
N5NW *	33	24	792	TN	TCG #4
KU4LL	28	13	364	TN	TCG #6
AA4LR	16	9	144	GA	SECC Team 2
K5VG	16	3	48	VA	
K5GN	679	228	154,812	TX	Armadillo CG
N5RZ	684	173	118,332	TX	
AD5Q	648	167	108,216	TX	
K5OT	595	180	107,100	TX	
N6ZZ	558	177	98,766	NM	
W5WMU	533	185	98,605	LA	
K5GO	508	191	97,028	AR	OCC #1
K5TQ	586	150	87,900	NM	
AA5AU	564	154	86,856	LA	
KM5G	516	151	77,916	AR	OCC #1
W5ASP	553	134	74,102	TX	Armadillo CG
W5YM (AC5RR)	458	131	59,998	AR	OCC #1
AB5SE	419	135	56,565	AR	OCC #1
K5OY	400	138	55,200	AR	OCC #1
K5KA	413	132	54,516	OK	
K4NR	394	131	51,614	TX	
NA5B (W5AO)	451	105	47,355	OK	
N5PO	387	118	45,666	TX	
WA5WJU	316	106	33,496	LA	
N5JO	307	101	31,007	TX	
KG5U	288	102	29,376	TX	
K5WA	308	80	24,640	TX	Armadillo CG
WA8GHZ	194	79	15,326	TX	
KJ5WX	170	84	14,280	AR	OCC #2
AA5WE	80	37	2,960	TX	
W5NR	40	26	1,040	TX	
KK5CA	35	18	630	TX	
W6EEN (N6RT)	791	192	151,872	CA	SCCC
AD6DO	781	166	129,646	CA	SCCC
K6AW @W6NL	632	191	120,712	CA	NCCC #1
W6UE (W4EF)	541	163	88,183	CA	SCCC
N6KI	569	149	84,781	CA	SCCC
KH6ND @KH7R	560	114	63,840	HI	
K6ZM (WA6O)	474	124	58,776	CA	NCCC #2
KQ6ES	348	124	43,152	CA	
K6CTA	368	114	41,952	CA	NCCC #2
W6ZL	324	109	35,316	CA	
W6TK	241	103	24,823	CA	
K6RO	207	106	21,942	CA	
KF6GUH	186	86	15,996	CA	
W6RKC	132	74	9,768	CA	
KH7L	138	59	8,142	HI	
W6MVW	132	34	4,488	CA	
K6CSL	114	34	3,876	CA	
K5RC	838	210	175,980	NV	NCCC #1
K6LL	758	206	156,148	AZ	SCCC
W7G (W7GG)	615	170	104,550	OR	POLO
W7CT	613	150	91,950	UT	
W7F (K4XU)	530	154	81,620	OR	
N7FO (KN5H)	512	159	81,408	AZ	Armadillo CG
K7NV	472	147	69,384	NV	
N7LOX	475	131	62,225	WA	
KU7Y	448	121	54,208	NV	POLO
NW7DX	348	102	35,496	WA	
W7NX	285	105	29,925	OR	Team PED
WL7KY	314	78	24,492	AK	Team PED
N7WA	271	89	24,119	WA	
W7YS	197	102	20,094	AZ	
KI7Y	184	86	15,824	OR	Team PED
W7HS	158	75	11,850	UT	
AA7TR	76	32	2,432	UT	
KL7/WD4AHZ	36	19	684	AK	FCG #1
N7RX	17	9	153	OR	
W7/JR1NKN *	16	6	96	WA	
K9TM	532	163	86,716	OH	MRRC
KU8E	506	145	73,370	OH	MRRC
N8BJQ	448	155	69,440	OH	POLO
ND8DX (NI3S)	470	141	66,270	OH	
WA8WV	442	125	55,250	WV	
K8MR	300	129	38,700	OH	MRRC
KG8GW	325	102	33,150	WV	
AA8U	268	118	31,624	MI	
N9AG @N8NR	198	87	17,226	OH	POLO
N8YYS	168	72	12,096	WV	
KB8PGW	158	58	9,164	MI	
WT8P	154	41	6,314	OH	
K8CV *	101	59	5,959	MI	
K8KFJ	107	37	3,959	WV	
KC8FXR	72	35	2,520	MI	
K8UCL *	52	34	1,768	OH	QRP SWAT
K9DX	561	181	101,541	IL	SMC Full Timers 1
K9MMS	456	143	65,208	IL	SMC Full Timers 1
WT9U	441	124	54,684	IN	SMC Full Timers 2
W9RE	345	155	53,475	IN	SMC Full Timers 1
KJ9C	402	117	47,034	IN	SMC Full Timers 2
N9CK	320	117	37,440	WI	
K9JWI	312	107	33,384	IN	
K9WX	259	97	25,123	IN	
KI9A	245	93	22,785	IL	SMC Full Timers 2
WE9V	212	83	17,596	WI	
K9BG	168	80	13,440	IN	SMC Part Timers
W9YS	150	74	11,100	IL	
N9NT	159	41	6,519	IL	
W9BS	109	42	4,578	IN	
AF9J *	67	33	2,211	WI	
N7IN	62	33	2,046	IN	SMC Part Timers
N9ZUT	52	28	1,456	IL	
N0KK @N0AT	666	173	115,218	MN	Minn Wire Assn
N0AV	557	185	103,045	IA	
KT0R	486	164	79,704	MN	
K0OU	481	136	65,416	MO	TCG #3
NA0N	436	137	59,732	MN	Minn Wire Assn
N4VI	425	134	56,950	CO	TCG #4
K0AD	397	136	53,992	MN	Minn Wire Assn
W0UY	421	128	53,888	KS	SMC Full Timers 1
WA0SXV	254	87	22,098	MO	
N9HDE	182	60	10,920	MO	
K0COP	66	20	1,320	CO	
VE3EJ	617	210	129,570	ON	
VE5MX	434	127	55,118	SK	
VE3IAY	279	106	29,574	ON	
VE3KP	230	104	23,920	ON	
VE5SF	223	100	22,300	SK	
VE2AWR	210	101	21,210	QC	
VY1DX (K6LA)	275	75	20,625	YT	
VE9DX	162	91	14,742	NB	
VE3WZ	166	75	12,450	ON	
K6LRN/VE7	22	12	264	BC	
VE6FU	13	8	104	AB	
WP2Z (KD4D)	586	163	95,518	VI	PVRC
XE2DV	576	147	84,672	XE	
XE1/AA6RX	506	159	80,454	XE	
XE3WAO	158	62	9,796	XE	
HP1AC	74	35	2,590	HP	
WP4LNY	28	14	392	PR	
PY2NY	176	73	12,848	DX	
KH2/N2NL	26	9	234	DX	
DL5NA	22	8	176	DX	

* Denotes a QRP entry.

Multi-Two Scores

Call	QSOs	Mults	Score	Section
W5NN (N5TU, K1OJ, K5NZ)	1005	217	218,085	TX
W0UO (W0UO ops)	714	191	136,374	TX
KT4ZX (KT4ZX, KG4BIG)	373	122	45,506	KY

■

WORLD RADIOSPORT TEAM CHAMPIONSHIP 2000

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

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

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

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

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

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

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

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

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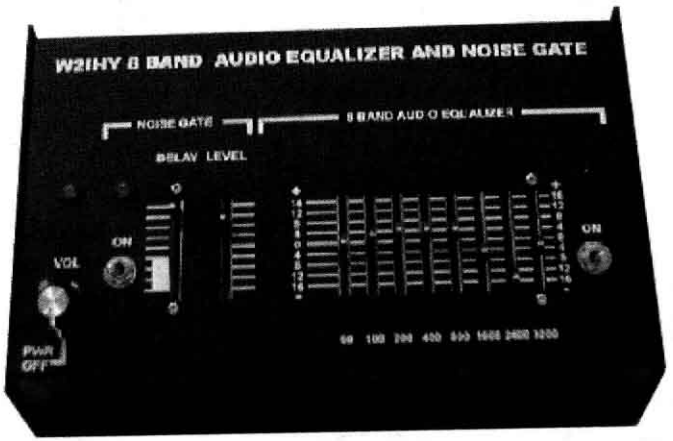

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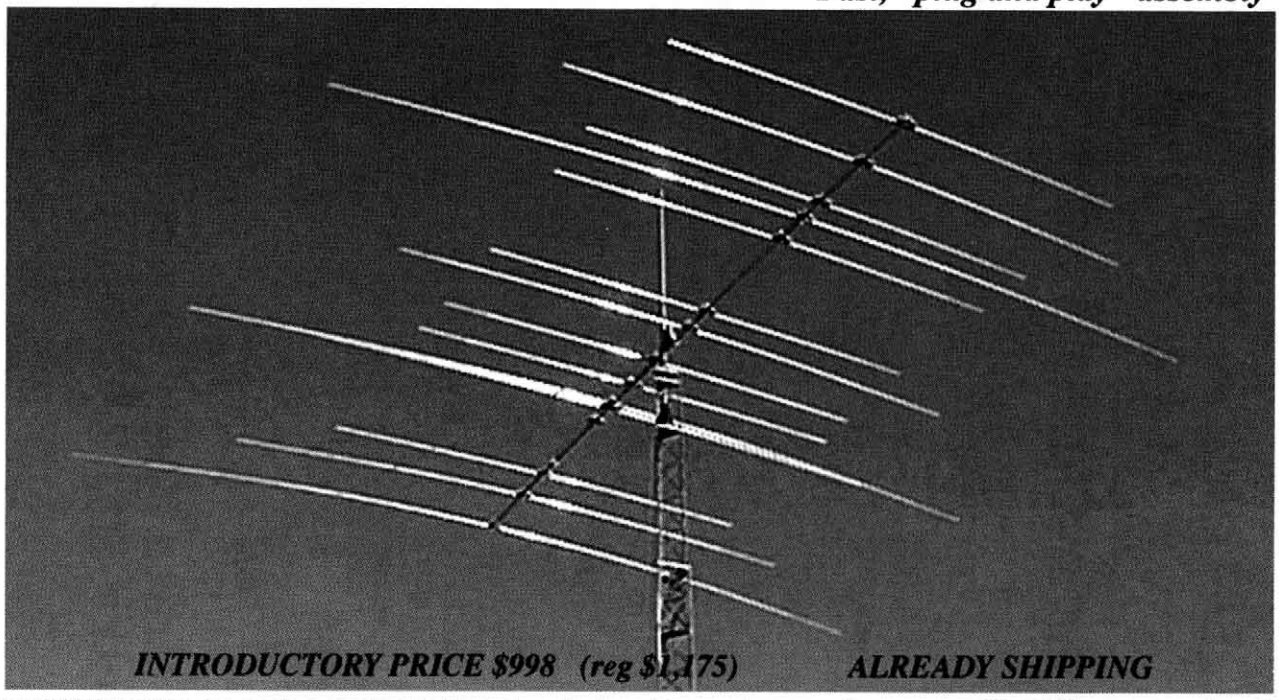

The **C-31XR** is truly the next generation in tribanders: designed for maximum performance on 20-15-10 mtrs, plus strength, ease of assembly, low mast torque, side mounting and stacking. The **C-31XR** is 3 monoband Yagis overlaid on the same boom. There is a wide spaced 3el 20, a wide spaced 4el 15 and 7 elements for 10 mtrs. The gain target to beat was our own **C-3**, which was shown to have the most gain across 20 & 15 mtrs according to independent testing by K7LXC and N0AX. We did it! The **C-31XR** exceeds the **C-3** on 20, 15 and 10 mtrs. F/B and side nulls are exactly what you would expect: excellent. There is nothing better than the **C-31XR.**

C-31XR

31' boom, 14 elements, 85 lbs, 10.5 sqft, 100mph, 5KW, single feedline, no traps, all elements full size

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Antennas and Towers

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Internet: force12e@lightlink.net; www.QTH.com/force12

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P.O. Box 1349, Paso Robles, CA 93447

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TELESCOPING ALUMINUM TUBING

DRAWN 6063-T832		1.250" .. $1.40/ft
.375	$.60/ft	1.375" .. $1.55/ft
.500"	$.70/ft	1.500" .. $1.75/ft
.625"	$.80/ft	1.625" .. $2.00/ft
.750"	$.90/ft	1.750" .. $2.25/ft
.875"	$1.00/ft	1.875" .. $2.50/ft
1.000"	$1.10/ft	2.000" .. $2.75/ft
1.125"	$1.25/ft	2.125" .. $3.00/ft

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

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HF5B, 5 Band Minibeam	$429
HF6VX, 6 Band Vertical	$269
HF9VX, 9 Band Vertical	$329
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CPK, Counterpoise Kit	$119
RMKII, Roof Mount Kit	$139
STRII, Roof Radial Kit	$109
TBR160S, 160m Kit	$109

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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
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Z750, 2m/70cm Mobile	$55
Z780, 2m/70cm Mobile	$69

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

More Diamond antennas in stock

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Please Call for Delivery Info

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

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

Please call for more Cushcraft items

M2 VHF/UHF ANTENNAS

144–148 MHz

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

420–450 MHz

420-450-5/420-450-11	$119/84
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440-18/440-21ATV	$109/129

Satellite Antennas

2MCP14/2MCP22	$155/209
436CP30/436CP42UG	$209/249

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6M5/6M7	$189/269
6M2WLC/6M2.5WLC	$399/529

10/12/15/17/20m HF

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

More M2 models in stock–please call

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259B Antenna Analyzer	$219
1798, 80–2m Vertical	$239
1796, 40/20/15/10/6/2m Vert.	$179
1793, 80/40/20m Vertical	$159
1792, 80/40m Vertical	$145
1788, 40–15m Loop	$399
1786, 30–10m Loop	$349
1780, 14–30 MHz Loop	$229
1768, 2m/70cm Beam	$65
1762, 3 Element 6m Beam	$65

Big MFJ inventory–please call

LAKEVIEW HAMSTICKS

9106	6m	9115	15m	9130	30m
9110	10m	9117	17m	9140	40m
9112	12m	9120	20m	9175	75m

All handle 600W, 7' approximate length, 2:1 typical VSWR ... $24.95

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Hustler Resonators in stock–call

FORCE 12–MULTIBAND

C3	10/12/15/17/20m, 7el	$519
C3S	10/12/15/17/20m, 6 el	$459
C3SS	10/12/15/17/20m, 6 el	$449
C4	10/12/15/17/20/40m, 8 el	$660
C4S	10/12/15/17/20/40m, 7 el	$569
C4SXL	10/12/15/17/20/40m, 8 el	$839
C4XL	10/12/15/17/20/40m, 9 el	$929
C19XR	10/15/20m, 11 el	$849
C31XR	10/15/20m, 14 el	$1119
C36XR	10/15/20/40m 13 el	$1449

Please call for more Force 12 items

FORCE 12–MONOBAND

EF410	10m, 4 element	$249
EF415	15m, 4 element	$379
EF420	20m, 4 element	$499
EF240	40m, 2 element	$539
MAG810	10m, 8 element	$619
MAG615	15m, 6element	$719
MAG520	20m, 5 element	$869
MAG620	20m, 6 element	$1119
MAG340	40m, 3 element	$899
MAG280B	80m, 2 element	$1829

Please call for more Force 12 items

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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-2800P	$1095
Yaesu G-450A	$239
Yaesu G-800S/SDX	$319/399
Yaesu G-1000SDX	$479
Yaesu G-2800SDX	$1069
Yaesu G-550/G-5500	$289/499

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R51(#20)/R52 (#18)	$.22/.32/ft
R61 (#20)/R62 (#18)	$.28/32/ft.
R81/82/83/84	$.25/.39/.52/.85/ft

US TOWER

MA40/MA550	$659/1055
MA770/MA850	$2359/3649
TMM433SS/HD	$1139/1379
TMM541SS	$1499
TX438/TX455	$1069/1319
TX472/TX489	$2649/4599
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HDX572	$4139

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

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25G/45G/55G	$79/179/229
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SB25G/45/55	$39/89/109
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HBX48/HBX56	$589/699
HDBX40/HDBX48	$549/699
BXB5/6/7/8	$39/49/59/59

Please call for more Rohn prices

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4-40'/50'/60'	$519/739/1049
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9-40'/50'/60'	$729/1049/1469
12-30'/40'	$559/869
15-40'/50'	$969/1399
23-30'/40'	$859/1289
35-30'/40'	$979/1509

Bold in part number shows wind-load capacity. Please call for more Universal models. All are shipped factory direct to save you money!

TOWER HARDWARE

3/8"EE / EJ Turnbuckle	$10/11
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Please call for more hardware items

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5 FTx .12" / .18"	$35/59
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HPTG1200I	$.39/ft
HPTG2100I	$.52/ft
PLP2738 Big Grip (2100)	$5.50
HPTG4000I	$.79/ft
PLP2739 Big Grip (4000)	$7.65
HPTG6700I	$1.15/ft
PLP2755 Big Grip (6700)	$10.95
HPTG11200	$1.55/ft
PLP2558 Big Grip (11200)	$16.50

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

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CT™ has been the recognized leader in contest software since 1985. No other program is as easy to use or contains as many helpful features. With CT, you can operate entire contest without ever touching a pencil or paper. Key features include logging, duping, scoring, PacketCluster® interface, MS and MM networking, QSL labels, radio support for nearly all popular transceivers, Multiplier lists, rate information, log stats, and free unlimited access to the K1EA Software BBS.

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- *ARRL DX Competition (W/VE & DX)*
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- *ARRL 160-Meter Contest*
- *WAE European DX Contest (Europe & DX)*
- *CQ WW DX Contest*
- *CQ WPX Contests*
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- *JARL All Asia Contest (Asia & DX)*
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⇒ CT Version 9 (for 386/486 computers only)	79.95	_____
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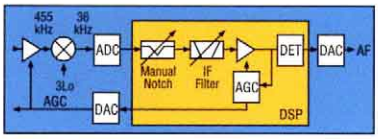
Contents

ICOM IC-756PRO

This is not your father's HF rig. This is all new, 32-bit DSP digital processing.

THE GREATEST THING TO HIT HF SINCE...

This is not a simple upgrade of ICOM's classic IC-756. The new IC-756PRO sets a new standard in ham radio design and construction. At the heart of the 'PRO is a 32-bit (not 16-bit) floating point DSP unit that operates at an unrivaled processing speed.



DSP IN THE IF, BEFORE THE AGC *Dual loop digital AGC eliminates strong signal pumping.*

THE DX ADVANTAGE YOU'VE ALWAYS WANTED

Faster processing means finer incoming signal sampling, and finer sampling means clearer, crisper reception...with almost no background noise.

YOU'LL NEVER BUY ANOTHER FILTER

The IC-756PRO features 41 built-in, front panel selectable levels of DSP filtering. There's no additional filters or high stability crystal oscillators to buy, because none are needed. It's like going from Zero-to-Contesting in seconds flat. Our filters are the sharpest–more selective than any crystal or mechanical filters. The selectivity lets you pull out the weak signals like never before.

CDs VS VINYL ALBUMS

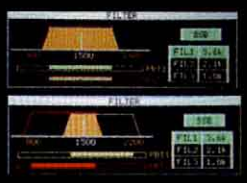
Remember the first time you heard CD sound quality in a headphone? The 'PRO's audio quality will knock your socks off. You've got to hear this rig to believe it.

Customize the screen's look by changing colors, fonts, brightness, contrast, and more.

Keep tabs on memory channels with an alpha-numeric readout of mode, frequency, filters & more.

A digital voice recorder has 4 slots for RX and 4 for TX, each 15 seconds long–a contesting bonus!

Copy RTTY DX without firing up your computer. A dual auto peak filter makes it easy.



Visual indicators of filter selection let you tweak the band pass. Choose from 31 steps of 100Hz between 3600–600Hz and 10 steps of 50Hz between 500–50Hz.

If the AGC is too fast or too slow, make it "just right" with a quick settings change. Use different settings for different modes.

EASY TO USE, EASY ON THE EYES *The IC-756PRO's front panel is well laid out and easy to control. The TFT LCD display is easy to see from wide angles, day or night. This handsome rig will look at home in any home or shack.*

SPECS & FEATURES

Subject to change without notice or obligation

Transmit: ..... All Amateur HF, 6 Meters
Receive: ..... 0.03 – 60 MHz
Mode: ..... USB, LSB, CW, RTTY, AM, FM
Power: ..... 5–100W (5–40W AM)
Power Supply Requirement: 13.8VDC, 23A
Memory Channels: ..... 101 Total
Size & Weight : .... 13.4(W) x 4.4(H) x 11.2(D) in.
340(W) x 111(H) x 285(D) mm., 21 lb / 9.6 kg

- **5" TFT Color LCD**
  - Wide viewing angle, more information
  - Adjustable colors and settings
- **32 Bit Floating Point DSP Processor**
  - Digital AGC loop operation
  - Digital IF filter, 41 selectable bandwidths
  - Built-in RTTY demodulator / dual peak APF
  - Built-in microphone equalizer
  - Manual notch function
- **8 Channel Digital Voice Memory**
- **Digital Twin Pass Band Tuning**
- **Built-In Auto Antenna Tuner**
- **Dual Watch • VOX**
- **Triple Band Stacking Register**
- **Built-In Memory / Electronic Keyer**
- **Independent RIT / ΔXT Control**
- **2 TX/RX, 1 RX Only Antenna Connectors**
- **100% Duty Cycle**

Whether it's voice, visual, CW or data, the IC-756PRO offers the details and performance capable of topping the contest charts. Contact your ICOM dealer today, or call for a brochure. **425-450-6088**

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