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COMMUNICATIONS & TECHNOLOGY

DECEMBER 2003

CQ

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Results: 2003 CQ WW 160-Meter Contests

CQ Reviews:

ICOM IC-703 QRP Transceiver

On the Cover: Bob Beaudet, W1YRC, of Cumberland, Rhode Island, with his collection of classic gear. Details on page 20.

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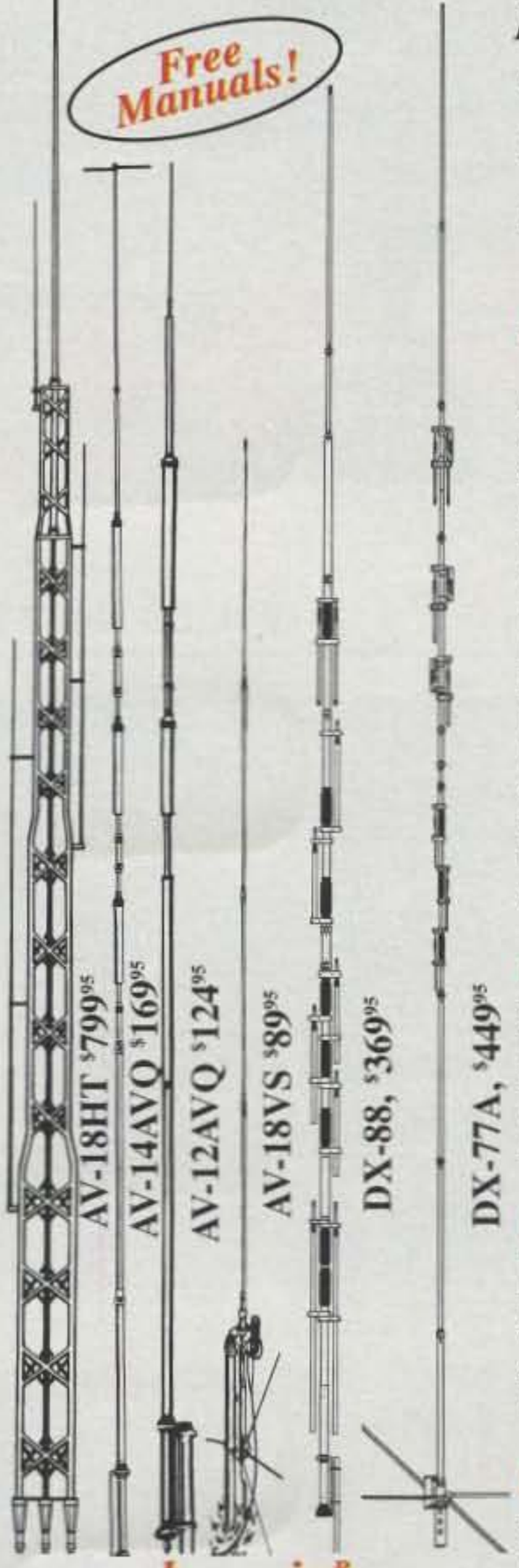
Self-supporting -- no guys required . . . Remarkable DX performance -- low angle radiation, omnidirectional . . . Handles 1500 Watts . . . Low SWR . . . Automatic band switching . . . Aircraft quality aluminum tubing . . . Stainless steel hardware . . . Recessed SO-239 connector . . . Two year limited Warranty . . .



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They offer remarkable DX performance with their extremely low angle of radiation and omnidirectional pattern.

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AV-18HT, $799.95. (10,12,15,20,40,80 M, 160, 17 Meters optional). 53 ft., 114 lbs.

Standing 53 feet tall, the famous *Hy-Gain HyTower* is the world's best performing vertical! The AV-18HT features automatic band selection achieved through a unique stub-decoupling system which effectively isolates various sections of the antenna so that an electrical 1/4 wavelength (or odd multiple of a 1/4 wavelength) exists on all bands. Approximately 250 kHz bandwidth at 2:1 VSWR on 80 Meters. The addition of a base loading coil (**LC-160Q, $109.95**), provides exceptional 160 Meter performance. **MK-17, $89.95**. Add-on 17 Meter kit. 24 foot tower is all rugged, hot-dip galvanized steel and all hardware is iridited for corrosion resistance. Special tilt-over hinged base for easy raising & lowering.

AV-14AVQ, $169.95. (10,15,20,40 Meters). 18 ft., 9 lbs. The Hy-Gain AV-14AVQ uses the same trap design as the famous Hy-Gain Thunderbird beams. Three separate air dielectric Hy-Q traps with oversize coils give superb stability and 1/4 wave resonance on all bands. Roof mount with Hy-Gain AV-14RMQ kit, $89.95.

AV-12AVQ, $124.95. (10, 15, 20 Meters). 13 ft., 9 lbs. The AV-12AVQ also uses Thunderbird beam design air dielectric traps for extremely Hy-Q performance. This is the way to go for inexpensive tri-band performance in limited space. Roof mount with AV-14RMQ kit, $89.95.

AV-18VS, $89.95. (10,12,15,17,20,30,40,80 Meters). 18 ft., 4 lbs. High quality construction and low cost make the AV-18VS an exceptional value. Easily tuned to any band by adjusting feed point at the base loading coil. Roof mount with Hy-Gain AV-14RMQ kit, $89.95.

DX-88, $369.95. (10, 12, 15,17,20,30,40,80 Meters, 160 Meters optional). 25 ft., 18 lbs. All bands are *easily* tuned with the DX-88's *exclusive* adjustable capacitors. 80 and 40 Meters can even be tuned from the ground without having to lower the antenna. Super heavy-duty construction. DX-88 OPTIONS: 160 Meter add-on kit, KIT-160-88, $189.95. Ground Radial System, GRK-88, $99.95. Roof Radial System, RRK-88, $99.95.

DX-77A, $449.95. (10, 12, 15, 17, 20, 30, 40 Meters). 29 ft., 25 lbs. *No ground radials required!* Off-center-fed Windom has 55% greater bandwidth than competitive verticals. Heavy-duty tiltable base. Each band independently tunable.

Model #	Price	Bands	Max Power	Height	Weight	Wind Surv.	Rec. Mast
AV-18HT	$799.95	10,15,20,40,80	1500 W PEP	53 feet	114 pounds	75 MPH	------
AV-14AVQ	**$169.95**	**10,15,20,40**	**1500 W PEP**	**18 feet**	**9 pounds**	**80 MPH**	**1.5-1.625"**
AV-12AVQ	$134.95	10/15/20 M	1500 W PEP	13 feet	9 pounds	80 MPH	1.5-1.625"
AV-18VS	**$89.95**	**10 - 80 M**	**1500 W PEP**	**18 feet**	**4 pounds**	**80 MPH**	**1.5-1.625"**
DX-88	$369.95	10 - 40 M	1500 W PEP	25 feet	18 pounds	75 mph no guy	1.5-1.625"
DX-77A	**$449.95**	**10 - 80 M**	**1500 W PEP**	**29 feet**	**25 pounds**	**60 mph no guy**	**1.5-1.625"**

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Hy-Gain's new **PATRIOT** HF verticals are the best built, best performing and best priced multiband verticals available today. For exciting DX make full use of your sunspot cycle with the **PATRIOT's** *low 17 degree angle* signal.

No ground or radials needed

Effective counterpoise replaces radials and ground.

Automatic bandswitching

Single coax cable feed. Each band is individually tunable. Extra wide VSWR bandwidth. End fed with broadband matching unit.

Sleek and low-profile

Low 2.5 sq. ft. wind surface area. Small area required for mounting. Mounts easily on decks, roofs and patios.

Full legal limit

Handles 1500 Watts key down continuous for two minutes.

Built-to-last

High wind survival of 80 mph. Broadband matching unit made from all *Teflon*® insulated wire. Aircraft quality aluminum tubing, stainless steel hardware.

hy-gain® warranty

Two year limited warranty. All replacement parts in stock.

AV-640, $359.95. (6,10,12, 15,17,20,30,40 Meters). 25.5 ft., 17.5 lbs. The AV-640 uses quarter wave stubs on 6, 10, 12 and 17 meters and efficient end loading coil and capacity hats on 15, 20, 30 and 40 meters -- no traps. Resonators are placed in parallel not in series. End loading of the lower HF bands allows efficient operation with a manageable antenna height.

AV-620, $289.95. (6,10,12,15,17,20 Meters). 22.5 ft., 10.5 lbs. The AV-620 covers all bands 6 through 20 Meters with no traps, no coils, no radials yielding an uncompromised signal across all bands.

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CQ contents

DECEMBER 2003

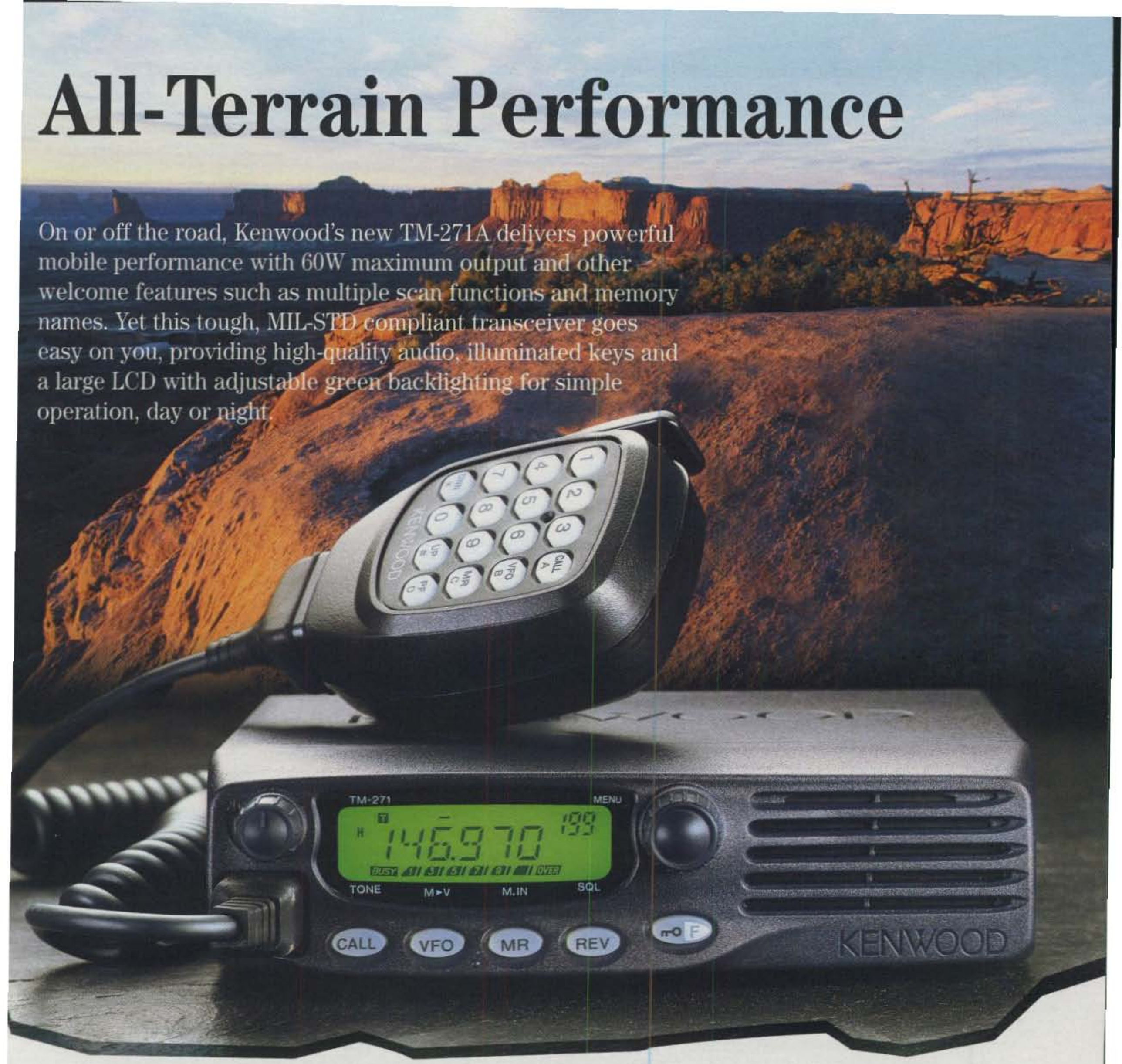
features

Vol. 59 No. 12

departments

All-Terrain Performance

On or off the road, Kenwood's new TM-271A delivers powerful mobile performance with 60W maximum output and other welcome features such as multiple scan functions and memory names. Yet this tough, MIL-STD compliant transceiver goes easy on you, providing high-quality audio, illuminated keys and a large LCD with adjustable green backlighting for simple operation, day or night.



144MHz FM TRANSCEIVER

TM-271A

▮ 200 memory channels (100 when used with memory names) ▮ Frequency stability better than ±2.5ppm (-20~+60°C) ▮ Wide/Narrow deviation with switchable receive filters ▮ DTMF microphone supplied ▮ NOAA Weather Band reception with warning alert tone ▮ CTCSS (42 subtone frequencies), DCS (104 codes) ▮ 1750Hz tone burst ▮ VFO scan, MHz scan, Program scan, Memory scan, Group scan, Call scan, Priority scan, Tone scan, CTCSS scan, DCS scan ▮ Memory channel lockout ▮ Scan resume (time-operated, carrier-operated, seek scan) ▮ Automatic repeater offset ▮ Automatic simplex checker ▮ Power-on message ▮ Key lock & key beep ▮ Automatic power off ▮ Compliant with MIL-STD 810 C/D/E/F standards for resistance to vibration and shock ▮ Memory Control Program (available free for downloading from the Kenwood Website: ***www.kenwood.net***)

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FCC Releases More Code Petitions for Comment

A second group of seven petitions proposing changes to code testing requirements and Technician privileges has been released for comment by the FCC. Most of these call for retention of a code test in some form, either for both General and Extra, for Extra only (two petitions call for increased speed requirements for Extra), or for anyone wishing to operate CW on the HF bands. Comments were due by November 7 on the second group of petitions. Most of the initial group of seven petitions called for elimination of the code test altogether. They garnered more than 2000 comments, although many people filed similar or identical comments under more than one petition.

An FCC official told *CQ* it would probably be late 2004 before a Notice of Proposed Rule Making would be issued. The petitions and comments may be read by going to the FCC's Electronic Comment Filing System website at <http://www.fcc.gov/cgb/ecfs/>. Check the CQ website (<http://www.cq-amateur-radio.com>) for a list of petition numbers, a direct link to the FCC comment page, and instructions on how to search for comments.

Broadcaster Group Opposes BPL

The ARRL reports that broadcast engineers around the world are joining the list of those concerned about potential interference problems from the widespread introduction of Broadband over Power Lines (BPL) internet access, as well as more common industrial, scientific, and medical (ISM) devices. A subcommittee of the International Telecommunications Union (ITU) concerned with terrestrial broadcasting issues released a statement expressing concern that "any increase in the amount of noise due to these systems is unacceptable ... as these emissions are a byproduct of a system that is not itself a user of the radio spectrum." The group called for creation of a panel representing all users of the radio spectrum to develop "limits to be imposed on the radiation from these systems."

In addition, the *ARRL Letter* reports that the BBC's Research and Development Branch has issued a white paper on BPL tests conducted in Scotland, reporting interference to broadcast reception, even in one area with underground electric cables. *Newsline* reports on efforts by at least one firefighter/ham to encourage others to enlist their fire departments in the battle against BPL, saying broadband interference often is not easily recognizable by non-technical fire personnel, who sometimes think interference is just unexplained "dead spots" in radio coverage.

FCC Continues to Go After Power Companies

Power-line interference to hams and other radio services is already a big problem in some areas, and the FCC is continuing its efforts to resolve long-standing cases. In once case involving the municipal utility in Gouverneur, New York, the Commission is threatening enforcement action against the city because it did not resolve an interference problem and did not respond to an earlier FCC letter.

In Pittsburgh, Pennsylvania, the FCC is calling for additional efforts to resolve an ongoing interference problem. According to an FCC letter, a Duquesne Light Company technician determined the noise source to be signs at a nearby mall. However, the letter said, the noise continued even when the signs were off, and an independent ARRL assessment of the area identified three power poles—including one with a broken ground wire—that appeared to be emitting high levels of noise. In a third case, the FCC is asking for renewed efforts by the municipal utility in Lubbock, Texas, to resolve a problem first brought to its attention by the Commission more than five years ago.

"Logbook of the World" Off to Good Start

The ARRL's "Logbook of the World" (LoTW)—an online database of amateur contacts that can substitute for QSL cards in credit for ARRL award programs—has gotten off to a flying start since its September 15th opening. According to the *ARRL Letter,* at the end of its first three weeks in operation more than 2200 hams were registered in the system, another 2400 applications were pending, and users had uploaded 4900 logs containing more than eight million contacts. *CQ*'s awards committee is working with the ARRL toward the goal of accepting LoTW contacts for CQ award credit, but as of press time, details still needed to be worked out.

Meanwhile, *Newsline* reports that EchoLink, one of the major amateur radio-internet linking systems, says it will accept LoTW digital certificates as proof of licensure for hams seeking access to the EchoLink system.

Early End to Annobón DXpedition

The 3CØV DXpedition to Annobón Island was forced by military officials to shut down on October 4, a week short of its planned end. According to reports in the *ARRL Letter* and *The Daily DX,* the operators—three Spaniards and one German—had a proper license and landing permit, and had gotten additional operating approval from the island's governor and military commander when they arrived in late September. Annobón is a territory of Equatorial Guinea off the west coast of Africa. Despite those prior approvals, military authorities reportedly interrupted operations numerous times, and on the morning of October 4 the hams were ordered to shut down the station, dismantle everything, and be ready to leave within two to three hours. They did so, and were placed on a plane to the capital of Equatorial Guinea and sent home from there. At press time there was still no word on why the permission to operate was revoked. Logs are reportedly safe and will eventually be loaded onto the 3CØV web page.

"Father of DXpeditioning" Dies at 85

Danny Weil, ex-VP2VB, considered by many to be the father of DXpeditioning, became a Silent Key in early October at age 85. Danny's adventures—and misadventures—aboard his boat(s), Yasme (I, II & III), that he sailed single-handedly around the world, were chronicled in the pages of *CQ* in the 1950s and '60s. His operations from a variety of rare DX locations, in addition to operating maritime mobile, set the standard for the future of DXpeditioning.

Hollingsworth Marks Five Years as Top Ham Enforcer

It was five years ago, in the fall of 1998, that longtime FCC attorney Riley Hollingsworth, K4ZDH, was put in charge of revitalizing amateur radio enforcement after years of neglect by the Commission. According to the *ARRL Letter,* nearly 1000 enforcement cases have crossed his desk since then, not including the countless "situations" he's been able to resolve informally. Hollingsworth says he's satisfied with his first five years on the job, but feels there's more to be done, telling the ARRL, "we need at least five more years of this ... level of enforcement, because the bands have quite a long way to go. It's no time to rest." Hollingsworth also said the past five years have been the highlight of his 30-year career at the FCC, noting, "It's the most rewarding thing I've ever done with the Commission."

Additional and updated news is available on the Ham Radio News page of the CQ website at <http://www.cq-amateur-radio.com>. For breaking news stories, plus info on additional items of interest, sign up for CQ's free online newsletter service. Just click on "CQ Newsletter" on the home page of our website.

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Its bell construction gives you total weather protection for super reliable operation. Its super heavy duty steel gear drive gives you years of superior and trouble-free performance. Many Hy-Gain rotators still provide excellent service after over 25 years of outstanding performance.

The last thing you want to fall apart is your rotator that's mounted on the top of your tower. You won't make any compromises when you buy and install high quality Hy-Gain rotators.

And we're the only manufacturer to offer a full line of rotators that are completely MADE IN THE USA.

HAM-IV, $559.95. *The heavy duty Ham-IV is the most popular rotator in the world!* It is designed for medium size antenna arrays up to 15 square feet wind load area when mounted in-tower, or 7.5 square feet when mast mounted with an optional lower mast bracket. New alloy ring gear gives extra strength up to 100,000 PSI for maximum reliability. New low temperature grease permits normal operation down to -30 degrees Fahrenheit. New wire-wound potentiometer gives reliable and precision directional indication, new ferrite beads reduce RF susceptibility, new Cinch plug connector plus 8-pin plug at control box (no screwdriver needed). Dual 98 ball bearing race for load bearing strength. Strong electric locking steel wedge brake prevents wind induced antenna movement. Easy-to-use Control Box has illuminated directional meter with North or South center of rotation scale, separate snap-action brake and rotation switches. Uses low voltage control for safe operation. Accepts masts up to 2 1/16 inches diameter. Rotator size is 13 1/2Hx8D inches.

T-2X, $649.95. *Extra heavy duty Tailtwister antenna rotator!* For large antennas up to 20 square feet wind load when mounted in-tower, or 10 square feet when mast mounted with optional support bracket. Triple 138 ball bearing race, strong electric locking steel wedge brake. Control Box has an illuminated directional indicator with North or South center of rotation scale, separate snap-action brake and rotation control switches. Accepts masts up to 2 1/16 inches diameter. Rotator size is 14 1/16Hx9 3/16D in.

CD-45II, $389.95. *Medium duty antenna rotator.* Handles antenna arrays up to 8.5 square feet windload area when mounted in-tower, or 5 square feet when mast mounted with supplied lower support. Dual 48 ball bearing race, disc brake system. Control Box has an illuminated directional indicator with North or South center of rotation scale, separate snap-action brake and rotation control switches with disc brake release. Accepts mast sizes up to 2 1/8 diameter. Includes light duty lower mast support, Rotator size is 17 3/8Hx8 D inches.

AR-40, $289.95. *Lightweight antenna rotator.* Handles smaller ham antennas and large TV/FM antennas up to 3.0 square feet windload area when mounted in-tower, or 1.5 square feet when mast mounted using the supplied lower support bracket. Dual 12 ball bearing race, disc brake system. Silent, automatic control box -- just dial and touch for desired direction. Accepts mast sizes up to 2 1/8 diameter. Includes light duty mast support. Rotator size is 17 3/8Hx8D inches.

Call your dealer for your best price!

Rotator Specifications	T2X	HAM-IV	CD-45II	AR-40
Wind Load capacity (inside tower)	20 sq. ft.	15 sq. ft.	8.5 sq. ft.	3.0 sq. ft.
Wind Load (with mast adapter)	10 sq. ft.	7.5 sq. ft.	5.0 sq. ft.	1.5 sq. ft.
Turning Power (in pounds)	1000	800	600	350
Brake Power (in pounds)	9000	5000	800	450
Brake Construction	Electric wedge	Electric wedge	Disc brake	Disc brake
Bearing Assembly/How many	Tripl race/138	Dual Race/96	Dual race/48	Dual race/12
Mounting Hardware	Clamp plate	Clamp plate	Clamp plate	Clamp plate
Control Cable Conductors	8	8	8	5
Shipping Weight (pounds)	28	24	22	14
Effective Moment (in tower)	3400 ft/lbs.	2800 ft/lbs.	1200 ft/lbs.	300 ft/lbs.

HAM IV

$559.95
Suggested Retail

T-2X

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CD-45II

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zero bias

BY RICH MOSESON, W2VU

Finding the Center

I was reading an essay in *Time* magazine recently about the possibility that Arnold Schwarzenegger (a) might possibly turn out to be an OK governor for California and, (b) as a Republican who is both a fiscal conservative and a social liberal, might be at the leading edge of a popular movement back toward the political center. Now, we've always stayed out of politics on these pages, except as directly applied to ham radio, and I intend to continue that tradition. But I did see an interesting comparison here with the way decisions are made about governing the Amateur Radio Service.

The basic message from *Time* essayist Andrew Sullivan was that over the past 30 years, American politics have been polarized by ideologues at both ends of the political spectrum, with the result being government policy that has, in his words, "lurched back and forth," depending on which group had the greater influence at any given moment. He's hoping for a return to more pragmatic politics, when moderates controlled the political parties and each side gave a little to get a little on major issues, and both met in the middle, ending up with policy that pretty accurately reflected the views of the "silent majority," as Richard Nixon described it back in 1969.

Amateur radio has always been a microcosm of society, but interestingly, and fortunately, the process for making and changing the rules in amateur radio has managed to prevent extremists on either side of our major issues from taking control away from the centrist majority. And we're seeing it again in the current round of petitions, counter-petitions, and comments regarding the future of the code test in U.S. amateur licensing. In the wake of the International Telecommunications Union's vote last summer to let each country make its own decision on code testing, a flurry of petitions was filed with the FCC—first a group of petitions calling on the Commission to eliminate the code test, then another group urging the FCC to maintain or even toughen the code test. Thousands of comments have been filed by the amateur "public," and this is where amazing things have started to happen—as is often the case in FCC rulemaking procedures.

The amateur service is kind of a unique creature to the FCC. As the only service with hundreds of thousands of individual (rather than corporate or municipal) licensees, most of whom have an emotional (in addition to financial) investment in its future, amateur radio is just plain different—and proposed changes to its rules are the ultimate test of the FCC's system for making changes democratically. In most other services, when a rule change is proposed, a few dozen comments at most will be received, generally from lawyers and engineers representing various companies with financial stakes in the outcome. When a change in the amateur rules are proposed, though, the Commission gets hundreds of comments—except when the proposed changes are major, in which case the number goes into the thousands. And when you get thousands of concerned individuals commenting on a proposal, something wonderful starts to happen. Those at the fringes (even though they may be the ones who initiated the change process) quickly become outnumbered by those at the center and a consensus begins to emerge.

In the case of code testing, we are seeing two major areas of consensus beginning to emerge from the comments: First, that currently-licensed hams who have not passed a code test (Technicians) should be given at least limited access to the HF ham bands (details to be worked out later); and second, that a way to accommodate both those who want the code tests eliminated and those who want them maintained or toughened is to remove the code requirement for General, but retain it for Extra, again with details to be worked out later. Frankly, this is something we at *CQ* can live with comfortably, even though our own comments sided with eliminating the code requirement (based primarily on the FCC's own statement that it no longer served a regulatory purpose). We are quite willing to meet in the middle, and we believe the majority of hams will be willing to do so as well.

The FCC has already said it will be guided by the desires of the amateur community on this matter, and those desires are becoming quite clear. Based on the petitions and the comments files so far, we would expect the Notice of Proposed Rule Making (NPRM) that emerges from this to propose: (a) eliminating the code test for General but keeping it for Extra (and keeping it at 5 wpm); and (b) opening current Novice HF frequencies to Technicians, with digital as well as CW privileges on 80, 40, and 15, along with voice on 10 (we proposed simply merging the two licenses, adding digital privileges and expanding Novice/Tech privileges on 10 meters to include the whole band). There were proposals for even more privileges, but if upgrading to General requires only a written exam, then this would represent a good compromise. If those who feel that code is too significant a part of amateur radio's heritage to disappear completely from the licensing picture will be satisfied by keeping the code requirement for Extra, then that would be a good compromise as well.

The critical factor in all this—and what sets apart the American way of doing things from what goes on in many other countries—is that the staff at the FCC actually *listens* to what we have to say and then tries to craft rules that meet both the FCC's regulatory needs and the desires of the licensees. When so many people have input to the process, reason prevails and reasonable regulations result, even if they completely satisfy neither side. Generally speaking, "the system" works.

I urge you to read the many petitions (14 as of mid-October) that the FCC has posted for comment, along with at least some of the comments on them. The November 7th cutoff for initial comments on the second group of petitions will be past by the time you read this, but when the NPRM is issued, I hope you will read it and add your opinion in the form of a comment.

Voices

We are providing a forum this month in "Op-Ed" for the National Conference of Volunteer Examiner Coordinators (NCVEC) to set forth its vision for the future of our hobby. I want to point out here that our publication of this NCVEC "white paper" does not and should not imply that we necessarily endorse it or even agree with it. The NCVEC is essentially the "gatekeeper" of amateur radio, deciding what's in our licensing exams and how they are structured and administered. It de-

(Continued on page 8)

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- Improved 3rd Order Intercept Point
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- AGC Loop Management
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announcements

TARA RTTY Melee – This contest, formerly called the TARA RTTY Sprint, sponsored by the Troy ARA, will be held on Saturday, December 6, 0000–2400Z. categories: Single Op All Band High Power (>150 watts), Single Op All Band Low Power (<150 watts), Multi-Op All Band (10 minute band change rule), and SWL. Frequencies: 80–10 meters, operate 16 hours maximum. Exchange: RS + State/Province or serial number for DX. QSO Points: 1 pt/QSO. Score: QSO points × S/P/C counted only once (US and VE only count as S/P). Summary sheets (no logs) are due by Dec. 31 via online submission to <http://www.n2ty.org/seasons/tara_melee_score.html>. For more information, go to <http://www.n2ty.org/seasons/tara_melee_rules.html>.

Hamfest 2003, sponsored by the Superstition ARC, will be held on December 6 on Dobson Road in Mesa, AZ. (Talk-in 147.120+; exam registration 8–9 AM, exams 9–11 AM)

Ham Radio University 2004 & the ARRL NYC/LI Section Convention will be held on January 18 at the East Woods Scool, Oyster Bay, Long Island, NY. As in past years, there will be forums geared to the non-ham as well as the experienced operator, a special event station, license exams, and table setups by various organizations and clubs. New for HRU 2004 will be a seminar presented by the ARRL explaining the online educational courses available. For more info go to: <www.limarc.org>.

•The following special event stations are planned for December:

W1C, honoring the 100th anniversary of the Wright Brothers first flight (contacts will be made from an aircraft in flight, weather permitting), Vacaville, CA; Aeronautical and Maritime ARC of California; December 17 (no times given) SSB on 1.950, 3.972, 7.250, 14.272, 28.475 MHz. For certificate send QSL and SASE to Bill Alber, WA6CAX, P.O. Box 799, Suisun City, CA 94585.

W2W, to commemorate the attack on Pearl Harbor, Baltimore, MD; Historical Electronics Museum ARC (W3GR); 1400–2200Z December 6 & 7 in the General portion of the HF bands on SSB and CW. For certificate and QSL send 9 × 12 SASE with 60 cents postage (business-size SASE for QSL only) to HEMARC W2W, P.O. Box 746 MS 4015, Baltimore, MD 21203. For more info e-mail <w3gr@arrl.net> or go to <www.qsl.net/w3gr>.

WX3MAS, for Christmas City ARC and Delaware-Lehigh ARC annual season's greetings from the twin Christmas Cities, Bethlehem-Nazareth, PA; 1400Z Dec. 13 to 0200Z Dec. 14 on 3.970, 7.270, 14.265, 21.365, 28.465 MHz. For certificate send QSL and 9 × 12 SASE to CCARC/DLARC WX3MAS, Greystone Bldg., Gracedale Complex, RR 8, Nazareth, PA 18064-9211.

W4M, to commemorate the 100th anniversary of Mt. Weather, VA; Mt. Weather ARC; Dec. 5–15 (no times given) on the HF bands. For a certificate send QSL and SASE to AG4SO.

KC5OUR, celebrating Christmas from Bethlehem, NM; Valencia County ARA; 1400Z Dec. 18 through 2300Z Dec. 25 (no times given) on 7.270, 14.270, 21.370, 28.370 MHz. For QSL send QSL and SASE to VCARA, P.O. Box 268, Peralta, NM 87042.

Zero Bias *(from p. 6)*

serves to be heard, even if you (or we) disagree with what it has to say.

The number of publications in which different voices in the amateur community can be heard is one smaller, with the announcement in October that *73* magazine was calling it quits after 43 years. We are saddened by this loss to the amateur community. While we have been competitors for readers and advertising dollars, a service with 685,000 people and an industry with sales of more than $100 million per year should be able to support more than three general-interest magazines. Members of our hobby with stories, ideas, and projects to share have one less opportunity to do so in print, and we will all be the poorer as a result.

Closer to home, we extend our deepest sympathy to *CQ* Public Service Editor Bob Josuweit, WA3PZO, on the loss of his wife, Kim MacNamara-Josuweit, KB3COV, in early October.

Season's Greetings

Finally, and on a happier note, all of us at *CQ* wish each and every one of our readers a happy holiday season and a healthy, happy, and peaceful new year.

73, Rich, W2VU

AMERITRON *True Legal Limit*™ Tuner

Easily handles 1500 Watts continuous carrier even on 160 Meters . . . High-current edge-wound silver plated Roller Inductor . . . Two 500 pf high capacitance tuning capacitors with 6:1 vernier reduction drives . . . 3 core choke balun . . . Six position antenna switch . . . True peak reading Cross-Needle SWR/Wattmeter . . .

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- ***Handles 1500 Watts carrier***
- ***Super High Current edge-wound silver plated Roller Inductor***
- ***500 pf tuning capacitors with 6:1 vernier reduction drives***
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- ***True peak reading meter***

AMERITRON's ATR-30 *True Legal Limit*™ roller inductor antenna tuner is ham radio's toughest! It'll handle 1500 Watts *continuous carrier output* on *all* modes and *all* HF bands into most antennas -- even on 160 Meters where most antenna tuners fail.

It's perfect for Ameritron's most powerful amplifiers where the ATR-30 just loafs.

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Two 500 pf -- *the highest of any antenna tuner* -- variable transmitting capacitors give you no-arc wide range impedance matching for true high power performance.

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Roomy extra-strong .080 inch thick aluminum cabinet gives highest efficiency and lowest loss. 13¼Wx5⅝Hx17½D inches.

AMERITRON ATR-20 Antenna Tuner

ATR-20, $459. Handles a full 1.2 kW SSB and 600 Watts CW. It's designed to safely handle the full SSB power of Ameritron's AL-811/811H/80B, ALS-500M/600 and other 1.2 kW SSB amplifiers.Has vernier reduction drives.

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AMERITRON's legal limit amplifiers use super heavy duty Peter Dahl Hypersil® power transformer capable of 2500 Watts!

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AL-1500

$3045

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Ameritron's *most powerful* amplifier uses the herculean *Eimac*® 3CX1500/8877 ceramic tube. It's so powerful that 65 Watts drive gives you the full output power -- and it's just loafing because the power supply is capable of 2500 Watts PEP. All HF bands, all modes. 77 lbs., 17Wx10Hx18½D inches.

Ameritron's *toughest* Amp

with Eimac® 3CX1200A7 tube

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Get ham radio's *toughest* tube with AL-1200. The *Eimac*® 3CX1200A7 has a 50 Watt control grid dissipation and the lowest history of field replacement of any modern transmitting tube that we use. 90 Watts in gives you full power out. All HF bands, all modes. 76 pounds, 17Wx18½Dx10H in.

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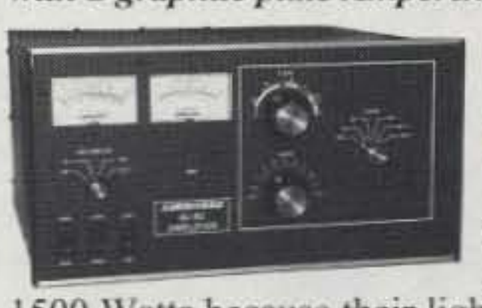
with 2 graphite plate Amperex® 3-500G tubes



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Most linears using 3-500Gs *can't* give you 1500 Watts because their lightweight power supplies *can't* use these tubes to their full potential. AL-82 is ham radio's *only* super 3-500G amp! 100 Watts in gives you full power out. All HF bands, all modes. Hefty 76 pounds, 17Wx10Hx18½D inches.

Desktop Kilowatt

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AL-80B, $1349. Gives you full kilowatt SSB PEP output (85 Watts in) from a whisper quiet compact desk- top linear. 14Wx8½Hx 15½D". Plugs into 120 VAC outlet. Graphite plate *Amperex*® 3-500G tube. Nearly 70% efficiency. Weighs 48 lbs.

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500 Watt Mobile Amp

ALS-500M, $799. 500 Watts PEP/400W CW output, 1.5-22 MHz, instant bandswitching, no tuning, no warm-up. SWR, load fault, thermal overload protected. On/off/bypass switch. Remote on/off control. DC current meter. Extremely quiet, fan off until needed. 13.8 VDC. 9Wx3½Hx15D in.

600 Watt FET Amp

ALS-600, $1299. *No tuning, no fuss, no worries -- just turn on and operate.* 600 Watts PEP/500W CW, 1.5-22 MHz, instant bandswitching, SWR protected, extremely quiet, lighted peak reading Cross-Needle SWR/Wattmeter, front panel ALC control, operate/standby switch. 120 or 220 VAC. Inrush current protected. 9½Wx6Hx12D in.

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Back in the "golden age" of ham radio, our transmitters and receivers (there weren't too many transceivers yet) didn't just have model numbers, they had NAMES. And the manufacturers chose the names to try to evoke certain images in our minds. WA9FWA reminisces . . .

There Once Was an Ocean Hopper
When Radios Had Names

BY SCOTT FREEBERG,* WA9WFA

A long, long time ago many youngsters, maybe including you, leaned over an incredible shortwave receiver called an Ocean Hopper and spent hours and hours late into the night scanning the airwaves for weak radio signals hopping across the ocean from strange and exotic places around the world. Maybe you didn't use the Ocean Hopper but instead owned a Sky Buddy with which to cruise the airwaves. However, the Ocean Hopper and Sky Buddy weren't the only radios with exciting names. Many ham and shortwave radios from the 1940s, 1950s, and 1960s had exciting, mysterious, or powerful names that made your imagination come alive just thinking about them. The names were as gentle as an Ocean Hopper or a Sky Buddy, or as thunderous and powerful as a Tornado or a Thunderbolt. I would like to take you on a lighthearted walk into our very recent ham radio past and share radio names that once inspired and influenced young and old.

Photo 1– The Pawnee was one of many Heathkit radios named after North American Indian tribes. (All photographs by, courtesy of, and copyright by Joe Veras, N4QB)

Names of the Past

Modern radios of today are often identified with a two-letter prefix followed by a set of numbers, such as the TS-830S, IC-730, or FT-10000. It's pretty straightforward. You start out with a low number and then go up in increments for each successive model—e.g., the TS-520, where the next model was the 530, and 820, followed by an 830, then 940, etc. There is one manufacturer with an FT-1000. Then there's an antenna that started out as the R3, and then came the R4, R5, and R7, then the R6000 and R7000. The point is that most radio manufacturers of today have very uninspiring, unemotional names for their radios. However, it wasn't always this way.

In our very recent past radios were often given just a name and no numerical designation. Granted, most manufacturers also had model numbers, but along with them were product names that projected an image then and still do today.

One fine example of naming is from the **James Knight Company**, which manufactured the Knightkit series of kits and built radios starting with the Ocean Hopper. What a cool name. Just saying the name inspires thoughts of combing the airwaves for rare and exotic signals hopping across the ocean. Knightkit also had the Space Spanner and Span Master, both regenerative beginners' receivers. The Space Spanner is another name that tickles the imagination of receiving signals across space. The company had a superheterodyne receiver called the Star Roamer. Plus, there was the Globe Patrol. Wow, to an 11-year-old kid these names were incredibly exciting.

Often the names were more exciting than the actual performance of the radios, yet we turned them on and were in awe. Now, some 50 years later, you can mention the name Ocean Hopper to a ham whose first radio was an Ocean Hopper and it will bring back rich memories.

Then there was the **Heath Company**, which manufactured a wonderful line of ham radio transmitters, receivers, and other equipment under the Heathkit name. Heathkit also had inspiring and unique names for its radios. For example, an entire line of equipment was named after powerful Indian tribes, such as the Apache transmitter and its matching Mohawk receiver. Whoa. The Apache and Mohawk pair is an imposing sight. For mobile radios, Heath had the Cheyenne transmitter and the matching Comanche mobile receiver. When it came time to turn on the amplifier, you mentioned you were running the Heathkit Chippewa, or better yet, the Warrior. Heathkit had an SSB transmitter called the Marauder, which was also designed to match the Mohawk receiver. There was some VHF gear, including a 6 meter transceiver called the Pawnee (photo 1), a matching 2 meter transceiver called the Shawnee, and a VHF transmitter called the Seneca. Then there was the gorgeous shortwave receiver called the Mohican.

On the humorous side, Heath offered a dummy load called the Cantenna, and it consisted simply of a paint can with resistors immersed in mineral oil. Now Cantenna is a name that's hard to forget. Heath also had some matter-of-fact names for a line of low-cost HF and VHF radios popularly called the Benton

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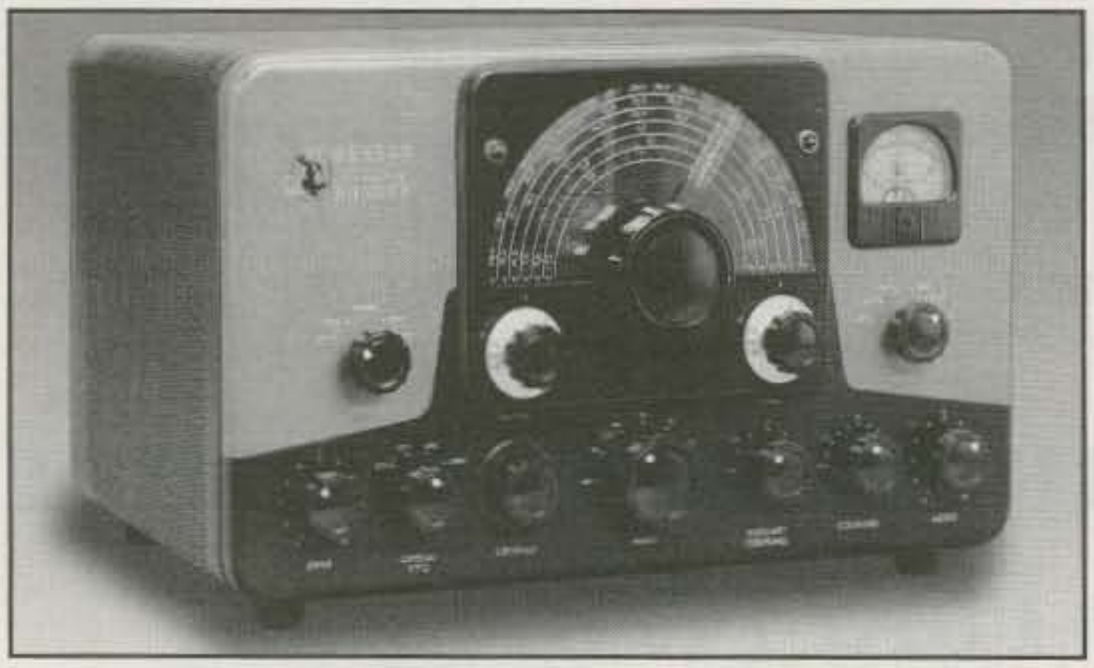

Photo 2– The Viking Ranger was one of more than a dozen E.F. Johnson radios and amplifiers to carry the Viking name plate.

Harbor Lunchboxes, appropriately named because they looked like a kid's lunchbox and Heath was headquartered in Benton Harbor, Michigan. The 6 meter model was called the Sixer, and guess what the 10 meter and 2 meter models were called? Yep, the Tener and the Twoer. Heath's customers insisted on giving the radios names even when the company didn't. Two of Heath's incredibly successful transceivers, the HW-100 and its successor, the HW-101, were affectionately called the Hot Water 100 and Hot Water 101. Even after 30 years, the HW-101 is still known as the Hot Water 101.

Lafayette Corporation offered a few radios with cool names, getting a lot of use out of the Explor-Aire series of low-cost shortwave receivers. The Explor-Aire finally ended with the fancy schmancy Explor-Aire Mark V. For transmitters, the company offered the Voyager and the Starflight. The rest of Lafayette's radios had letter/number configurations.

Another standout company was **Hallicrafters**. It manufactured a long line of receivers, transmitters, and amplifiers with cool radio names. Some early Hallicrafters receivers sported such names as Sky Buddy and Sky Champion. Then there were the SkyRider and Ultra SkyRider, followed by the Super Skyrider. Hallicrafters also offered the Sky Ranger, Sky Chief, Sky Challenger, Legionnaire, Sky Traveller, and the Defender. For HF transceivers they offered the Cyclone, a 500 or 750 watt transceiver. Now if the Cyclone wasn't enough to do the job, then you turned on the Tornado. Still need more power? Then it was time to turn on the Hallicrafters Hurricane, a 2 KW CW/SSB transceiver. Now you have to be running some serious power when you are harnessing a Hurricane. You can imagine that your signal strength must have gone up 12 dB alone just from mentioning that you were going to turn on a Hurricane.

Hallicrafters had a standalone high-power HF amplifier called the Loudenboomer. Now if you think that this doesn't fit the pattern of other Hallicrafters names, all "serious"-sounding English names, you'd be right. Curiously, the Loudenboomer was originally manufactured by **Radio Industries** of Kansas City, Kansas, with models through the Loudenboomer Mark II. By the time the next version appeared, though, it sported a Hallicrafters nameplate and model number, HT-45, even though it was also labeled on the front as the Loudenboomer Mark IIA.

The **Hammarlund Manufacturing Co.** offered a wonderful series of communications radios called the Super Pro and the Comet Pro. There were many years of different models under the Super Pro and Comet Pro name plates.

Clegg offered a series of VHF transmitters, receivers, and transceivers with a Nordic and Greek god name theme, including the Thor, the Venus, and a 6/2 meter transmitter called the Zeus. For high power, Clegg offered the Apollo 6 meter amplifier. The company also had a line of smaller VHF transceivers aptly called the 22'er and the 66'er.

E.F. Johnson Company of Waseca, Minnesota had some of the more exciting ham radio names which suggested power and strength, principally the Viking series, which spanned nearly 20 years. The Viking radios were as strong and powerful as their name suggests! On the low-power, crystal-controlled side, there were the Viking Challenger and Viking Adventurer. Thus, even for a simple low-power Novice transmitter, you could still command the strength of a Viking. Johnson's lower power VFO transmitters included the Viking Navigator and the Viking Ranger (photo 2). As you climbed the power ladder, there were the Viking Valiant (I and II), the just-plain Viking (I and II), and the Viking 500. Then there was the Invader for medium power, followed by the Invader 2000 for high power.

For high-power amplifiers, E.F. Johnson offered the Courier and Thunderbolt. Your signal had to go up 12 dB alone just from the cool names such as Courier (photo 3) and Thunderbolt. I can imagine the pride you must have felt when you told someone you were turning on the Thunderbolt and *knew* the S-meter on the other end had just slammed to the side.

E.F. Johnson also offered an early SSB/AM/CW transmitter called the Pacemaker. Personally, I have fun with this name, since I design heart pacemakers for a living. If you needed real power, the company produced a monster HF amplifier that weighed nearly 500 pounds and was built into a battleship-gray steel desk. It was appropriately called the Johnson Viking Desk Kilowatt. Johnson also offered some antenna matchers that were appropriately named the Viking Matchbox. There was the Matchbox Jr., which was a 250 watt tuner, and the Viking Kilowatt Matchbox, which handled—you may have guessed—a kilowatt. There was a drawing of a box of matches silkscreened in light green on the front panel. We may be talking about the classiest tuner ever made!

World Radio Laboratories was another great radio company that enjoyed using fun names for its radios. On the lower power side, WRL offered various models of the Globe Scout. It also offered some medium-power transmitters such as the Globe Champion, GlobeTrotter, and the Globe Chief, followed by the Globe Chief Deluxe. On the more serious power and weight side, there were several models of the famous Globe King series, ending with the Globe King 500. For a power amplifier, the company offered a Power Master as well as an Atlas.

Harvey Wells was a small company that offered some great transmitters, including a few with descriptive names such as the

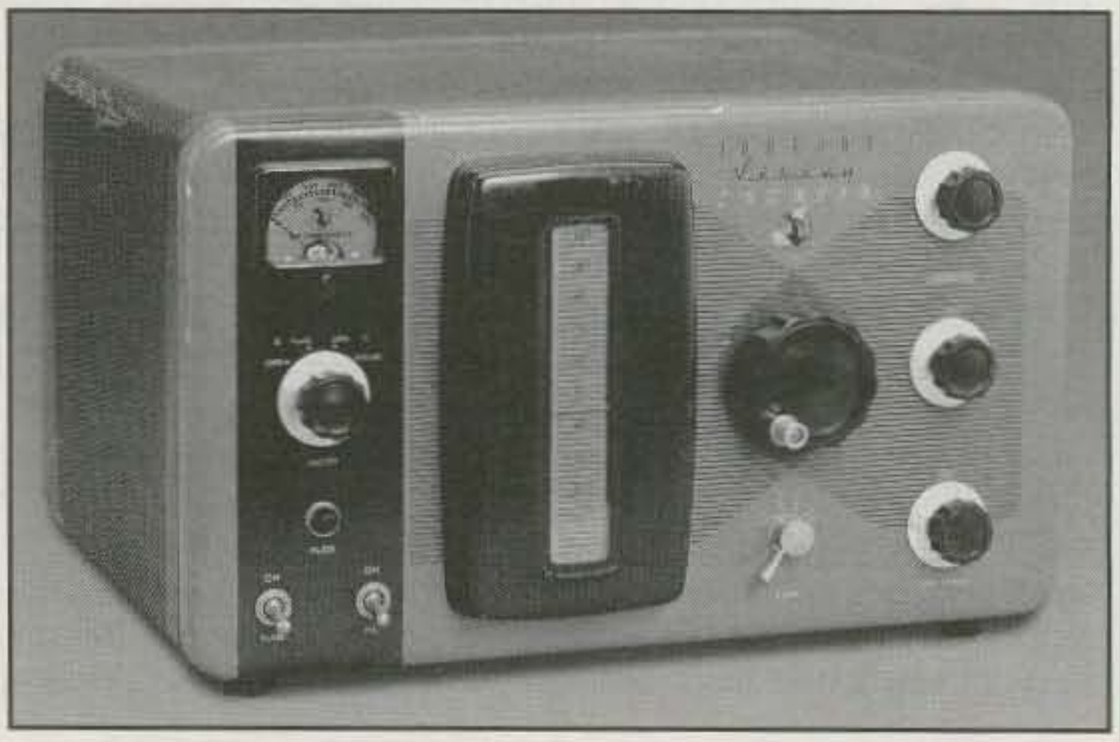

Photo 3– Courier was the name E.F. Johnson gave to its medium-power (300 watt) amplifier. If you wanted a full kilowatt, you had to go with the Thunderbolt, or maybe the Viking Desk Kilowatt.

HF EXCITEMENT

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Blending leading-edge technologies developed on the FT-897 and MARK-V FT-1000MP transceivers, the FT-857 is the world's smallest* HF/VHF/UHF Multimode Transceiver, and it's available now!

*Jan. 2003

FT-857 DESIGN HIGHLIGHTS

The FT-857 is a high-performance, ultra-compact transceiver operating on the 160-10 meter HF bands, plus the 50, 144, and 430 MHz VHF/UHF bands. Providing 100 Watts of power on HF/6 meters, 50 Watts on 2 meters, and 20 Watts on 70 cm, the FT-857 is ideal for mobile, vacation, DX-pedition, or home use when space is at a premium.

Utilizing the renowned receiver performance of the FT-897 and MARK-V FT-1000MP, the FT-857 features wide dynamic range, optional Digital Signal Processing, and outstanding audio.

The wide array of convenience features includes a 32-color display; Spectrum Scope; built-in keyer with memory and beacon mode; U.S. Weather Band reception; 200 memories with Alpha-Numeric labels; AM Aircraft reception; detachable front panel (optional YSK-857 required); and much, much more.

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the FT-857 New Mobile. . .from
the engineers at Yaesu!

New Remote Control
DTMF Microphone MH-59A8J (Option)

The optional MH-59A8J Remote Microphone provides control of the major functions of the FT-857 from the microphone's keypad. The MH-59A8J includes a rotary control knob for adjusting the operating frequency and the receiver volume level.

Actual Size

March 2003 VP6DIA Ducie Island Expedition Utilizing Mark-V Field, FT-857, FT-847

The 2nd Ducie Island DX-pedition (VP6DIA) was active March 5 - 13, 2003 from this rare DXCC Entity near Pitcairn Island. Operators VP6MW, VP6DB, VP6AZ, JA1SLS, DK9KX, JR2KDN, DJ9ON, N6TQS, and FO3BM generated over 25,000 QSOs on SSB, CW, and RTTY using YAESU Mark-V Field and FT-857 rigs, and provided the first-ever AO-40 Satellite contacts using the FT-847. The excellent ergonomics, high performance, and compact size of the FT-857s yielded no-compromise pile-up performance on all HF bands.

QSL via JR2KDN. VP6DIA Home Page: http://www.qsl.net/wd4ngb/ducie.htm

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Photo 4– A favorite joke about the Harvey Wells Bandmaster was that the name was appropriate since harmonic suppression wasn't that great and it often seemed to transmit on all bands at once!

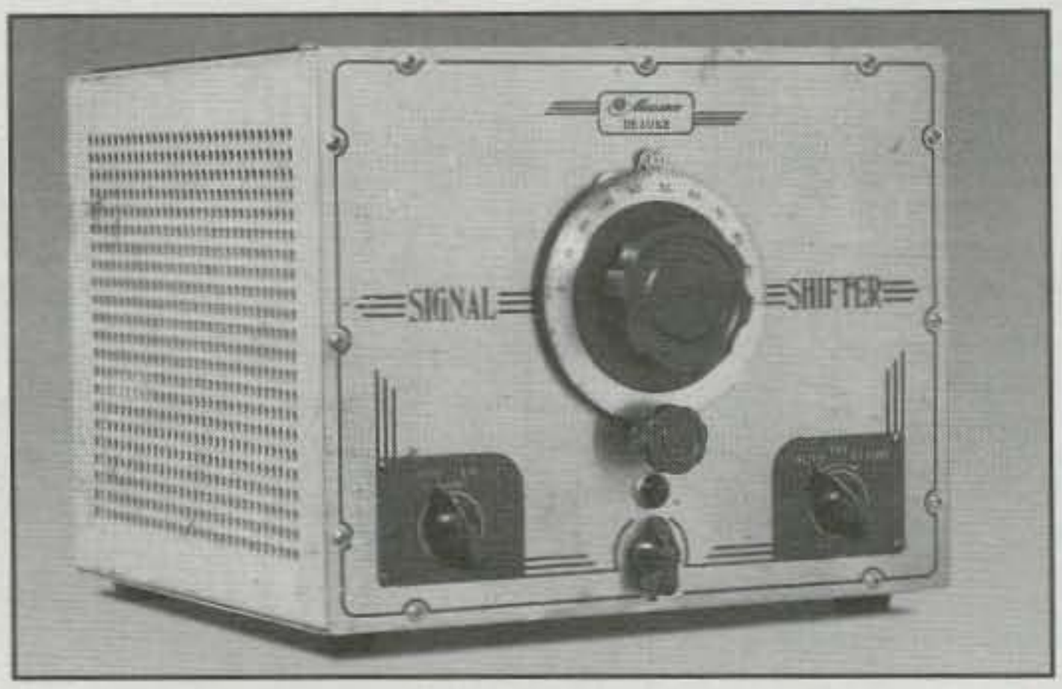

Photo 5– Today, the Meissner Signal Shifter might be considered a QRP transmitter, with 5–7 watts output on CW. In its prime, though, it was often used as an outboard VFO for higher power crystal-controlled transmitters.

Bandmaster Jr, followed by the Bandmaster Sr and the Bandmaster Deluxe (photo 4).

Collins Radio Corporation built the Cadillacs of ham radio in the 1950s and '60s, although they didn't use exciting or rugged names for their radios. One of their setups, though, acquired a nickname over the years. In the mid-'50s, Collins offered a kilowatt SSB/AM/CW transmitter called simply the KWS-1. The letters KWS came from KiloWatt Sideband. The matching receiver was simply the 75A-4 (which replaced the 75A-3, which replaced the 75A2, etc.). Nothing special in that name either. Together, though, they cost around $2500 in 1955 . . . about the price of a new car in those days! Because of their incredibly high price, they acquired the nickname Gold Dust Twins. Today they are highly prized by Collins collectors and are still quite expensive.

The **Gonset Company** manufactured a line of 6 and 2 meter radios with the straightforward name Communicator—a solid name for a solid radio. Oddly enough, the Communicator picked up the goofy name Gooney Box. I am not kidding. Most of the VHF guys I knew from the '60s AM days were running Gooney Boxes on 2 meters. There were also 6 meter Gooney Boxes. This may be one of the oddest nicknames a radio ever acquired. Gonset later introduced a 6 meter and 2 meter transceiver series called the Sidewinder, which offered single sideband as well as AM. Gonset also had an HF transmitter called the Commander.

Meissner manufactured a small, low-power transmitter with a built-in VFO. Many rigs of the day were crystal controlled, so it was often used as the VFO for a larger transmitter. The transmitter/VFO (photo 5) was appropriately called the Signal Shifter (as in frequency shifting).

One of my favorites has been the **Zenith** TransOceanic series of shortwave receivers. That name has always inspired me with its intrigue and mystery. The TransOceanic was a very long-lived radio that was made for 40 some years in many different versions.

Last, but not least, there was **Whippany Labs** of Whippany, New Jersey, which manufactured a small 6 meter AM transmitter and matching receiver called Lil Lulu. It's a cute little name for a cute little radio.

Where Have All the Good Names Gone?

Most of the wonderful radio companies that developed and sold these creatively named radios are now only a part of our history. They faded into the sunset in the 1960s or 1970s with the inrush of foreign-manufactured SSB transceivers. However, there *is* a ham radio company still in business and going strong that still offers radios with imaginative names: Ten-Tec. One of its first QRP transceiver offerings was called a Powermite, as in mighty low power—an appropriate name for a transceiver running only 2 watts. Ten-Tec's next series of SSB/CW QRP transceivers started an ongoing trend of looking to Greek mythology for names. They were called Argonauts, as in "Jason and the Argonauts," with the Argonaut 505, Argonaut 509, and of course the Argonaut 515. (*The 20 watt Argonaut V, in current production, continues that tradition—ed.*) After that came the Triton, an SSB/CW transceiver with higher power, along with other Greek-derived names such as the Corsair, Paragon, and Omni. Ten-Tec's current radios, in addition to the Argonaut V, include the "Pegasus (the flying horse of Greek mythology), the Jupiter, and the Orion. For high-power amplifiers, Ten-Tec offers the Centurian and the Titan III.

Still On The Air

Do you know that you can still hear many of these radios on the air? Imagine that after 50 years, you can still run into folks on the air running a Viking Ranger or a Globe King 500, or listening to the shortwaves on a TransOceanic. Acquiring and operating classic tube radios from our recent past is an exciting aspect of ham radio that many folks currently enjoy or are just discovering. There has been a tremendous growth in this area over the past several years as new hams find out about this fascinating aspect of our hobby. In just a short period of time, old tube radios that couldn't be given away are now selling at premium prices as hams discover the wonder and excitement of these classics.

Some folks enjoy collecting and restoring the classic or rare radios. Some enjoy repairing their radios and learning their history. There is often a rich and satisfying history surrounding a classic radio, not to mention legends and myths. Many folks simply enjoy owning and operating the equipment and experiencing vintage-radio contacts with other vintage-minded folks. Because of all this interest, you can now hear many of the old classic radios on the air again. This is radio gear that is often 40 or 50 years old, yet it sounds wonderful and performs exceptionally well. It may be equipment that you used in the past or wished you had had back then, or then again it may be totally new and intriguing to you. Whatever the reason, it is great to hear all these classic radios and names on the air again.

It's exciting to QSO with other vintage stations, because you can't wait to hear what sort of legendary radios they are running. I have had many recent CW and AM QSOs with hams running a Viking Ranger, a Heathkit Apache, the Collins Gold Dust Twins, or the Globe King 500. Maybe you'd like to make some contacts of your own on a Johnson Viking Invader 2000

transmitter. Maybe you'd like to listen to the shortwaves with a radio as gentle as a Sky Buddy or an Ocean Hopper, or maybe you'd like to crash the ether with a Tornado" or a Thunderbolt." The past comes alive again, and we are able to enjoy these radios that come from a classic period. It is a wonderful new—and old—aspect of ham radio.

Classic Websites

The internet is full of websites that discuss and promote classic ham radio. Just type in the word "boatanchors" in any search engine and you will find more websites and information that you could ever read. (*The label "boatanchor" comes from the size and weight of many classic tube radios—ed.*) There are links to all sorts of wonderful vintage-radio sites that feature history, information, and photos of old classic ham radios. If you are getting bored running a sterile rig-with-no-name, maybe it's time for a classic. ■

What Happened to the Names?

Why don't most radio manufacturers use cool names anymore? The answer, in a word, is "globalization." The Japanese manufacturers, for example, sell their radios worldwide, in places where names such as Signal Shifter or Bandmaster would have little meaning. One of those places, of course, is Japan itself, just as Japanese names would have little meaning to most Americans. On the other hand, I might enjoy using a Godzilla amplifier! —*W2VU*

"The List"

I couldn't cover every radio with a cool name, or even every brand, in this article, and I probably even missed a few in the more comprehensive list that follows. However, here's my full list of just about every "radio with a name" that I could dig up:

Clegg
22'er
66'er
Apollo
Comet
Thor
Venus
Zeus

E.F. Johnson
Courier
Pacemaker
Thunderbolt
Viking 500
Viking Adventurer
Viking Challenger
Viking Desk Kilowatt
Viking I, II
Viking Invader 200, 2000
Viking Kilowatt Matchbox
Viking Matchbox
Viking Mobile
Viking Navigator
Viking Ranger I, II
Viking Valiant I, II

Gonset
Commander
Communicator I, II, III, IV
Sidewinder
Super-Ceiver

Hallicrafters
Civic Patrol
Cyclone
Defender
Hurricane
Legionnaire
Loudenboomer *(see text)*
Sea-Farer
Sky Buddy
Sky Challenger
Sky Champion
Sky Chief
Sky Ranger
Sky Rider
Sky Rider Defiant
Sky Rider Diversity
Sky Rider Marine
Super Defiant
Sky Trainer
Sky Traveller
Super Sky Rider Tornado
Ultra Sky Rider

Hammarlund
Comet
Comet Pro
Four –20
Super Pro

Harvey Wells
Bandmaster Jr., Sr., Deluxe

Heathkit
Apache
Cantenna
Cheyenne
Chippewa
Comanche
Marauder
Mohawk
Mohican
Pawnee
Seneca
Shawnee
Sixer
Tener
Twoer
Warrior

Hunter
Bandit 2000
Cyclemaster

Knight-Kit
Ocean Hopper
Space Spanner
Span Master
Star Roamer

Lafayette
Expor-Aire
Starflight
Voyager

McMurdo Silver
Ham Super
Radio Silver
Silver Single-Signal Super

Meissner
Allwave 8
Dejong 8
Signal Shifter
Traffic Master
Traffic Scout

National
World Master

Radio Industries
Loudenboomer *(see text)*

Ten-Tec
PowerMite
Argonaut 505, 509, 515, V
Centurion
Century 21
Corsair
Hercules
Jupiter
Omni
Orion
Paragon
Pegasus
Titan I, II, III
Triton

Whippany Labs
Lil Lulu

World Radio Labs
Atlas
Duo-Bander
Globe Champion
Globe Chief
Globe Chief Deluxe
Globe King 400, 500
Globe Scout
Globe Trotter
Hibander
Meteor
PowerMaster
Tech-Ceiver

Nicknames
Benton Harbor Lunchbox:
Heathkit Tener, Sixer, Twoer

Gold Dust Twins:
Collins KWS-1 transmitter and 75A4 receiver

Gooney Box:
Any of the Gonset Communicators

Hot Water 100/Hot Water 101:
Heathkit HW-100/HW-101 transceiver

Seven Drifty Three:
Eico 753 transceiver

Think you don't have enough room for a good 160 meter vertical? Think again, says KK7DP, whose small vertical can still put out a big signal on "Top band."

The Conix Class 160 Meter Vertical Antenna

BY DAVE JACOBS,* KK7DP

Are you an operator who is interested in trying 160 meter operation with a vertical antenna but is precluded from erecting a 60 ft. vertical in your backyard? How does the possibility of having a 31 ft. 9 in. high antenna that fits into a corner of most backyards and covers at least a 130 kHz bandwidth at the 2:1 SWR points sound to you? That is exactly what I use at my QTH, and this article will describe how you can replicate this antenna.

The basic configuration is an inverted cone (photos A and B), hence the name I gave the antenna: the "Conix Class 160," or CC-160. With four radials installed and 425 watts of power, I worked 225 stations in 15 hours in the 2003 CQ World-Wide 160 Meter Contest. This may not sound like a very successful contest performance until you consider that my QTH is Montana, the original black hole of propagation. The path from my station to Europe or Japan is completely blocked by the polar auroral zone, and we are so far north that the ionization levels that support propagation have decayed to very low levels. Nevertheless, I received several 5-9 +30 signal reports, copied CT2 stations at S-7, and worked Caribbean stations at the +20 level.

All that having been said, the antenna is still a physically shortened radiator with gain figures to match. Do not expect it to be a giant killer; it is a compromise that will fit into a limited space but still function very satisfactorily. It is very quiet in the receiving mode, because it is a closed loop similar in design to the cubical quad and is operated at DC ground potential (which additionally gives some degree of lightning protection). This design effectively shorts

*P.O. Box 307, Ulm, MT 59485

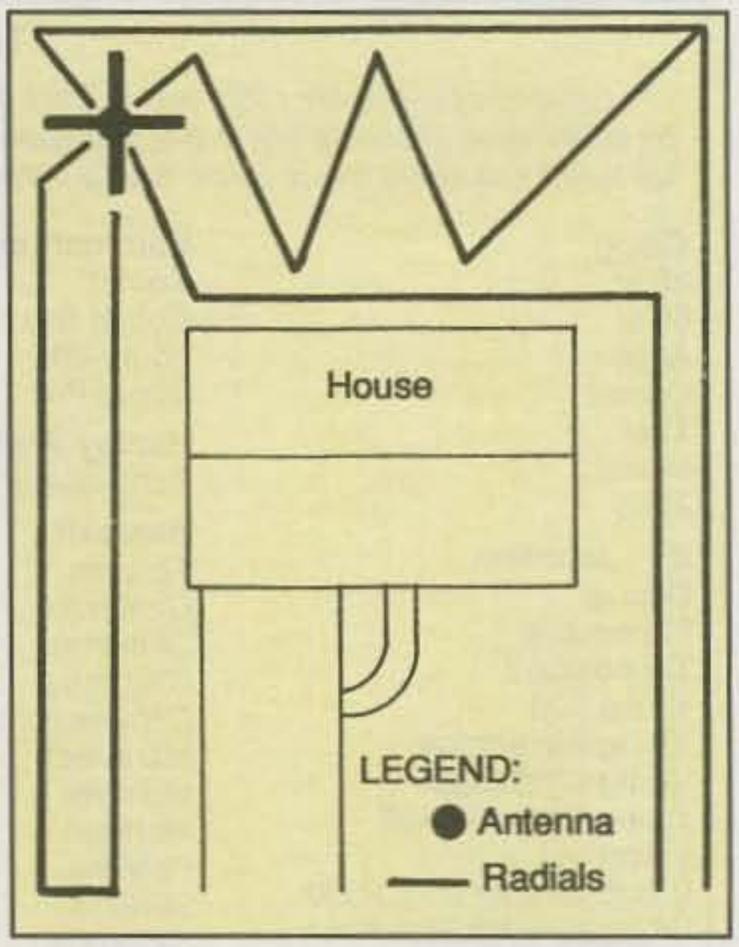

Fig. 1– Possible installation of antenna with four radials on a small lot. Note that the radials do not have to be straight to be effective.

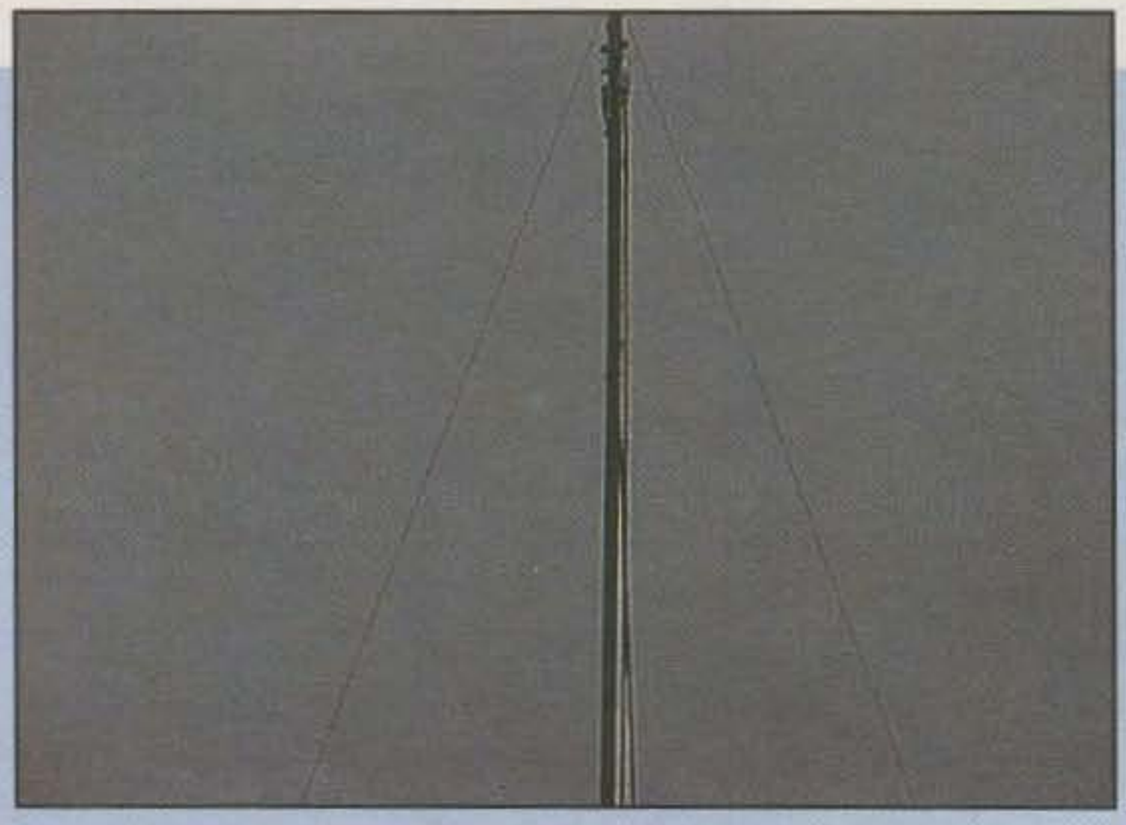

Photo A– Top section of the Conix Class 160 vertical.

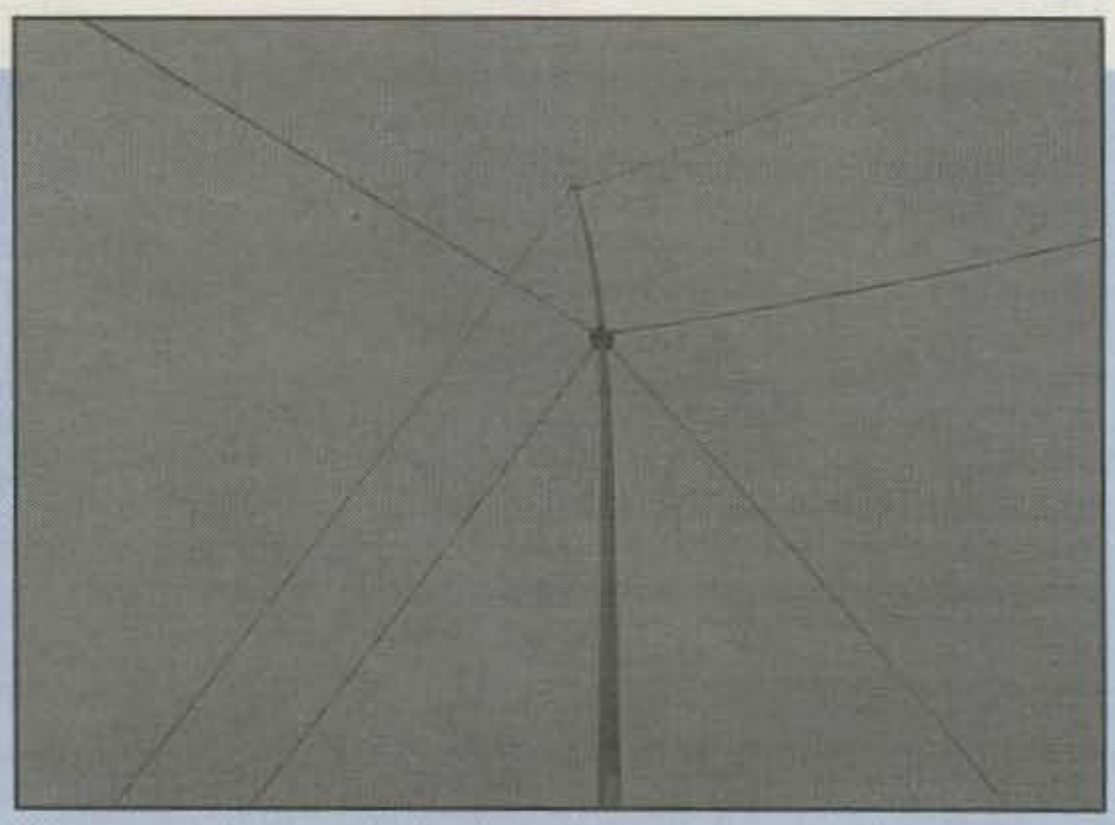

Photo B– Another view of the top section, looking up. Note the diagonal wires coming off the upper mast section.

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out static voltages and couples them to ground before they can cause a noise-generating arc. This should be of great benefit to amateurs living in the south who experience a great deal of static-induced QRN.

Since this vertical antenna is non-symmetrical, a good ground is required. My current configuration utilizes four radials, each one 130 ft. long and surface mounted on the ground. The antenna will actually work without any radials, because the ground braid of the coax acts as a first radial. However, a minimum of two is highly recommended. What is important is to decrease the effective ground loss by installing a sufficient number of radials to electrically couple the antenna to ground. With four radials installed, the ground loss reduction is 1.2 dB, or an increase in the effective radiated power of 1.2 dB. Every time the number of radials is doubled, the effective radiated power increases by an additional 0.6 dB, with 4.2 being the maximum gain for 120 radials. That is why adding a few radials to an existing installation provides only a little improvement unless the installation has no or few radials to start with. While it may not be feasible to expect an average backyard to support 20 radials, almost any backyard can support at least two 130 ft. radials if they are installed in a bent pattern. Additional radials of that length, or even shorter ones, can be installed into whatever space is available. Fig. 1 is a possible layout of four radials in an average yard. A full acre is required to install 120 radials, and yet the effective radiated power will only be 4 dB higher than that of a station with only two radials.

The antenna is resonant and will cover the entire 200 kHz of the 160 meter band if it is erected in the open and if you spend sufficient time fine-tuning the antenna. Even without fine-tuning, the antenna will cover 130 kHz of the band within the 2:1 SWR points. The purpose of the series capacitor (see detail in fig. 2) is to tune out the +j inductive reactance that the antenna possesses, making it a pure resistive load.

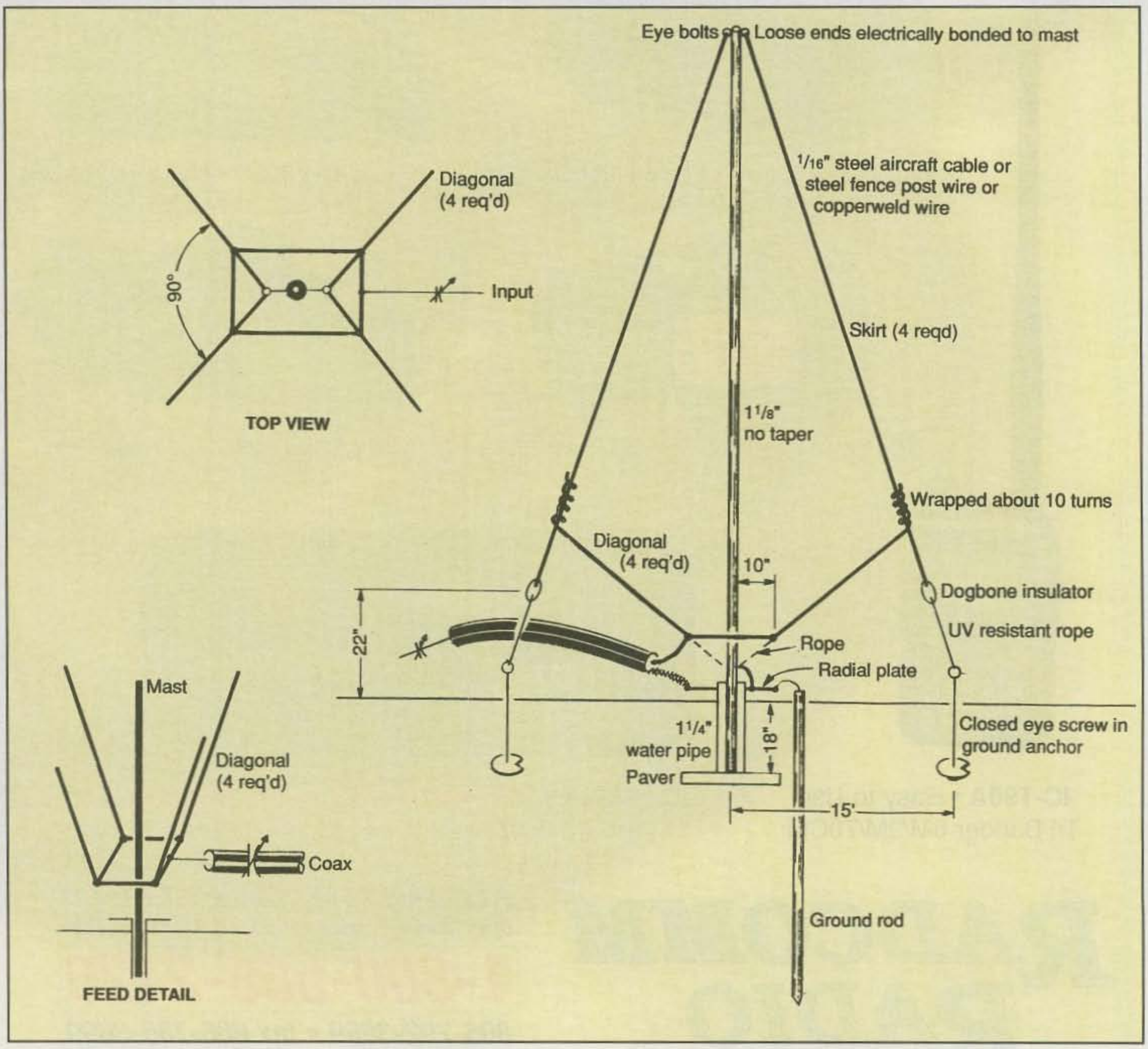

Fig. 2– Construction details of the Conix Class 160 antenna.

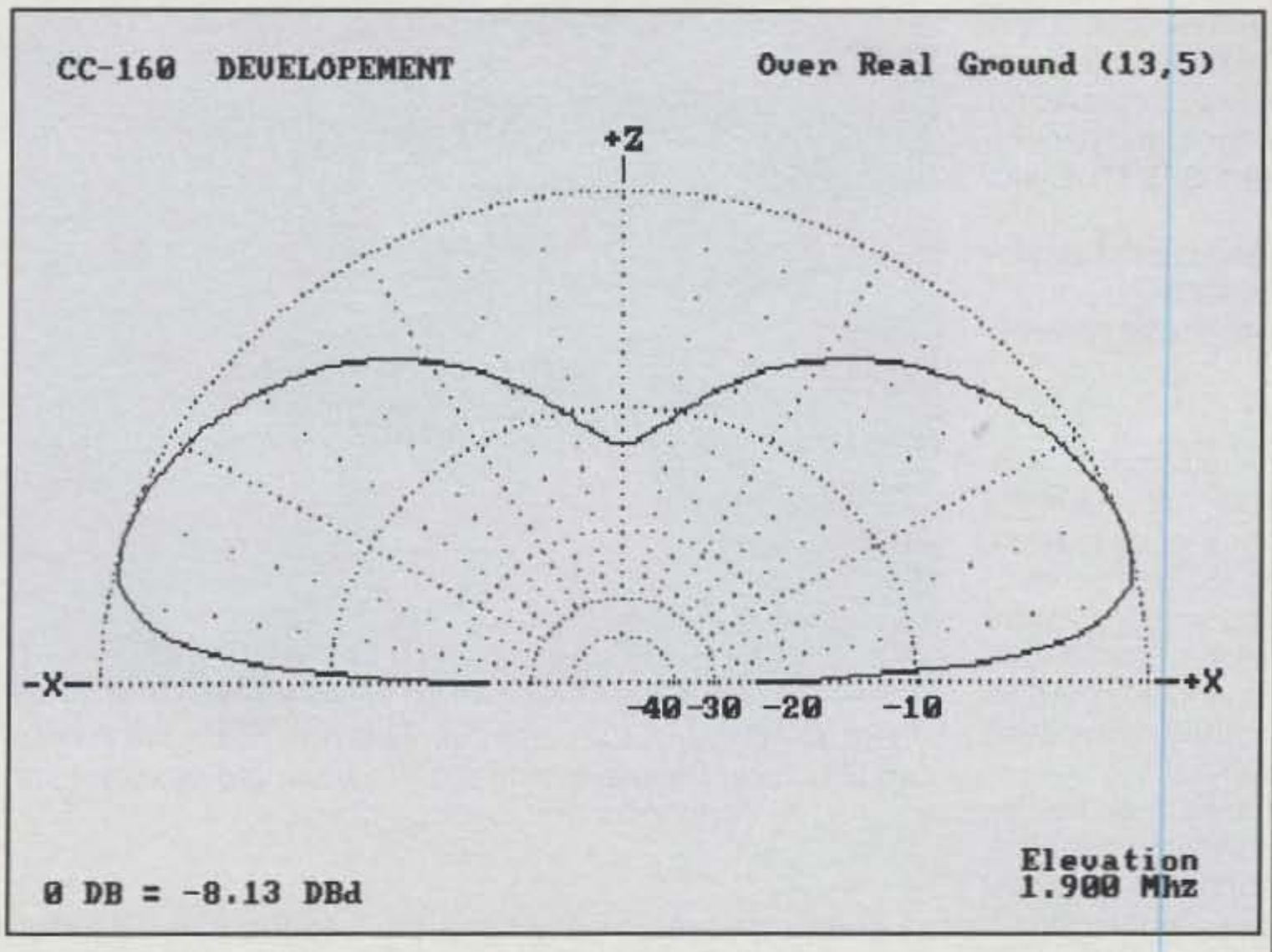

Fig. 3– Mininec© plot of elevation pattern for the CC-160 antenna.

Antenna resonance is a function of antenna height and skirt length, and fine-tuning is accomplished by varying the length of the skirts. I use 1/16 in. steel aircraft cable for my skirts, looped through dog-bone-style insulators and secured at the 6 ft. level. This technique makes the adjustment of the skirt length very simple. The impedance will usually fall between 45+j400 and 75+j475.

The design uses a 500 pF variable capacitor with 0.125 plate spacing for

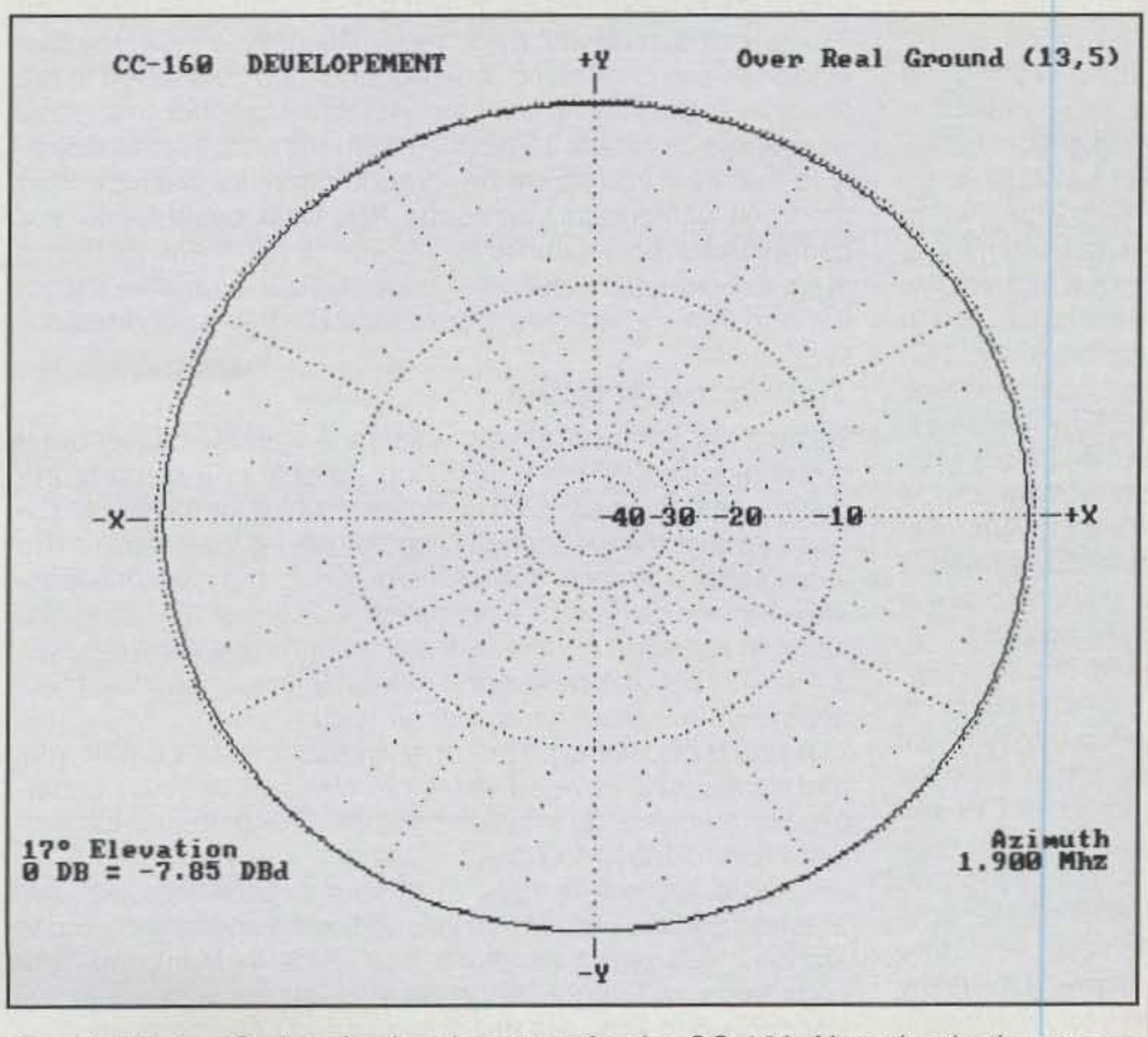

Fig. 4– Mininec© plot of azimuth pattern for the CC-160. Note that both patterns are consistent with an omnidirectional vertical antenna.

full 1 KW operation; however, any variable that covers this range will work if the spacing between the plates is adequate to handle the proposed power output. Tuning the capacitor changes the +j inductive reactance component, and cancellation of reactance usually occurs at about 1.875 MHz with an SWR of 1.2:1.

As a plus, even though the antenna has been optimized for 160 meter operation, it also covers the 40 meter band and will out-perform a full-size quarter-wavelength 40 meter vertical.

Construction

The mast section of the antenna is constructed from $1^1/_8$ in. aluminum tubing with a 0.058 wall thickness. The tubing is not tapered, and sections are fastened together by a 12 in. section of the next smaller diameter tubing. Silicon conductive grease is applied to this 12 in. connecting section in order to ensure good electrical conductivity between sections of the mast. The total mast length is 33 ft. 9 in., including 18 in. buried below ground level. No insulator is required, because the antenna is operating at DC ground potential.

To support the antenna, bury an 18 in. length of $1^1/_4$ in. galvanized water pipe and drop the mast down into this pipe. If the characteristics of your ground are such that the mast may continue to sink, insert a concrete paver at the bottom of the hole to prevent this from happening. Lay a 12 in. radial ground plate over the $1^1/_4$ in. pipe (see fig. 2) and insert the mast through the center hole. All of the radials and the ground wire from the coax are attached to this plate by stainless-steel screws.

Two inches below the top of the mast, drill two holes to hold two closed eyebolts as shown in fig. 2. Attach four skirts as shown and electrically bond them to the mast. As indicated earlier, I use aircraft cable for my skirts, but copperweld or equivalent material is suitable. At my location I experience intense winds, so not only is aircraft cable required for support, but I also add nylon rope at the 16 ft. level for additional strength. For ground anchors I use screw-in type bolts available at most hardware stores.

Photo C– Base of the antenna. The box holds the tuning capacitor and the plate to which it is mounted attaches the capacitor unit to the antenna.

Next, install the four antenna diagonals using No. 12 copperweld wire as shown in fig. 2. The antenna diagonals are connected to the skirts by tightly wrapping 10 turns of one end of the diagonal on each skirt and attaching the other end 7 in. from the mast with nylon rope. The mast ends of the four diagonals are connected together and then connected to the variable capacitor. I mount the variable capacitor in a metal box (photo C) to seal it from the elements and attach it directly to the mast just above the ground plate, insulating it from the mast with ceramic standoffs. The coax-cable feedline is connected directly to the antenna (via the capacitor) as shown in fig. 2. Solder the inner wire conductor to the variable capacitor and firmly attach the ground braid to the ground plate.

Tuning the Antenna

To tune the antenna, simply adjust the variable capacitor for the minimum SWR that will occur at only one discrete frequency. If the lowest SWR point is too high or too low in the band, adjust the skirt length accordingly. It may require two individuals to simplify this tuning process, but it is not impossible for one person to accomplish it. Plots of elevation and azimuth radiation for a four-radial antenna are shown in figs. 3 and 4. This plot was made using Mininec© and the characteristics are those over real ground.

A word of caution: Do not erect this antenna under or in the vicinity of overhead electrical wires or over an underground electrical distribution system. The potential for serious injury is much too great.

I would appreciate hearing of your experiences with this antenna and the results that you achieve, especially for those stations with better locations than mine in Montana. Your comments and suggestions will provide me with additional information to evaluate this antenna and to perhaps improve upon its design. I hope to hear your signal in one of the future 160 meter contests. Good luck! ■

On the Cover

"It's middle-aged stuff," says Bob Beaudet, W1YRC, of Cumberland, Rhode Island, whose vintage radio collection graces our cover this month. "You always try to get the equipment you couldn't afford" when you started out. Bob's classic gear would have been a dream station in the mid-1950s, when he started out. On the very top shelf, second from the right, is an Eldico TR-75TV, Bob's first transmitter not built from the junkbox. To the left are several vintage antenna tuners and to the right is a National speaker, which is hooked to the NC-183D receiver just below it. Moving to the left on the second shelf is a Hallicrafters S-38C receiver with an RME preselector on top of it, a 1920-vintage RME LF-90 low-frequency (100 600 kc) receiver, and a Hammarlund HQ-150 receiver. Below the 150 on the bottom shelf is a Collins 32-V3 transmitter, followed by a Collins 75-A2 receiver and, behind Bob's head, a Heathkit DX-100 transmitter. Not seen in the photo are a Hammarlund HQ-140 and Collins 75-A4, both receivers.

Bob says he's not a serious collector, yet all of that equipment works and is regularly used. He says his real passion is DX. "I'm a shameless DXer," he admits, noting that his "real station," next to the vintage rigs and out of the photo, includes a Yaesu FT-1000D and Henry 2K amplifier used for CW and SSB, plus an ICOM IC-765 for digital modes. Bob also runs the DX Cluster packet node for eastern Rhode Island and southeastern Massachusetts, and is ARRL Section Manager for the Rhode Island. He's retired from Raytheon, where he worked for 42 years, finishing up as the company's University Relations Manager. Bob also writes a monthly tutorial column for two radio club newsletters.

(Cover photo by Larry Mulvehill, WB2ZPI)

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Results of the 2003 CQ WW DX 160 Meter Contests

BY DAVID L. THOMPSON,* K4JRB

We now can add Prince Edward Island and Cape Verde Islands to the places to be for a 160 meter contest. Alex, 4L5A, operated D4B to a new contest record 1.5 million points CW. His SSB effort was second in the world Single Operator, too. Jeff, K1ZM, activated his VY2ZM super station for world high CW Multi-Operator, and then went Single Op SSB to achieve the high Single Op score. His Single Op effort was second only to UA9MA's Multi-Op effort from Cyprus. Gena calculates that once he can break into the U.S. midwest and west, he will break 1 million points on SSB. Jeff figures he can reach both Europe and North America for most of the day from Prince Edward Island at the sunspot minimum. So look out for bigger scores to be heading our way.

Both modes had a record number of logs with, 1148 CW and 519 SSB logs received. This is a whopping 30% increase over 2002. Throw in the check logs, and the total number of logs received broke 1700. Certainly the CQ 160 Meter Contests are the most popular 160 contests by a wide margin.

The master logs (after weeding out unverified uniques and busted calls) show 5132 different CW calls and 5120 SSB. This is another record and probably the cleanest master log we have ever had. The bonus is that this allows the scoring to be the most accurate, too. This is aided by electronic submission in Cabrillo format and the ability to convert the non-Cabrillo logs so that all but hand logs are checked in the same manner. RN6BN put 89 countries in the log, so the time is fast approaching for someone to make DXCC during the CW weekend. 141 countries are in the master log for CW and 133 for SSB, so the possibility is there.

The antennas at RU3DX for the CW contest.

CW

D4B had the world high CW score (both Single and Multi-Op). His 1.5 million points set a new record for a score in either contest. FM5GU placed second with 741K. Bill, W4AN, again operated W8JI to top U.S. and placed 4th world Single Op. John, VE3EJ, placed 10th. It's nice to see the U.S. and Canada make the top 10. SN7Q (SP7GIQ) was high Europe and 3rd in the world. ZF2NT topped North America (outside W/VE) with his 5th place score. SO2R (SP2FAX), HA8DU, OZ7YY, and LY7Z placed 6th to 9th. 4X3A (4X4NJ) topped Asia and just missed the top 10. Riki will be Stateside for the next five years assisting at the N7JW multi-op station. KH6ND operated KH7X (the Pacific Contest Club) to a new high Oceania score. W5SJ traveled to PYØFF and topped South America as PRØF.

The VY2ZM station ran up the high Multi-Op score and had the second overall contest score. PJ2X finished second not far behind, and CT3FN led by HB9CRV placed 3rd from Africa. KC1XX was the top U.S. Mult-Op, with W2GD and W1FJ in top 10 scores.

The top low power scores came from Europe, with VE3NE coming in at number 3. GU4YOX claimed the world high low power score while providing a rare multiplier for many. SP4TKR topped a European field in the QRP category. However, WA4PGM broke up the European lock by placing 5th and also high U.S. QRP. Virginia's K7SV was the high U.S. low power scorer. Close races in California and Virginia (Multi-Op) show that a little extra effort does pay off.

RN6BN was the top CW country scorer with a record 89. Forty-two different CW contestants worked 70 or more countries. Again Europe dominated with VY2ZM slipping in with 75, followed by KC1XX (73), D4B (72), and W2GD(71). W8JI led the Single Ops with 67 countries. W8JI also lead the QSO parade with 1406. North Americans dominate the high QSO scorers, with VY2ZM, W2GD, KC1XX, and AA1K making up the top 5 QSO places. D4B with 1255 was 6th, and a record 39 stations made 1000 or more QSOs. Still many complained about running out of stations to work on Sunday and spending hours calling CQ. A word to the wise: Get

2002 Corrections

OK1CZ operated as **OLØA** not **OL1A** in the CW section.

Jim, ON5UM, operated **OT2A** as Single Operator not Multi-Operator. **OT2A** placed second to OT2T (ON4UN) CW in Belgium.

The CW QRP log of Alex, **VA3TTT** (now VE3XAX) was left out of the listings. His score of 58,144 is the QRP winner from Ontario.

Brian, **VY2MGY/VE3**'s log was also left out of the CW section. His score of 40,205 places him second in Ontario QRP. Brian is now VE3MGY.

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on on Sunday and give out some QSOs and you will make a host of friends.

SSB

VY2ZM was the high Single Op scorer, followed by D4B and EA8/OH2BYS. In Europe LY2FY edged out OR3T (ON4UN) by a scant 3000 points. They placed 4th and 5th, respectively. W4MYA recorded the U.S. high score and settled into 6th Place. DJ4PT had a solid 7th-place finish, followed by VE3PN in 8th as the Canada high. SY8A (SV8CS) and LY3UM rounded out the top 10. Bob, W4MYA, seems to have settled into the top US. score position. Bob led runner-up ND8DX by 86K. ND8DX's score is very good from the near Midwest. NØFW placed 4th high U.S. while placing first worldwide on low power. Another remarkable Midwest score. VE3KZ continued the Canadian tradition by topping the QRP entrants. WA3HQK broke through the European block to top the U.S. QRP entrants and place 4th. The combined score by D4B makes Alex the champion for this year's contests.

Gena traveled to Cyprus, and his 5B4/UA9MA effort was the top SSB Multi-Op. His score was also the highest overall on SSB. Gena says it's much easier from Cyprus than Siberia! The EI7M group made a fine score and placed second. K9NR operating from WB9Z's station came in third and was the U.S. Multi-Op winner, remarkable from the Midwest. XE1RCS made another strong effort for 4th place, just 700 points behind K9NR. Europeans dominate the rest of the top 10 Multi-Ops.

Only five stations made 1000 QSOs or more this time, but that will change when North America finally gets a full weekend without overwhelming QRN. K9NR and W4MYA led the QSO parade with 1217 and 1103 QSOs, respectively. 5B4/UA9MA topped the DX with 1100. Thirty-two contestants worked at least 50 countries, led by LY2FY at 63. VY2ZM beat the old North America record by 6 by working 58 countries. No other North American broke the 50 country plateau. Every year we have an unusual entry, and the W5DJW, Mississippi Multi-Op entry takes the cake this time. They made 241 QSOs in 49 states and provinces plus 6 countries while loading up a bridge! It's not every day that you work a bridge.

Clubs

The Potomac Valley Radio Club (PVRC) made a terrific effort and placed first by 600K. The Bavarian Contest Club (BCC) also improved and moved into second place. The Frankford Radio Club (FRC) remained consistent with a solid third-place finish. The Yankee Clipper Contest Club (YCCC) and the Society of Midwest Contesters rounded out the top 5. Watch out for that new Contest Club Ontario, too!

The club scores are a "for fun" competition as intended by the founders of the CQ 160 Meter Contests. This does not stop clubs from making major efforts each year. At least three logs are required to make the club list. Why not get your gang out in 2004? Remember that DXpeditions by club members count for the club score, and this has been leveraged well in the past.

PLAQUE WINNERS AND DONORS

SINGLE OPERATOR

CW

WORLD BY W4ZV (DJ8WL Memorial): Winner Alexander Teimurazov, D4B (4L5A op)
USA BY K4TEA: Winner Charles T. Rauch Jr., W8JI (W4AN op)
CANADA BY K8FC: Winner John Sluymer, VE3EJ
ZONE 3 BY N5IA: Winner Ken Keeler, N6RO
ZONE 4 BY K4WA: Winner John W. Battin, K9DX
ZONE 5 BY N4PN: Winner Jon Zaimes, AA1K
AFRICA BY WS9V: Winner Manuel De Aguilar, EA8ZS
ASIA BY K4SX: Winner Riki Kline, 4X3A (4X4NJ)
EUROPE BY K9DX: Winner Krzysztof Sobon, SN7Q (SP7GIQ)
OCEANIA BY K9DX: Winner Pacific Contest Club, KH7X (KH6ND op)
SOUTH AMERICA BY W4NU (W4UUH Memorial): Winner Bill Priakos, PRØF (W5SJ)
JAPAN BY W4ZV(JA1XAF Memorial): Winner Masaki Okano, JH4UYB
NORTH AMERICA BY CQ (N4IN Memorial): Winner Dennis Clement, FM5GU

SSB

WORLD BY N4NX: Winner Jeffery T. Briggs, VY2ZM (K1ZM)
USA BY K4JRB: Winner Robert S. Morris, W4MYA
CANADA BY WØETC: Winner Peter Barron, VE3PN
ZONE 3 BY N4TMW: Winner J. C. Stevens, KG7H
ZONE 4 BY N4XMX: Winner Karl Brandt, ND8DX
ZONE 5 BY K4ODL: Winner Steve Sussman, W3BGN
AFRICA BY WB4ZNH: Winner Alexander Teimurazov, D4B (4L5A)
ASIA BY NT4TT/AH2BE: Winner Alexander Timkin, RA9MJ
EUROPE BY WS9V: Winner Rolandas Jokubauskas, LY2FY
OCEANIA BY D4B/4L5A: No Entry.
SOUTH AMERICA BY D4B/4L5A: Winner Edgar Ochoa, YV2IF
NORTH AMERICA BY CQ (K2EEK Memorial): Winner Dennis Clement, FM5GU

MULTI-OPERATOR

CW

WORLD BY N4RJ: Winner Jeffrey T. Briggs, VY2ZMM (K1ZM)
USA BY W8UVZ and K8GG: Winner Matthias Strelow, KC1XX
Zone 3 BY 4X4NJ: Winner Jim Wilson, N7JW

SSB

WORLD BY SOUTHEASTERN DX CLUB: Winner Gena Kolmakov, 5B4/UA9MA
USA BY WB9Z: Winner Don Kerouac, K9NR
Zone 3 BY 4X4NJ: Winner Jacks Peak Amateur Radio Association, N7GP

The 2004 Contests

For the 2004 e-mailed contests logs that are not fully in Cabrillo format will be rejected by the robot. However, a message telling you what needs to be changed or how to submit a conforming log will be sent in reply. The contest log checking has been slowed down by logs that are not fully Cabrillo. Please don't homebrew your log, but instead use one of the converter programs available to convert the old logging format to acceptable Cabrillo. Remember the contest name must be exact. Make sure the contest name is either **CQ-160-CW** or **CQ-160-SSB**. Please insert a claimed score in the Cabrillo summary so we can test the final score against the claimed score in case of difficulty. We will reinstate having the top 200 high-claimed scores on the CQ web page in 2004, so a value in the claimed score line is required for proper listing, too. Remember that power levels only apply to Single Operator categories. All Multi-Operators are considered high power, and if you use any assistance (packet or web spotting nets) then your log is Multi-Op.

Please leave duplicates in your Cabrillo log. Somehow the rumor has gotten around that you must remove duplicates, but this is just a throwback to the old way of log checking where duplicates were often counted for points and thus the log-checkers removing them caused a penalty. There is no penalty for duplicates.

A word on uniques: There is nothing wrong with uniques, and the well-equipped stations will always have them. However, with the new log-checking programs, busted calls can now be pinpointed. Over 60% of so-called uniques turn out to be busted calls! The other problem is unverified uniques. The log-checking program spotlights logs with 3% or more uniques, which is twice the average for the CQ 160 Meter Contests. Over 7% uniques will bring your log under higher scrutiny. Thanks to Jim, AD1C, and Eddie, W6/GØAZT for their help in overcoming problem logs.

The rules for plaques and certificates are changed to meet conditions every so often. Only one plaque per section is awarded per entrant, so a runner-up may then get a plaque. No plaque is awarded for a score of less than 30K. Minimums for low power and QRP certificates are 5K for low power and 1K for QRP. Exceptions are made by CQ 160 Contest Committee decision (Japan low power, for instance). The CQ 160 Committee or the Contest Director can decide to

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not award a certificate if sufficient effort is not shown (usually a very low score). A runner-up in either a state, province, or country can be awarded a second-place certificate if there are eight or more entries and the score is 100K or more. Have patience, as all plaques and certificates are handled by volunteers and hopefully we will get caught up by the 2004 contest.

The dates for the 2004 CQ WW 160 Meter Contests are set for CW, January 24–25, and SSB, February 28 –29 (leap year). The contests run from 0000Z the first date to 2359Z the second date. Logs may be submitted in Cabrillo format via e-mail. This year logs go to two separate e-mail addresses: CW logs go to <**cq160cw@kkn.net**> and SSB logs go to <**cq160ssb@kkn.net**>. If you send both in March, please use two e-mails! Remember to put your call in the subject area of the e-mail. You may also submit electronic logs on diskette (3.5 inch, please, with a printed summary sheet, Cabrillo format requsted) or hand-written logs. Both of these should be mailed to CQ 160 Meter Contest, 25 Newbridge Road, Hicksville, NY 11801 (please mark CW or SSB on the envelope). We must hold everyone to our required deadlines of February 28, 2004 for CW or March 31, 2004 for SSB. The exception is if both logs are submitted together, and then the date is March 31, 2004.

For complete rules for the CQ WW 160 Meter Contests see the November issue of *CQ*, or go to the CQ web page, <www.cq-amateur-radio.com>. Good luck in the 2004 contests!

73, Dave, K4JRB

TOP 10 SCORES

SINGLE OPERATOR

USA CW		USA SSB	
W8JI	641,576	W4MYA	320,862
AA1K	540,096	ND8DX	234.324
K4JA	481,740	W3BGN	219,978
W3BGN	446,576	NØFW	169,324
N2NT	446,538	N3HBX	160,310
W4ZV	398,460	W3TS	152,554
NO2R	361,990	K1VW	145,986
K9DX	327,318	K3NM	126,252
K4BAI	317,645	W3GH	107,120
WE3C	294,000	K4JA	103,411

VE (TOP 5)

CW		SSB	
VE3EJ	543,998	VE3PN	272,049
VE3AT	317,475	VA5DX	198,250
VE3QAA	256,022	VE3ESE	108,072
VE3PN	252,588	VE3NE	106,731
VE3NE	245,847	VE6JY	84,111

QRP (TOP 5)

CW		SSB	
SP4TKR	96,800	VE3KZ	41,160
S57IIO	86,940	HF7ØI	39,376
OK1FKD	75,118	OK1ES	14,147
YU1RA	72,471	WA3HQK	11,894
WA4PGM	70,977	OK1CZ	7,775

DX CW		DX SSB	
D4B	1,513,105	VY2ZM	727,088
FM5GU	741,684	D4B	627,715
SN7Q	681,757	EA8/OH2BYS	565,222
W8JI	641.576	LY2FY	381,133
ZF2NT	604,395	OR3T	378,102
SO2R	585,758	W4MYA	320,862
HA8DU	559,800	DJ4PT	307,276
OZ7YY	555,758	VE3PN	272,049
LY7Z	549,500	SY8A	253,595
VE3EJ	543,998	LY3UM	244,732

LOW POWER (TOP 5)

CW		SSB	
GU4YOX	299,896	NØFW	168,324
YU1EA	298,076	G4VGO	135,730
VE3NE	245,847	HA8BE	131,274
EA4ML	218,862	VE3ESE	108,072
YU1ZZ	207,328	VE3NE	106,731

W/VE LOW POWER (TOP 3)

VE3CSK	207,298
VE3OSZ	171,864
K7SV	145,704

MULTI-OPERATOR

CW(WW)		SSB(WW)	
VY2ZM	1,180,010	5B4/UA9MA	796,288
PJ2X	1,085,729	EI7M	351,370
CT3FN	855,621	K9NR	295,862
9A1P	700,980	XE1RCS	295,070
KC1XX	700.050	SO2R	278,208
OM7M	665,680	LX9UN	257,790
W2GD	665,250	HG1S	251,454
W1FJ	624,980	YZ1W	234,360
RN6BN	613,180	UU7J	216,450
RW2F	579,168	IV3OWC	215,941

CW W/VE QRM

Surprised how many assumed a W as the first letter of the prefix. I was called WC6QV and WA6QV far too often . . . **AC6QV.** Ran into feedback in my computer so had to switch to hand logging . . . **K7QBO.** A bettor antenna helped my score this year. Thought I had Alaska but then he signed portable 7 so no 50th state yet . . . **N2FY.** Only computer I have is an old Apple IIe that uses 5-1/4 inch diskettes . . . **W2LRO.** Missed Wyoming and never did find KH6 or KL7. Heard a VK3 but he was mobbed . . . **W5TVW.** Do away with the meaningless RST and let's go with year of first license or something more meaningful . . . **W8IM.** Poor conditions in western Canada . . . **VE6BF.** Things have changed since the last time (1978) I enter the CQ 160 CW test . . . **WØNFL.** Close to my best QRP effort. New receiving antenna really helped . . . **W4TMR/QRP.** Worked VY2ZM on the first call with my 100 watts to my 80 meter dipole . . . **WA1LAD.** Biggest achievement was stringing an antenna on Saturday and having it work . . . **KC7QY.** Surprising that 90% of the time I could work the DX through a pile-up. *(Maybe it was the Rhode Island QTH.—ed.)* . . . **K1DFT.** Biggest thrill was working KH7X at the greyline . . . **AC4G.** Thanks to everyone who heard my QRP . . . **N8A/QRP.** Amazed to work the East Coast, VE, and ZF2NT. Band is very quiet here in rural Utah . . . **KB7NZG.** Everyone was polite, patient, and helpful . . . **KA6UMQ.** Worked Hawaii to complete my 160 WAS . . . **K4DGJ.** As always nearly everyone worked well together . . . **WA9TZE.**

I know it is not much of a score but I had a heckuva of a good time . . . **AAØA.** Europe came in waves with the best run coming at 0600Z the first night . . . **AA1K.** Great conditions blew away last year's score. Still have some work to do on the transmit antennas though . . . **KØTV.** Neighbors turned off their electric fence; thank you . . . **KØUK.** First time to operate this contest from Florida. Band was quiet each night . . . **K1TO.** Operated at the new QTH of NQ4I. Thanks, Rick . . . **K4BAI.** Limited operating due to family and 40 over 9 line noise . . . **K4CNW.** Paul's 4-square really works . . . K**4JA (K4MA op).** Things started well but fell flat, as no JA's were heard . . . **K4VX (N9JF op).** Band was good and the operators the best . . . **K5GO (N5OE op).** Great preparations for working 26 hours fell by the wayside when the PC got hit with a virus . . . **K5PTC (N1LN op).** DX activity was great but USA activity seemed down . . . **K5ZD.** Used a balloon-supported vertical over a dry lake bed 50 miles from the home QTH . . . **K6SE.** Propagation west on the sunrise greyline was poor . . . **K7UIR.** Enjoyed the contest but where were the islands, XE, and Central America? . . . **K8AB.** First time in the contest. Worked 27 states and 3 provinces. Will definitely put the contest on my calendar next year . . . **KA6R.**

Hot competition from W2GD and W1FJ at W1KM. This contest rocks . . . **KC1XX.** Working new countries mobile becomes very difficult without the DX window . . . **KH6DX/W6.** Really like the new hours. Great to get on Sunday afternoon . . . **KZ1M.** Did much better than expected with 80 watts . . . **N1DC.** First try with a 4-square but nobody hears me off the back. Next year need an omni antenna too . . . **N2NT.** At 2359 the band was crowded on Sunday. At 0045 on Monday the band was empty . . . **VE3BNO.** Conditions good both nights. The problem was the number of high-power stations calling CQ . . . **VO1HP.** Conditions better than expected. I do miss the window . . . **W8CAR.** Best DX in a long time. My European antenna did have a high line noise though . . . **W9SE.** Band was great. Too bad I had the flu . . . **WA4AOS.** Since I don't do CW I look for hired guns. If the guns don't learn to S&P and use packet for mults I will find new ones . . . **WD5R.** Big surprise was being called by XQ6ET . . . **WA7LT.**

CW DX QRM CW

VERON never did get the time change. *(The rules were on the CQ web page—ed.).* I prefer the old times . . . **PAØLOU.** UT1YW wrote a long note but the only thing in English was "so QRP" at the end. Eugen did run QRP . . . **K4JRB (for UT1YW).** Using the old KH6CC rig that made 160 DXCC. Worked Field Day style from Laupahoehoe Point Beach Park . . . **KH6B.** This is my fifth CQ 160 CW, and although I enjoy the contest, I am limited by my poor antenna and low power . . . **LU1EWL.** I worked all that could hear me. Most had good ears . . . **KH6ZM.** Heard many more U.S. stations but with poor transmitting antenna they did not hear me . . . **OH3WD.** Not able to produce a Cabrillo log as I use the "Swisslog" which is a DOS program . . . **HB9QA.** With the "legal" German power of 75 watts it's very difficult to work across the Ocean . . . **DJ5AA.** Really like the new 48-hour format but we need the DX window back . . . **VK6VZ.** Easy to reach Europe from here but not North America . . . **4L1FX.** Conditions were much better this year especially for North America. We lost our 26-meter-high ground plane three days after the contest . . . **CT3FN.** Balloon-supported 41 meter vertical was great on transmit . . . **DJØMDR.** Worked two new ones in D4B and EY8MM. Still was hearing VY2ZM at 9:30 AM Sunday morning . . . **DJ2MX.** Thanks to Roger, DL5RBW, and his wife Gabi. Without their support this operation would not be possible . . . **DLØXAX.** Intermittent S9 noise made receiving a problem . . . **DU9/NØNM.**

Good opening to North America on Saturday morning did not reoccur on Sunday . . . **EA5BY.** D4B was very loud. Glad to see VU2BGS get on and work 16 stations . . . **EY8MM.** Slept through the Saturday morning opening to North America . . . **F6CWA.** Worked three new countries and two new states with 400 watts to a 25 meter wire in downtown Paris . . . **F6GOX.** It's the dry season in Martinique so I sent the wife to pray for rain. It poured—HI . . . **FM5GU.** First time on Top band in 39 years . . . **G3SEK.** Five watts to a K2 transceiver. Not record breaking, but exceeded expectations . . . **G3YMC.** My first CQ 160 CW. Hard to make it across the pond with low power even with a semi-rare call . . . **GU4YOX.** Better score this time as I did not go to sleep . . . **GW3JXN.** Happy to work nine states . . . **IK4AUY.** Conditions poor to USA so many did not hear my low power. VK6VZ was very loud and every JA was calling him . . . **JE1SPY.** The former times are more convenient for Europe . . . **LX5A.** More relaxing to operate with two operators. At 67, G3LZQ sure needs it . . . **M2D.** Enjoyed the contest. My first on 160. Did better than expected with my modest station . . . **YU1WC.** Please North America don't forget to listen to the south . . . **YV5MBX.** Our first serious effort in the CQ 160 CW. We will do better next time . . . **Z36W.** Thunderstorms the second day . . . **ZC4DW.** We got off to a great start on Saturday but conditions went downhill the second and we did not break our old record . . . **ZL6QH.**

SSB W/VE QRM SSB

Got my TS-940 back in service in time . . . **AA6EE.** It was great to get out that far with a simple dipole in my first 160 contest . . . **KBØARZ.** Too much QRN this

"CQ... CQ... CQ..."

SA9NTA bought his holiday radios at AES."

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RU3DX and UA3DPX multi-op in the CW contest using the call RU3DX.

time. Rain and snow storms both . . . **N8XA/QRP.** Being in the middle of the country (Kansas) I could hear many stations who couldn't hear me. Will have an amp for the next one . . . **WØNEB.** Great conditions for QRP . . . **K3TW.** My antenna failed Saturday evening and I finally fixed it in time for the last 5 minutes . . . **AF1T.** Getting FM5GU on the first call . . . **KA1BXB.** I like the new 48-hour format. This gives me three chances at the Midwest/East coast . . . **WA9TZE.** Excited to work all the stations with my antenna which was high in the center, but since I never got to put up poles, ends were almost on the ground . . . **W8KNO.** D4B called me . . . **N7ZT.** Next year we need to get out of the city and away from the noise . . . **N7WL.** Working all continents in less than 4 hours . . . **W4DR.** Stayed within the ARRL Bandplan for the whole contest. This was a big mistake . . . **W3TS.** Hard work on QRP but working Mexico and Canada made it worthwhile . . . **KKØQ.** I had to install a filter to get rid of AM broadcast interference . . . **WB6FRM.** Low Windom was not very effective for transmit . . . **AJ6T.** High SWR on my L was caused by the wind blowing the vertical portion into my guy wires . . . **KØBJ.** Lots of loud signals from close in but needed a receiving antenna for those farther out . . . **K1KO.**

Please place me in 4-land this time . . . **K3KO** *(K3KO and K3OOO are a YL/OM team—ed.).* Managed to get in 4 hours through the heavy QRN . . . **K4WI.** High noise level at Kitty Hawk, but the balloon worked fine. Next time maybe Maritime Mobile . . . **K4YFR.** Limited time to operate so I only called multipliers . . . **K5RX.** Make the contest 24 hours rather than 48 . . . **K5ZD.** Good conditions the second day gave me my highest score in ever on SSB . . . **K6TIM.** Lost the amp before the start of the contest. Working with 100 watts humbles you . . . **K7OX.** I still enjoy the CW section more . . . **K7RE.** Had some fun with my HF2V vertical which is not much on 160 . . . **K7ZO.** Tried low power this year with good results . . . **K9FO.** QRN was mind-boggling both nights . . . **K9NR.** Could not operate Saturday night as my shack is in the barn and we had a blizzard . . . **K9SG.** First time on Top band and in spite of the QRN I am hooked . . . **KC4PX.** This is the contest where the entrants are good and polite . . . **KE4SCY.** It always amazes me that you can follow one QSO in 10 minutes with a run of 10 more QSOs in just over a minute . . . **KH7H.** KO8HIO was a special event call . . . **K8ZT,op.** Stations in the south were 59+20 but both coasts were barely heard . . . **NØFP.** I made 90% of my 1000 QSO gold standard this year running 100 watts . . . **NØFW.** I switched from a dipole to a full-wave loop but still had receiving problems. See you next time from the hills of western Maine . . . **N1YIS.** New antenna still not good enough for hearing the West Coast . . . **N2VR.** The voice keyer hung up the computer and had to be abandoned, so I got hoarse . . . **N3HBX.** Low static on Sunday from 22 to 2400 allowed me to work three new mults including EA8 . . . **N3UM.** Set up a portable operation with a blimp-held 1/4-wave vertical. Will be back next year . . . **N7X.** QRN made this a real test of operator skill . . . N8YEL. A little casual DXing . . . **VE1JF.** Nice opening to Europe on Saturday . . . **VE3PN.** Would like to have heard and worked more DX but I am on a small lot . . . **VE7JKZ.**

SSB DX QRM

My half-wave dipole went with the wind . . . **HA5FA.** Top band and this contest is my lifestyle since 1970 . . . **OK1TP (also OK1JDX).** Sorry no computer or internet here . . . **UA9ACJ.** Next year I will try to break my lowest score in the contest record . . . **WP4LNY.** Bad propagation this time . . . **CU2AF.** My first try at the CQ 160 SSB. QRN and QRM made it very hard to hold my frequency . . . **D4B.** Please return to the old schedule . . . **DK2OY.** Only one hour of operation . . . **DL6FBL.** Hard work with 100 watts . . . **DL9NDS.** We really enjoy this contest. Working ZL was a first for us . . . **EI7M.** There should be a special restricted class for France as we only have 1810 to 1840. Too narrow for either CW or SSB . . . **F5PYJ.** Poorest conditions I have ever seen. I was more interested in watching TV . . . **FM5GU.** Full-size delta loop 300 feet up with the bottom at 60 feet held by a balloon . . . **G4VGO.** Used a balloon vertical for my first try at the CQ 160 SSB . . . **IC8POF.** A must contest . . . **IK8UND.** Very hard going on SSB . . . **M3C.** Worked D4B and VY2ZM with my QRP . . . **MU3EFB.** Very good signal from XE1RCS. Hope to QSO next year . . . **OE1TKW.** Not a serious operation this time. Just testing the antennas . . . **OK1RF.** Hope this log makes it . . . **OR3T (ON4UN op).** We came no where near our QSO or multiplier goals but enjoyed the hospitality of host 5B4AGN . . . **P3F (G3UEG op.).** It takes a mathematician to design the Cabrillo format . . . **S54A.** Finally got the vertical over salt water . . . **V31MD.** Best European opening in the past seven contests . . . **XE1RCS.** We had no cluster help either night so missed some DX and USA mults . . . **LX9UN.**

Station Ops CW Multi-Op

3ZØPRK: SP9ADU, ANDY. **9A1A**: 9A5W, 9A5E, 9A6A, 9A7R, 9A9A **9A1P**: 9A5AEI, 9A6NDX, 9A6XX, S56A. **9A5Y**: 9A3LG, 9A5AGL, 9A3NM. **AAØA** & PACKET. **AA4V** & N4SF. **CT3FN**: HB9CRV, DK7YY. **DFØSAX**: DL8DYL, DL7FER, DL3DXX. **DF9ZP** & PACKET. **DH1NFL** & DL2MDZ. **DJ2YA** & PACKET. **DJ5IW** & PACKET. **DJ9MH** & PACKET. **DJ9NMH** & DJ9MH. **DKØIW**: DF9MV, DJ9WH, DL6KO, DL9CHR. **DKØNS**: DJ9MH, PACKET. **DK3GI** & PACKET. **DLØAO**: DJ3TF, DJ5RE, DJ6RN, DK1RP, DL3RAH, DL5PRO. **DLØMB**: DJ2UU, PACKET. **DL2MY**: DJ9MH, PACKET. **DL6LAU** & DJ6TK. **DL7YX** & DF1HF, DK5XG. **EA1WX** & EA1CS. **EA5BY** & EA5FID, EA5KW, EA5ERV, EA5XC. **EA6IB**: EA3AIR, EA6ACC. **EI6IZ** & PACKET. **ES5Q**: ES5MC, ES5RY, ES5TV, ES5QX. **FY5KE**: FY5FY, F5HRY. **HG1R**: HA1ZZ, HA1DRR, HA1XU, HA1ZN, HA1ZV. **HG1S**: HA1TJ, HA1DAI, HA1DAC, HA1DAI, HA1AG, HA3LN, HA1AV, HA1SN, HA1AR, HA1AH. **HG3DX**: HA3LN, HA3MY, HA3PW, HA3UU, HA4WU, HA5MY. **HG5A**: HA5IW, HA5FM, HA6WX, HA5HL, HA5OM, KISS TIBOR, HA5ZD, HA5UA, HA6GK, HA5DQ, HA5YI, HA5BGG. **IK2NCJ** & IK2JUB, IK2FIL, IZ2ABI. **IV3TDM** & IV3IHF, IV3YDD, IV3FHH. **JAØZRY**: JA1GGO, JE5UMJ, JH5XDD, JA8DGK, JS3JSB, JL1GJE, JH1JVA. **JA3YBK**: JF4FUF, JH3PRR, JO3LDN. **JG2ZUP:** 7N4VPG, JJØBRG, JA3-34192. **JY9QJ** & PACKET.

CLUB SCORES

(Minimum of three entries required for listing.)

CLUB	SCORE
POTOMAC VALLEY RADIO CLUB	6,172,206
BAVARIAN CONTEST CLUB	5,289,414
FRANKFORD RADIO CLUB	5,090,450
YANKEE CLIPPER CONTEST CLUB	4,511,751
SOCIETY OF MIDWEST CONTESTERS	3,706,595
CONTEST CLUB ONTARIO	3,453,936
SLOVENIAN CONTEST CLUB	3,301,260
CONTEST CLUB FINLAND	2,869,246
RHEIN RHUR DX ASSN.	2,685,478
SP DX CLUB	2,493,061
ATCC (RUSSIAN FEDERATION)	2,487,095
HA DX CLUB (HUNGARY)	2,065,031
SOUTHEASTERN DX CLUB	1,890,046
KTU RADIO CLUB (LY)	1,767,804
CDXC (ENGLAND)	1,519,130
RUSSIAN CONTEST CLUB	1,476,402
MAD RIVER RADIO CLUB	1,309,112
FLORIDA CONTEST GROUP	1,242,680
UA2 CONTEST CLUB	1,075,428
SKY CONTEST CLUB	878,486
TENNESSEE CONTEST GROUP	871,904
WWYC	825,132
CRIMEA CONTEST CLUB	727,376
UKRAINIAN CONTEST CLUB	714,544
MARCONI CONTEST CLUB	603,787
NORTH TEXAS CONTEST CLUB	596,547
CAROLINA DX ASSN.	570,496
MINNESOTA WIRELESS ASSN	553,447
SOUTHERN CALIFORNIA CONTEST CLUB	509,670
URE (SPAIN)	509,407
VRHNIKA CONTESTERS (S5)	481,938
HUDSON VALLEY CONTEST DX CLUB	475,818
URAL CONTEST GROUP	474,801
NORTH COAST CONTESTERS	457,633
SOUTHWEST OHIO DX ASSN.	428,982
LATVIAN CONTEST CLUB	402,446
GRAND MESA CONTESTERS	402,253
FOX CONTEST CLUB	379,621
CENTRAL ARIZONA DX ASSN.	336,800
KANSAS CITY DX CLUB	332,635
DARC	328,333
OKLAHOMA DX ASSN.	311,072
C. TEXAS DX CONTEST CLUB	304,150
LNDX (SPAIN)	233,684
WILAMET VALLEY DX CLUB	220,618
WESTERN WASHINGTON DX CLUB	178,779
TEXAS DX CONTEST CLUB	152,065
NW FLORIDA DX GROUP	139,314
MLDXCC (CALIFORNIA)	127,362
NORTHERN ARIZONA DX ASSN.	100,500
UARL (UKRAINE)	98,317
NNY CONTEST CLUB	85,105
CENTRAL SIBERIA DX ASSN.	80,519
ROCHESTER DX ASSN.	71,437
WEST PARK RADIO OPS	47,622
KENTUCKY CONTEST GROUP	38,928
BARA (NEW YORK)	32,821

GUEST OPERATORS

CW

Call	Operator
4N7M	YT7AW
4X3A	4X4NJ
7S3E	SM2DMU
7S7V	SM7VZX
8SØ	SMØNJO
DLØDX	DL5JS
DLØMFL	DL2JRM
DLØXAX	DL6RDR
EA2URD	EA2AAZ
EA4ML	UY7CW
G6PZ	G3TJE
HF70G	SP2DNI
HF70I	SP6IHE
K4JA	K4MA
K4VX	N9JF
K5GO	N5OE
KH7X	KH6ND
KSØT	KRØB
LY7Z	LY2TA
N4AO	WC4E
N8A	N8XA
NF4DX	W4TMM
NH7O	N6KB
NR3X	N4YDU
OHØR	OH2TA
OHØZ	OH5DX
OH7A	OH7UE
OH9W	OH2BYS
OLØA	OK1CZ
OL5Y	OK1FUA
OL6M	OK2BOB
P3F	5B4AGN
P4ØRH	W6FRH
PI4ALK	PI1VW
PRØF	W5SJ
RD4M	UA4LU
SM3X	SM3CVM
SM7E	SM7BHM
SN1A	SP1EG
SN3R	SP3RBR
SN7Q	SP7GIQ
SN8M	SP8MI
SO2R	SP2FAX
UW7F	UR5FEO
V31YN	DJ4KW
WØAIH	KØTG
W2MU	WA2JQK
W7RM	KI7Y
W8JI	W4AN
WA5AAA	K5KA
YEØX	OK1JR
YO5KAD	YO5AJR
YU1AB	YZ1EW

SSB

Call	Operator
CN2R	W7EJ
D4B	4L5A
KO8HIO	K8ZT
N6VOA	WB9AUJ
OR3T	ON4UN
RD4M	UA4LU
RK9CZO	RX9CGD
SM7E	SM7BHM
SO2R	SP2FAX
SY8A	SV8CS
T31MY	KF4TUG
UR5E	UR5EDX
W1CTN	W1CRS
YO5KAD	YO5ORF

KØLIR: KØRAY, WAØIYY, WØBBH, KCØNNH, NØIS, WØSLW, NØLIK, KBØTO, KBØJBY. **KØSX** & KJØG. **KØTV** & N1IW, WO1N. **K1NU** & PACKET. **K1TTT** & N2OW, KB1W. **K3DI** & PACKET. **K3KO** & PACKET. **K3NM** & PACKET. **K3WW** & PACKET. **K4BP** & PACKET. **K5NA** & PACKET. **K5PTC**: N1LN, PACKET. **K7FL** & PACKET. **K8SM** & PACKET. **K8XXX**: N8CC, ND5S, K8AQM, K8KS, NU8Z, K8DD, KB8ECG, AC8W, K8JM, W8MC. . **KB9CRY** & PACKET. **KC1XX** & W1FV, KM3T, K1GQ. **KD2I** & KN2T, N2ORM, W2MF. **KS4YT** & KV4T, WN4C, MURPHY. **LA8W**: LA6MP, LA8SDA, LA9VDA. **LX5A**: DK2OY, DK6WL. **LY1YK**: LY3CI, LY2CO, LY2FY. **LY2CX** & LY2HN. **LY2WJ**: LY3DA, LY3NUT. **LY7A**: LY2UF, LYR-346. **M2D**: G3LZQ, G4BYG. **N3BB** & PACKET. **N3II** & PACKET. **N3OC** & PACKET. **N3ZA** & PACKET. **N4IQ** & W4GFA. **N4RV** & N4GG. **N4VV** & PACKET. **N4WW** & KOLUZ. **N5TW** & KE5C, W5TA. **N6KI** & PACKET. **N7GP**: N5IA, NI5L, W7MCO. **N7JW** & K7CA, W7UT. **N8KM** & PACKET. **N8PR** & PACKET. **N8RA** & PACKET. **N8TR** & PACKET. **N8UZE** & PACKET. **N9RV** & PACKET. **NF1A** & PACKET. **NO8C** & PACKET. **NS7K** & PACKET. **NU4Y** & K4EL, N4KE, N4UF. **NX5M** & RACHEL. **OD5/OK1MU** & PACKET. **OE1TKW** & PACKET. **OE2LCM** & PACKET. **OE2VEL** & PACKET. **OH3BU** & PACKET. **OH4AB**: OH4JFN, OH4KBC, OH4KEC, OH4MDY, OH4MFA, OH4YR. **OK2KRT**: OK2DW, OK2MJ, OK2AUZ, OK2BJS, OK2PAD, OK2STK. **OK5DX**: OK1TN, OK1CW, OK1DF, OK1DIX, OK1DUO, OK1PAT. **OL1C**: OK1IEC, OK1TIC, OK1FPQ, OK1DUG, OK1IPS, OKAN, OK1UZW. **OL2U**: OK1FMG, OK1MPM, OK1FMX. **OL4W**: OK1DXB, OK1IW, OK1DTP, OK1MQ. **OL5Q**: OK1HRA, OK1FFU. **OL7Q**: OK2MWR, OK2SS, OK2PEA, OK2ZB, OK2INW.

OM7M: OM3PA, OM5RW, OM5ZW. **ON4ATW** & WØAIH. **OT3A**: ON5UM, ON4DB. **PA3BAS** & PA3AUC, PA3DSB, PA3CQE, PA3BPL, PA3CLH. **PA3FDO** & PACKET. **PA5MW** & PAØRCT, PAØSHY, PA1MRK, PA3FGA, PA4TU, PA5EA. **PI4ALK**: PA1VW, PAØXAW, PDØNQD. **PJ2X**: W8UVZ, K8GG, KD9SV. **PY2FUS** & PACKET. **RK3VYA**: RU3VD, RX3VA, RZ3VA, UA3VFS. **RK4FWX**: RA4FG, RK4FW, RW4FO. **RK4UWR**: RA4UF, RW4UU, UA4UDF. **RN6BN** & RA6AX, RA6CM. **RT9W**: RU9WX, RX9WR. **RU1A**: UA1ARX, RA1ACJ, RV1AW, RA1AIP. **RU3DX** & UA3DPX. **RV2FW** & RA2FA, RA2FW, RN2FA. **RWØAR** & PACKET. **RW2F**: UA2CC, UA2FB, UA2FF, UA2FX. **S5ØC**: S51TA, S53MM, S53OO, S57MW, S53BB. **S57M** & S58A, S51RE. **SP3KFH**: SP3GTS, SL3JZR, SP3GKH, SP3GXH. **UA6LV** & PACKET. **USØQ**: UR3QT, UR2QT. **UT4UXW** & PACKET. **UT7L**: UR4LRG, UXØLL, US4LGW, UY5LW. **UU7J**: UU4JDD, UU8JV, UUØJM, UUØJBL. **VA3EC** & PACKET. **VE2OJ** & VE3NJ, VE3EDR, VE3OP, VE3FFK, VE3IAY. **VE7SV** & VA7NT, VA7CW. **VY2ZM**: K1ZM, WW2Y, K1PX. **W1FJ** & W1KM, K1XM, NB1B. **W1QA** & NC1I. **W1QK** & PACKET. **W2GD** & K2TW, K8NZ, N2OO, W1GD, W2CG, W2NO, W2RQ. **W2GDJ** & PACKET. **W2XL** & K4HA. **W3FV** & PACKET. **W3FVT** & PACKET. **W3GQ** & PACKET. **W3HVQ** & PACKET. **W4MYA** & PACKET. **W4WNT** & PACKET. **W5TM** & W5AO, W5KA. **W6TER** & WD7Z. **W8BAR**: W8WEJ, W1TO, W8VVE, WA8SDA, KF8NW, AA4VV. **WA1Z** & NE1I. **WA8WV** & PACKET. **WB9CIF** & PACKET. **WB9Z** & AE9B, AK9F, K9CS, K9FO, K9NR. **WD5R**: KV5D, N5ECT. **WS4Y** & K4WA. **WY3T** & N3JRX. **YLØA**: YL2KA, PACKET. **YZ7A**: YT7DQ, YU7KC, YU7BW, YU7CM, YU7JDE. **YZ7A**: ROBY, LACY. **Z36W** & Z32ID, Z31GX. **ZL6QH**: ZL2BSJ, ZL1AZE.

Station Ops SSB Multi-Op

4O6A: YT6A, YU1EU. **4U1WB**:AJ3M, PACKET. **5B4/UA9MA** & RZ9UA. **AAØA** & PACKET. **AA1K** & PACKET. **AA4V** & PACKET. **AF8C** & PACKET. **AG4MX** & KS4YT, KV4T. **DH1NFL** & DH1NHI, DL5RMH. **DJ5IW** & PACKET. **DJ9MH** & PACKET. **DKØDO** & PACKET. **DK2OY** & PACKET. **DLØMB**: DF2UU, DJ5IR, DK9IP. **DL5RMH** & DH1NFL, DH1NHI. **DLØDRI** & PACKET. **EA4URE**: OPS. **EA5BY** & EA5FID, EA5GRV, EA5KW, EA5XC. **EA5EG** & PACKET. **EA6CA** & EA6NY. **ED5GCT** & EA5GKC, EA5AT, EA5GKB. **ED7VG**: EA7ATX, EA7HY, EA7TL, EA6AR. **EI7M**: EI8GS, EI8IR, EI3JE. **F5PYJ** & F6IIT. **G3UEG** & PACKET. **G4IIY** & PACKET. **G6PZ** & G3TJE. **HA5KHC/7**: HA5BH, HA5OJ, HA5ZA, HG5OLQ, HA5TBK, HA7PC. **HB9CXZ** & HB9BLQ, HB9OCR, YL PIERA, HB9FAP. **HG1S**: HA1TJ, HA1DAE, HA1DAC, HA1AG, HA1DAI, HA1SN, HA1AH, HA3LN, HA3MY. **I2OKW** & IK2FIL. **IT9EQO** & IT9CHU, IT9LGV, IW9GIH. **IV3OWC** & IV3SKB, IV3WKI, IV3RIK, IV3DBU, IV3ZXQ, IV3ZIZ. **KØLIR**: NØIS, WØSLW, WAØIYY, NØPKX. **KØXD** & PACKET. **K1DAM** & W1JJM. **K1RV** & PACKET. **K2FL &** PACKET. **K2PS &** PACKET. **K2SB &** PACKET. **K3DI &** PACKET. **K3IXD &** PACKET. **K3OO &** PACKET. **K3OOO &** PACKET. **K3SKE &** PACKET. **K3VOA**: K3NJ, K1HTV, WG3A. **K3WW** & PACKET. **K4BP** & PACKET. **K4UZ** & KB4IUJ. **K4YFR** & W4AVN. **K4YT** & PACKET. **K5BAT**: N5QJ, WB5BHS, WU5X, W5RZ. **K8OQL** & PACKET. **K9NR** & WB9Z, K9CS. **KB9CRY** & PACKET. **KD2I** & KN2T, N2ORM, W2MF.

LX4A: LX1NO, LX1NW. **LX9UN**: LX1UN, LX2AJ. **LY7A**: LY3BA, LY3NUT, LYR346. **LZ8T**: LZ2CJ, LZ2JE. **M3C**: GØVQR, M3XTN. **NØFP** & PACKET. **NØKOV** & WBØLBF, WBØSRP. **N3AM &** PACKET. **N3DL &** PACKET. **N4ION** & N4JDB, KS4B. **N4VV** & PACKET. **N7GP**: W7MCO, N5IA, N7QK, K7LON, NA5S, K7JEM. **N7KQ**: W7GNP, N1KQ, KJ7RX, TODD. **N7PWZ** & N7IZM, KB7YEB, AC7KV. **N7X**: NK7C, N7CQQ. **N8TR** & PACKET. **NE3F** & KS3F. **NF1A** & PACKET. **NK7U** & KW7J. **NZ1U**: N1XS, KB1H. **OE1TKW** & PACKET. **OE2VEL** & PACKET. **OK1KMG**: OK1UDJ, OK1ULE. **OL1C**: OK1IEG, OK1TIC, OKAN, OK1FPQ, OK1DUG, OK1IPS, OK1UZW. **OL5T**: OK1DUO, OK1PAT, OK1QM. **OM3KZA**: OM3TYC. **OZ5ESB**: OZ1CWP, OZ1INN, OZ4AFQ. **P3F**: G3SJJ, G3SVL, G3UEG. **PY3MHZ** & PACKET. **RN6BN** & RA6CO. **RW3WWW**: UA3WHS, RA3WJ. **RZ9AYA**: UA9AT, UA9AZ, UA9AFZ. **SN8V**: SP8BLK, SP8NCF. **SO2R**: SP2FAX, US5WDX. **SP3KFH**: SP3GTS, SP3JZR, SP3GXH. **SP4PBI**: SP4Z, PETER. **TI8/K4UN** & W4BD. **US8IZM**: MAX, MARK, VITALY. **UU7J**: UU4JMG, UUØJM, UU4JDD, UU4JGR, UU5JBO, UU8JK, UU5JIB, UUJ079. **UZ4E**: UR7EU, IGOR, SERGE. **V31MD** & WØCP. **VE1JF** & PACKET. **VE2UMS**: VE2FAB, VE2CVB. **VE3DC**: VE3BK, VA3DJ, VE3VZ, VE3SS, VE3VMO, VE3STT. **VE6JY** & PACKET.

WØNO & ABØS. **W1TO &** PACKET. **W2GG &** PACKET. **W2MF** & KD2I, KN2T, N2ORM. **W3FV** & PACKET. **W3FVT** & PACKET. **W3HVQ** & PACKET. **W4GFA &** N4IQ, AC4Q, W8KMX, W4OSS. **W4HJ** & PACKET. **W4HZ** & PACKET. **W4NF &** PACKET. **W4UNP &** PACKET. **W5DJW** & W4WLF, W5YS, KD5RVX. **W6YRA**: WA6AYI, K6LDO, IK3ZAW, KC6LDS, KU6T. **W7WA** & PACKET. **WA1Z** & NE1I. **WA9IRV** & PACKET. **WB9CIF** & PACKET. **WD5R** & N5ECT. **WE3C** & KQ3V. **WY3T** & N3JRX. **XE1RCS**: XE1JG, XE1KK, XE1ME, XE1VIC, XE1YJY. **YLØA**: YL2KA, PACKET. **YZ7W**: 4N7ZZ, YT7DQ, YU7AR, YU7CM, YU7KC, YU7ZZ.

(Continued on page 105)

ICOM, which began the HF/VHF/UHF-in-one-radio revolution with the IC-706, has now joined the take-it-anywhere QRP category with its low-power IC-703, which even has its own optional backpack for operating while hiking. QRP Editor K4TWJ has our review.

CQ Reviews:

The ICOM IC-703 Portable/QRP HF Transceiver

BY DAVE INGRAM,* K4TWJ

ICOM has entered the world of QRP in a big way with the new IC-703, and we will surely hear more and more of these versatile little transceivers on the air during the weeks and months ahead. They are small, lightweight, energy efficient, loaded with features, and reasonably priced to boot. That, dear friends, is a winning combination from any point of view!

An understandably natural reaction when first seeing an IC-703 is that it looks just like ICOM's world-famous IC-706. That makes sense, as it is built on the same 2.2" × 6.2" × 7.6" mainframe with the same physical design/layout as an IC-706, and even uses the same menu set. It differs from an IC-706 with more battery-efficient circuitry, and enhanced/lower noise receiver, a built-in automatic antenna tuner, and a maximum output of 10 watts. The transceiver's microprocessor has also been changed such that it monitors and controls battery-current consumption of various circuits to ensure maximum in-field operating time. The features? Wow, this little rig is amazing! Our enthusiasm may be starting to out-pace our discussion, so let's step back and start with an overview of this little delight's general specs and assets.

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Photo 1– ICOM's new IC-703 is small in size, big in performance and a QRPer's dream. It looks like an IC-706, but it is lighter in weight and specially designed for portable operation with a built-in automatic antenna tuner, DSP, and battery-efficient circuitry.

Facts and Figures

The IC-703 may be small in size, but it is loaded for big-time radio action with all-mode operation on 160–10 meters (the IC-703 "Plus" version includes 6 meters) and full shortwave reception from 300 kHz to 30 MHz. It sports 101 memories, five "scratch pad" memories, dual VFOs, three scan modes, an adjustable speech compressor and noise blanker, RIT, and IF Shift with a pop-up display of the IF response curve when adjusted. The receiver section seems to have a slight edge in high sensitivity and low noise floor compared to an IC-706, and its overall gain can also be stepped up 10 dB or down 20 dB with the panel-selectable RF preamp or attenuator. The

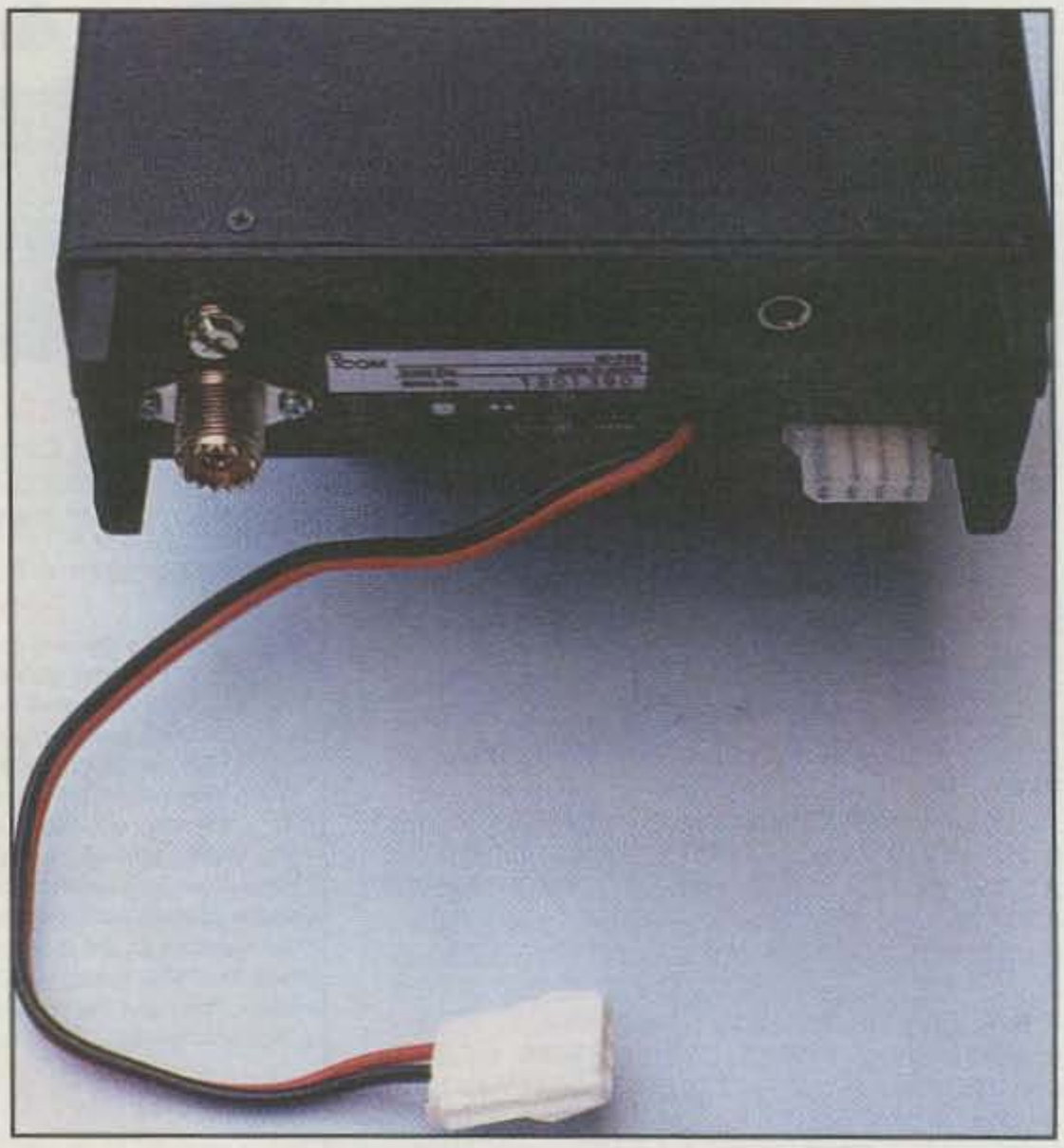

Photo 2– The rear panel of the IC-703 is flat without a protruding heatsink, so the transceiver can be operated while inside a carrying bag or backpack.

rig's out-of-the-box selectivity of 2.4 kHz on SSB and CW also seems fine to me, although some folks may prefer to add ICOM's optional FL-52A/500 Hz filter for CW work. Personally, I find using the wider SSB bandwidth and adjusting the IF Shift quite adequate for dodging any difficult-to-ignore QRM on both SSB and CW, and it lets me keep an ear on adjacent frequency activities at the same time. Additional "specs" on the IC-703, incidentally, may be found at <http://www.icom.co.jp/world/info/ic-703/index.html>.

Particularly notable is the IC-703's ability to operate with input voltage ranging from 9–15 volts. When the voltage is between 11 and 15 volts, power output is adjustable up to 10 watts. When the input drops below 11 volts, the IC-703's microprocessor reduces output to 5 watts and begins controlling current to various stages to reduce overall current demands and extend battery life. Does it work? Yes, indeed. At 9.6 volts, receive current is a scant 300 ma and transmit current is only 2 amps—noticeably lower than the 1.8 amp receive/10–20 amp transmit demands of most compact transceivers.

Special Features and Frills

ICOM's new IC-703 also has a lot going for it in the "fancy features and spiffy frills" department, such as an automatic antenna tuner, CW keyer with memory, high-stability TCXO (temperature-compensated crystal oscillator), plus bandscope and SWR plotting function.

The built-in automatic antenna tuner is really cool. It is a digital unit that uses latching relays for tuning. It only matches coax-fed antennas, but it has a quite wide impedance matching range and tames high SWRs with no problem. The big benefit of latching-type relays is they hold their settings without any "keep alive" current drain after tuning. In fact, the tuner will continue "holding its tune" even if all external power to the radio is removed, an always-appreciated asset when camping or operating portable.

The CW keyer is adjustable in both speed and paddle-lever selections, plus it has three 50-character memories that are dandy for "push-button contesting." Just program the memories, tap the buttons, fill in callsigns during QSOs, and experience contesting supreme!

Although a high-stability TCXO is optional in most transceivers, ICOM included it at the factory it in the IC-703. Apparently, ICOM is anticipating many folks will use the little rigs for backpacking or operating in other areas of possibly extreme temperatures. A

transceiver's TCXO, as you may know, determines its overall frequency stability from "cold turn on."

The on-board DSP (digital signal processing) has two modes: It can reduce band noise or minimize "beat tones" or tune-up carriers on SSB. The noise-reduction mode is adjustable in 15 steps, and like any DSP, it tends to introduce a strange watery sound when set near maximum. With the IC-703's built-in noise blanker minimizing intermittent noise and its DSP reducing constant noise, this double action pulls weak signals out of the mud surprisingly well.

Do you like to quickly check action on different bands when pressed for time or when first switching on your rig? The IC-703's bandscope function is quite helpful here. You just set the range to check and punch it up, and it gives you a visual display of signals above and below your tuned/center/displayed frequency. Nice!

One especially neat feature of the IC-703 is SWR plotting over a selected range. You just menu-select G2, set the steps of measurement and range to be analyzed, then tap the mic's PTT switch a few times while watching the IC-703 step through frequencies and graph SWR across the range. It is a killer—especially when mobiling—and it is ideal for determining resonant frequency and 2:1 SWR bandwidth of an antenna.

Using the IC-703

Whether used on a casual or continuous basis, the IC-703 is a most delightful little rig to operate. In fact, there is a natural tendency to forget that it runs low power (probably because it looks and handles like an IC-706) and call any station heard just like you do when running any 100 watt transceiver. Yes, and that positive mindset can prove beneficial for working in-country and DX stations alike, especially if you have the operating savvy to back it up. Then if you truly believe you can work the world (well, most of it) with QRP, you can! Attitude and confidence are everything!

The IC-703's receiver is really good. It is sensitive but not noisy from static, intermod, and/or AGC pumping like many economy-class rigs. The built-in automatic antenna tuner works like a champ and even remembers to switch back in or out of line when changing bands if you forget. Both semi and full CW break-in operation are smooth and pleasant. There is some T/R relay noise on CW, but it does not seem overly objectionable. Some transceivers are quieter here, but some are also noisier, and some even introduce CW chirp due

Photo 3– Rhonda Comer, KG4FVL, shows us the concept of operating pedestrian mobile with the IC-703. The rig is enclosed in its optional LC-156 backpack, fitted with a W6MMA multi-band MP-1 mini-antenna, and mated with a Heil "Traveler" headset with boom mic.

to T/R relay lag. The IC-703, however, delivers a very clean, clear output signal. The ability to operate full break-in style and listen to on-frequency activity in between your transmitted dots and dashes—to hear other callers in pile-ups and time your calls perfectly—incidentally, is a 6 to 10 dB advantage in communicating!

During the first few days of using the IC-703 (actually quickly grabbing 15 or 20 minutes in the morning and evening), I worked VK3BVM and OM3SEZ on 30 meters, 5R8FU and R1PQ on 20 meters, and G3HWS/FO-Tahiti on 17 meters. The DX success continued day after day and even included working Europe, South America, and Caribbean areas while mobile with a 6 foot whip. The little rig proved to be such a romper that I had to disconnect its power cable and hide the antenna's coax to stop it from working DX and blowing those "big guns" right off the bands. Would Dr. Dave jest?

A Real "Grab 'n Go" Rig

HF packing, pedestrian mobiling, or walk-and-talk HF'n and emergency preparedness are hot interests nowadays, and the IC-703's highly portable nature mates perfectly with those pursuits. How so? The transceiver's case is fully enclosed with a flat rear panel and does not need or have a cooling fan or a large

Photo 4– Rhonda shows us the IC-703's front panel/controller, which is carried in its belt clip pouch and connected to the transceiver's main body by an optional OPC-581 controller/rig separation cable.

rear heatsink. The rig and an optional 9.6 volt 2800 maH BP 228 battery pack can thus be stuffed into a carrying bag or backpack for on-the-spot operation anytime and anywhere. Realizing that fact, ICOM also developed the LC-156 "multi pack" for the IC-703. In addition to holding the IC-703 and BP-228 safe and sound, the backpack has mounting loops to hold a whip antenna, a removable belt pouch for the front panel/controller, and extra pockets for the microphone and maybe a key. An optional ICOM OPC-581 cable is used/required when the front panel is separated from the main body.

Two facts few people realize until actually getting into pedestrian mobiling or walk-and-talk HF'n is how important a counterpoise wire is to a vertical antenna and how much SWR changes as you move around. Any vertical that is a quarter wave or shorter must have a metal ground plane to "work against." In an automobile or on a bicycle, the metal frame serves as a ground/counterpoise. When walking, however, you need to pull a quarter-wave length of braid or shield behind you as a counterpoise for the antenna. Since wavelengths are much longer on HF than on 2 meters; everything within 30 feet or more affects SWR. The IC-703's automatic antenna tuner is not just helpful here, it is invaluable. Just tap its tune button and walk on!

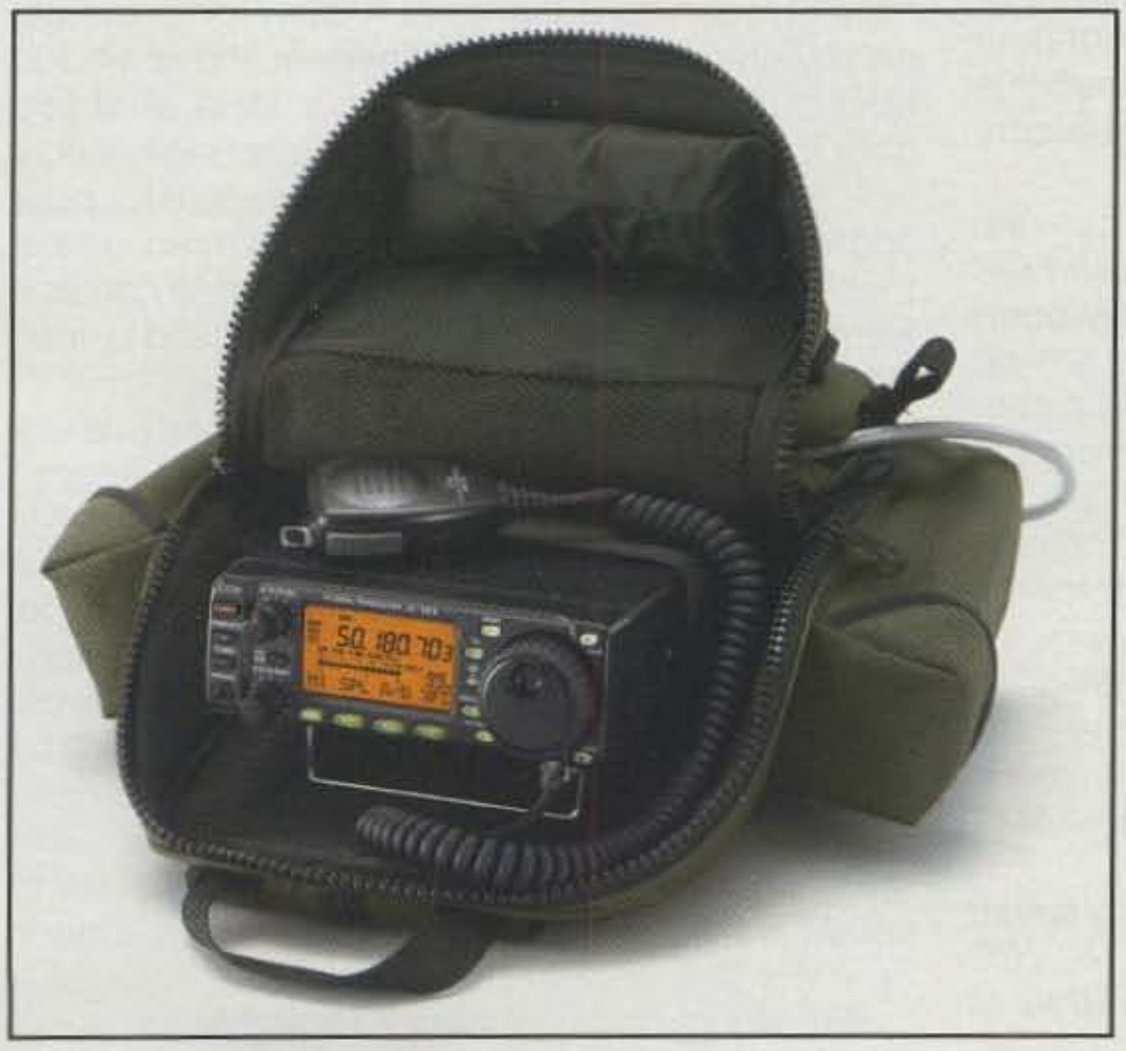

Photo 5– A close-up look at the optional LC-156 multi/backpack with a cover flap turned back so you can see how the IC-703 fits inside. It is "grab 'n go" HF'n at its best!

Conclusion

Overall, ICOM's new IC-703 strikes me as one cool "go anywhere, do anything" QRP transceiver at a quite affordable price. We hear rumors some amateurs still use their big 100 watt rigs reduced to 5 watts output for serious QRP pursuits and contesting, and that's fine (although folks habitually question if you are really running QRP when catching good DX). Factually speaking, however, nothing brings home the real radio thrills and excitement of low-power communications like hitting the bands with a brand-new and dedicated QRP transceiver such as the IC-703. It is akin to hitting the roads with a new automobile, but it is much less expensive. Try one (IC-703, not automobile!) in your own shack and see for yourself!

The IC-703, HF only, lists for $853.32 (average street price under $700); the IC-703, HF plus 6 meters, lists for $919.99 (average street price around $750). It is complemented by a wide range of accessories, including the previously mentioned LC-156 multipack, FL-52A/500 Hz CW filter, FL-222/1.8 kHz SSB filter, FL-257/3.3 kHz SSB filter, UT-102 voice synthesizer, and more. The transceiver and its accessories are available from dealers nationwide. For more information, check <www.icomamerica.com>. ■

op ed

BY THE NATIONAL CONFERENCE OF VECs RULES COMMITTEE*

Amateur Radio in the 21st Century

The National Conference of VECs' "Master Plan"

CQ magazine has no affiliation with the National Conference of Volunteer Examiner Coordinators (or any other amateur radio organization), and our publication of this "Op Ed" piece should not be taken to suggest that we either agree or disagree with its views. We are providing this space for an explanation of the group's current and anticipated actions because of widespread public interest in the amateur radio community in proposals by NCVEC and others to end Morse code testing in the United States. — *the Editors*

On August 29, 2003, the FCC circulated seven Petitions for Rulemaking seeking changes in the rules which require demonstrated knowledge of Morse code communications when the operation takes place on frequencies below 30 MHz. The two petitions that garnered the most comments were those submitted by the National Conference of VECs (NCVEC) and No Code International (NCI). The NCVEC is the umbrella group consisting of all Volunteer Examiner Coordinators. NCI is an international organization that seeks to end Morse code testing.

At its annual meeting on July 25, 2003, the VEC Conference voted overwhelmingly to support ending Morse code testing. A four-person committee consisting of Fred Maia, W5YI (of the W5YI-VEC), John Johnston, W3BE (Laurel VEC), Scott Neustadter, W4WW (CAVEC), and Jim Wiley, KL7CC (Anchorage VEC), was appointed to develop and file a petition requesting an immediate end to telegraphy exams in the U.S. Amateur Service. The group was also asked to investigate other related issues that might naturally be connected with this action.

All four hold long-term Extra Class licenses, have passed the 20 wpm code exam at an FCC (not VEC) exam, consider themselves CW operators, and belong to the ARRL. There are no "Morse code haters" among them; there is no conspiracy, no secret agenda, no kickback from the manufacturers, no "black plan" from the ARRL, no anything. It's just some guys who want nothing more than to see our great hobby prosper for the next hundred years, or longer.

The petition was filed on August 1 and assigned file number RM-10787. On August 29, the FCC accepted this petition along with six others and established an initial 30-day public comment period, which ended September 28.

Over 2100 comments were filed on the seven petitions, with the NCI (RM-10786) and NCVEC (RM-10787) petitions collecting nearly 1000 of them. The NCVEC petition received the most comments—more than 600. After eliminating the duplicate and unresponsive comments, 57% of all commenters favored eliminating Morse code testing, 40% wanted to retain it, and 4% wanted the code exam kept for the Extra Class level only.

Confusion About Proposals

There seems to be a lot of confusion in the comments as to just what these two very similar petitions from the NCI and NCVEC propose, so let's set the record straight. These two petitions simply propose to eliminate all telegraphy examinations and to add the HF privileges currently enjoyed by the so-called "Technician Plus" operator (a Tech operator who has passed a code exam) to the Technician Class. These privileges include the "Novice" CW segments on 80 meters (3.675–3.725 MHz), 40 meters (7.10–7.15 MHz), 15 meters (21.10–21.20 MHz), and 10 meters (28.1–28.5 MHz), plus SSB (voice) between 28.3 and 28.5 MHz.

Nobody loses any privileges and there are no frequency, subband, or mode changes proposed for the General or Extra Class. To upgrade, an amateur simply passes the appropriate written examination.

Some Considerations by The NCVEC Rules Committee

Will dropping the Morse requirement remove a "filter" that keeps out poor operators, "CB Radio" types, scofflaws, and so on? We (the NCVEC Rules Committee) think not. Listen to 75 meters on any given evening, or 20 meters above 14.300 MHz during the day, and all too often what you hear is a cacophony of indecent language, illegal operation, intentional interference, music, poor sportsmanship . . . you name it. And every one of those characters passed a code test! Whether it was 5 or 13 or 20 wpm, they all passed a test. Some filter, huh?

Will removing the Morse requirement let in some "bad apples"? Yes, it will. But we firmly believe the number will be very small in comparison to the gain our hobby will receive from decent, law abiding, talented, and enthusiastic new hams. Just as letting code-free new hams onto our VHF bands has not, for the most part, resulted in chaos, the same will be true of our HF assignments. It will be up to us, as the "experts," to guide newcomers, passing on the traditions of our hobby, the skills and operating techniques that make a ham to whom we all can point and say, "That is a good operator."

Will Morse code go away? Probably not in our lifetimes. Remember that Morse code is still the easiest way to get on the air, the most effective means of communicating under poor conditions, and where most of the DX still will be. We are not

**This article was written jointly by NCVEC Rules Committee members Fred Maia, W5YI; Jim Wiley, KL7CC; and Scott Neustadter, W4WW.*

calling for making Morse code illegal; we just want to make it equal to any other mode that hams might enjoy. We don't have special tests before a ham can operate SSB, or RTTY, or SSTV, or any other mode, so why for Morse code?

Morse will probably retain most of its exclusive band segments, at least for now. We are not addressing this issue at this time, although it may change in the future. Several countries no longer have exclusive segments, but depend instead on voluntary band plans and mode bandwidth restrictions. In fact, our 160 meter band works this way today, and with surprisingly few problems.

Remember that when ham radio started, Morse code was all there was. It wasn't even CW; we all used spark gap transmitters! One of the justifications for amateur radio, from the government's point of view, is that we continue to lead, or at least follow closely behind, advancements in the "state of the art" of electronic communications. That means advancing, not standing still.

Will we lose something if we no longer have the knowledge such that all hams on HF can at least minimally understand and send CW? Maybe, maybe not. You would be surprised at the number of applicants we see at test sessions who actually want to learn CW. They think it will be fun. There's a novel concept—someone learning a skill because it is fun, not because the government says you must do it.

Obviously, removing the Morse test requirement will make it easier for thousands of interested persons to join our hobby and to upgrade. There are many who, for whatever reason, have a real, not imagined, problem with learning the code. Call it stage fright, a psychological block, hearing problems, poor recognition skills . . . whatever you want. There are indeed those who literally cannot master the code, no matter how hard they try.

Mastering the code has no apparent connection with how "good" a ham a person is. What we want is "new blood," those who will respect our traditions, follow the rules, bring enthusiasm and vigor to the hobby, and make a positive contribution. CW is a great mode. But it's time to move on.

We believe Morse code will live forever. As long as someone cares about the history and mystery of early radio—and lots of hams do—CW will be around. Like anything else, when people find they have a need to use Morse code, they will learn it. Want to work DX, or QRP, or weak-signal VHF, or moon-

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bounce? Better learn the code, or you won't have a very satisfying experience.

Are we "dumbing down" amateur radio? Are you kidding? Have you looked at the new Extra Class tests? Could you honestly say you could pass one, picked at random, "cold"? Few can, at least not without some serious study of the books.

Will ham radio turn into CB? No, it won't. In the first place, the Citizens Band is essentially an unlicensed service. Second, there are still the written exams, and add to that peer pressure from other hams, and the fact that hams must use callsigns instead of "handles." There is just no comparison or common ground between the two services. Hams will literally refuse to talk to someone without a callsign—and a callsign removes the anonymity of CB. Break the rules on the ham bands, and you will get caught, and fined . . . or even sent to jail.

Looking to the Future

Another point of apparent confusion among some commenters was what additional changes the NCVEC planned to propose once the code requirement was eliminated. While this wasn't specifically addressed in our petition, the NCVEC has developed a "master plan" for helping promote amateur radio growth in the 21st century. The next step, in our view, is creating a new beginner-level license.

What is the fastest growing sector of our economy today? The answer is Information Technology (IT). And what does IT need to succeed and grow? Interconnection, that's what. And increasingly, wireless interconnection. And what does wireless interconnection need? Spectrum. Radio spectrum—lots of it. And who has lots of spectrum, a lot of it unused or underused? The Amateur Service.

Now what happens to that spectrum when (not if) you become a silent key and there is no one to take your place? What happens when there are so few hams that we become insignificant? What happens when there are so few hams that manufacturers can no longer afford to amortize the engineering costs needed to bring you a new radio? It has already started.

You always build everything from scratch? Great! Who, exactly, are you going to talk to? Most of us opt for the practical approach, and purchase a rig from one of the several companies that cater to hams. If there are no manufacturers, then there are no new rigs. Hard to carry on a QSO if no one is there.

One of the primary goals of the new license the NCVEC is going to propose is a true entry-level ticket. Limited power, limited frequencies, but still useful, with enough of the essence of amateur radio to attract beginners and show them what lies ahead when they upgrade. It will be obtained by passing a simpler exam.

Yes, we said a simpler exam. Hopefully 20 questions . . . aimed at a young person age 12 or higher. That means a sixth-grade education. It also fits teens, high schoolers, . . . home schoolers.

That Sure Sounds Like "Dumbing Down" . . .

Here is what the VECs are thinking, and some of the rationale behind it. However, we don't have all the good ideas. In fact, we may not even have most of them, so input from others is solicited and welcome.

First consideration: Lower power. Two reasons. First, everyone at the recent NCVEC meeting expressed concern about letting brand new hams loose with 1500 watts of VHF or UHF power. That's dangerous, no doubt about it. Cook your neighbor's cat type stuff. Not funny. *(Although it is currently allowed for Technicians—ed.)* So, we are thinking about a license that allows enough power to be useful, but not enough to be unsafe.

The rules generally require that an RF environmental evaluation be performed when the peak-envelope-power (PEP) input to the antenna exceeds 50 watts when operating at the VHF/UHF frequency level. An RF evaluation is generally not required on 100 watt power levels when the operation takes place in the HF range. Transmitters at those frequencies and power levels are presumed safe. If there are no RF safety issues, then there is no need to ask questions about those issues, and we can have a smaller exam.

Second, those power levels represent the vast majority of commercially manufactured (or kit) radios offered for sale. The 100 watt HF set is everywhere, and very few VHF/UHF mobiles exceed 50 watts. Yes, some sets run more power, but the overwhelming majority meets the 100W HF/50W VHF standard.

Remove some of the math from the license exams. Remove some or even most of the "radio law" type questions. Instead, require applicants to sign a statement that they have read the Part 97 rulebook, and that they have a copy (available for free via web download). Yes, some of the applicants will "skate" and not read it when they signed that they did. But most will, and even among those who don't, eventually, probably

sooner rather than later, they will get around to it. Some never will. That's human nature. We're not looking for saints, just people who can become productive hams.

And take out some of the theory questions. We're not making engineers, at least not yet. Put in a couple of additional practical questions about operating your radio. A poke here, a cut there, and we're done . . . a 20-question exam from a 200- or 250-question pool that covers what a beginner really needs to know. Finish up with a few words about how to find the information needed to advance one's skills, how to find an "Elmer," and how to find out more about the hobby on the Internet.

Take a moment to think back. Did you know everything about ham radio once you passed your license tests? It took time, study, listening to other hams, and much more to get where you are today. Were you nervous on your first contact? Did you get over it? Did you make a couple of dumb mistakes, maybe even accidentally violate the rules once, or maybe even twice? These people will too. It's called learning.

What do you think is better for our hobby—lots of enthusiastic newcomers, or an ever-declining number of increasingly older hams? Answer the question honestly, not just in light of your favorite band getting more crowded. Another thing: If the bands get more crowded, doesn't that help make a case for increased spectrum? And guess what? All those new hams vote (or will soon enough), and Congress pays attention to numbers. Numbers become very important when we are in competition with commercial interests for spectrum space. And maybe the prices of new radio gear will decline if manufacturers can spread fixed costs over a larger sales base. And maybe some brand-new manufacturers will be encouraged to bring something to market. Will that be bad?

OK, now we've got a brand new beginner's license. Whether we call it a "Communicator," a "Basic" license, or some other name, what's next? Where are they going to operate? Are you going to get run over by a horde of newcomers?

We have a plan. It probably won't turn out to be exactly the way the final rules are adopted, but it's a start. Someone else may very well come up with a better suggestion. That's OK, too.

Whatever we come up with, it will have to fit within the FCC budget and existing computerized license structure. This probably means that in all likelihood what will happen, assuming that the idea of a

beginner's class license is accepted at all, is that the FCC will juggle the existing three classes to accommodate the new structure. Technician will change from what it is now to the basic license. It may be named "Communicator" or simply left as Technician. Let's assume it gets the name "Communicator."

All existing Techs would be upgraded to General under our plan. Assuming that the Morse requirement is removed first, our opinion is that most Techs will take (and hopefully pass) the Element 3 exam as soon as they can anyway, thus becoming General class licensees. Remember that before the changes that led to the creation of the present no-code Tech, the General and Tech exams were identical. Only the code separated them, and even then it was only the difference between 5 and 13 wpm. All Advanced licenses would be upgraded to Extra, and if there are any remaining Novice tickets out there, they would become "Communicators." Now we have three classes: (1) Communicator, (2) General, and (3) Extra.

The exams would be adjusted to combine Elements 2 and 3 into a new Element 3, probably with a 50-question exam, using the existing pools. Element 1 (Code) disappears, as it probably will with or without a new beginner's license. A new Element 2 question pool is created, from which the Communicator exam is generated. Element 4 remains as is, or maybe becomes even harder, in the event we (all hams) indicate that the Extra exam should really be a test that "separates the men from the boys." Many would agree that this is already the case, and that no future changes are required.

Kind of sounds like a bunch of folks are going to get something for free, something that you might have worked hard for, doesn't it? How can we justify this? Well, maybe it won't happen that way at all. Maybe instead of "instant upgrades," the Techs will have to pass their Element 3 exam or be downgraded to Communicator licensees, and maybe Advanced licensees will have to pass Element 4 or be downgraded to General.

That concept, however, "flies in the face" of our desire to have this whole thing take place with no net loss to any existing licensee. But if enough people object to the idea of "free" upgrades, then that is one alternative (but probably unlikely) solution. Another is to continue the Technician and Advanced licenses "as is," until they upgrade, maybe even make upgrading mandatory for renewal. Using that plan, they all will either upgrade or disappear within 10 years, with no further effort on the part of the FCC.

What About Frequency Privileges?

We need some place where these new licensees can get their feet wet, and where they can participate in amateur radio in a meaningful way. All of ham radio, not just local repeaters. What we need is a few spare kilohertz. I wonder where we can find some? New band? Probably not. So, what do we have that can be reworked to fit our need? How about the present HF Novice bands?

Suppose, just for a moment, that a petition got filed requesting that the FCC make the following changes: Take the present HF Novice bands on 80, 40, 15, and 10 meters and reassign them to voice operation. Move the corresponding phone segments down by the appropriate amount. Change the segments open to various classes of license to fit, and let the new "Communicator" licensees have access to the HF bands in 50 or 100 kHz blocks. For example, and this is just an illustration, 40 meters could end up looking something like this:

7000–7025: Extra, CW, and data only
7025–7100: All classes, including Communicator, CW, and data only
7100–7150: Extra, all modes
7150–7250: Extra and General, all modes
7250–7300: All classes, including Communicator, all modes

Similar adjustments could be made at 80, 15, and 10 meters. Actually, 10 meters is already pretty much set and ready to go. We might do only 50 kHz on 15 meters, leaving the other 50 as a "DX window." There could be, or not be, consideration of allowing Communicators onto the other HF bands (160, 30, 20, 17, 12) as well. Not too sure what to do about the new 60 meter band yet. We have to think about that one for a while. Perhaps we start with 80, 40, 15, and 10, and after a few years' experience, revisit the issue and decide whether granting access to parts of the other HF bands is a good idea. Time will tell.

In other words, what we will suggest is to "slide" the phone bands down the equivalent amount of the former Novice segment, and allow the new Communicators access to the top 50 kHz of the voice band. Traditionally, higher-class licensees have been given access to the lower frequency segments within a band, and this would remain true. No

one loses anything! Generals and Extras get some new phone bands, even former Novices (now upgraded to Communicator) get more room in the CW segment, and access to a portion of the phone band.

On VHF and UHF, Communicators could use the four bands between 50 and 450 MHz, with a power limit of 50 watts. On HF, Communicators would operate with a 100 watt limit; General and Extra can use 1500 if they wish. Again, no one loses! No hassle like many of us remember over "incentive licensing" all those many years ago. If a "Communicator" wants to run more power, he or she simply upgrades to General and away they go. We (hams in general) might decide that voluntary power restrictions in the Communicator segments are appropriate, but time will tell. That is another issue, not part of the three-part plan the NCVEC Committee is currently working on.

An alternative solution, which has been adopted in other parts of the world, would be to grant Communicators the same frequency privileges as Generals, but with the lower power limits discussed above. The United Kingdom has implemented this approach in its "Foundation" license, which has become the fastest growing license in the UK's history.

Will anyone have any problems with these proposals? Of course. Inevitably, it will turn out that someone's favorite net is in the Communicator area. Maybe the net members will decide to move; maybe they will stay where they are and attract hundreds of new members. Someone's favorite spot may suddenly be open to new modes. OK, so what? Where does it say that anyone is given exclusive rights to one particular spot or another? Pretty much every radio available today has a VFO. Use it. You might even meet a new friend or two.

A Timetable

As we all know, several petitions requesting that the FCC remove Morse code testing have been filed. Depending on how soon an NPRM (Notice of Proposed Rule Making) is issued, assuming it is at all, we will have to wait while the Commission and its staff work their way through the rulemaking process—most often a two-year process. One of the things that is happening is that comments, both pro and con, are accumulating.

After several weeks, or at most a few months, and assuming the majority of comments are in favor of eliminating the code as a licensing requirement (which they seem to be), then the VECs plan to file for a waiver asking for an immediate end to code testing, even before a Report & Order is issued. We feel this can be done, since there are enough favorable comments on file for the FCC to justify granting such a waiver. The actual change in the FCC rules would still be in progress, but if we can show that there is enough interest, and that such a waiver will be beneficial to amateur radio as a whole, then there is a good chance it may be granted.

Very soon (a few days at most) after the Morse requirement disappears, assuming it does, then the VECs plan to file for the creation of the Communicator license, as detailed elsewhere in this discussion. We will follow the same procedure as before, filing a petition for a rulemaking, and starting

the clock on that issue. Assuming that the comments on that issue are also favorable, after a reasonable time has elapsed, we will file a petition to upgrade Techs to General, and Advanced to Extra, as explained earlier.

We probably will not be able to accelerate the creation of the Communicator license, since it would involve a complete restructure of the present system. But in case that option should become available, we would likewise pursue that end.

Next, once the Communicator proposal starts to look like it will become reality, we will file another petition asking that the Novice HF assignments be re-allocated, also as per the previous discussion. We would further ask that the re-allocation take place at the same time as the implementation date of the new license, so that those who pass their tests will have a place to operate.

In all cases, because this is a multiple-step process, useful information will be gained as each part moves forward. This is actually a benefit, because we may very well find that some of the present ideas need revision before being submitted.

All this will take some time, perhaps several years. In other words, nothing is going to happen next week, and everyone will have ample time to offer his or her own suggestions as to how to proceed. There will be no "rush to judgment." All these actions can do is get something out there for consideration. There is absolutely no guarantee that the FCC, or the ham community at large, will accept these proposals.

What the NCVEC Will *Not* be Addressing

We are not addressing the issue of reallocation of bands or sub-bands, either by mode or license class, with the sole exception of using the former Novice CW sub-bands on 80, 40, 15, and 10 meters to create working space for new Communicator licensees. By the way, don't forget that this adjustment will create more phone space for General, Advanced, and Extra operators at the same time.

We are not suggesting that the CW sub-bands, or the exclusive CW bands for Extra licensees, be eliminated or otherwise adjusted. Again, with the exception of Novice CW, we are not proposing any change whatsoever to the present band plans or allocations.

We are also not addressing the issue of the relative split between General, Advanced, and Extra allocations at HF. We feel that these issues are best dealt with only after some period of experience with both the proposed new license and a completely code-free licensing structure give us more insight on the best way to proceed. This intermediate stage may take a while to properly evaluate.

There you have it, the "NCVEC Master Plan." Will it actually turn out this way? Probably not. Just as there are thousands of hams, there will be lots of suggestions, pro and con, about which is the best way to go. When (and if) a petition is filed, and a Notice of Proposed Rule Making (NPRM) is posted, offer your comments and suggestions. The FCC will consider all views before changing anything.

If a majority of comments indicates that hams want things to stay the way they are, then that's what will happen. If most hams want change, and their arguments make sense, then that's what will happen. In almost no other country in the world are the governed given the chance to affect the rules as we are here in the U.S. Use that power if you wish. But don't just sit there and complain if you don't act.

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FM Mobile/Base Transceiver

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DR-435T MkII UHF

FM Mobile/Base Transceiver

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www.ALINCO.com

public service

BY BOB JOSUWEIT,* WA3PZO

Public Service Around the World

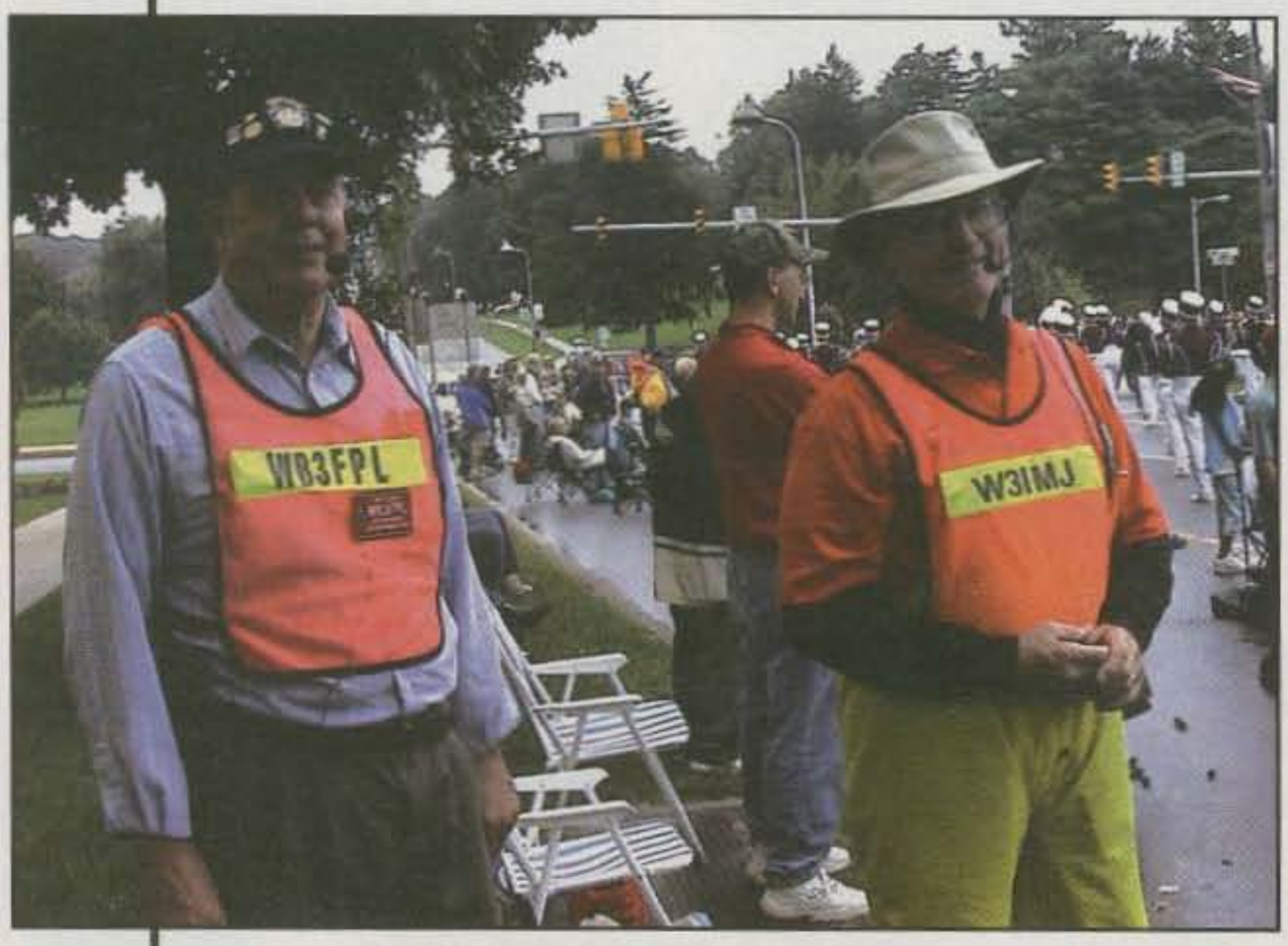
Each month we report on amateur radio operators providing a public service at some event or disaster. This month we want to celebrate the dedication of thousands of volunteers from around the world who make sure important information is passed on in times of need.

Reaching the Peak

Our first stop is at the highest mountain peak in Southeast Asia. Malaysia's Mt. Kinabalu is 13,432.26 feet above sea level. The 17th Mt. Kinabalu International Climbathon took place in October with 26 members of the Sabah Amateur Radio Society (SARS) providing strategic communications from various checkpoints, medical and emergency stations, and assisting with air and ground support. Approximately 280 runners from over 20 countries participated in this event. SARS members provided the runners' positions and status to the race coordinators.

Many hams who have been at the end of a race or a parade know it will be some time before activity picks up at their position. For this run it was almost two hours before the first runners arrived. According to race officials it takes the average person two *days* to make the climb to the top. Florence, 9W6AI, described his experience at the finish line on a previous race. He said, "Tracking to the peak was exciting and indeed the toughest challenge . . . the altitude, the steep track, the temperature and the wind."

*c/o CQ magazine
e-mail: <wa3pzo@cq-amateur-radio.com>



Eric Olena, WB3FPL, and John Hunt, W3IMJ, provide communications in "Chocolate Town, USA," also known as Hershey, Pennsylvania. (Photo courtesy of K3PD)

Florence continued, "We left Laban Rata at 3:30 AM and reached Sayat-Sayat Hut at 5:00 AM. After a short rest, we proceeded and reached the peak at 7:00AM. . . . For about an hour the temperature was testing our endurance, confidence, strength, energy, etc. As more and more runners reached the peak, our concentration was on the runners rather than the environment. The temperature was 12–15° C (50°s F) and wind varied from 5 to 10 knots. Visibility was excellent that morning. We spent more than three hours at the peak. Despite all the challenges, we dare to say that we all enjoyed ourselves."

Hams Cover Chocolate Town

In mid-September some 29 amateur radio operators helped the town of Hershey, Pennsylvania celebrate its centennial. Hershey is the home of the famous candy maker. This was the town's largest parade since 1913 and featured colorful floats, bands, clowns, antique cars, etc.

Parade Coordinator Amy Walp contacted ARRL Eastern Pennsylvania Section Manager Eric Olena, WB3FPL, requesting assistance. Walp said the parade would include some 5000 participants. Based on her successful interaction with hams in the Philadelphia Thanksgiving Day Parade, she wanted to work with hams in the Hershey area. She said these radio operators would provide a valuable source of communication along the parade route.

"Typically we position a radio operator on each block to serve as a first responder for any health or safety issues that should arise during the parade," said Walp. "We are providing EMS stations along the parade route. But the radio operators are able to provide direct 911 contact to immediately dispatch assistance to any location along the parade route should a situation occur anywhere besides directly in front of the positioned EMS location. They can also tie in with police should there be the need for such a response."

For such a large event, the ARES group reported for duty four hours before the parade was to begin. Key staff members got into position and met with the parade coordinators. Harrisburg REACT provided a complete communications van, equipped with HF, VHF, UHF, and Slow Scan and Fast Scan TV. The parade ran smoothly with only one parade staff person twisting her ankle. A key to the event going so smoothly was the parade director's familiarity with ham radio operations in another part of the state.

Hurricane Wrap

Amateur radio operators in Bermuda and the United States worked in unison as Hurricane Fabian made landfall on the island on September 5th. The Category-3 hurricane, with sustained winds of 120 mph, was the strongest hurricane to

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hit Bermuda in nearly 80 years. The hurricane left four people dead and many homes and businesses with severely damaged roofs.

Planning for the unwelcome guest started nearly a week in advance of its anticipated landfall. Operators at the National Hurricane Center's ham station, WX4NHC, performed equipment maintenance and began coordinating with Hurricane Watch Net Manager Mike Pilgrim, K5MP, and Tony Siese, VP9HK, who would be manning the radios at the Bermuda Emergency Management Office (EMO). The director of the Bermuda Weather Center also advised that ham radio would be available as a backup link there should normal communications fail.

Several hurricane surface weather reports were received from Bermuda via e-mail prior to landfall. However, once the electricity, phone lines, and thus the internet, started to go down, e-mail became useless. This also included the use of IRLP. The only direct communications to Bermuda was via 20 meters. Some reporters described it as "old fashioned technology," but when it comes to hurricanes, amateur radio is still one of the most reliable forms of communications available. The Bermuda hams, using car batteries, basic wire antennas, and only 50 watts of transmitter power, were able to send those valued "Surface Reports" and receive vital hurricane advisories. These advisories were passed on to the local EMO, police stations, hospitals, and other agencies via ham radio.

Surface reports are visual and instrument observations, made by amateur radio operators and weather enthusiasts, that are sent to the Hurricane Center by ham radio frequencies and other methods. These surface reports are submitted in "real time" as events happen and can be a very important tool in forecasting, as they reflect what is actually happening at ground level during a hurricane. Damage reports are not only helpful in determining the severity of the hurricane and its effect on local topography, but also add a human perspective to hurricane advisories. Max Mayfield, Director of the National Hurricane Center, said, "We really want to know what is happening on the ground."

The weak signals from the Bermuda hams were heard around the world. Band conditions on 20 meters were generally good, and the reception noise level was nice and low. However, as the atmospheric propagation conditions changed and did not favor reception at NHC in Miami, the well-trained Net Control Operators of the HWN relayed the information. The "surface reports" would be heard by the Net Control in Canada or Texas, or even the Virgin Islands, and then relayed back to WX4NHC. Like a well-choreographed relay race on the airwaves, the reports were handed off seamlessly from station to station to WX4NHC. Julio Ripoll, WD4JR, Assistant Manager of WX4NHC, said, "This was an excellent example of how ordinary people from so many different places and backgrounds can cooperate very well in a crisis situation such as a hurricane."

Hurricane Fabian made a direct hit on the Bermuda Emergency Management Office, placing many in danger, including hams. (Photo courtesy of Tony Siese, VP9HK)

On Friday evening, when the worst winds were affecting Bermuda, reports were received that the Emergency Management Office and other buildings in the area had lost their roofs. National news organizations were using reports heard on ham radio frequencies for their news coverage. After almost an hour, reports came from Tom Trimingham, VP9KG, that all were okay at the EMO.

"When part of the police operations roof came off and the building had to be evacuated," said VP9HK, "the only contact with the outside world for a few hours was via myself relaying info to the guys on HF and getting the WX reports from the Hurricane Center. This lasted about two hours, and when the government station was operating, we were giving them the updated reports received from the weather center in Miami."

NHC Director Mayfield said, "My sincere thanks to all the ham radio operators who kept supplying critical information during Fabian. We never would have known what was going on in Bermuda without your help. You are a part of the hurricane team and it is a pleasure to work with you."

During Hurricane Fabian, WX4NHC conducted some pre-planned on-the-air HF testing with the Hurricane Hunter Airplane, NOAA-42, as it made its way to St. Croix and later made several eye penetrations and perimeter passes as the hurricane was in the Atlantic, and then as it made landfall over Bermuda. John Ellis, NP2B, was instrumental in the testing from St. Croix and later had the privilege of a tour of NOAA-42, "Miss Piggy," by Captain Dave Tennesen, NL7MT. These HF radio experiments were planned to test the effective frequencies to be used to communicate directly to the Hurricane Center as a back-up link.

Nova Scotia Hams Greet Juan

Hurricane Juan roared across Nova Scotia on Sunday, September 28th with sustained winds of 80 mph. Landfall was just east of Halifax. In this case the internet stayed up and communications with WX4NHC were established using EchoLink radio-internet linking software. This allowed hams at the National Hurricane Center to talk directly with local hams in the affected areas. Surface reports were received from Nelson Burgoyne, VE1GO, who lives near Sydney Harbor, about 200 feet from the shoreline. Bob Roper, VE1CRR, who lives on Cape Breton Island, reported that the Halifax area lost many large trees and suffered downed power lines and roof damage. Bob has heard of at

Santa has help getting to the end of this Philadelphia parade, courtesy of the Holmesburg Amateur Radio Club. (WA3PZO photo)

least two fatalities caused by Hurricane Juan, one being a paramedic who was killed by a falling tree during the storm. Jim Milner, VE1VIA, in Amherst, north of Halifax, reported at about 10 PM that in Halifax the power was out and the two main bridges were closed.

One unusual result of this storm was reported to *CQ* by reader Ron Reyno, VE3RYN: "I phoned my brother in Halifax, Nova Scotia, just after Hurricane Juan had passed through his area," Ron wrote. "I was enquiring about the damage there when interference came on the phone line. I asked my brother if he heard it and he said no. I then realized it was Morse code causing the noise ..." Ron said he began to copy and found it was a fellow ham, a VE1 about a half-mile from his brother's house, calling a G3 station in England. "This is the first time in my radio career," he concluded, "that I have been interfered with over the phone from the (location of the other person) who was talking to me at the time."

Back in Miami...

The WX4NHC group at the National Hurricane Center continues to expand its efforts to increase the quantity and quality of surface reports to include many different modes of reception and groups of people, including HF, VHF/UHF IRLP & Echolink, VHF & HF APRS, CWOP NOAA Program, CARMEN Program, and ON-NHC Weather Observers Network. More information on these programs can be found at <http://www.wx4nhc.org>.

Indian Hams Provide Watchful Eyes

In September, 30 ham radio operators in India kept a watchful eye on millions of people who descended on Girgaum Chowpatty to bid farewell to Ganesha, an idol in India. Members of the Mumbai Amateur Radio Club have assisted police and civic authorities with rescue operations during this annual event for the past ten years.

The ham radio operators are given special permission to set up *machans,* or elevated platforms, for a bird's eye view along the river to help coordinate information. Other operators are stationed in boats to respond to possible drowning victims. When a person in trouble is spotted, information is relayed to all of the hams and the closest rescue team responds in minutes.

The group also helps to reunite lost children with their families. MARC members explain that there are many emergencies, since many people walk or dance for four or five hours as they make their way to the river banks. The operators are on duty for 18 hours.

Holiday Season: Parade Season

As we enter the holiday season, many ham radio clubs around the country will be providing communications for local parades. Philadelphia actually has two parades near Thanksgiving in different parts of the city.

In one long-running parade, members of the Holmesburg Amateur Radio Club make sure that Santa gets down the parade route safely and on time. The route is noisy with bands and spectators, making initial coordination difficult. For the past 11 years the three hams organizing the parade as it started down the street have been Dave Hogan, KB3AKK; Kim MacNamara-Josuweit, KB3COV; and yours truly, Bob Josuweit, WA3PZO. A different trio will handle coordination this year. While there have been several guest columnists filling in for me over the past couple of months, I've been attending to family matters. My wife Kim became a Silent Key in early October after a short fight with cancer.

Many of you who contacted me by phone over the years often got to speak to Kim first. Even before she got her license, she knew all of the lingo and who the key people were. She actually surprised me when she walked in the door saying she had gotten her license.

If you haven't done it recently, recognize all of the people around you who let you do what you do by serving in the public interest. Don't put it off. My world got turned around in just two months.

Next Month . . .

Next month we hope to be back with another interesting column on ham radio operators serving in the public interest. Have a story to tell? Drop us a note. Until next time have a great holiday season and 73.

Bob, WA3PZO

what's new

BY KARL T. THURBER, JR.,* W8FX

'Tis The Season!

'Tis the season, indeed! This month we again shine the *CQ* product spotlight on more new accessories for the radio shack, antennas and antenna accessories, internet applications, books,and more—including some goodies we think will be of gift-giving interest to you as we approach the upcoming Holiday Season.

Accessories for the Radio Shack

AOR ARD9800 Fast Radio Modem. AOR USA has introduced a truly exciting new product, the ARD9800 Fast Radio Modem (see photo A). It's a digital modem that could bring a "universal" digital voice format to HF. AOR developed the breakthrough product and associated format over the past few years in an effort to bring the advantages of digital voice and communications to the HF bands. The advantages offered by the ARD9800 are many, including "near FM" quality audio and the likelihood that the digital format can operate at lower signal levels than analog SSB.

The AOR ARD9800 is a small unit that requires only two connections to an existing transceiver, one through the radio's microphone input port and the other from the rig's "speaker out" jack to the ARD9800's audio input port. No modifications to the radio are necessary. The owner may use the microphone provided with the ARD9800 or wire his or her own mic to work through it.

The impressive ARD9800 uses the open G4GUO digital protocol, a complex digital format that incorporates elements of phase shifting to transmit the digital signal. Operators with ARD9800s will not have to place their units in the digital mode to receive digital signals, since the unit will automatically detect the digital format, decode it, and pass it to the self-contained speaker or to an external speaker. This allows operators to listen for both conventional analog signals, as well as digital ones. To transmit in digital mode, the operator simply moves a switch on the ARD9800 front panel. Setting the switch back to the analog mode allows "normal" use of the transceiver.

The ARD9800 is easy to install and operate; you simply solder a connector to a mic input cable that matches the mic inputs for your radio. The ARD9800 is then connected to the mic input, the speaker output, and a 12 VDC power source.

Besides voice communications, with an optional memory board the ARD9800 also can be used to transfer still images and even computer files. The unit also has a computer connection port, along with a provided serial connection cable, to allow controlling ARD9800 parameters and to aid in file transfer.

Included is the modem unit, a microphone, a power cable for connection to 12 VDC, a computer connection cable, and a conventional 8-pin round mic input connector. Options include a power cube, the memory expansion board, and custom-made mic cables. Manufacturer's suggested retail price (MSRP) is $549 USD.

For more information, contact AOR U.S.A., Inc., 20655 S. Western Ave., Suite 112, Torrance, CA 90501 (310-787-8615; e-mail: <info@aorusa.com>; web: <http://www.aorusa.com>).

West Mountain RIGrunner, with a Twist. In July 2002 we highlighted the RIGrunner 4012, an

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e-mail: <w8fx@cq-amateur-radio.com>

Photo A– Here's a truly exciting, if not revolutionary, new accessory—AOR's ARD9800 Fast Radio Modem. With it, you can use a conventional voice transceiver for digital voice communications, data, and images, while maintaining analog capabilities. Details are in the text of this month's column. Stay tuned for a full review in an upcoming issue. (Photo courtesy AOR USA)

Photo B- The West Mountain Radio RIGrunner 4010S DC Power Panel incorporates a solid-state FET on/off switching system. The FET switching is not the only innovation. The "twist" is that you can control your entire station with the power button on your favorite piece of equipment. (Photo courtesy West Mountain Radio)

"intelligent DC power panel" that, according to the manufacturer, is the most convenient way to connect all of your 12-volt equipment to a power source. West Mountain Radio has done it again with a new and innovative product. The RIGrunner 4010S DC Power Panel (photo B) incorporates a solid-state FET on/off switching system that performs without compromising the performance of the standard RIGrunner. The FET switching is not the only innovation: The "twist" is that you can control your entire station with the power button on your favorite piece of equipment! You simply plug it in to the RIGrunner's "master" outlet.

RIGrunner uses the ARES, RACES, and RSGB standard PowerPole connectors. These connectors exhibit very low voltage drop, as does the RIGrunner itself. Most mechanical switches are designed only for low-current, high-voltage AC operation, and good high- current DC switches are simply not available. The RIGrunner uses an FET switch designed for 12 VDC operation at up to 100 amps, with over-current and over-temperature protection. The FET, incidentally, has a typical "on resistance" of only .005 ohms!

Whatever you plug in to the "master" power jack will automatically control nine PowerPole switched outlets, each rated at up to 40 amps with a maximum of 40 amps for the entire RIGrunner. The current sensing for this circuit does not use a separate sensing resistor. Instead, it actually senses the voltage drop across the fuse that protects the master outlet!

Using the fuse has two advantages: no additional voltage drop and increased sensitivity with low current devices. Thus,

Fig. 1– The Tigertronics™ SignaLink™ Model SL-1+ defines a new standard in multimode sound-card interfaces; dozens of signal modes are supported. Check out the unit's many features and specs on the Tigertronics website at <http://www.tigertronics.com>, which is shown here. (Graphic from the Tigertronics website)

Photo C– The tiny MFJ-902 Travel Tuner is billed by MFJ as the world's smallest 150 watt, 80–10 meter antenna tuner, one which fits in the palm of your hand! Easy to pack away in your briefcase, suitcase, backpack, or glove compartment, it's both compact and lightweight. (Photo courtesy MFJ Enterprises)

even a QRP rig should control the automatic switching. A toggle switch is provided to select among "off," "auto" and "all on" so that you can use your other equipment independent of whatever is plugged into the "master" outlet.

The new RIGrunner 4010S, which we described here, sells for $109.95 plus shipping. For more information, contact West Mountain Radio, 18 Sheehan Avenue, Norwalk, CT 06854 (203-853-8080; e-mail: <sales@westmountainradio.com>; on the web: <http://www.westmountainradio.com>).

Tigertronics™ SignaLink™ Model SL-1+. The SignaLink Model SL-1+ (see fig. 1) is the latest addition to the SignaLink™ line of sound-card-radio interfaces from Tigertronics. The SL-1+ provides all the features of the original SignaLink, plus many new advanced features and capabilities of its own. With full support for virtually all radio mic, data, and ports, the SL-1+ can be attached to the back of the radio, so you can keep your microphone plugged in.

Photo D– Here's the rear panel of the diminutive new MFJ-902 Travel Tuner. With it, you can operate anywhere, anytime. It's great for DXpeditions or Field Day, and it's tiny enough to slide in your back hip pocket. (Photo courtesy MFJ Enterprises)

This permits easy switching from phone to digital operation.

Besides supporting all available digital modes, the SL-1+ supports the latest voice modes, such as internet repeater linking (for example, Echolink), remote base, and voice keyer operation. Performance has been optimized by increasing the sensitivity of the Auto-PTT™ circuit, and by the addition of a front-panel-selectable variable transmit delay. This delay is factory-set for typical voice applications, but it can easily be adjusted to suit your needs. The SL-1+ comes fully assembled and tested.

Some of the unit's many features include: operation using all available digital and voice modes; no serial port required; improved Auto-PTT sensitivity; complete radio isolation; adjustable RX and TX levels; variable transmit delay; compatibility with virtually all radio mic, data, and accessory ports; selectable fixed or variable transmit "hang time" delay; external speaker support; flexible power requirements; front-panel switches and indicators; and availability of assembled radio cables. Every SL-1+ is supplied with a detachable radio cable, a software CD, a power plug, jumper wires to configure the unit for your radio, and a printed installation manual.

Contact Tigertronics, 400 Daily Lane, P.O. Box 5210, Grants Pass, OR 97527 (1-800-822-9722; e-mail: <sales@tigertronics.com>; on the web: <http://www.tigertronics.com>). Full technical details on the SL-1+ are on the firm's well-designed and highly informative website, as shown in fig. 1.

Antennas and Accessories

World's Smallest 150 Watt, 80–10 Meter Antenna Tuner de MFJ. The new MFJ-902 Travel Tuner (photos C and D) is billed by MFJ as the world's smallest 150 watt, 80–10 meter antenna tuner—one which fits in the palm of your hand! In fact, it measures a very compact 4.5"W × 2.25"H × 3"D, and it tips the scales at about one pound. The MFJ-902, priced at $69.95, is compact-built to support radios such as the ICOM IC-706MKIIG, Yaesu FT-100, Kenwood TS-50, and other small rigs with a built-in SWR meter. The verdict: great stocking stuffer potential, indeed!

Despite its small size, the Travel Tuner isn't a pipsqueak inside. Real air-variable capacitors are used, not plastic ones. It also uses three stacked iron-powder toroids to handle the power and provide plenty of matching range. The unit, designed to use anywhere with any HF transceiver and any coax-fed or random-wire antenna, is said to be great for base, backpacking, and mobile operation. It even includes a tuner bypass switch.

The unit's diminutive size makes it suitable for carrying in a briefcase, suitcase, backpack, or glove compartment, or using at the desk. Operate anywhere, anytime with a quick, easy setup, especially welcome for DXpeditions or Field Day use. It's tiny enough to slide in your back hip pocket.

For additional information or a free catalog, contact MFJ Enterprises, Inc., 300 Industrial Park Road, Starkville, MS 39759 (1-800-647-1800; e-mail: <mfj@mfjenterprises.com>; on the web: <http://www.mfjenterprises.com>).

The Ham's Dime Store: Tower Electronics. Billed as "the ham's dime store & wholesaler to the world since 1978," Tower Electronics provides an online wholesale catalog that features a full range of RF connectors, adapters, and cables to meet most amateur and commercial needs. The firm is operated by Scott Cole, KB9AMM, and Jill Cole, KB9PZF.

The Tower Electronics online catalog is divided into six well-organized "pages." They feature parts and products such as PL-259, Motorola and N connectors; Coax Seal®; universal adapter kits; TNC, mini-UHF, SMA, F, and BNC connectors; video splitters; audio and microphone plugs; telephone jacks; DC power cords and adapters; soldering aids; antenna mounts and adapters; coaxial cable; DC wire; antenna wire; antennas; and more.

Contact Tower Electronics, P.O. Box 12631, Green Bay, WI 54307-2631 (1-800-662-3422; e-mail: <pl-259@juno.com>; on the web: <http://www.pl-259.com>). You can request a paper catalog be mailed to you simply by providing your callsign on the website.

Software and Computers

Log Window(s) is Back! According to Les Scofield, W4SCO, proprietor of SCO, Inc., Log Windows (LW), an excellent and well-known amateur logging program, was removed from the market in November 2002. This was over a dispute with Microsoft® about who owned the word "Windows." However, in January 2003 Microsoft agreed to let SCO continue with LW if they dropped the "S" from the end of the program's name. Thus, Les decided to rename the software Log Window©, and to sell, develop, and support the program directly rather than through a contractor.

It took several months of work, but Log Window© 4.03.04 has been re-

Fig. 2– Express Technologies offers a free time-zone and weather web page you can dial up. Known as the Special Time Zone Webpage, it's for those who need to check time and weather information worldwide. Here's an sample page we pulled up to easily check out Adelaide, Australia's time and weather. Go to <http://www.exptech.com/timezone/citylisting.asp>. (Graphic from the Special Time Zone Webpage)

leased (the version number may be higher by the time you receive this issue). The program is available for download on the Log Window© website at <http://www.logwindow.com> as a free upgrade to all version 4.x users of Log Windows©. A fee of $40 is assessed for all version 3.x users.

Les says that version 4.03.04 is essentially the same program as 4.03.03, the last release of Log Windows©. There is a new key encryption scheme and several bug fixes contained in the new version, so all LW users should upgrade. Also, the free Log Window© upgrade offer is good through the end of 2003.

Contact Les Scofield, W4SCO, at SCO, Inc., Attn: Log Window©, 4426 Hugh Howell Rd. #B-369, Tucker, GA 30084 (e-mail: <logwin@mindspring.com>; on the web: <http://www.logwindow.com>). Complete program features are described on the website.

N3FJP Software Announcements. We often have highlighted N3FJP's Amateur Radio Software Site, where many useful shareware and freeware amateur radio programs are offered. You'll find the site, designed and operated by Scott Davis, N3FJP, at <http://www.n3fjp.com>.

Recently, Scott told us that N3FJP's PA QSO Party Log 1.0 software now is available. Like the rest of his contesting software, the new program performs all the functions you have come to expect. These include easy, intuitive program operation; dupe-checking, including partials; listing of all contacts; generation of CW via your PC's communication port and the playing of WAV files for phone automation; writing files for log submission; use of the ADIF export file format; DX spotting via Telnet, your TNC, or AGW Packet Engine; interfacing with most radios; and many current statistics and visual displays.

Like all of Scott's software, the program is included with his $39 and $49 (with CD) software registration. Scott also tells us that several of his other programs and datasets have been updated; check N3FJP's Amateur Radio Software Site for details.

For more details, contact G. Scott Davis, at 118 Glenwood Rd., Bel Air, MD 21014-5533 (e-mail: <snkdavis@aol.com>; <http://www.n3fjp.com>).

New on the Net

New Time Zone and Weather Page from Express Technologies. Express Technologies Corporation probably is best known for its World Watch™ software for desktop PCs, Palm™-powered handhelds, and Pocket PCs. Its popular World Watch software continually provides you with the exact time in any location around the world, using a variety of maps.

Though not specifically designed for radio amateurs, World Watch shows, at a glance, the correct time in all 24 standard time zones and all 16 nonstandard time zones, illuminates the parts of the world that are under daylight, and even shows weather conditions. Your columnist has used the desktop PC version for about four years and wouldn't be without it.

Now Express Technologies offers a free time-zone and weather page you can dial up without installing special software on your PC. Known as the Special Time Zone Webpage (fig. 2), it's derived from the company's World Watch Map Generator program. The online page was created for those who need to check time and weather information; to access the page, go to <http://www.exptech.com/timezone/citylisting.asp>.

For more information on World Watch products, contact Express Technologies Corporation, 400 Reid Street, Suite O, De Pere, WI 54115 (1-800-654-9548; e-mail: <info@exptech.com>; <http://www.exptech.com>).

World Time Server. The free World Time Server offers up the correct time at <http://www.worldtimeserver.com>. The service, which isn't brand new (but is to me), provides accurate local times, even making real-time adjustments for Daylight Savings Time. With its database listing of over 380 locations around the globe, no matter what time zone a country or city is located in, the site provides an excellent resource for determining any time, anywhere. The page also offers a link for you to download the freeware Atomic Clock Sync utility to help you keep your PC up to date with the correct time.

The website also offers a free future event planner which lets you calculate the time in any given country on a specific date of your choosing. To use the planner, you first tell it the place at which the event will take place, or at least the location on which you want to base your time conversion calculations. Then, you select the date and time that your event will be taking place, click on the "submit query" button, and select a second location to convert to. The program then shows you the future date and time at the second location. For a fee you can subscribe to the current database and guide for use on your own website or in your own software programs.

The World Time Server web page is offered by Chaos Software Group, Inc., which also offers the popular time-management software, Time & Chaos, among other software products. For more information, contact Chaos Software Group, Inc., P.O. Box 835540, Richardson, TX 75083-5540 (972-495-6724; or on the web: <http://www.chaossoftware.com>).

From the Bookshelf

Bob Locher's *Complete DX'er* is Back. First published in 1983, Bob Locher's *The Complete DX'er* was sadly missed when the second edition sold out, since many considered it the most popular DX book ever written. The new third edition took over three years to complete, and you'll quickly appreciate the effort Bob has put into updating it.

The new edition has been revised to take into account the realities of 21st century DXing. Written in an engaging personal narrative style, *The Complete DX'er* is as entertaining as it is informative. It's both the highly enjoyable diary of a serious DX chaser, and at the same time full of lessons for DXing success.

If you're new to amateur radio, the book will tell you most everything you need to know about the mysterious world of DX, and if you are an old denizen of the "DX dogpiles" you will learn some new tricks. Too, a pleasant surprise in the third edition is the attention devoted to QRP DX.

There are 26 chapters in the 223-page book; it's all there in a very palatable format. The third edition, which is likely to confirm the book's status as an all-time classic, is priced at $19.95 plus $3 domestic ($5 outside the U.S.) s/h.

Incidentally, the revised book is published by Bob's own Idiom Press (derived from "I Did It On My Own"), established in 1982 not only as a publishing vehicle, but as a manufacturer of CW keyers, rotor enhancements, audio filters, and other products. In fact, thousands of Logikey CW keyers and kits from Idiom Press have found their way to CW operators worldwide.

Contact Idiom Press, P.O. Box 1025, Geyserville, CA 95441(707-431-1286; e-mail: <Sales@IdiomPress.com>; web: <http://www.idiompress.com>).

Note: The Complete DX'er also is distributed by CQ (1-800-853-9797; web: <http://www.cq-amateur-radio.com) and Marshall Emm, N1FN, through his firms, Morse Express and Oak Hills Research. For purchase information, contact Morse Express, 2460 S. Moline Way, Aurora, CO 80014-1833 (1-800-238-8205; e-mail: <nifn@MorseX.com>; web: <http://www.MorseX.com/books>). Marshall also distributes books written by *CQ*'s own prolific columnist Dave Ingram, K4TWJ, as well as other books and publications on a variety of Morse-related topics. In addition, see this month's "World of Ideas" column for information on the Morse Express 2003 Christmas Key.

Wrap-Up

That's all for this time, gang. Next time, more "What's New." See you then.

Overheard: In most of life's endeavors, not to worry if you're moving rather slowly. But do be very concerned if you're standing absolutely still!

73, Karl, W8FX

MFJ *Speech Intelligibility* Enhancer

. . . makes barely understandable speech highly understandable!

MFJ-616
$169.95

"What did you say?" Can you hear but . . . just can't always understand everything people are saying?

As we get older, high frequency hearing loss reduces our ability to understand speech. Here's why . . .

Research shows that nearly *half* the speech intelligibility is contained in 1000 to 4000 Hz range, but contains a miniscule 4% of total speech energy.

On the other hand, the low frequencies, 125 to 500 Hz have most of the speech energy (55%) but contribute very little to intelligibility -- only 4%.

To dramatically improve your ability to understand speech, you must:

First, drastically increase the speech energy above 500 Hz, where 83% of the speech intelligibility is concentrated.

Second, drastically reduce speech energy below 500 Hz where only 4% of speech intelligibility lies.

The MFJ-616 splits the audio speech band into four overlapping octave ranges centered at 300, 600, 1200 and 2400 Hz. You can boost or cut each range by nearly 20 dB.

A balance control and separate 2½ Watt amplifiers let you equalize perceived loudness to each ear so both ears help.

By boosting high and cutting low frequencies and adjusting the balanced control, speech that you can barely understand become highly understandable!

Even if you *don't* have high frequency hearing loss, you'll dramatically improve your ability to understand speech. You'll get an edge in contesting and DXing and enjoy ragchewing more.

Here's what *QST* for April, 2001 said . . . *"I expected a subtle effect at best, but I was astonished . . . The result was remarkably clean, understandable speech without hissing, ringing or other strange effects . . . made a dramatic improvement . . ."*

Immuned to RFI. Has phone jack, on/off speaker switch, 2 inputs, bypass switch. 10Wx2½Hx6D". Needs 12 VDC.

MFJ-1316, $19.95. For 110 VAC operation. Provides 12 VDC/1.5 Amps.

MFJ-72, $58.80. *All-in-one MFJ-616 Accessory Pack.* Includes MFJ-392 headphones, two MFJ-281 speakers and MFJ-1316 power supply. ***Save $7!***

Try it for 30 Days

Order from MFJ and try it -- No obligation. If not delighted, return it within 30 days for refund less shipping.

MFJ Contest Voice Keyer

Transformer-coupled -- No RFI, hum or feedback . . . 75 seconds total, 5-messages . . . Records received audio . . .

MFJ-434
$179.95

Let this *new* microprocessor controlled MFJ *Contest Voice Keyer*™ call CQ, send your call and do contest exchanges for you in your own natural voice!

Store frequently used phrases like "CQ Contest this is AA5MT", "You're 59" . . . "Qth is Mississippi" . . . Contest by pressing a few buttons and save your voice.

Record and play back five natural sounding messages in a total of 75 seconds. Uses *eeprom* -- no battery backup needed.

You can repeat messages continuously and vary the repeat delay from 3 to 500 seconds. Makes a great voice beacon and calling CQ is *so* easy.

You can also record and play back off-the-air signals -- great help if you didn't get it right the first time! No more "*Please repeat*".

A playing message can be halted by the *Stop Button*, your microphone's PTT/VOX, remote control or computer.

Has jack for remote or computer control (using CT, NA or other program). Lets you select, play and cancel messages.

Your mic's audio characteristics do not change when your MFJ-434 is installed.

All audio lines are RF filtered to eliminate RFI, audio feedback and distortion. An audio isolation transformer totally eliminates hum and distortion caused by ground loops.

It's easy to use -- just plug in your 8 pin mic and plug the MFJ-434 cable into your transceiver. Internal jumpers let you set it to your rig. Use your mic or its built-in mic for recording.

Built-in speaker-amplifier. Speaker/phone jack. Use 9 Volt battery, 9-15 VDC or 110 VAC with optional MFJ-1312D, $14.95. 6½Wx2½Hx6½D in.

MFJ-73, $29.95. MFJ-434 Remote Control with cable.

60 dB Null *wipes out* noise and interference

MFJ-1026
$179.95

Wipe out noise and interference *before* it gets into your receiver with a 60 dB null!

Eliminate all types of noise -- severe power line noise from arcing transformers and insulators, fluorescent lamps, light dimmers, touch controlled lamps, computers, TV birdies, lightning crashes from distant thunderstorms, electric drills, motors, industrial processes . . .

It's *more effective* than a noise blanker! Interference much stronger than your desired signal can be completely removed without affecting your signal.

It works on *all modes* -- SSB, AM, CW, FM -- and frequences from BCB to lower VHF.

You can null out strong QRM on top of weak rare DX and then work him! You can null out a strong local ham or AM broadcast station to prevent your receiver from overloading.

Use the MFJ-1026 as an *adjustable phasing network.* You can combine two antennas to give you various directional patterns. Null out a strong interfering signal or peak a weak signal at a push of a button.

Easy-to-use! Plugs between transmitting antenna and transceiver. To null, adjust amplitude and phase controls for minimum S-meter reading or lowest noise. To peak, push reverse button. Use built-in active antenna or an external one. MFJ's exclusive *Constant Amplitude Phase Control*™ makes nulling easy.

RF sense T/R switch automatically bypasses your transceiver when you transmit. Adjustable delay time. Uses 12 VDC or 110 VAC with MFJ-1312D, $14.95. 6½x1½x6¼ in.

MFJ-1025, $159.95. Like MFJ-1026 less built-in active antenna, use external noise antenna.

MFJ *tunable* Super DSP filter

MFJ-784B
$249.95

Only MFJ gives you *tunable* and *programmable* "brick wall" DSP filters.

You can continuously *tune* low pass, high pass, notch and bandpass filters and continuously *vary* bandwidth to pinpoint and eliminate interference.

Only MFJ gives you 5 factory pre-set and 10 programmable pre-set filters you can customize. **Automatic** notch filter searches for and eliminates multiple heterodynes. Advanced adaptive noise reduction silences background noise and QRM.

Free MFJ Catalog
Visit: http://www.mfjenterprises.com or call toll-free 800-647-1800

• 1 Year *No Matter What*™ warranty • 30 day money back guarantee (less s/h) on orders direct from MFJ

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300 Industrial Pk Rd, Starkville, MS 39759 **PH:** (662) 323-5869
Tech Help: (662) 323-0549
FAX:(662)323-6551 8-4:30 CST, Mon.-Fri. ***Add shipping.***

http://www.mfjenterprises.com for instruction manuals, catalog, info

Happy Holiday Treats for Hams

BY DAVE INGRAM,* K4TWJ

Season's Greetings to our amateur radio friends, fans, and followers near and far. May all the joys of the holidays brighten your life and may your shack overflow with many special goodies to enjoy during the months (and years!) ahead. Yes, and with those good wishes foremost in mind, we once again make our traditional December column diversion to highlight neat treats for the world's greatest folks—today's radio amateurs. We did some heavy-duty hunting and digging to find this year's collection of items (several of which are debuting right here for the first time), so get comfortable and enjoy the tour. If you are moved to purchase a few featured items, incidentally, we have included addresses, telephone numbers, and websites for your ordering convenience. Now let's check out some totally irresistible, yet quite affordable items guaranteed to please everyone, starting with an exciting new mini-rig!

Photo 1– Nothing makes the holidays more exciting than a new transceiver, especially when it is small and affordable, like this just-announced Elecraft KX-1. The little delight sports unique design with top-mounted controls, features galore, and up to 4 watts output on 20, 40, and 30 meters.

New Elecraft KX-1 Transceiver

Would you like to be the first (ham) kid on the block with a new toy (rig) this Christmas? (Need we even ask?) Elecraft, the innovative kit rig company that brought us the popular K1 and K2 transceivers, has just announced a new KX-1 transceiver, and it promises to be a really hot item among amateurs worldwide (photo 1). The little gem measures only 1.2"H × 5.3"W × 3.2"D, works 20 and 40 meters CW (plus 30 meters as an option) with 2 to 4 watts output, and sports top-mounted controls so that it sits flat on a book or travel bag for on-the-spot use. It is a fancy little tyke, too, with direct digital synthesized VFO, three-pole variable bandwidth filter, LED plus Morse code frequency readout, RIT, built-in keyer, and an internal battery case that holds six AA cells. Options include an internal automatic antenna tuner and a plug-in paddle. Add a thin wire antenna or small Maldol whip, and you have a complete pocket-size station ready for traveling or vacationing in style. It's a winner!

The KX-1 is a kit you build, but assembly is a snap—even for first-time builders. You just mount components in their marked places, solder connections as you go, and then slip the PC board into

*4941 Scenic View Drive, Birmingham, AL 35210
e-mail: <k4twj@cq-amateur-radio.com>

Photo 2– Great-sounding audio and blow-away good looks to boot! Heil Sound's new broadcast-station-grade Heritage mic also works like a champ with modern SSB transceivers and adds real radio pizzazz to a setup. Even the King, Elvis himself, would love this masterpiece!

Photo 3– One of the most authentic American keys ever made was the famous J-38, and this miniature replica made in limited quantity by Lee Hutchins, KA6IRL, brings it back to life in an extra classy way. It is 1.3 inches wide by 2.2 inches long and is available with a black-plastic or mahogany-wood base just like the one you used as a Novice.

Photo 4– The 2003 Morse Express Christmas key is a gold-plated, miniature brass telegraph key that is very usable for sending code and also will double nicely as a Christmas tree ornament.

its case, step through an easy alignment, and start enjoying. The KX-1 is destined to sell like crazy (especially during the holidays), so ordering early is encouraged—and it also gives you maximum time to enjoy the KX-1 after assembly. To order one or get more information, contact Elecraft at P.O. Box 69, Aptos, CA 95001, telephone 831-662-8345, or go to <www.elecraft.com>. Direct-from-manufacturer price is $279.

Awesome Accessories

Looking for some blowout-terrific station accessories to really brighten your life in the amateur radio lane? Check out the fantastic new microphone, keys, and key fob shown in photos 2, 3, 4, and 5. Oh, what heartthrobs!

The microphone is Bob Heil's new Heritage model (photo 2), and it is a modern reproduction of those flashy big-head mics used by Rock 'n Roll singers and radio stations of the 1950s and '60s. It has a dazzling chrome finish with blue grill cloth, and the cloth is also acoustically transparent foam that functions as a built-in windscreen. The Heritage is fitted with a full-range, mag-

Photo 6– This larger crystal cube also has name and call letters engraved inside. It sits on a polished wood base with five LEDs illuminating the letters and looks terrific. Photographing these crystal cubes is akin to shooting pictures of a dozen mirrors in sunlight—nigh impossible—so check them out further at <www.scilux.com>.

nificent-sounding element for professional studio or broadcast station use, and you adapt it for ham use with an optional prewired Heil cable to plug into your Kenwood, Yaesu, or ICOM transceiver. Then you use your rig's built-in audio equalizer to tailor the full response to your particular voice, just like the pros. Also, by changing equalizer settings you can quickly change between "glamour" and DX sounds, as desired. If you want to add some real radio pizzazz and incredibly great-sounding audio to your station, this mic is the answer! It is available from amateur radio dealers nationwide or direct from the audio master, K9EID, at Heil Sound Ltd., 5800 North Illinois, Fairview Heights, IL 62208, telephone 618-257-3000, or via <www.heilsound.com>. While checking on the microphone, incidentally, take a look at Heil's new noise-canceling earphones. Tiny microphones around each earpiece pick up nearby noises, amplify and invert the noise 180 degrees, and then feed it back to the earphones to cancel the noise. The thing is a killer! You can even copy DX while wearing them and standing beside a Mack truck.

Our CW friends and fans of the fabulous '50s have also been remembered in this year's retro radio rally with a special little key, the miniature J-38 replica shown in photo 3. This palm-size beauty is comprised of over 30 tiny handmade pieces, and except for its reduced size, it is identical to those dear little pumpers many of us used during our early days in amateur radio. The upper mechanism is solid brass polished to a jewelry-like finish, and it is available with a glazed black-plastic or polished mahogany base to fit your preference. The key is being made by Lee Hutchins, KA6IRL, of 23 Linda Dr., Oroville, CA 95966, telephone 530-533-2872, or via <www.qrpj38.com>. Lee calls it a QRP J-38, but I checked it out with my 100 watt transceiver and can assure you it works with big rigs too—even those with high-power amplifiers.

In what is becoming a ham radio holiday tradition, Morse Express has released its 2003 Christmas Key (photo

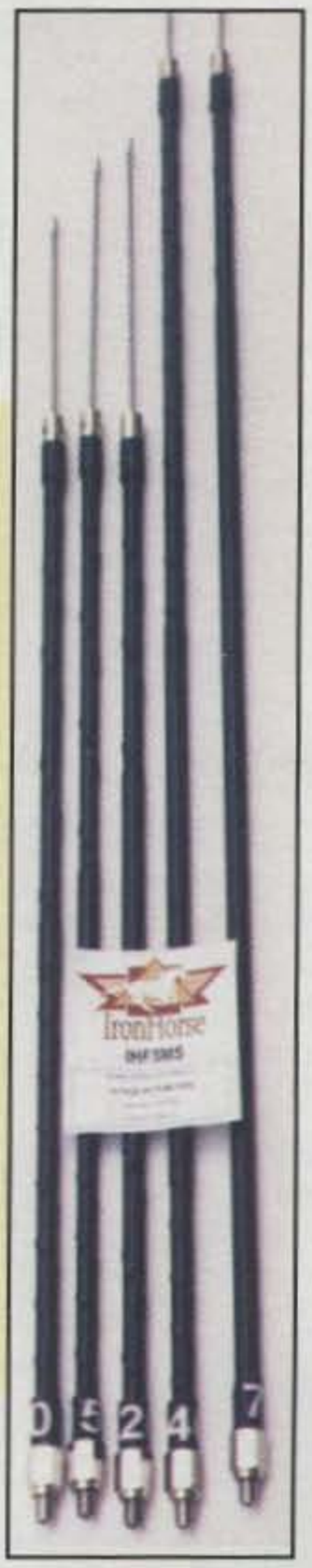

Photo 7– Do you like HF mobiling, but dislike garaging entanglements with tall antennas? Take a look at the new Iron Horse mini-antennas. They are only slightly taller than a car's regular antenna and fit in a standard 3/8-24 thread mount. Add their optional quick disconnects, and changing bands or switching from short to tall antennas for city or highway use is a cinch.

Photo 5– Check out this remarkable ham treat for your pocket, friends. It is a key ring with key fob that has your call letters laser-cut in a 1.25" × .75" section of crystal glass for a "suspended in air" look. The fob is custom made by Scilux company.

SAVE BIG ON ANTENNAS, TOWERS & CABLE

TELESCOPING ALUMINUM TUBING

DRAWN 6063-T832

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

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

CUSHCRAFT ANTENNAS

13B2/A148-10S	$159/89
A270-6S/A270-10S	$79/99
A3S/A4S	$459/549
A50-3S/5S/6S	$99/169/269
A6270-13S	$199
AR2/ARX2B	$55/69
AR270/AR270B	$89/99
R6000/R8	$309/459
X7/X740	$649/269
XM240	$679

Please call for more Cushcraft items.

FORCE 12–MULTIBAND

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

Please call for more Force 12 items.

TRYLON "TITAN" TOWERS

SELF-SUPPORTING STEEL TOWERS

T200-64	64', 15 square feet	$1099
T200-72	72', 15 square feet	$1299
T200-80	80', 15 square feet	$1499
T200-88	88', 15 square feet	$1769
T200-96	96', 15 square feet	$2049
T300-88	88', 22 square feet	$1989
T400-80	80', 34 square feet	$1899
T500-72	72', 45 square feet	$1799
T600-64	64', 60 square feet	$1699

Many more Trylon towers in stock!

BENCHER / BUTTERNUT

Skyhawk, Triband Beam	$1129
HF2V, 2 Band Vertical	$249
HF5B, 5 Band Minibeam	$359
HF6VX, 6 Band Vertical	$339
HF9VX, 9 Band Vertical	$369
A1712, 12/17m Kit	$54
CPK, Counterpoise Kit	$129
RMKII, Roof Mount Kit	$159
STRII, Roof Radial Kit	$125
TBR160S, 160m Kit	$139

More Bencher/Butternut–call

M2 VHF/UHF ANTENNAS

144–148 MHz

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

420–450 MHz

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

Satellite Antennas

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

ROHN TOWER

25G/45G/55G	$89/189/239
25AG2/3/4	$109/109/119
45AG2/4	$209/225
AS25G/AS455G	$39/89
BPC25G/45G/55G	$75/99/110
BPL25G/45G/55G	$85/109/125
GA25GD/45/55	$68/89/115
GAR30/GAS604	$35/24
SB25G/45/55	$39/89/109
TB3/TB4	$85/99

Please call for more Rohn prices.

US TOWER

MA40/MA550	$849/1399
MA770/MA850	$2359/3649
TMM433SS/HD	$1139/1379
TMM541SS	$1499
TX438/TX455	$979/1579
TX472/TX489	$2459/4579
HDX538/HDX555	$1269/2269
HDX572MDPL	$5899

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

COMET ANTENNAS

GP15, 6m/2m/70cm Vertical	$149
GP6, 2m/70cm Vertical	$139
GP9, 2m/70cm Vertical	$179
B10NMO, 2m/70cm Mobile	$36
SB14, 6m/2m/70cm Mobile	$59
SBB224NMO,2m/220/70cm	$69
SBB2NMO, 2m/70cm Mobile	$39
SBB5NMO, 2m/70cm Mobile	$55
SBB7NMO, 2m/70cm Mobile	$75
UHV4/UHV6	$109/135

Much more Comet in stock–call.

M2 ANTENNAS

50–54 MHz

6M5X/6M7JHV	$209/269
6M2WLC/6M9KHW	$459/499

10/12/15/17/20m HF

10M4DX, 4 Element 10m	$399
12M4DX, 4 Element 12m	$399
15M4DX, 4 Element 15m	$449
17M3DX, 3 Element 17m	$399
20M4DX, 4 Element 20m	$529

More M2 models in stock–please call.

GLEN MARTIN ENGINEERING

Hazer Elevators for 25G

H2, Aluminum Hazer, 12 sq ft	$359
H3, Aluminum Hazer, 8 sq ft	$269
H4, HD Steel Hazer, 16 sq ft	$339

Aluminum Roof Towers

RT424, 4 Foot, 6 sq ft	$159
RT832, 8 Foot, 8 sq ft	$239
RT936, 9 Foot, 18 sq ft	$389
RT1832, 17 Foot, 12 sq ft	$519
RT2632, 26 Foot, 9 sq ft	$869

UNIVERSAL ALUMINUM TOWERS

4-40'/50'/60'	$539/769/1089
7-50'/60'/70'	$979/1429/1869
9-40'/50'/60'	$759/1089/1529
12-30'/40'	$579/899
15-40'/50'	$1019/1449
23-30'/40'	$899/1339
35-30'/40'	$1019/1569

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

DIAMOND ANTENNAS

D130J/DPGH62	$79/139
F22A/F23A	$89/119
NR72BNMO/NR73BNMO	$39/54
NR770HBNMO/NR770RA	$55/49
X200A, 2m/70cm Vertical	$129
X500HNA/X700HNA	$229/369
X510MA/510NA	$189/189
X50A/V2000A	$99/149
CR627B/SG2000HD	$99/79
SG7500NMO/SG7900A	$75/112

More Diamond antennas in stock.

MFJ

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

Big MFJ inventory–please call

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	Ple ase 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

TOWER HARDWARE

3/8"EE / EJ Turnbuckle	$11/12
1/2"x9"EE / EJ Turnbuckle	$16/17
1/2"x12"EE / EJ Turnbuckle	$18/19
3/16" / 1/4" Big Grips	$5/6

Please call for more hardware items.

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5 FT x .12" / 5 FT x .18"	$35/59
10 FT x .18" / 11 FT x .12"	$129/80
16 FT x .18" / 17 FT x .12"	$179/129
20 FT x .25" / 21 FT x .18"	$315/235
22 FT x .12" / 24 FT x .25"	$149/379

GAP ANTENNAS

Challenger DX	$289
Challenger Counterpoise	$29
Challenger Guy Kit	$19
Eagle DX	$299
Eagle Guy Kit	$29
Titan DX	$329
Titan Guy Kit	$29
Voyager DX	$409
Voyager Counterpoise	$49
Voyager Guy Kit	$45

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

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

HUSTLER ANTENNAS

4BTV/5BTV/6BTV	$129/169/199
G6-270R, 2m/70cm Vertical	$169
G6-144B/G7-144B	$109/179

Hustler Resonators in stock–call.

ANTENNA ROTATORS

M2 OR-2800P	$1249
Yaesu G-450A	$249
Yaesu G-800SA/DXA	$329/409
Yaesu G-1000DXA	$499
Yaesu G-2800SDX	$1089
Yaesu G-550/G-5500	$299/599

ROTATOR CABLE

R62 (#18)	$.32/ft.
R81/82	$.25/ft./.39/ft.
R84	$.85/ft

PHILYSTRAN GUY CABLE

HPTG1200I	$.45/ft
HPTG2100I	$.59/ft
PLP2738 Big Grip (2100)	$6.00
HPTG4000I	$.89/ft
PLP2739 Big Grip (4000)	$8.50
HPTG6700I	$1.29/ft
PLP2755 Big Grip (6700)	$12.00
HPTG11200	$1.89/ft
PLP2758 Big Grip (11200)	$18.00

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• All models supllied with hinged T-base, anchor bolts, hand winch (except motor drive models), top plate, and rotor plate.

• MDP & MDPL models include motor drive

• Options include coax arms, raising fixtures, masts, motor drives, and more!

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TX SERIES HEAVY DUTY CRANK-UP TOWERS					
TOWER MODEL	MAX. HT.	MIN. HT.	WT. (LBS.)	LIST PRICE	SALE PRICE
TX-438	38'	21'6"	355	$1,269	$979
TX-455	55'	22'	670	$1,915	$1,579
TX-472	72'	22'8"	1040	$3,147	$2,459
TX-472MDPL	72'	22'8"	1210	$5,064	$3,999
TX-489	89'	23'4"	1590	$5,475	$4,579
TX-489MDPL	89'	23'4"	1800	$8,212	$6,429

HDX SERIES CRANK-UP TOWERS

• Heavy duty, handles 44.7 square feet of antenna load at 50 MPH, 35 square feet at 70 MPH.

• All models supllied with hinged T-base, anchor bolts, hand winch (except motor drive models), top plate, and rotor plate.

• MDPL models include motor drive

• Options include coax arms, raising fixtures, masts, motor drives, and more!

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HDX SERIES HEAVY DUTY CRANK-UP TOWERS					
TOWER MODEL	MAX. HT.	MIN. HT.	WT. (LBS.)	LIST PRICE	SALE PRICE
HDX-538	38'	21'6"	600	$1,642	$1,269
HDX-555	55'	22'	870	$2,874	$2,269
HDX-572MDPL	72'	22'8"	1600	$7,528	$5,899
HDX-589MDPL	89'	23'8"	2440	$9,855	$7,699
HDX-689MDPL	89'	23'8"	3450	$19,039	$14,999
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• Handles up to 22 square feet of antenna load. (See chart below)

• MDP & MDPL models include motor drive.

• All models supllied with anchor bolts, load-actuated hand winch, and house bracket.

• Options include coax arms, raising fixtures, motor drives, self-supporting and rotator bases, remote control panel, and more!

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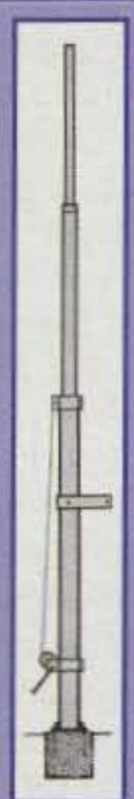

MA SERIES CRANK-UP MASTS							
MAST MODEL	MAX. HT.	MIN. HT.	WT. (LBS.)	50 MPH (sq. ft.)	70 MPH (sq. ft.)	LIST PRICE	SALE PRICE
MA-40	40'	21'6"	242	16.5	6.8	$1,007	$849
MA-550	55'	22'1"	435	22	9	$1,704	$1,399
MA-550MDP	55'	22'1"	620	22	9	$3,258	$2,729
MA-770	71'	22'10"	645	15.5	5.5	$2,810	$2,359
MA-770MDPL	71'	22'10"	830	15.5	5.5	$4,445	$3,729
MA-850MDPL	85'	23'6"	1128	15.3	6.3	$5,991	$5,029

TMM SERIES COMPACT CRANK-UP TOWERS

• Handles 20 square feet of antenna load at 50 MPH, 8 square feet at 70 MPH.

• Compact design is great for areas with tower restrictions, or where a less intrusive installation is desirable.

• All models supllied with hinged T-base, anchor bolts, load-actuated hand winch, 8' steel mast, top plate, and rotor plate.

• Options include coax arms, raising fixtures, motor drives, thrust bearing, remote control panel, and more!

Now shipping from CA for west coast customers, and KS for east coast and midwest customers, to reduce freight cost!

TMM SERIES COMPACT CRANK-UP TOWERS					
TOWER MODEL	MAX. HT.	MIN. HT.	WT. (LBS.)	LIST PRICE	SALE PRICE
TMM-433SS	33'	11'4"	315	$1,355	$1,139
TMM-433HD	33'	11'4"	400	$1,624	$1,379
TMM-541SS	41'	12'	430	$1,779	$1,499

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CQ's features and columns cover the entire spectrum of amateur radio, from DXing and contesting on HF to wireless networking on microwaves and nearly everything in between. Reader surveys continually show that the majority of *CQ* readers are active on both HF and VHF, and enjoy a wide range of on-air activities.

"We've always believed in straight talk with our customers," adds Martin. "*CQ* takes the same approach, making sure its articles are straightforward and easy to understand. Advertising in *CQ* is a natural partnership for us at MFJ. That's why we've been regulars on the pages of *CQ* since the company was founded 32 years ago."

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Photo 8-– Like high-tech weather watching? This MFJ Wireless Weather Station does it right with a wireless remote sensor and multifunction monitor unit that displays indoor and outdoor temperature, humidity, and barometric pressure, plus local and UTC time. It can also produce an alarm when temperature rises above or drops below present levels.

Photo 9– This new MFJ Wrist Watch receives atomic clock-referenced signals from WWVB and automatically sets/calibrates its display time to maintain split-second accuracy. It also sports alarm and stopwatch modes, plus more, and is quite affordably priced.

4), a gold-plated, miniature brass telegraph key that is very usable for sending code and will double nicely as a Christmas tree ornament. It is hand machined from solid brass and plated in gold, measures a tiny $2\frac{3}{8}" \times 1\frac{1}{8}"$ at the base, and weighs only 5 ounces. According to Marshall Emm, N1FN, at Morse Express, the 2003 Christmas Key is similar to last year's key, but has a hand-turned olive-wood knob. All of the usual adjustments (trunnion bearing tension, lever spring tension, contact spacing, and lever stop) are available by means of gold-plated screws with matching lock-nuts, and the indented knob is very comfortable to use. The base of each key is engraved with Morse Express's "Speedy Key" logo and "Christmas 2003." This is a limited edition of 200 keys, and each bears an engraved serial number on the base. The 2003 Christmas Key is $59.95, plus s/h, and is available only from Morse Express. Call (303) 752-3382 for more information, or to order call (800) 238-8205 toll free, or go to: <http://www.MorseX.com>.

Next up is a very special new item amateurs with all interests and of all backgrounds should find exceptionally attractive—the laser-engraved callsign key fob shown in photo 5. The fob is clear crystal and measures 1.25" × .75". Your call letters are engraved by dual laser beams under computer control and appear to be magically suspended within the crystal. It is a real showpiece, and it also has a "big brother," the 3" × 2.25" × 2.25" crystal cube with your laser-engraved name and call letters illuminated by multiple LEDs recessed in its wood base (photo 6). It is a work of art in glass! Both items are available direct from <www.scilux.com>.

Fun 'Tennas

Have you been seriously considering going HF mobile but cringe at installing a big "ugly stick" on your prized vehicle? Need a trim and stealthy looking radiator that will slip in and out of parking decks or garages with ease? Try the new Iron Horse mini-antennas and optional quick-disconnects from ATOC Technologies (photo 7). These monoband antennas stand approximately 32 inches tall for 10 through 20 meters and 44 inches tall for 40 or 75 meters, have a standard $\frac{3}{8}$-24 thread base, fit in a regular mount, and produce a trim, low-profile look on any vehicle. Short antennas obviously do not radiate a strong signal like a tall antenna, but they are capable of surprisingly good performance when mounted up high for maximum efficiency. In other words, they are like roof mounts on SUVs or trunk-lip mounts on regular cars. Changing

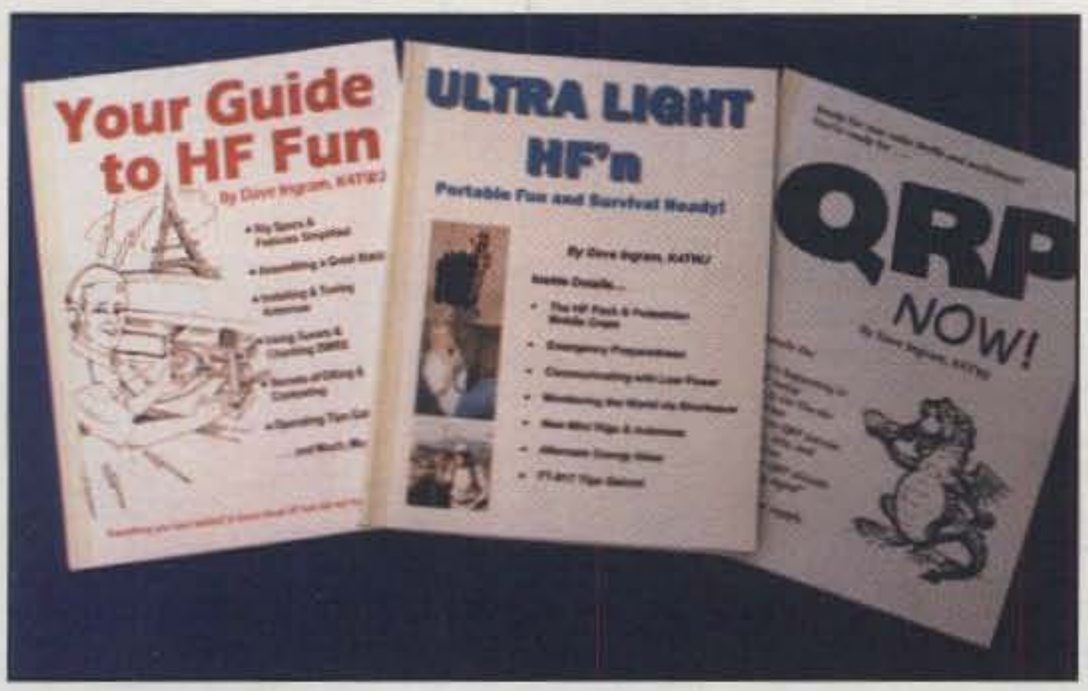

Photo 10– Would you like to investigate some new areas of amateur radio such as pedestrian mobile or HF Pack? Order a copy of my self-published Ultra Light HF'n *book during this holiday season and take your pick of my* Guide to HF Fun *or* QRP Now *book at half price.*

Photo 11–The gift that keeps on giving 12 times a year—a subscription or renewal to CQ *and/or its sister publications,* CQ VHF *and* Popular Communications. *Each issue is loaded with great news and info, making it akin to a hamfest by mail.*

bands is also a cinch. Just add an optional Iron Horse Quick Disconnect to each whip, then push, turn, switch, and hop back in the vehicle.

Watch for more details on these "minis" in our next mobile column. Meanwhile, gear up with two, three, or more and start enjoying the vast world of HF every day. Iron Horse antennas are available from dealers nationwide or from ATOC Technologies, P.O. Box 36, Covington, OH 45318, or via <www.atoctechnologies. com>.

Super Stocking Stuffers

Now for those fortunate folks who already have every piece of ham gear imaginable, we offer two special (and still inexpensive) treats: the MFJ Wireless Weather Station and the MFJ Atomic Wristwatch (photos 8 and 9). The Weather Station measures indoor and outdoor temperature, humidity, and barometric pressure, plus includes severe-weather detection with visual and audible alarms and also displays local and UTC time. The remote sensor and display units both are battery-powered and can be separated up to 100 feet, and since they are wireless, installation is a cinch. You can even carry them on vacation and monitor temperature in your sun-drenched and sweltering-hot vehicle while dining in a cool, air-conditioned restaurant.

The Wrist Watch displays time in 12- or 24-hour format, the date, month, and year, and includes alarm, stopwatch time-elapse modes, and a backlite. It also receives continuously transmitted atomic-clock time signals from WWVB and automatically sets/recalibrates to maintain millisecond accuracy. It is an amazing piece of modern electronic technology. Both the Weather Station and the Wrist Watch are available from amateur dealers nationwide or direct from MFJ at 1-800-647-1800 or <www.mfjenterprises.com>.

Good Reads

The holidays are an ideal time to relax, read, and expand your amateur radio interests, and the best way to pursue that self-improvement goal is with a couple of good books, plus a stack of up-to-date magazines. Whether you are relatively new to the exciting world of HF, curious about QRP, or looking for "how to" details on hot new pursuits such as pedestrian mobiling or HF packing, I can help. In fact, I will even go a step further during this holiday season. If you purchase my new *Ultra Light HF'n* book (photo 10) on HF Packing and portable operating ($16 plus $3.85 Priority Mail or $2.50 book rate mail), you can also take your pick of my *Guide to HF Fun* or *QRP Now* book for half price ($8 plus $2.50 book rate). (Each book is mailed separately due to postal entanglements.) Just drop me a note (Dave Ingram, K4TWJ, 4941 Scenic View Dr., Birmingham, AL 35210), and I will get autographed copies in the mail to you.

CQ, everyone's favorite ham magazine, has a hot deal for the holidays for you, too: a one-year subscription (or renewal) is presently $29.95 (photo 11). You also can add a year of *Popular Communications* to your 2004 reading material for $26.95, or *CQ VHF* for $23.00. *(Note that these prices are for U.S. subscribers only; for pricing of multiple-year subscriptions and for foreign subscriptions, see page 73.)* You can subscribe by mail (CQ Communications, 25 Newbridge Rd., Hicksville, NY 11801), by phone (1-800-853-9797), by fax (516-681-2926), or via the web <www.cq-amateur-radio.com>.

Go for all the magazines, books, and goodies you can order, enjoy the holidays, and spend some good time on our great amateur radio bands every day!

73, Dave, K4TWJ

digital connection

BY DON ROTOLO,* N2IRZ

WinLink2000, Telpac, and Paclink

Thousands of hams are able to keep in touch via e-mail using the WinLink 2000 system. Boaters, RVers, hikers, and almost anyone else have found the "WL2K" system quick, easy, and convenient. It's kind of like the old Packet BBS forwarding system on steroids. This unique system is about to take another giant step forward, thanks to two new utilities called Telpac and Paclink. This month we'll take a look at the whole system, and learn how you can get involved.

Being the Digital editor of *CQ* doesn't guarantee that I know everything. I'd seen and heard a little bit about WinLink 2000 (WL2K), but it wasn't until a presentation made by Rick Muething, KN6KB, at the 2003 ARRL/TAPR Digital Communications Conference in September in Connecticut when I really understood what he and his colleagues (Victor Poor, W5SMM, Hans Kessler, N8PGR, and Steve Waterman, K4CJX) had accomplished.

Photo A– At the ARRL/TAPR Digital Communications Conference in Connecticut, Rick Muething, KN6KB, explains the finer points of Telpac to John Wood, KF6HFA.

Do you remember back in the heyday of packet when Packet Bulletin Board System (PBBS) operators accepted your text-only message, and if you addressed it correctly, it could get across the state in a day or two, and across the country in under a week? Later, when HF was used for message forwarding, times were cut to a day or so for most of the world. Then the internet came along, just about killing that idea. However, the need for a radio-based message system didn't go away, and folks struggled with AX.25 packet, Pactor, and other modes on slow and fickle HF channels.

WinLink 2000 was introducedIn late 1999. Take a look at the winlink.org website for some history on how it evolved from Aplink, Winlink, and NetLink, early messaging systems dating back to 1983. Basically, with WinLink 2000 you have a few Participating Mail Box Operators (PMBOs) scattered throughout the world, generally with HF and some VHF radio ports. Users connect to the PMBO site over the air and interact with it much like one would interact with a PBBS. All of the PMBOs (there are 39 at present) are linked via the internet to a central server, which intelligently routes the messages to the best PMBO for the addressee, defined as the one(s) the addressee has used in the last 90 days. All this makes for a very fast, wide-reaching, and reliable message system, while eliminating the need for users to deal with address routing as in the old packet days.

Of course, it isn't all *radio*. Some readers will be troubled by such a heavy use of the internet for message forwarding. After all, can we count on the internet in an emergency? I asked Rick Muething about that very subject, and he told me the following:

WL2K is mainly directed at mobile hams who want to keep in touch, but is designed to be "Emergency Management" ready. If a large area was affected by some kind of disaster, one could expect that PMBO stations outside the affected area would remain operational and ready to accept emergency traffic via HF from the affected area. WL2K uses redundant central servers to connect to all the PMBOs, sited at professional hosting sites located in California and Ohio, to further reduce the chances of a local failure affecting the system. So, despite the use of the internet, the system is designed to function, and likely to be very useful, in an emergency. The system has achieved much better than a 99% uptime over the past four years of operation.

Until recently, the WinLink 2000 system was geared mainly towards support of HF Pactor operations, with limited VHF/UHF packet support. The PMBOs cover a wide area with HF, but there is a need for more local, shorter-range VHF packet coverage—something like a mini-PMBO, since a full-service PMBO requires significant investment. Having terrestrial VHF packet coverage would greatly increase the utility of WL2K, both for travelers and emergency preparedness.

A second issue was the e-mail client. Although AirMail (by Jim Corenman, KE6RK) was (and is!) used to provide a convenient and easy-to-use e-mail client, it was focused on the HF Pactor user. While AirMail offers direct support of the PTC II TNC (terminal node controller) for HF Pactor operation, as well as SCS and Kantronics TNCs for packet,

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MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-10	7	10	1⅛ x 6 x 9	3.2
SS-12	10	12	1⅛ x 6 x 9	3.4
SS-18	15	18	1⅛ x 6 x 9	3.6
SS-25	20	25	2⅞ x 7 x 9¾	4.2
SS-30	25	30	3¾ x 7 x 9¾	5.0

MODEL SS-25M

DESKTOP SWITCHING POWER SUPPLIES WITH VOLT AND AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-25M*	20	25	2⅞ x 7 x 9¾	4.2
SS-30M*	25	30	3¾ x 7 x 9¾	5.0

MODEL SRM-30

RACKMOUNT SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25	20	25	3½ x 19 x 9¾	6.5
SRM-30	25	30	3½ x 19 x 9¾	7.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M	20	25	3½ x 19 x 9¾	6.5
SRM-30M	25	30	3½ x 19 x 9¾	7.0

MODEL SRM-30M-2

2 ea SWITCHING POWER SUPPLIES ON ONE RACK PANEL

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25-2	20	25	3½ x 19 x 9¾	10.5
SRM-30-2	25	30	3½ x 19 x 9¾	11.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M-2	20	25	3½ x 19 x 9¾	10.5
SRM-30M-2	25	30	3½ x 19 x 9¾	11.0

MODEL SS-12SM/GTX

MODEL SS-10EFJ-98

CUSTOM POWER SUPPLIES FOR RADIOS BELOW

EF JOHNSON AVENGER GX-MC41
EF JOHNSON AVENGER GX-MC42
EF JOHNSON GT-ML81
EF JOHNSON GT-ML83
EF JOHNSON 9800 SERIES
GE MARC SERIES
GE MONOGRAM SERIES & MAXON SM-4000 SERIES
ICOM IC-F11020 & IC-F2020
KENWOOD TK760, 762, 840, 860, 940, 941
KENWOOD TK760H, 762H
MOTOROLA LOW POWER SM50, SM120, & GTX
MOTOROLA HIGH POWER SM50, SM120, & GTX
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
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SS-12EFJ
SS-18EFJ
SS-10-EFJ-98, SS-12-EFJ-98, SS-18-EFJ-98
SS-12MC
SS-10MG, SS-12MG
SS-101F, SS-121F
SS-10TK
SS-12TK OR SS-18TK
SS-10SM/GTX
SS-10SM/GTX, SS-12SM/GTX, SS-18SM/GTX
SS-10RA
SS-12RA
SS-18RA
SS-10SMU, SS-12SMU, SS-18SMU
SS-10V, SS-12V, SS-18V

*ICS – Intermittent Communication Service

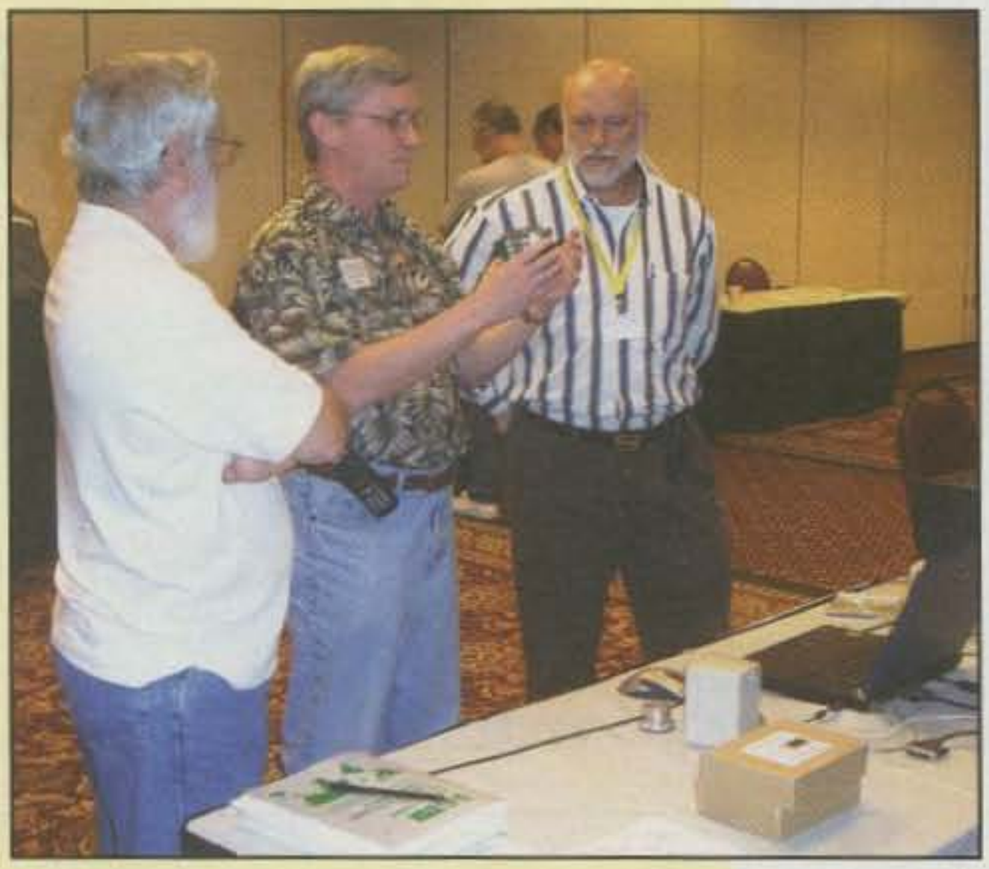

Photo B– Gerald Youngblood, AC5OG, discusses the SDR-1000 Software Defined Radio with Ron Block, KB2UYT (left), and Phil Thies, K3TUF (right), at this past September's DCC.

some users wanted to use more generic e-mail clients such as Microsoft's Outlook Express, as well as operate VHF or UHF packet with other TNCs.

Using Common E-Mail Programs

Then, early this year, two new utilities were developed which address these issues. The first, Paclink, provides an interface from Microsoft Outlook and Outlook Express (and other common e-mail clients) to the packet radio world. The second, Telpac, provides a bridge between the worlds of packet and Telnet, allowing almost anyone to set up a local link to the WL2K system. Since over 90% of the computers out there run Windows®, the authors developed these only for computers running Microsoft Windows®. It's not that they have anything against Apple or Linux, but Microsoft offers software tools that make the task much easier. Of course, any competent Mac or Linux programmers are welcome to contact the WinLink 2000 folks to offer their services. Anyway, let's take a closer look at both of these new utilities.

Paclink software is aimed at the user of the WL2K system—that is, it is a client program. Instead of using AirMail or a terminal program to access the WinLink 2000 system, you can harness the power of an advanced mail client such as Outlook. Any e-mail client capable of SMTP (Simple Mail Transfer Protocol) or POP3 can be used, and those with multiple account capabilities are the most convenient. The idea is that you can set up your WL2K account just like you'd set up any other e-mail account, and just switch between them as necessary. In other words, Paclink gives MS Outlook a *radio* connection.

For example, my Internet Service Provider allows me to set up five different e-mail addresses. Of course, one is my callsign, but I also have one with my name, so non-ham friends and family don't have to wonder what an "N2IRZ" might be. Naturally, both kids have their own accounts, and so does the XYL. In Outlook Express, which comes with all newer Windows® versions, I set up each of these accounts, and I easily can select the one I want to use. While they all use the same dial-up connection, they could just as easily use different ones instead, just as each has its own password. Paclink appears like just another mail server to Outlook; it doesn't matter that it's running on the same computer.

You'll also need some other software to use Paclink, all of it free for the downloading. Since Paclink was written in Microsoft's VB.NET, you'll need to install the .NET (pronounced "Dot Net") framework. While this is a huge (over 25 MB) download from the Microsoft site, it also allows you to run anything else that requires it. It's possible you already have it installed on your PC. If not, you can use the Windows® Update feature to get it.

The AGW Packet Engine

AGWPE, written by George Rossopoulos, SV2AGW, acts as the interface between your computer and TNC. While Paclink can control some types of TNCs directly, using AGWPE simplifies the task and adds flexibility. The program is free for amateur use and can be downloaded from the AGW website (see sidebar). Setup of Paclink, Outlook (or Outlook Express), and AGWPE is straightforward and is explained very clearly in the Paclink documentation.

Of course, you'll need a TNC, or at least a sound card. The WinLink 2000 folks recommend Kantronics products if you are not using the AGW Packet Engine, since the Kantronics Host Mode handles multiple channels more reliably. Of course, the AGW Packet Engine software kind of makes that point moot, supporting almost any TNC

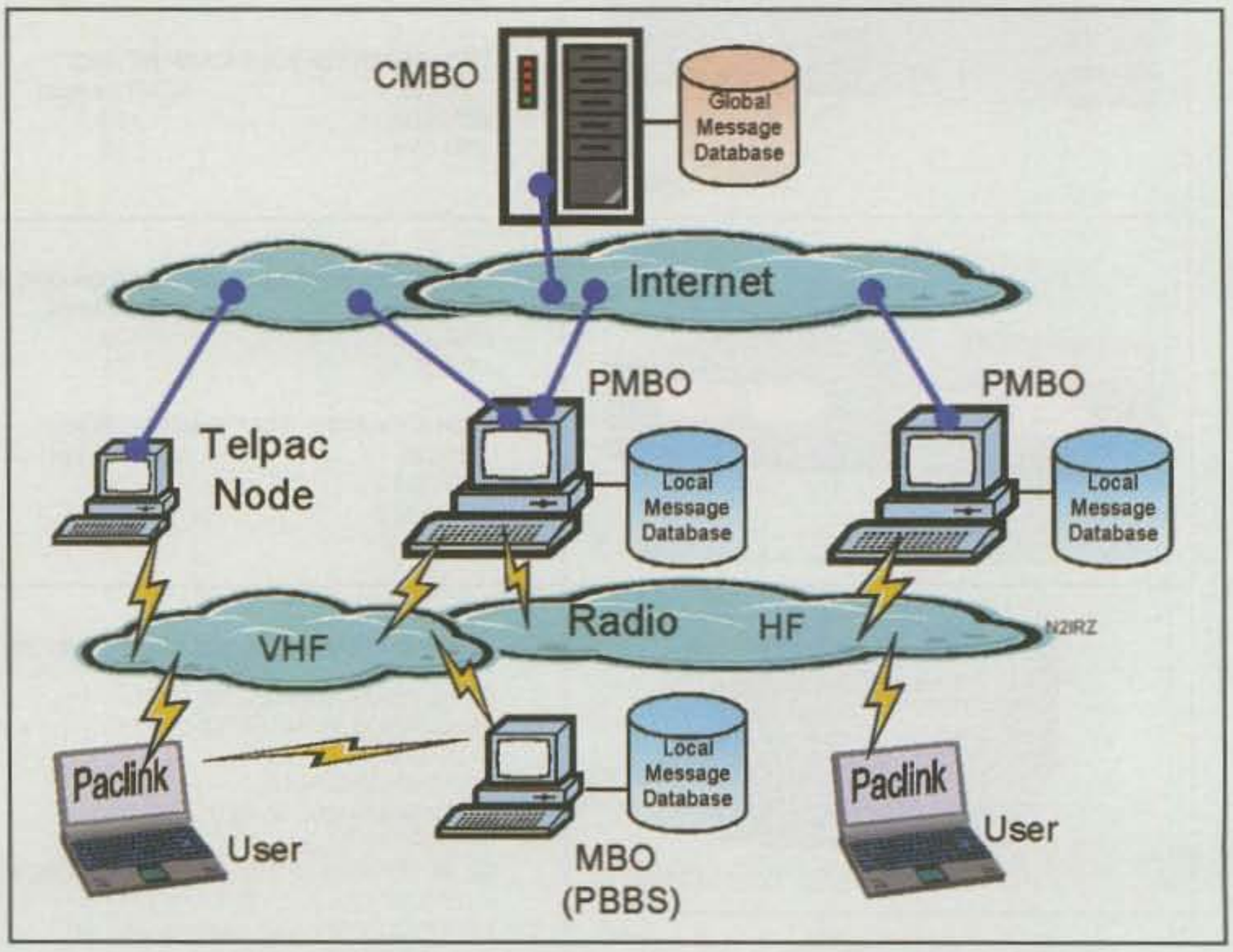

Fig. 1– The WinLink 2000 system. Users connect to one of 39 Participating Mail Box Operators (PMBOs) either directly or through a Telpac connection. PMBOs route all messages to the Clearing Mail Box Operator (CMBO), where they are passed along to the PMBOs the addressee has used in the recent past. Designed with emergency operations in mind, the system is very robust and flexible.

ever made, including the BayCom serial and parallel modems and most PC sound cards. Finally, you'll need a radio for the final link, a connection to your nearest PMBO . . . or do you?

With only 39 PMBOs out there, even with multiple ports, one can easily imagine congestion and competition for those precious HF entry lanes into the WL2K system. More PMBOs are welcome to join in certain geographic areas (sorry, but most of North America is well-covered), but you must realize that you need a significant investment in hardware (you need a server-class machine and a lot of radios), infrastructure (a full-time broadband internet connection), radios, antennas, and data terminals (PTC II TNC with Pactor I, II, and III), along with the commitment to ensure a very high degree of uptime. A PMBO isn't a part-time or fly-by-night operation. With these considerable resource requirements, it could be daunting for a casual operator to participate.

For exactly that reason Telpac was developed. Telpac is a small program that provides an interface between packet (either through the AGWPE or to a TNC directly) and Telnet (an internet connection). Basically, any casual packet operator can put his or her station on the air, accept WL2K connections over the air, and route them over the internet to a PMBO for processing. Unlike a PMBO, a Telpac station doesn't need to make much of an investment, nor is there a commitment to ensure availability. Unlike Paclink, which is a client program aimed at WL2K users, Telpac is aimed at network infrastructure operators—those willing to put up equipment for the rest of us.

Thus, here's an opportunity for most anyone with a packet station to get involved in WinLink 2000. You can put up a WinLink 2000 Telpac port for general WL2K access on any VHF or UHF radio channel, or attached to a packet network, with little to no investment. (Note that HF packet access, being relatively inefficient, is not desirable.) Whether you do this as a service to local users, for travelers in your area, as another network utility, or for emergency preparedness, you'll be helping the WL2K system expand. Even if it's just local users trading e-mail using Outlook Express instead of a terminal program, it's the next big thing for packet. WinLink 2000 supports the FBB transfer protocol, so even your local BBS can be used to pass messages to and from WL2K via a PMBO or Telpac node.

The Internet Side

While the radio side of the Telpac connection is fairly straightforward, the internet side may be a little more unfamiliar. Because the WL2K system is designed for emergency use, it was made as flexible as possible. Your internet connection can be anything from full-time broadband (such as a cable modem or DSL) to a regular dial-up connection. Yes, Telpac will even dial up your ISP, pass the traffic, and hang up when it's done. Although the user will sense a little latency while the dial-up connection is built, having that flexibility is great in an emergency situation. Like Paclink, setup is straightforward and clearly explained in the documentation.

Some other emergency-preparedness features include the capability for PMBOs to connect to each other using an RF path instead of the internet. It's slower, for sure, but better than nothing in an emergency. Even Telpac operators can use a wireless radio path, such as WiFi (802.11x) or an HF internet bridge, for their internet connection. To prevent unauthorized access, passwords are used on the internet side of things, but the radio ports are open to any registered user. Registration and callsign verification are automatic and as simple as connecting to the system—and it doesn't cost a dime.

Although I've been focussing on the e-mail capabilities of the WL2K system, it's capable of handling all kinds of traffic, from position reports to weather maps. The only limitation is the relatively slow RF data link, and with the progress being made there, that might not be much of a problem in the future. Whether you send the data from your yacht in the middle of the Pacific using Pactor, or from your RV parked by Mount Rushmore, WL2K offers a fast, reliable, and—most important—convenient way of moving data.

Summary

So there you have it: WinLink 2000 and the new Paclink and Telpac utilities. WinLink 2000 is everything the worldwide packet radio network wanted to be, but never attained. Although it uses the internet, it is a valid and valuable synergy, which makes the entire system much more valuable for all of us. Paclink lets us use off-the-shelf e-mail programs for messaging, and—with AGWPE—supports virtually any TNC. Telpac lets most anyone get involved in providing infrastructure for the rest of us so that access to the WinLink 2000 system can become universal and ubiquitous.

Every other month I write about some digital technology, whether it's something relatively new (like this month) or something well known (such as PSK31). I strive to discuss these topics in a way that is easy to understand, yet gives you enough information to decide whether or not it's interesting enough to learn more about it on your own.

My last two columns on PKS31 surprised me with the volume of mail it generated. Folks who had never tried anything digital before had a ball with a keyboard for the first time ever. I hope that each of you takes a moment and tries something new, whatever it may be, every month. You don't have to go crazy with every new mode (there are so many!), but until you try something new, you'll never know what's going to be fun. Go ahead and give this month's topic a try, then and write and let me know what you think.

As always, in this cold but festive time of year I want to extend my wishes for peace in the world, and all the very best to you and yours.

73, Don, N2IRZ

More Information and Software

To learn about the WinLink 2000 system and download software, visit their website at <http://www.winlink.org>. To see the location and status of the current Telpac nodes, visit <http://www.winlink.org/status/Telpac.aspx>.

To get more information about the AGW Packet Engine, Packet Engine Pro, Monitor, Terminal, and Digi software, visit <http://www.elcom.gr/sv2agw>.

To download the Microsoft .NET framework, which allows any .NET application to be run on your Windows® computer, visit <http://www.microsoft.com>. As an alternative, use the Windows® Update feature, which also lets you download any critical updates and other utilities for your Windows® operating system.

For more information about AirMail, or to download the software (which is licensed without charge for amateur radio use), visit the AirMail 2000 web page at: <http://www.airmail2000.com>.

As a special service for *CQ* readers who either don't have internet access or have a dial-up connection which might take hours to download the software, I'm offering a CD-ROM with the files you need for Paclink and Telpac. This includes the Microsoft .NET framework and all of the AGW packet engine files. To cover my costs for CD duplication and mailing, please enclose $3.00. There is no need to send an SASE or stamps; just send $3.00 and your address and tell me you want the Paclink/Telpac CD. My address is on the first page of this month's article.

math's notes

BY IRWIN MATH,* WA2NDM

Component Review

It's been awhile since we looked at some of the newer components available to the experimenter, so this month I would like to make you aware of a few interesting devices that we came across.

The first of these is a series of high-current diodes from International Rectifier, and we mean high! The new "CPQ" series covers the current range of 10 to 80 amperes and comes in the familiar TO-220 and TO-247 three-lead packages. The more interesting devices in the series are the 60CTQ150 and the 80CPQ150. The 60CTQ150 will handle 60 amperes and comes in a TO-220 package, the same size as the popular three-terminal regulators. This device has a forward drop of only 0.88 volts at 30 amperes for a dissipation of 26.4 watts. Reverse voltage is 150 volts, and the smaller package means more space available for other components in a tightly packed circuit board.

*c/o CQ magazine

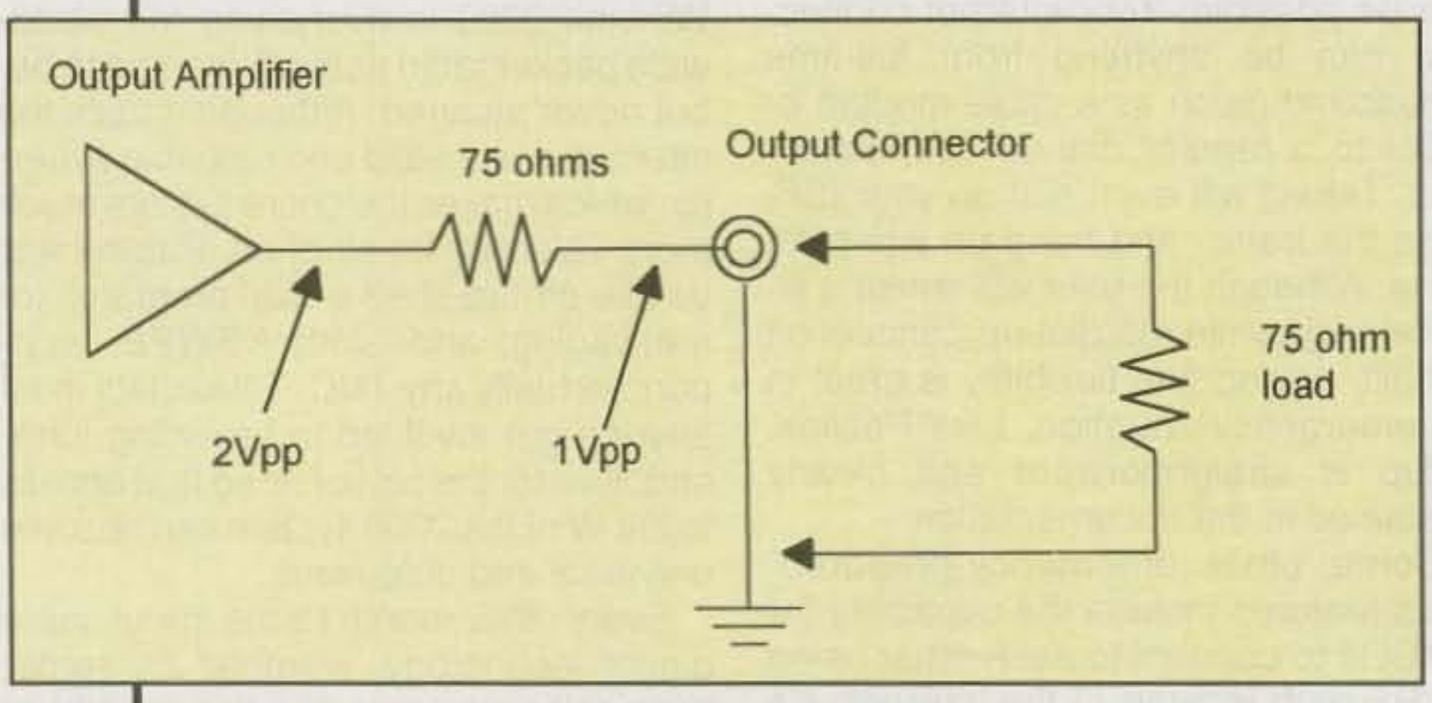

Fig. 1– Details of back termination.

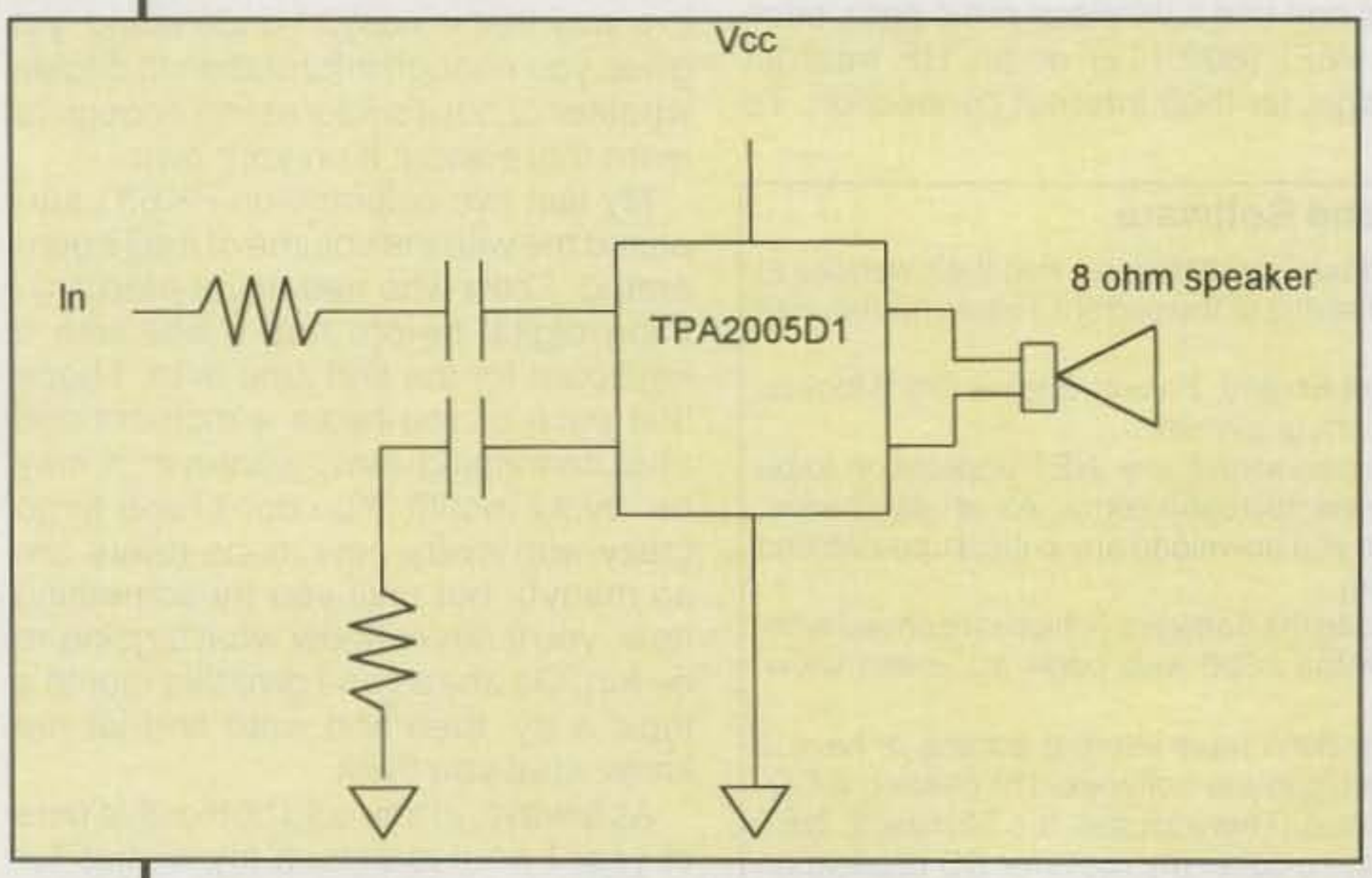

Fig. 2– Typical single-ended audio amplifier using the TPA2005D1.

The 80CPQ150 will handle 80 amperes at a voltage drop of 0.86 volts (at 40 amperes) for a dissipation of 68.8 watts. This device comes in a TO-247 package, which is slightly larger than the TO-220. Either of these diodes is ideal for that homebrew DC power supply to run your 100 watt rig. I only hope you build one instead of buy it. For further details go the application-specific website at <http://ac2dc.irf.com/e150v>.

While on the IR website be sure to check out their new PVY116 solid-state relay. This tiny device (SOP package) can be used in the same way as a conventional SPST normally open reed relay, but will switch signals as high as 450 MHz. Input/output capacitance is only 9.1 pF, and continuous currents up to 250 ma can be switched safely. The device also will withstand reverse voltages as high as 7 volts and only requires 2 ma of drive current.

While on the subject of power, Texas Instruments offers a line of operational amplifiers that have, to say the least, fairly high output current specifications. The OPA569 will provide 2.4 amperes (yes, we said *amperes*) with a bandwidth of 1.2 MHz and a power-supply voltage of only 2.7 to 5.5 volts! Cost is only $2.95 in thousand quantity (a bit more for small quantities), and for this type of device that seems like a real bargain. You say 2.4 amps is not enough? Try the OPA549. This baby will provide 10 amperes of output, but the bandwidth drops to 900 kHz and the cost goes up to $10.95. With these kind of specifications you could drive DC motors directly and eliminate the need for external power stages. If this sort of thing interests you, visit <www.ti.com/opa569> for more information.

Continuing with op-amps, Intersil recently has introduced a line of low-power operational amplifiers that feature very high bandwidths and rail-to-rail output specifications. These devices are designed for use as video drivers, and unlike other op-amps will provide reasonable output levels with low power-supply voltages. Most standard video op-amps provide an output level that is at least 1 to 1.5 volts lower than the applied Vcc line. This means that you need at least a 5 volt supply to derive a clean, non-distorted 2 volt peak-to-peak video output level in order to properly drive a so-called back-terminated 75 ohm load. Fig. 1 shows why this level is needed in order to achieve proper impedance matching for the non-video enthusiasts. The output of the EL8x00 series can be as close as 0.1 volt from the Vcc line, so you could probably even get away with a Vcc supply as low as 3 volts. The 3 dB gain-bandwidth of the

series extends from 200 to 600 MHz, and the 0.1 dB flatness extends from 50 to 60 MHz. Current drain, by the way, is only 5.6 ma. For further details, visit <www.intersil.com/highspeedvideo>.

Texas Instruments has announced a class D audio-amplifier chip that should be of interest to those who need audio power to drive a speaker but also need to conserve power. Most audio amplifiers operate with total efficiencies of around 50 to 70%, which means that a fair amount of power is lost in the process of amplifying the audio (heat production) and not in output. Class D amplifiers, however, simply switch between cutoff and saturation, and as a result are able to deliver efficiencies of better than 80%. The switched nature of the output, though, requires filters to smooth out the signal. The TPA2005D1 provides up to 1 watt of output with an efficiency of 85% at 400 milliwatts into 8 ohms, operates from supply voltages as low as 2.5 volts, and has all necessary filtering built in. To further conserve power, there is a shut-down input which can be used to reduce no-signal current to 0.5 microamperes. Fig. 2 shows the simple circuit of this chip. For further details, suggested component values, and additional application circuits and notes visit TI's website at <www.ti.com/sc/device/tpa2005d1>. By the way, if you need more power than a watt, consider the other class-D audio amplifiers available from TI. The TPA30001D1, for example, will give you 20 watts of output with a distortion figure (THD+N at 1 kHz) of better than 0.1%, a Vcc range of 8 to 18 VDC, and, of course, very high efficiency. Other class-D devices are available with stereo outputs, built-in volume controls, headphone compatibility, etc. Again, for further details go to the TI website and look at the Amplifier Selection Guide.

Finally, also from TI is the TVL2460, a chip designed to process the output of a common electret microphone. Using only 550 microamperes of supply current, the chip has a bandwidth of 6.4 MHz, a noise figure of 11 nanovolts per root Hz, and a supply-voltage range of 2.7 to 6 volts. Fig. 3 shows the simple circuit of this device, and the small SOT23 package allows the pre-amp to be built directly into the microphone housing. Go to the TI website for more details on this one as well.

That's about it for now. My best wishes to all for a happy, healthy holiday season, and see you next month.

73, Irwin, WA2NDM

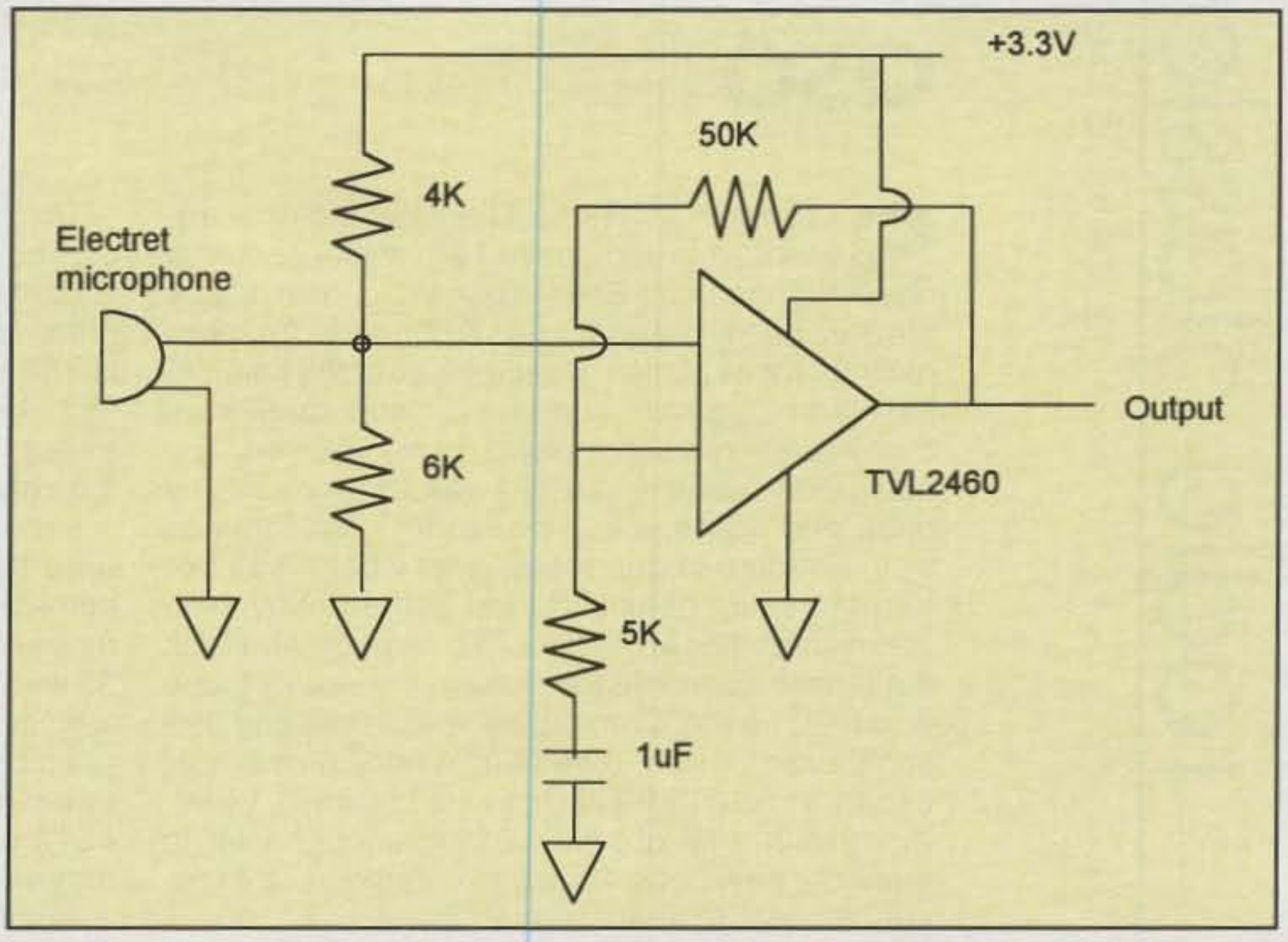

Fig. 3– Circuit of the TVL2460 electret microphone amplifier.

BY JOE VERAS,* N4QB

QSO

September's "Radio Classics" column revised my early-days ham experiences in Wausau and Green Bay, Wisconsin. I blew the dust off my old gear and introduced a few people from those places. Near the end of the column, I invited readers to share their own experiences by completing a survey form on my website. The basic information requested was about your early gear, and space was included for comments as well. I wanted to get a feeling for what it was like for others just getting started in the hobby. You astonished me. My thanks to everyone who took the time to complete the survey, especially those who filled up the "Comments" spaces relating personal experiences, then sent in additional e-mail expanding on *that*! This time the column is yours. Along with a bit of analysis and enough filler to merit my paycheck, I have excerpted your experiences here to share with others.

In the Shack and in the Air

Most of those participating in the survey were initially licensed between 1950 and the early '60s. In that distant and different age for our hobby, the most frequently reported first transmitter was a homebrew job. Another almost-but-not-quite-homebrew category includes converted surplus Command Sets. More than 600 articles about using military surplus gear on the amateur bands were published during the decade-and-a-half following World War II. My own sideband activity began with such a conversion. It was not a surprise to see the Command Sets pop up so often in the survey.

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The most popular commercial transmitter still carried the *some assembly required* label. Heathkit's AT-1 showed up more times than any other first transmitter. The runner-up transmitter is a kit as well: Allied Radio's Knight-Kit T-50. After that, the groupings drop down to ones, twos, and threes. Many of those will be mentioned later in the column.

Experimenting with crystal sets was a common experience, but only a single survey-taker used a homebrew tube-type first receiver. The favorite first receiver by a wide margin was the Hallicrafters S-38 with all suffix letters A–E represented. Lumped together as a single group, the surplus equipment ran a close second to the S-38. This includes several of the ARC-5/SCR-274 receivers, with the BC-454 and 455s dominating and a number of BC-312 receivers. I expected to see more BC-348s.

Another popular first receiver was the Heathkit AR-3, ranking third behind the S-38 and surplus receivers. One AR-2 appears on the list. Several hams started out with regenerative receivers in the form of Knight-Kit Ocean Hoppers and Space Spanners.

The most commonly used antenna was the 40-meter dipole. Some were fed with open-wire line, some with coax, and a couple with 72-ohm twinlead, a feedline all but unheard of today. Folded dipoles, constructed from and fed with 300-ohm TV twinlead, were popular antennas on 40 as well as other bands. The odd-harmonic relationship with the Novice band on 15 (after March 1953) gave the beginner twice the value for his 40-meter antenna dollar. Novices previously had been tenants on 11 meters since the inception of the license class in July of 1951.

Random-length or "longwire" antennas form the second most numerous survey group. Many

World War II era BC-312-N receiver manufactured for the Signal Corps by the Farnsworth Corporation. (Photos © Joe Veras, 2003, all rights reserved)

transmitters of the era used a pi-network between the output stage and the antenna (the popular AT-1 is an exception). The pi-net allowed the 1950s Novice to load up a random length of wire or a feedline on which the SWR might have been 5 or even 10:1. Blissfully unaware of these standing waves doing their invisible dance outside his shack window, the Novice of that era actually got on the air and made contacts.

I was pleased to note the presence of a number of Gotham verticals among the antenna responses. Gotham Hobby, later Gotham Antenna Company, advertised incessantly for years using the clever marketing tool of turning one into a "Champion DX Operator" by the purchase of a Gotham beam or vertical. The company's name derived, I imagine, from its original location in Gotham City. It later relocated to Florida, apparently not an uncommon move for New Yorkers, if you've ever been to Florida and have an ear for regional accents.

I recall being over at a friend's place when his Gotham V80 arrived. I think it came via Railway Express. He unboxed what appeared to be a couple of lengths of aluminum tubing and a piece of B&W coil stock. Also included was an alligator clip for tapping the coil at different points to change bands. Models V160, V80, and V40 comprised Gotham's vertical product line. Each antenna was 23 feet tall; the difference among the models was the length of the B&W coil stock you received, and the model number indicated the lowest band on which the antenna resonated. Each model covered all bands from its lowest up to 6 meters.

Hallicrafters S-38A receiver, one of the S-38 series that ranked first in popularity among commercial receivers in the survey.

Our Early Days

The Novice class license, conceived by the Federal Communications Commission as a learner's-permit portal into ham radio, was good for one year and non-renewable. One reader relates this story: After taking the Novice test and receiving his license, he was unable to get on the air before it expired. Undaunted, he sat for and passed the General exam. Before the ticket came, he found himself in boot camp at Parris Island, South Carolina. Few United States Marine drill instructors were actively involved in promoting amateur radio, so it was QRX once again. I won't further identify our unfortunate recruit, but I will say his story has an eventual happy (and ham radio-filled) ending . . . Semper Fi, Bob!

Chuck, W7LBV, has had that call since receiving it at age 15 in 1947. His 6L6 crystal-oscillator transmitter was paired with an S-38 receiver. Bob, WA9PLT, built a one-tube 6V6 transmitter from a 1948 *ARRL Handbook* circuit. He used it with a Knight-Kit Ocean Hopper receiver. Chuck and Bob echo an earlier era when the transmitter was most often homemade and identified by the tube lineup rather than brand name. Here's another one: An old TV chassis, a '59 *Handbook* circuit, and mentoring from W9SOG were the ingredients and inspiration Richard, K9SSB, needed to construct a transmitter using a 6AG7 to drive a pair of 6L6s. This was back when he still had the *N* in his call and we both were members of Green Bay's Mike and Key Club. Dick also built his receiver, a Christmas gift Heathkit AR-3.

Most of us wish we had kept our original gear, but by nature, human and hobby, that is not often the case. Dale, WA9ENA, is an exception. He began (as WN9ENA) with a Hammarlund HQ-110C and Heathkit DX-40 and still has the original gear today. Dale didn't say when the original purchase took place, but I'm guessing his call was issued more than 40 years ago. A second DX-40 has since joined the first in his shack. The pair is used on 75, 40, and 10 AM. He loves the sound of the HQ-110's audio, preferring it to that of the Collins S/Line receivers in his collection.

Jack, K4CNW, managed to hang on to his original National SW-54 and Heathkit AT-1. He remembers the arrival of his Novice ticket on 16 April 1955 and the thrill of that first QSO in response to his CQ on 40 meters. Occasionally you still can find Jack and his vintage National/Heath station on 40 CW.

After starting with a Knight-Kit Ocean Hopper when he was WV6BWF/KN9QLL, Bob, K9QLL, soon pressed a Command Set into service as a 40-meter receiver. He says, "Using a regenerative receiver on 40 in southern California in '58 was a real challenge. I quickly became an ARC-5 fan! I still have the AT-1, and in my stable of (much-converted) ARC-5 receivers I think I have the first one I used."

When he was a 14-year-old Novice, Harold, WJ1B, used a 40-meter dipole but applied his own logic to its design. Rather than calculating the antenna's dimension with the 468/f(MHz) formula, Harold let the size of his parent's back yard determine its length. It worked just fine, and the unconventional length made no difference to his Eico 722 transmitter. Harold used a BC-455 Command Set for receiving. The former military radio covered 6–9.1 MHz and required 24 VDC for its tube filaments. In addition to the $10 purchase price of the BC-455, Harold invested a little time converting the set to civilian power, rewiring it for 12-volt filaments at the Waterbury, Connecticut Amateur Radio Club.

Jerry, K5AKB, is another fan of surplus sets such as the BC-312. His copies of CQ's *Command Sets* and the *Surplus Conversion Handbook* are dog-earred from use. Jerry says, "Flipping through the pages is like a trip through my personal ham history. Looking at the various conversions . . . I've made many of them."

Rich, K9AAO, first licensed in 1960, remembers that great AES store on Lisbon Avenue in Milwaukee. He purchased his DX-35/AR-3A+QF-1 station

there. Barry, W1HFN, was another AR-3 user in 1959 when he resided in Aberdeen, Maryland signing KN3IWW. He grew disenchanted with the Heathkit receiver when he plugged his headphones into a borrowed Hallicrafters S-76. His original Ameco AC-1 transmitter was replaced by a homebrew 6146 rig, and that eventually gave way to a Heathkit DX-20. Barry says, "A lot of boatanchors have come and gone since then."

Terry, K7MPP, used a surplus TCS (a transmitter-receiver manufactured by Collins during WW II for use on small naval vessels as well as on land) . . . the only one to show up on the survey . . . as an interim receiver between his S-38E and an S-85. Purchasing the S-38 exhausted the station budget of 13-year-old KN7MPP, so he got on the air with a borrowed AT-1 transmitter. Terry remembers his benefactor, W7STB (now SK), as kindly and helpful, exemplary of the amateur tradition.

K3OMI found a Heathkit DX-20 under the Christmas tree in December 1960 and had it built and working (into a dummy load) when his Novice license arrived early in '61. Gary's Hallicrafters-brand loyalty led him through an S-14/S-53A/SX-100 receiver progression while still a Novice. The crop grown on the antenna farm changed, too: a WRL Duo-Band dipole, a Gotham V80 vertical, and a Hornet TB-500 tribander.

Those of us coming of age in ham radio during the 1950s often did so with basic equipment and modest antennas. The simple stuff really seemed to work great, and the fun factor was 0 dB down from what it is today. Bob, K5ZR, points out that sunspot cycle 19 contributed significantly to our enjoyment of the HF bands during the middle and latter part of that decade. Science has no record of anything such as cycle 19 before it and nothing since . . . not even close.

"I made a lot of contacts and enjoyed an equally large number of good times on 40 meters," says Mike, K9HCK. He seemed almost puzzled so much pleasure could be derived from his first station, a National SW-54, a Knight-Kit T-50, and a 40-meter dipole antenna. I know the answer: The simpler the trick, the more magnificent the magic, Mike.

Few images from the pages of ham magazines are more persistent than the ads run for decades by the James Millen Company. Whichever products were being promoted, the ads varied little in format, style, or placement. One such ad presented, in living black-and-white, Millen's 90800 exciter. The 807-final Millen transmitter, along with a Hallicrafters S-40, put K9JQE on the air in 1957. Chris also e-mailed a photo of his shack as it appeared later on, a place I remember well and spent many hours visiting.

I was always fascinated by the wooden A-frame towers pictured in the old ARRL *Handbooks*. Val, K9GAW, built a pair of 45-footers and used them to support Telrex 40- and 80-meter dipoles. He built his 6146 transmitter from information in the *Handbook*, too, experience that paid off many times over when he enlisted in the Navy and found he qualified for Class A electronics school.

I recently lifted a WRL Globe Champion 150, so appreciate the effort Chuck, W6RD, put into assembling his WNØEWW Novice station in Bismarck, North Dakota. He had his first QSO with Norma, K7UTT, on 22 January 1963, going on to log more than 700 contacts before upgrading in June of that year. Nearly every one of them wanted a North Dakota QSL.

Unless you're the local repeater troll, staying on one frequency for an entire year seems an unlikely thing to do in today's age of all-synthesized, go-everywhere radios. Robert Palambo (possibly K9ZWH; no call was entered on the survey form) operated with a single 40-meter crystal in his Knight-Kit T-50 for 12 consecutive months. That's not as restrictive as it sounds to the uninitiated. Most others were rock-bound, too. We called longer CQs, then tuned up and down the band, listening for lengthy calls in reply. You think some smarty-pants DXpedition guys with $8000 transceivers invented split operation? Crystal-controlled Novices did it all the time.

Here, for the second column in a row, is another (almost) *Great Gatsby* reference: "So we beat on, boat [anchors] against the current, borne back ceaselessly into the past."[1] Ron, K2RP, has taken this to heart. His current project is assembling a station representative of each of the decades he has been licensed. Included in his plans are a Marauder, AT-1, VF-1, AR-2, SB-303 & SB-404 from Heathkit; a Hammarlund HQ-170; and a Hallicrafters S-38C.

For Louis, the Space Spanner nameplate on his Knight-Kit receiver was more accurately descriptive than he realized. One night in '58, while still KNØOJC, he worked K3XBV, with the other station repeatedly sending his callsign. It finally dawned on Louis that he was in QSO with VK3XB! That was a long haul on 40 from his Missouri home and a good catch with his ARC-5 transmitter and longwire antenna, too. DX got even better for Louis as he added a Hammarlund HQ-160, Johnson Valiant, 40-foot tower, and 10-meter beam. The Walter Ashe Company of St. Louis was the source of his equipment upgrades. Louis signs W9IL these days.

Dick, W8HYD, used a homebrew L-network to couple his AT-1 to a 135-foot longwire. His all-surplus receiving setup consisted of BC-454 & 455 conversions and a BC-312. Dick worked 35 states with this station while still a Novice.

The Heathkit AT-1 showed up in the survey more times than any other first transmitter.

Build-it-yourself is implied in Heathkit's name, and many readers constructed stations from the Benton Harbor, Michigan company's products. The survey revealed the Knight-Kits from Allied Radio to be popular as well. How many of you remember Hallicrafters' kits? Rick, now K7KO, started out with the SX-140 and HT-40, offered in kit form $20 cheaper than the factory-wired versions. The Hallicrafters twins were sold between 1961 and 1964. Rick still uses Hallicrafters gear, running an SX-115 paired with a Johnson Viking Ranger.

Jerry, KØJV, received a practical lesson in pi-network design when he built his Knight-Kit T-150A. First time through, the variable capacitors in the output circuit were installed in reverse order. When he swapped them around, Jerry found the transmitter loaded much better. His first contact was made with the amateur station at the Navy's Treasure Island (California) base. He was coached through that first QSO by his high school friend Jim, WAØJBZ.

KD7RCJ's first transmitter was a homebrew 6L6 oscillator driving a 6L6 amplifier. Jack then moved on to a Stancor 10-P, one of my favorite pre-WW II transmitters. What about it appeals to me? I like the way it looks. It's a nice industrial design in a compact package. The 10-P can still do the job on a cold winter night, when you feel like plugging in the bug and taking to the air with a 6L6.

Digesting the survey data, I concluded many of us see our hamshacks as continually evolving. No single snapshot can accurately picture the way we started in the hobby. For some, it didn't begin with a defining moment or a particular piece of equipment. These are the readers from whom I received lengthy comments in the survey, as well as additional information via e-mail. Jerry, NR5A, for example, put it well.

Jerry's first receiver was a Hallicrafters S-20R, a gift from his uncle. Jerry's uncle was fine, but his receiver was unstable. Someone walking across the floor in the next room sent it skittering across the band. Shortly after Jerry's ticket (WN5TFU) arrived, W5RPH brought him a BC-455 to use in place of the S-20R. "I thought I was in heaven with that receiver," he remembers. A National NC-125 came next, then a Hallicrafters SX-140. On the transmitter side of the T/R switch, Jerry started with a borrowed Ameco AC-1, then built a 6L6 rig in a pie pan from a *Popular Electronics* circuit. Next came a Knight-Kit T-60, and Santa brought Jerry a Heathkit DX-60B. The

Allied Radio's Knight-Kit T-50 was nearly as popular among Novices as competing transmitters from Heath.

antenna farm evolved similarly. He began with the popular 40-meter dipole and made a 20-meter vertical, complete with a good radial field, upon upgrading to General. A B-24 Mini-Beam, mounted on a small TV tower, also found its way into Jerry's antenna arsenal. The miniaturized tribander + 6-meter antenna was made by Mini-Products of Erie, Pennsylvania.

The VHF Experience

The Novice license with voice privileges on a portion of 2 meters in the 1950s and the Technician class, also considered an entry-level or second-tier license by some, gave many beginners experience in the higher ranges of the frequency spectrum. The VHF activity of that day bore little resemblance to today's FM and repeater operation.

Dan, NC1Y, was active on both HF and VHF as K1PTY. His original transmitter, a Johnson Challenger/Globe VFO combo, covered 80–6 meters; the upgrade several years later, a Viking Ranger II, stretched all the way from 160–6. An RME VHF-152A tunable converter allowed his Hallicrafters SX-99 to cover 6 meters. Subsequent additions to the shack included an Ameco Model CN-50 Nuvistor converter for 6 and a Hallicrafters SR-34 transceiver which worked on both 6 and 2. Dan's 6-meter antenna was a 6-element Yagi from Hi-Par, a Fitchburg, Massachusetts company whose amateur product line consisted of mobile and fixed-station VHF antennas. The company was active from the late 1950s through the early '70s.

Duane, AC5AA, manufactured his own VHF antennas back when he was WN2HDS. In an effort to extend the range of his Heathkit Two'er, Duane constructed a 5-element Yagi consisting of aluminum wire elements on a bamboo boom. Even the instruments used to adjust it, an SWR bridge and field-strength meter, were home made. Results count: He worked Maryland in the June VHF QSO Party. "I was in heaven," Duane says.

Wayne, WBØCTE, is another member of the homebuilt VHF antenna gang. It sounds as if his creations are sturdy stuff, too: He made his first 6-element, 2-meter beam out of brazing rods. Wayne began with equipment similarly no-nonsense in character: a BC-312/Ameco 2-meter converter for receiving and an SCR-522 for transmitting. Both military pieces were converted per the *Surplus Manual, 1st Edition*. His on-the-air interest is now limited to RTTY. Computers? No thanks; Models 19 and 32 Teletype Corporation machines, please.

In Closing . . .

I'm no child psychologist, but I have given a lot of thought to the 1950s and '60s, the era in which I grew up. Because I lack academic credentials and possibly am biased, I can't state with authority whether or not amateur radio positively influenced the youngsters involved in it. Perhaps their lives merely reflect those very different times. A single theme . . . working to earn the purchase price of that first receiver or transmitter . . . occurred more often than any other in the survey comments. This usually took place at an age when employment in the regular job market often was not possible, so initiative and creativity came into play. I believe these lessons, learned early, remain valuable for life.

Dick, W8HYD, caddied all summer to get the cash to buy his rig. I'm not sure how far you have to push a lawn mower, or how many hours of baby-sitting it takes to earn the purchase price of an S-38E, but K7MPP could tell you. That's what he did when he was a Novice. KØJV painted his grandparents' house to earn the $79.95 he needed for the Lafayette HE-30 receiver he used with his Knight-Kit T-150A. Muskegon, Michigan has plenty of what is called *lake effect* snow, which was practically a fool-proof way for Larry, K8PUJ, to fund the purchase of his ham radio gear . . . as long as he was willing to shovel it. He also cut grass, raked leaves, and wound up with a Heathkit AR-3/QF-1/DX-40 station. Duane, AC5AA, worked an entire summer mowing lawns to purchase his Knight-Kit R-100A.

Another regularly occurring comment came from those who found a piece of ham gear waiting beneath the tree on Christmas morning. The calendar pages have fluttered back around to December again, and similar scenes from my own young ham career tug at me emotionally. From my hamshack and my house to yours, may the peace of this season be with all of you and your families. This column looks at amateur radio's past, but I wish you good health and prosperity in the year to come as well!

This time around "Radio Classics" stepped outside its usual format and entered what I came to think of as *QSO mode*. It was almost as if we were in contact with one another on the air, exchanging station information and experiences. I can't imagine a more enjoyable experience or greater privilege.

Thanks again to *everyone* who contributed information, those mentioned here specifically as well as all the others. Tnx to Doc , K9BX, for updates on people from my Novice days and to George, W1EBI, for the pleasant e-mail we exchanged on equipment from that same era. 73, Joe, N4QB

Note

1. F. Scott Fitzgerald, *The Great Gatsby* (New York: Charles Scribner's Sons, 1925). The "anchor" part is my own contribution.

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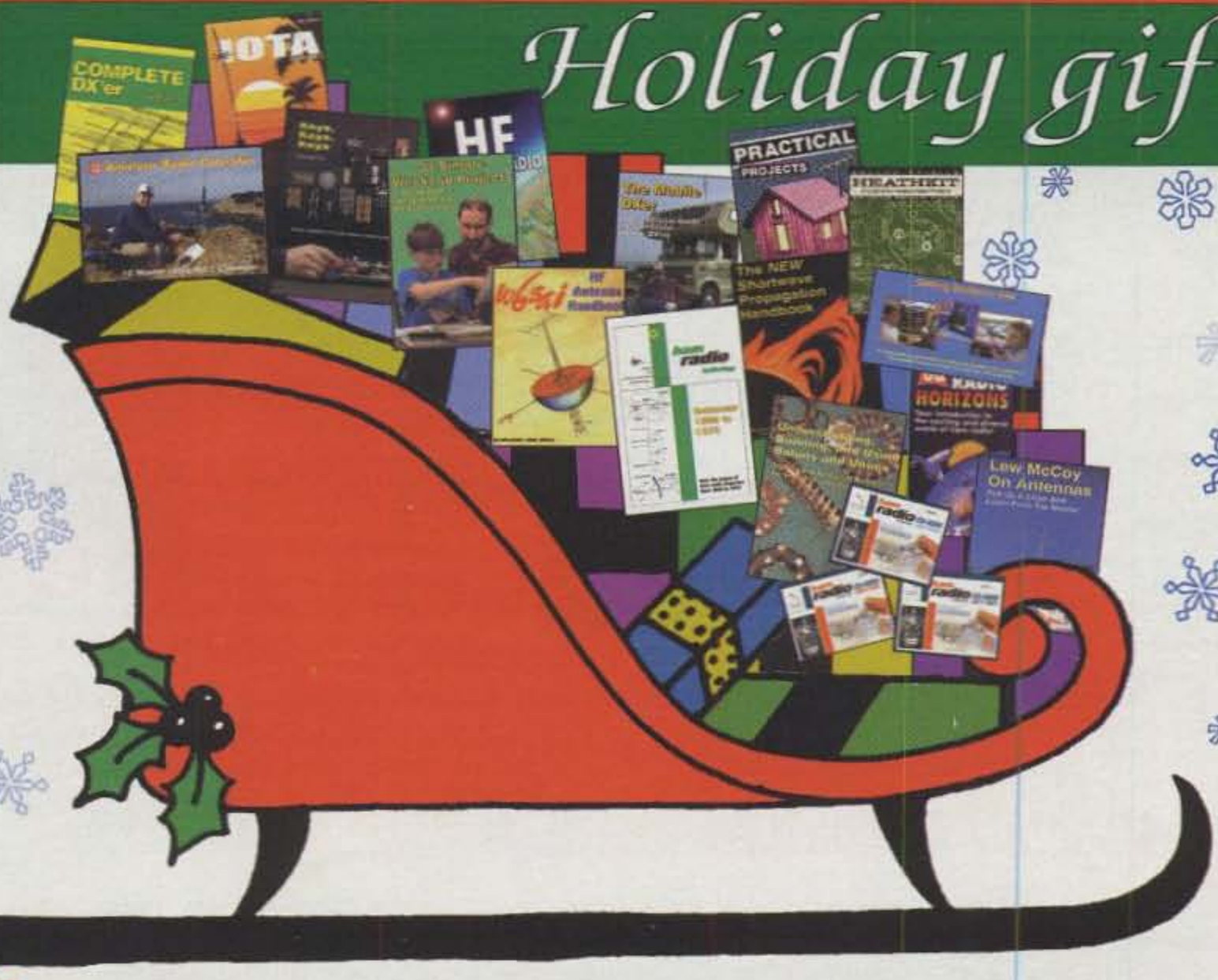

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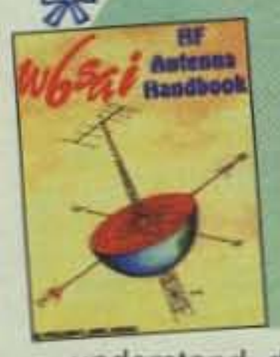

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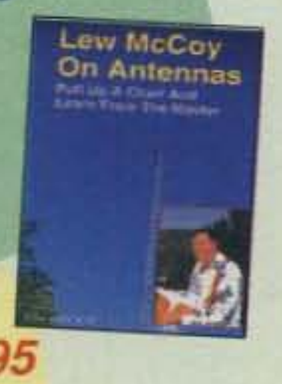

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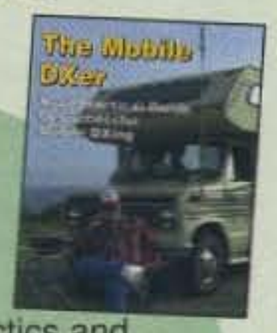

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beginner's corner

BY WAYNE YOSHIDA,* KH6WZ

A Successful Failure

As highlighted in the book *Lost Moon* by James Lovell and the movie *Apollo 13*, the phrase "successful failure" was used to describe the thirteenth mission to the Moon. Although the mission goal was not achieved, the mission was declared a success because the crew was brought safely back home. Lessons were learned about the hows and whys some things failed.

Although not as dramatic, I recently had an interesting successful failure in ham radio. The point here is not in the details of a microwave contest, but rather it is an example of how one must take each and every experience for what it is—a lesson in patience, experience, and persistence. Fellow microwave beginner Bill Honeyman, KG6CNL, and I learned by doing and observing, as mentioned in "Beginner's Corner," February 2003.

One of the rules in the ARRL 10 GHz and Up contest is Rule Number 5.5: "A transmitter used to contact one or more stations may not be used subsequently under any other call during the contest period. The intent of this rule is to prohibit 'manufactured' contacts." This is a rather cruel rule, since if your rig breaks and you are with a group of other operators, you cannot borrow their equipment. Making a contact on the microwaves is quite a bit more challenging than just handing a key or microphone to another operator. In any case, a rule is a rule, and I won't debate the validity of the rule here.

In this instance of a successful failure, as you will see as you read on, instead of just taking our gear and going home, forgetting about the contest altogether, we decided to follow along with the group to learn the tricks and techniques of successful microwave contest operating. It was my first experience with a new microwave (10,368 MHz, or 10 GHz) rig and the 10 GHz and Up contest. I had planned on being a "rover station," in which participants set up a temporary contest station in multiple locations, making contacts at each stop, at least 16 kilometers, or 10 miles, away from the last location.

The part about setting up in remote locations is very much like Field Day (see "Beginner's Corner," June 2003). In VHF-and-up contests the object is to work (contact) as many stations as you can, in as many grid squares as you can, during the contest period. Contest details and rules are posted on the ARRL website at <http://www.arrl.org/contests/calendar.html>. The ARRL site also has a good explanation of what grid squares are and how they are used.

This contest was a fairly high-profile event for me, since I sent out a pre-contest notice to the San Bernardino Microwave Society (SBMS) club members that I was all QRV (ready) for my very first microwave radio contest. I even boasted that the WA6CGR team would "kick butt," as we used to say in an HF contesting club I belonged to.

The KH6WZ 10 GHz rig looks pretty, but it didn't put out much power. A simple resistor was the downfall of the rig. "Morpheus" is being re-built yet again.

Lesson 1: Do not brag about the results before a contest begins. A positive attitude is good, but if something bad happens . . .

The rig was working on the test bench, although the power output was a little on the low side, below specifications. That bothered me, but I thought that it was going to be okay to go ahead and do the contest anyway. At least I could say that I had an additional challenge to operate the contest QRP (low power). The receiver section had plenty of gain, but the noise figure was also slightly out of spec. However, since receiver noise figure is a finicky thing to test for sometimes, I ignored that and figured a good field test (the contest) would be the best indicator of the rig's performance.

Lesson 2: Do not take on additional "challenges" with any first experience. You need all the advantages you can get.

Lesson 3: If something is out of spec, get it fixed.

In any case, I would be traveling with some very experienced microwave contest partners, Pat Coker, N6RMJ, and Dave Glawson, WA6CGR. I

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was hoping that if anything unusual came up, they would be able to help me out of a jam.

Lesson 4: Having experienced people on-hand to check and coach you is a good idea.

Things went normally in the beginning. Bill and I loaded up the vehicle, and we car-pooled to each stop as planned by Dave. We got to the first operating location early to get an optimum parking space. I then checked the area for the right place to set up the equipment. It's a good thing the SBMS website has some great pictures of the area; I recognized a "good spot" right away.

Lesson 5: Intelligence-gathering is a very good thing to do. Use of the internet is particularly useful.

I set up the equipment, turning on the transverter first, so it would warm up and stabilize. Although the unit is all solid-state and has no tubes, the crystal oscillator normally needs about ten minutes for this. I tuned around and moved the dish antenna to hear the N6CA/B beacons on 10.368310 GHz (Frazier Peak) and 10.368300 GHz (Palos Verdes). The beacons were booming in, and I noticed that my frequency readout was a bit higher than the actual frequency. No problem, as I could just subtract the difference amount from the frequency readout to know what my actual operating frequency really was. This was sort of like the good old days before digital frequency readouts. Actual operating frequency was not measured to a high degree of accuracy, but as long as the signals were within band limits, everything was okay. In fact, you'll see a lot of experienced operators describe their operations on just a certain band, such as "20 meters," or note only the most significant digits, such as "14.1 MHz" in their log books and on QSL cards.

The Battle Begins

Since reception was now verified, I listened for my fellow club members operating down south in Mexico (XE). All stations of the group were surprisingly loud. I was very excited, as my first 10 GHz contest contacts would be from another country!

Patiently I waited for my turn to transmit. I copied the contest exchange (the information needed to qualify the contact for contest points—in this case, the callsign and six-character grid square) as I listened to the operators make contacts. I noted the pattern and how the operators completed and verified the information for contest points.

Lesson 6: Listen, listen, *listen.* Make mental notes of how the station you would like to work responds. Watch for any patterns or similar techniques the successful stations use to get through.

Of course, there are no points for listening, so I jumped right in. I squeezed the microphone button and calmly called the sending station: "XE2 stroke W6YLZ from Kilo Hotel Six Whiskey Zulu." The "stroke" is the slant bar to indicate "portable," or a station that is operating from a location other than what the callsign indicates. In this case, the California-area callsigns were operating in Mexico (prefix XE). One could also say, "W6YLZ portable XE2 from Kilo Hotel Six Whiskey Zulu," but using "stroke" is faster.

The station in Mexico returned with "K6JEY Delta Lima 29 Charley X-Ray." Huh? He didn't hear me. He answered Doug Millar's stronger station. The "Delta Lima" business (DL29cx) is the six-character grid square. Maybe I just had the timing wrong. If JEY was

stronger than me and I called the XE station at the same time, then that's why I did not get through.

I patiently waited for another turn so I could try again. "XE2 stroke W6YLZ from Kilo Hotel Six Whiskey Zulu."

The station in Mexico returned with "N9RIN Delta Lima 29 Charley X-Ray." Huh? He didn't hear me again. He answered Chris Shoaf's call from his newly rebuilt rig.

I took my own advice and checked the rig to see if it was really broken (see "Beginner's Corner," March 2003). I watched the S-meter to see if the signals faded or maybe if my antenna could be aimed better. Nope. Everything seemed to be working okay.

Lesson 7: One must have patience, patience, *patience*.

In the meantime, the first Mexico station finished working all of the stations on frequency, except me.

Lesson 8: You can't work all of the stations all of the time. Just like fishing, some will get caught and some will not. But it is all fun, right?

Okay, now someone else from the Mexico end was calling for contacts. I waited for my turn again. Since the second operator was in the same location as the other station, the grid square would be the same. There were four or five stations at the same location, and I wanted to get at least one of them in my log.

I squeezed the microphone button, this time with a little nervousness and stress in my voice. "XE2 stroke W6DTA from Kilo Hotel Six Whiskey Zulu."

Lesson 9: Stay calm.

The station in Mexico returned with "KJ6HZ Delta Lima 29 Charley X-Ray." Huh? That wasn't me again. That was John Oppen, one of my microwave Elmers. The stations in Mexico were still quite loud. I was not used to being ignored on the radio.

Pat, N6RMJ, took a look at my rig, and we checked the frequency and how my signal sounded. We were so close to one another that we pointed the dish antennas away from each other. Pat's rig was putting out a lot of power, and he pegged my meter way to the right, so I answered him. He heard me fine.

Then I thought, "Shoot, I should have done something about that power output issue before I left the testing stage." Too late.

Lesson 10: Make sure your test results are not only correct and correctly done, but also know what you can expect to achieve with what you have.

We Lost the Moon

I got this really stomach-churning feeling as I recalled Rule Number 5.5. It must have been the same feeling Apollo 13 Commander Jim Lovell had when he asked Mission Control to verify an instruction to do something and realized that they would not be going to the Moon. "We lost the Moon," he said. I thought, "We lost this contest weekend."

I conferred with Bill, KG6CNL. He had come to watch and learn what a microwave contest is all about, as he continued building his rig.

"Looks like my rig isn't working. I can hear them, but they can't hear me. Do you want to quit and go home, or what?" I said to Bill. I was hoping that he would want to continue to follow the WA6CGR team to the rest of the contest spots so we could watch them operate to see exactly how to get to the contest locations and what the grid squares were.

"Let's follow them some more. I really want to see the 'Secret Site 51' they always talk about," Bill replied.

"I'm so glad you said that, because that's exactly what I was thinking," I said. Contest partners do think alike sometimes.

Lesson 11: Always discuss situations and come to an agreement with your contest partner.

We watched Pat and Dave finish on Signal Hill and pack up to go to the second location. As we drove in traffic, Bill and I discussed the improvements I needed to make on my rig.

Lesson 12: Save time and money by watching what others are doing and learning what works and what doesn't. There is no reason to re-invent the wheel.

What Now?

Meanwhile, at the third operating stop Bill noticed a fluid leak from under his vehicle. A leaky radiator meant possible overheating as we ventured upwards in elevation. Stop four was to be the SBMS Secret Site 51. We did the right thing and ended our trip at stop three. We finally went home.

Lesson 13: Don't do anything risky or stupid for the sake of a radio contact. This rule is sometimes ignored, depending on how important the radio contact is. Always analyze the risks versus benefits and make a decision.

Post Contest

Despite all this, Bill and I enjoyed going to the operating locations with Pat and Dave, watching them operate, and learning "microwave contest etiquette." Contesting on the microwave bands is similar and yet totally different from contesting on the lower bands.

One more thing: Pat, N6RMJ, named his rig Lazarus, since it died and then came back to life. Several SBMS members have names for their rigs, including Phoenix, Flame Thrower, and Sir Richard. I will continue the SBMS tradition and name my rig Morpheus, since it seems to change all the time. Or maybe Kenny, as in Kenny McCormick, the character in the Comedy Central television show *South Park,* who seems to get killed in every episode.

On the Monday after the contest weekend I called technical service for some advice on the power-output situation. The answer was really quite simple and was in the documentation that came with the rig.

Lessons 14 A & B: Read the manual! Call customer service if you don't understand something. If your local advisors aren't sure or aren't available, call the factory sooner rather than later.

The following weekend I opened up the unit and took a look. Sure enough, the factory technician was absolutely correct. A small resistor really should have been a shorting wire.

As you can see, there are over a dozen lessons, both positive and negative, learned from this "successful failure." I suggest that we all need to take any seemingly negative experiences and turn them into positive ones. I am not suggesting that everything is always "peachy" or "rosy," but instead, let's see what can be learned from all of our experiences, good or bad.

With regard to microwave contesting, as Arnold Schwarzenegger as the "Terminator" said, "I'll be back."

73, Wayne, KH6WZ

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The San Bernardino Microwave Society (SBMS, <http://www.ham-radio.com/sbms>) is probably one of the most active microwave clubs in the nation, and I am very proud to be a part of the group. Well, I probably cannot say this until I participate successfully in a few contests. . . . .

Good Times and Great Goodies

BY DAVE INGRAM,* K4TWJ

The good times and great goodies just keep on coming in our wonderful world of QRP, and although sunspots are declining, interest in and enthusiasm for QRP continues to rise. Will the trend fade anytime soon? That's doubtful, as today's amateurs are keen on small, low-power rigs for both portable fun and emergency preparedness. Equipment manufacturers are also recognizing that fact and are turning out some really terrific gear—and at quite affordable prices. How do you fit into this QRP picture? Are you still running 100 watts but becoming inspired to try QRP, or are you presently running QRP and thinking about trying the next step up—err . . . down—from milliwatting? Either way, you win! You just need a positive mindset and some good operating savvy, and you will have a ball!

Remember the little Tuna Tin Two transmitter designed by Doug DeMaw, W1FB, during the 1980s? It ran only 350 milliwatts (that's less than a half a watt) and folks built copies and worked far and wide with them. The New Jersey QRP Club produced an updated kit version of the "TT2" a couple of years ago, and folks again built it and proved very low power still works out well today. Now the tiny, low-power Rock Mites from Small Wonder Labs are hot, and you can hear folks around 14.060 MHz using them almost daily. Yes, QRP works; yes, milliwatting is a gas; and yes, there is a special place for everyone—including you—in QRP. Come on in and join the fun! How long and loud must I continue beating this low-power drum? Is anyone still asleep?

I recently answered a slightly weak, but quite readable "CQ" from Jerry Felts, NR5A, on 20 meters and was pleasantly surprised to hear his setup was a plain Little Rock Mite running 560 milliwatts to an inverted-Vee (photo A). Furthermore, the Vee was only up 20 feet and Jerry had just finished "hot rodding" his Rock Mite from only 250 mw. Previously, since building the palm-size rig a month earlier and while using only 250 mw and a G5RV antenna, Jerry had worked 14 states. Amazing, but true! The Rock Mite, incidentally, is a direct-conversion mini-transceiver that uses one crystal and operates on two adjacent same-band frequencies. It is available from <www.smallwonderlabs.com>, and its power-boosting mod (which just involves changing R-18 to a 2.2 ohm resistor and changing RF output transistor Q6 to a 2N2219 or NTE 123) is shown at <www.qsl.net/wb6dwd/home.htm>.

Jerry endorses our philosophy that patience and persistence are vital for successful milliwatting, and he also points out the importance of "going with the flow" of good propagation. In his case, that involves shifting to his Elecraft K2 "big rig" for 5 watts output when band conditions get rough. Only 5 watts, and he still has a ball. Now answer honestly, friends: Where but in the world of QRP could one experience such radio fun at such low cost?!

Photo A– Jerry Felts, NR5A, with his total QRP setup. Gear consists of an Elecraft K2 and Heathkit HW-8 plus NorCal 40 (top shelf) and a like-new Ameco 6V6 transmitter for nostalgic fun (on desk). The little 500 milliwatt Rock Mite used for our QSO is mounted in a homebrew PC-board case sitting between the K2 and HW-8.

DSP for the FT-817

W4RT Electronics—those friendly folks who brought us the One Plug battery packs, One Big Punch speech compressors, dual IF filter mods, and more for Yaesu's popular FT-817 portable

Photo B– W4RT Electronics is now installing "One Button DSP" in Yaesu's FT-817 portable transceiver, and it is hot! The unit features four levels of noise and carrier reduction that are selected by a new top-mounted pushbutton and confirmed by an LED on a small top-mounted panel. (Photo courtesy W4RT Electronics)

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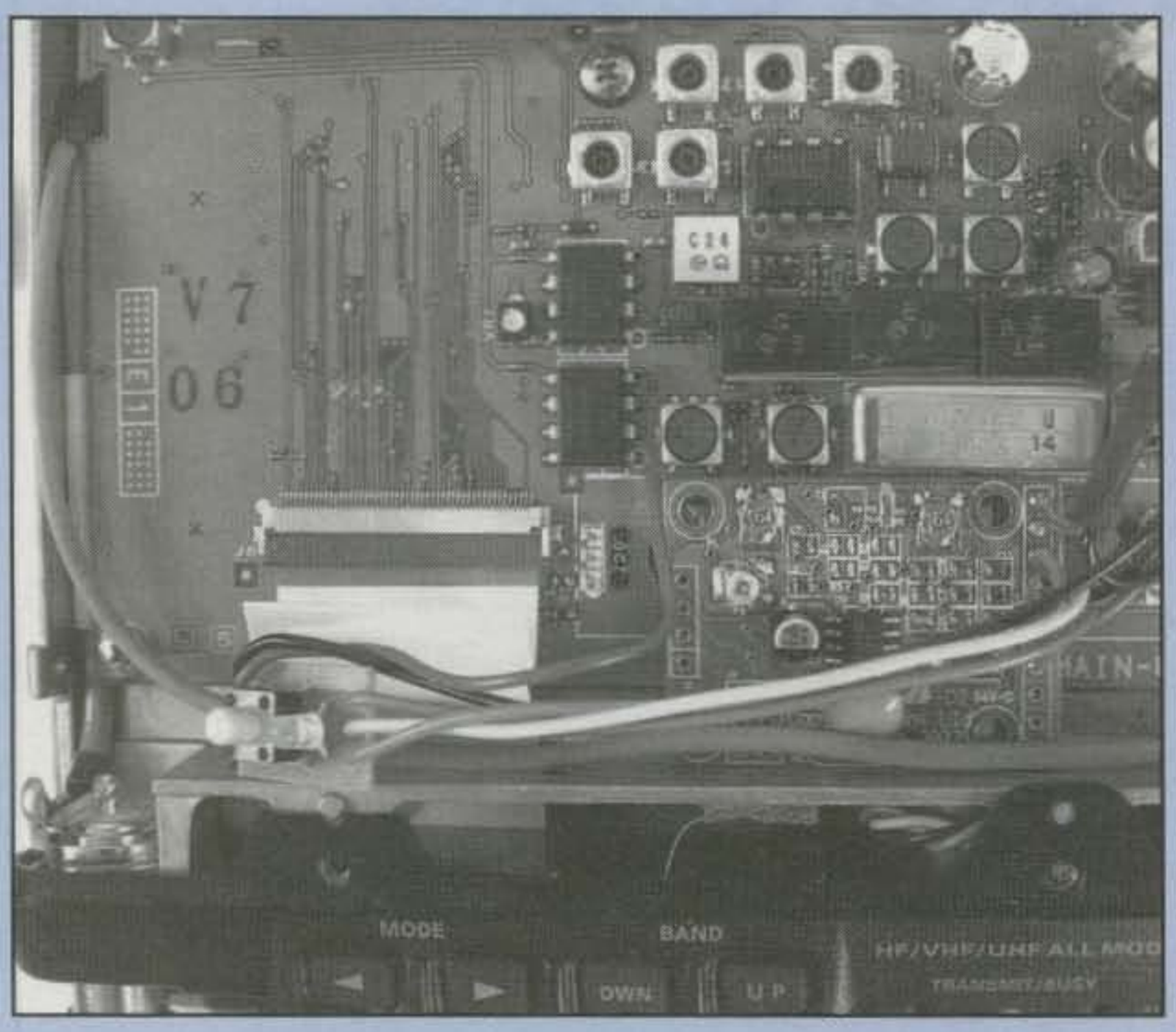

Photo C— Here you see the 26 by 37 mm DSP board/module installed under the top cover of an FT-817. The board sits atop the "main board" in the transceiver, while the pushbutton and LED on its left in the photo mount to the top cover of the rig's case. (Photo courtesy W4RT Electronics)

transceiver—has done it again. This time the company is custom-installing DSP in the FT-817, and it really moves the little transceiver into the big-rig category (photos B, C, and D).

The DSP module is manufactured by BHI Ltd. in the U.K., distributed in North America by GAP Antenna Products, and the authorized dealer/installer in the U.S. is W4RT Electronics. The little 26 by 37 mm module fits right inside the FT-817's top cover, and a tiny pushbutton mounted on the cover steps through the DSP's four modes of operation. Blinks on an adjacent LED and/or beeps from the FT-817's speaker or an earphone confirm mode selections. In Mode 1, band noise is reduced 11 dB and "tune up" carriers are attenuated 5 dB. In Mode 2, noise is reduced 13 dB and carriers attenuated 8 dB. Mode 3 reduces noise 19 dB and carriers are attenuated 21 dB, and Mode 4 reduces noise 35 dB and carriers are attenuated 65 dB.

This DSP uses dynamically adaptive neural network technology, which in plain language means it performs a mite better than average audio-level DSP. In this system the (DSP) passband is divided into subbands. Noise and carriers within each subband are reduced separately, and then the subbands are recombined. Cool!

I talked with Barry Johnson of W4RT Electronics after he installed the first DSP unit in an FT-817, and he was both excited and impressed with the results. He noted that while using only level 2 (13 dB noise reduction and 8 dB of carrier reduction), he could copy a DX station that was buried by noise and indiscernible with the DSP off. Now that's good DSP!

Although you can purchase the BHI DSP module (and pushbutton) LED panel from W4RT Electronics and install it in the FT-817 yourself, the process is tedious, and W4RT's charge for custom installation is very reasonable. The firm's turnaround time is also quick, and unlike your work, theirs will be under warranty. It is a good deal, and if you want to really make your little FT-817 a hot rod, you can even get a dual filter mod and speech compressor installed at the same time. Want more details? Check with W4RT Electronics, 3077-K, Leeman Ferry Rd., Huntsville, AL 35801 or go to <www.w4rt.com>.

Simple SWR Monitor

Several types of QRP transceivers utilize a 40 or 50 volt zener diode connected between the collector of their power output transistor and ground for mild SWR protection. If and when SWR exceeds a preset level, the zener shunts excess voltage to ground and prevents damaging the transistor. Nice! Now suppose we insert a low-value resistor (10 to 30 ohms) in series with the zener and ground, and then connect an isolation resistor (20 to 60 ohms, typically) and an LED across the added

Photo D– The W4RT "Mod Squad" posed for this group photo at a recent hamfest. These are the boys behind the popular FT-817 mods and goodies. From left to right are Ralph, N5DOI, Rudd, W4TCD, and Barry, W4WB. Step up and say hello when you see them at a hamfest.

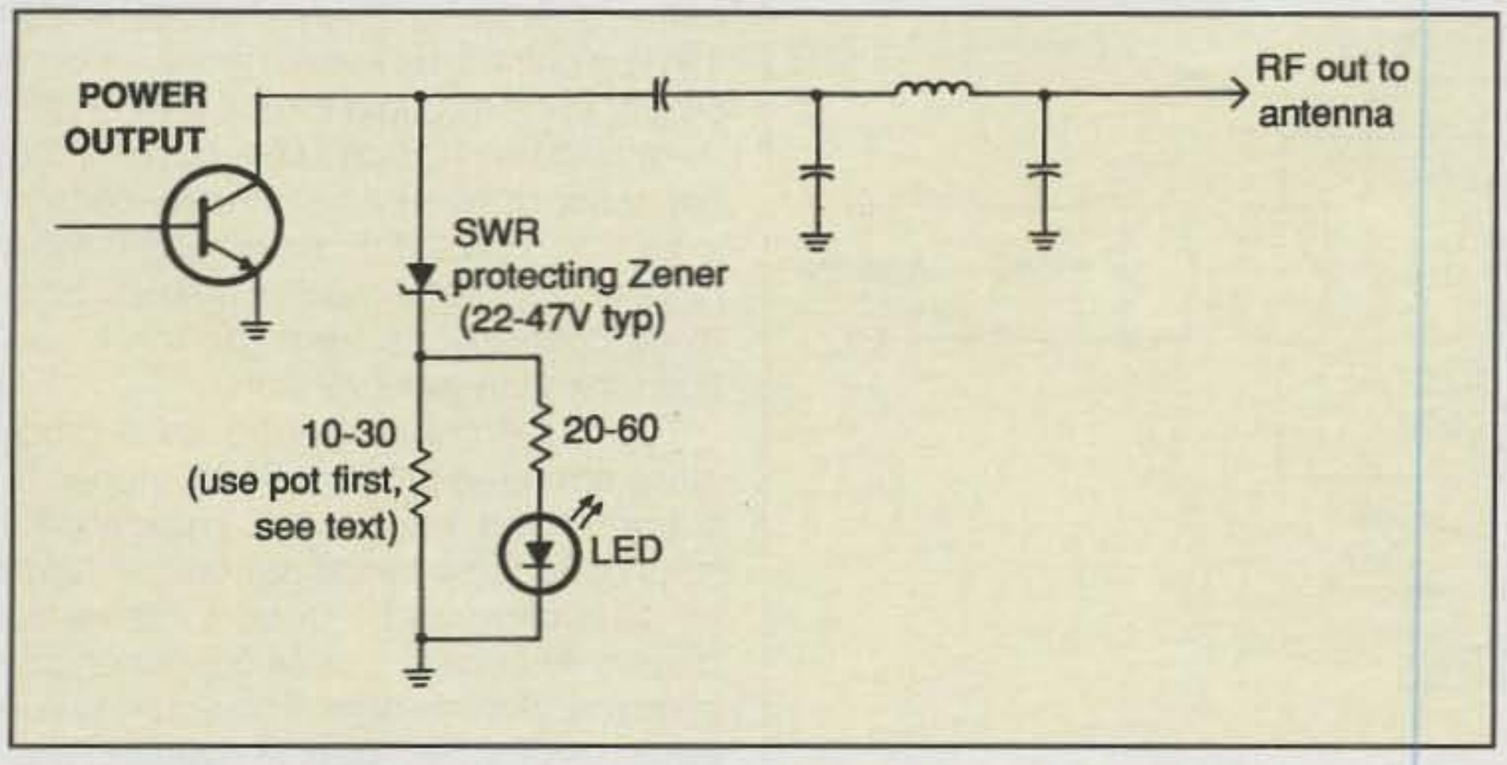

Fig. 1– Experimental circuit for adding in SWR monitor/indicator to a QRP transceiver. (Discussion in text.)

zener resistor (fig. 1). When the SWR then increases and the zener conducts, a fraction of sampled voltage illuminates the LED. Bingo—a high-SWR monitor!

Implementing this idea will require some dinking, as adding a resistor in series with a zener will raise its point of SWR protection because a zener's value depends on the related rig's output power. As a starting point for dinking, try using a 10 to 30 ohm potentiometer for the zener's resistor and 20 to 60 ohm resistor in series with the LED. Connect an antenna tuner and external SWR meter between the transceiver and antenna, and adjust its controls for a near 1:1 SWR. Confirm the transceiver is delivering its full output and your added LED is not lit. Then carefully reset the tuner for 2:1 SWR and (quickly!) adjust the zener's potentiometer to reduce output and protect the output transistor.

Next, vary the LED resistor's value until the LED lights to indicate high SWR. Finally, reset the tuner for a low SWR and confirm the LED is extinguished and output power is back up to normal. Remember to key-down only long enough to read a meter or view an LED when transmitting, and closely monitor output-transistor temperature when dinking with the idea. Then enjoy more confident operations when using unusual portable antennas.

Acorns for QRP

We close this month's column by briefly reflecting back on those golden days of yesteryear, and highlighting a trim little QRP transmitter built around one or two unique-style 955 Acorn tubes (fig. 2A, B, and C). The transmitter makes a nice weekend project for homebrew enthusiasts and can be assembled for operation on 80, 40, or 30 meters, as desired. It runs a whopping 500 milliwatts of DX-grabbing power with one Acorn—err . . . tube—and one full watt output with two tubes. I dreamed up the circuit several years ago, and a twin-tube version was devised by GM3OXX and written up in the G-QRP Club's magazine, *SPRAT,* during the fall of 2002. Yes, the 955 is primarily a VHF/UHF tube, but it works just fine on HF and is a real attention grabber. It is available from several vintage-tube suppliers (some advertise here in *CQ*), and its unusual center-mount socket often surfaces at surplus dealers such as Fair Radio.

Parts hunting is half the challenge and fun of building this mini-rig. If you experience difficulty, look for a couple of low-cost, cardboard-case aircraft beacon transmitters. They have both 955 tubes and sockets at a fair price. As an alternative, you can substitute regular 1S4 or 3S4 miniature tubes for the 955s. In that case, just connect the tube's screen grid to its plate (at the tube[s] socket[s]) and use a classic Sucrets tin for a chassis. Sucrets boxes foreran Altoid tins as early symbols of genuine QRP.

Referring to the Acorn rig's circuits, any small RF choke between 1 and 2.5 µHy that will handle 40 or 50 ma is fine for the plate circuit. If you feel creative, you can even switch to a series-fed plate circuit like that used in the dual-tube version and eliminate the RF choke. An older FT-243-case crystal or a larger HC-6 metal-can crystal with 30 pFd load capacitance (a "regular" ham-band crystal) works fine in this trans-

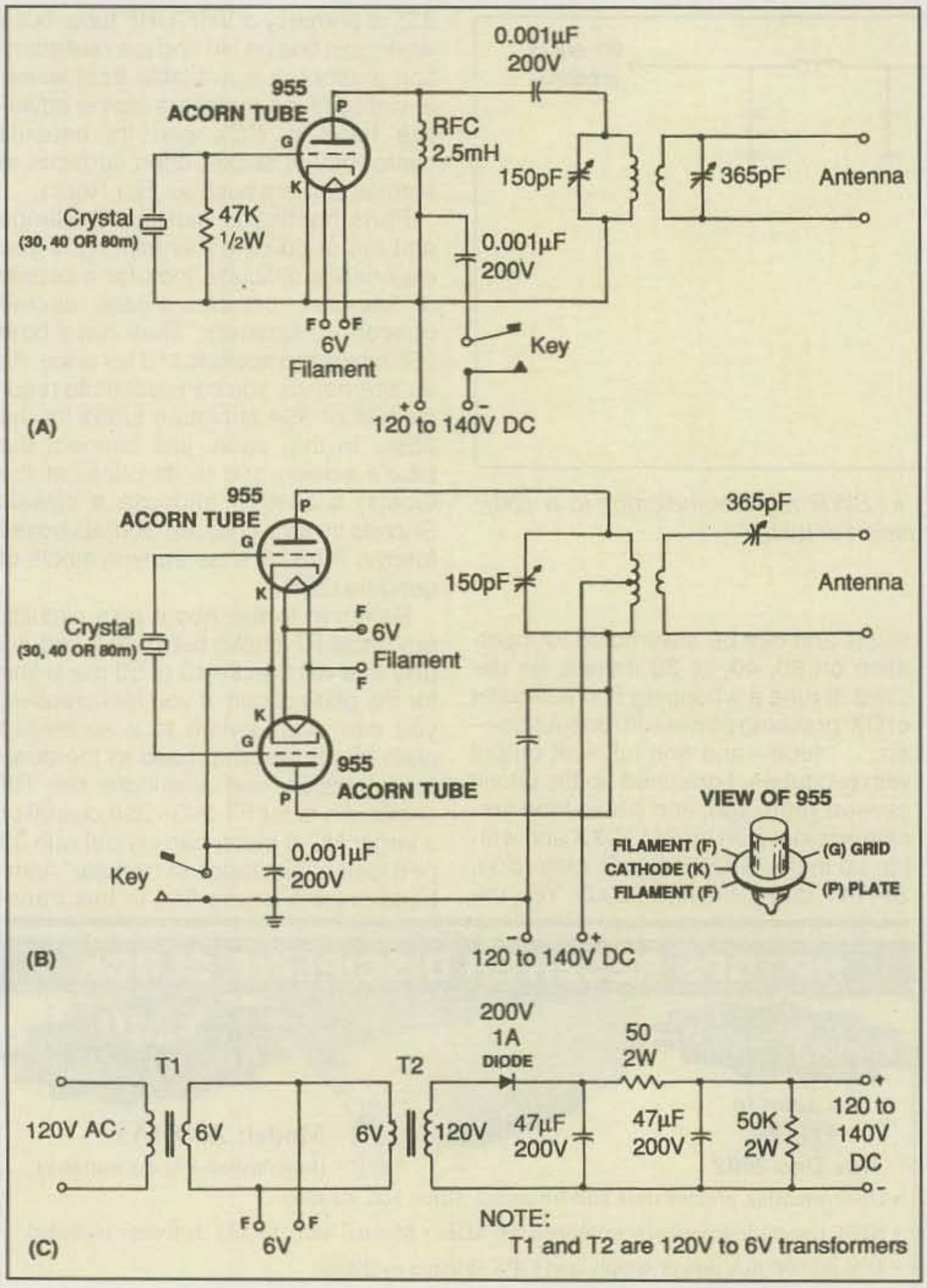

Fig. 2– Circuit details of (A) a single 955 Acorn Tube transmitter, (B) twin 955 Acorn tubes transmitter, and (C) power supply for single or twin 955 Acorn tube transmitter. (Discussion in text.)

mitter. Just avoid using a miniature HC-18 type crystal, as even a small amount of grid current could cause it to break. A miniature 100 or 150 pFd tuning capacitor or even a heavy-duty ceramic trimmer capacitor can be used in the plate circuit. Remember to insulate both of its connections from ground if you build the twin-tube version.

The plate coil is wound on a drug-store-obtained pill bottle 1.25 inches in diameter and 3 inches tall. The coil consists of 22 turns for 30 meters, 30 turns for 40 meters, or 56 or 60 turns for 80 meters. Number 22 or 24 copper enamel wire works fine here. The antenna coil is 8 turns of similar-gauge insulated wire wound over the plate coil for 30 or 40 meters, or 15 or 16 turns for 80 meters. The center-tapped version is made by winding half the total turns, pulling about a half inch, twisting it a couple of times to make a tiny loop, and then winding the coil's other half. When you are finished, scrape the enamel coating from the loop/tap and solder on an insulated wire for connecting the high voltage. A 150 to 365 pFd tuning capacitor can be connected in series or in parallel with the antenna coil for tuning up the transmitter "pi-net style" and obtaining maximum output. Just remember to exercise care with the little tubes, as 10 ma each is maximum plate current. Check signal quality with a mating receiver (a refurbished S-38 would be great), reduce loading as necessary to obtain a clean note, and then enjoy some real QRP fun!

Need a quick-and-easy power-supply suggestion for this little transmitter? Just connect a pair of small, low-current 120-to-6 volt transformers "back to back," tap off filament voltage "between" the transformers, and then connect a simple half-wave rectifier with filters to the 120 volt output of the second transformer. Actually, I just straight-rectify and filter the 120 volt AC line and use only one transformer "AC-DC style," but suggesting such brings screams of disapproval from our "do as I say, not as I do" readers. Bless you everyone!

On that note of good humor, we must bow out of yet another wonderful year of sharing good thoughts with you and writing for *CQ*. I lost track of exactly how long I have been writing for *CQ* (probably 25 to 30 years), but I can truthfully say every year just gets better, and I owe it all to you, our friends, fans, followers, on-the-air associates, and the staff of *CQ*. Thanks, and may the force of good signals always be with all of you!

73, Dave, K4TWJ

BY JOE LYNCH,* N6CL

Inspiring Youth

What is a very important asset for our hobby? It is our youth. Recent articles in our sister publication, *CQ VHF*, have dealt with inspiring youth to become involved in ham radio. In this month's column I want to highlight some of these items.

Writing in the Winter 2003 issue, Gordon West, WB6NOA, highlights how youth can become involved in building super-system repeaters ("Building a Super [Repeater] System, p. 6). Among the activities are building antennas (photo 1) and demonstrating ham radio in the classroom, as 14-year-old Kevin Guice, KG6MIH, has done for his fellow classmates at El Modena High School in Orange, California (photo 2).

The Fall 2003 issue of *CQ VHF* features two examples of involving youth in our hobby. Jason Baack, N1RWY, describes how he modified a radio-controlled truck to contain an amateur television camera ("Amateur Television on the Move," p. 12). He uses it to attract interest in our hobby through the excitement generated by watching the truck being maneuvered around at hamfests and following its path via the television monitor set up to receive the ATV signals.

Commenting on his reason for developing this project, Jason writes: "Activities such as the Boy/Girl Scouts Jamboree, as well as the school ARISS projects, are great ways to involve kids in ham radio. While they do a great job of introducing ham radio, these activities tend to involve a lot of people, time, and planning. I wanted to develop something that I could put together fairly quickly while being interactive enough to hold interest, and at the very least, generate a few smiles during a hamfest or during a club meeting. We know that a hands-on presentation provides more than information about a subject; it also creates memories and personal experience associated with the event. In other words, a good hands-on presentation can put the fun back into learning!"

Another inspirational story in this same issue of *CQ VHF* magazine is the "The Flight of El Fenix, North Texas Balloon Project Number 10" (p. 10), co-authored by Doug Howard, KG5OA, and Tommy Davis, W5TCD. It had been five years since the Lockheed Amateur Radio Club launched and tracked a weather balloon containing an amateur radio payload. This time they wanted to include youth as part of the launch experience, so they involved the Boy Scouts.

e-mail: <n6cl@fuller.edu>

VHF Plus Calendar

Dec. 7	Moon apogee. Poor EME conditions.
Dec. 9	Full Moon.
Dec. 10	Highest Moon declination.
Dec. 14	Good EME conditions. *Geminids meteor shower predicted peak.*
Dec. 16	Last quarter Moon.
Dec. 21	Moderate EME conditions.
Dec. 23	Moon perigee, New Moon, and lowest Moon declination. *Ursids* meteor shower predicted peak.
Dec. 28	Good EME conditions.
Dec. 30	First quarter Moon.
Jan. 4	*Quads* meteor shower predicted peak.

—EME conditions courtesy W5LUU.

Photo 1– The WA6TWF Super System encourages young people to take part in antenna projects. (Photo by WB6NOA)

Photo 2– Kevin Guice, KG6MIH, talks to fellow hams all over the world from his wheelchair via the Southern California Super System. Shown in the company of his companion dog Nina, Kevin keeps his fellow classmates at El Modena High School in Orange, California fascinated by his hobby. (Photo by WB6NOA)

Photo 3– Several Boy Scouts attended the Lockheed Martin ARC high-altitude amateur balloon launch this past summer. (Photos 3, 4, and 5 by KG5OA and W5TCD)

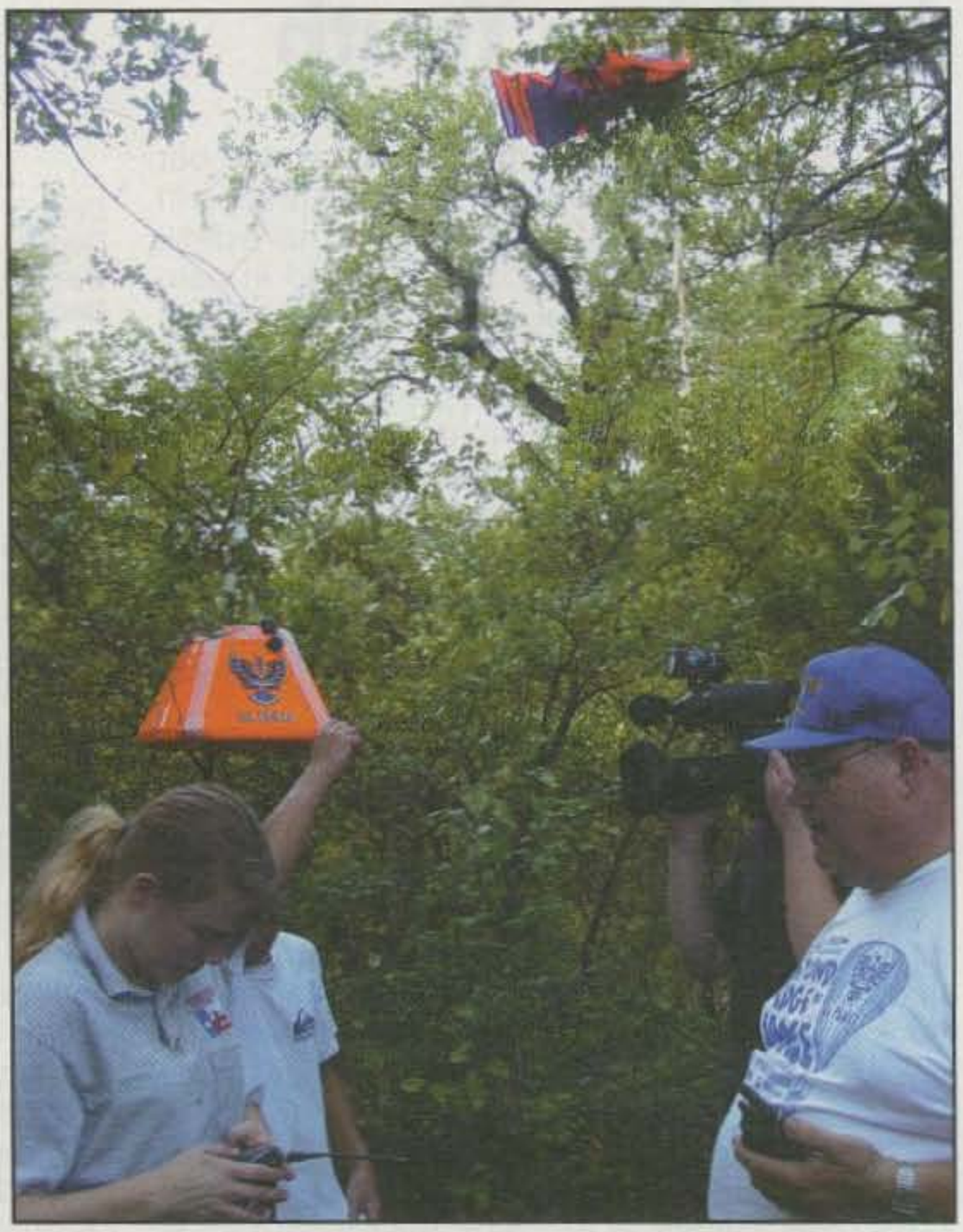

Photo 4– First to arrive on the scene of the recovery of the payload from the balloon launch were Melissa Rasmussen, KM5R, and David Forbes, KC5UYR.

Howard and Davis have this to say about their efforts to include the scouts: "In the weeks leading up to the launch, several Boy Scout troops were contacted both in Fort Worth and in Hillsboro, Texas. Members of the balloon project went to troop meetings and helped several Boy Scouts with their requirements for the Radio merit badge. The boys were invited to watch the launch. As a result of this preliminary work, several scouts showed up for the launch and said they thought it was cool to see a weather balloon go up (photo 3). They watched the live ATV video and thought that was pretty neat, as well. In an effort to maintain this relationship with the Boy Scouts, the Lockheed Martin ARC plans to work with these boys to finish their Radio merit badge by participating in Jamboree-On-The-Air (JOTA) on October 18–19." Also involved in the recovery were other young people. First to arrive on the scene of the recovery of the payload were Melissa Rasmussen, KM5R, and David Forbes, KC5UYR (photo 4).

Perhaps the most inspiring aspect of their activities is what was captured in the candid shot of Carter Reid, grandson of Dave Heald, KA5ZAM, Hillsboro, Texas airport manager. With his hands folded over his head, Carter watched in amazement as the balloon that he just held onto moments before floated away into the sky (photo 5). Truly, this is the future of our hobby!

Another September Tropo Report

The following is from **Al Ward, W5LUA:**

Here is a list of the stations I worked on the various bands during the recent tropo opening. September 6, 2003 UTC: 144 MHz—K4QI (FM06), KR8L (EM57), W8JKS (EM89), K4TO (EM77wx), K3IB (FN20), W2KV (FN20) tried 10 GHz but no luck, KB8U (EN71), KB5SSJ (EM44), K5MA (FN41) 1533 miles, K8MD (EN82), N3FZ (EN90), K2AXX (FN12cs) 1222 miles, W9UD (EN41), K2DRH (EN41), VE3AX (FN02cw) 1138 miles, and KA9CFD (EN40); 222 MHz—KR8L (EM57), WAØSJR (EM56), W9RVG (EM57), NØLIE (EM27), KB8U (EN71), K2DRH (EN41), VE3AX (FN02cw) 1138 miles, K2AXX (FN12cs) 1222 miles, K8TQK (EM89), WW8M (EN72), KA9UVY (EM58), and KA9CFD (EN40); 432 MHz—KR8L (EM57), W9RVG (EM57), KB8U (EN71), W8PA (EM88), K2AXX (FN12cs) 1222 miles, K2DRH (EN41), VE3AX (FN02cw) 1138 miles, K8TQK (EM89), and WW8M (EN72); 1296 MHz—WW8M (EN72xf) 932 miles; 2304 MHz: K4TO (EM77wx) 780 miles; and 3456 MHz—K4TO (EM77wx) 780 miles.

September 7, 2003 UTC: 144 MHz—WB8JHT (EM79), VE3EME (FM19), VE3AX (FN02cw) 1138 miles, K1TEO (FN31jg) 1404 miles, K9MRI (EN70), W8HOM (EN71), NY2Z (FN02), WZ1V (FN31mq) 1424 miles, W8BYA (EN70), and WØDQY (EM48); 222 MHz: VE3AX (FN02cw) 1138 miles, K1TEO (FN31jg) 1404 miles, WZ1V (FN31mq) 1424 miles, WØDQY (EM48), and KØWYN (EM38); 432 MHz—WB8JHT (EM79), WØDQY (EM48), W9ZIH (EN51), and KMØT (EN13); 902 MHz—K8TQK (EM89je) 858 miles, W9UD (EN41rl) 667 miles, K2DRH (EN41), and KMØT (EN13vc) 690 miles; 1296 MHz—K2DRH (EN41) and KMØT (EN13vc) 690 miles; 2304 MHz—K8TQK (EM89je) 858 miles and KMØT (EN13vc) 690 miles.

Al's report was inadvertently left out of last month's column. I apologize for the oversight.

Shooting the Duct: EME and Tropo

With all of this emphasis on tropo activity these past few months, it is interesting reading about a rather unusual tropo event that Steve Powlishen, K1FO, recently shared with the Moon Net reflector:

Many years ago—I think that it was 1984—the first weekend of the ARRL EME contest was at the end of September. On the east coast of the U.S. there was a huge tropo opening. Tropo was so good that early Sunday morning (local time), when my array was pointed southeast and elevated around 60 degrees, I started getting stations from South Carolina and Georgia calling me on tropo. I made contacts as far as 800 miles away, at about 90 degrees off of the main lobe (432 MHz).

In the late afternoon the Moon set. But I was still hearing good echoes and other 432 EME stations. It was 10 minutes after moonset and I was still hearing great EME signals. I checked my computer to see if it was wrong. I then went outside, climbed the tower to look for the Moon visually, and saw nothing. I went back into the shack and found a VK (I think it was VK5MC). It was now 30 minutes after moonset and VK5MC's signal kept getting stronger and stronger and my echoes were unbelievably strong, too. Then, all of a sudden, like someone flipped a switch, VK5MC's signal disappeared.

The explanation that I have is that I was looking into a tropo duct that came out hundreds of miles away where the Moon was still visible and in line with the duct. I've never experienced anything like that again. However, I have noticed many times in the years since that when there is super-refraction (a strong single inversion layer) I can hear my echoes up to 15 minutes before moonrise and after moonset.

Udo's Summary

The following is from **Udo Langenohl, DK5YA:**

For Europeans, year 2003 has been the most incredible 144 MHz sporadic-*E* season ever. With 41 days of openings, this year 144 sporadic-*E* has become a more or less "reg-

Photo 5–Carter Reid, grandson of Dave Heald, KA5ZAM, Hillsboro, Texas airport manager, watched in amazement as the balloon floated away into the sky.

Photo 6– There were 42 microwave enthusiasts crammed into this small conference room for the Roadrunner Microwave Group and North Texas Microwave Society joint meeting held at the Belton Hamfest on October 4. (N6CL photo)

ular DX mode" here in Europe. Never before have we seen so many strong and long openings with extraordinary high MUFs. For summaries of each day's activities, go to <http://www.dk5ya.de/es_summary_03_overview.htm> and search your favorite days by clicking on the images and checking out what happened on that date. Each date includes information gleaned from a bunch of logs and audios sent to me over the course of the year.

Dave Bostedor, N8NQS, SK

Dave Bostedor, N8NQS, became a Silent Key on August 23, losing his too short life to brain cancer. Here is what John Walker, WZ8D, one of his many friends, had to say of his passing: "Dave, N8NQS, and his dad, also Dave, K8WKZ, were very good friends of mine. Dave has now joined his dad in heaven. Both men's lives were taken way too soon by cancer. They both had a lot to offer to all of us who love the VHF bands. They will be missed."

Steve Rutledge, N4JQQ, wrote the following concerning both Daves:

Dave, Sr., K8WKZ, was my *first* 6 meter contact ever. I was living outside Detroit circa 1987 and Dave was in Jackson, MI. He was the only fellow I could raise on my Squalo and 551D. I didn't realize until later that I had made a QSO with a 6 meter legend. I kept in touch with him as I moved around the country, on the air and via e-mail. He was a class act.

Dave Jr., took up where his father left off. We too worked one another on numerous occasions and exchanged e-mails. He was dedicated to the band and keeping his father's memory alive. Dave Sr. couldn't have asked for a better son, and I'm sure that Dave Jr.'s family couldn't have asked for a better husband and father.

I miss Dave Sr. and I will sure miss Dave Jr. We are saddened here in Memphis, EM55. Rest In Peace, friends.

CQ magazine editor Rich Moseson, W2VU, commented on Dave's passing: "Dave was one of the brighter lights on the VHF spectrum from my perspective. He really had his head screwed on straight, a nice guy and a good writer, too!"

Thanks to John Fridenstine, W8PAT, for passing this information about Dave Jr. on to the VHF reflector.

Bill McGeehan, Jr., K3HCE, SK

One of the more tragic losses our community has experienced is the passing of Bill McGeehan, Jr., K3HCE. Bill Heath, AI3Z, relayed the following information concerning K3HCE: "It's with great sadness that I send you this e-mail. I learned that Bill was struck and killed by a drunk driver while he was walking home Saturday night, September 6, from an Orioles baseball game. He was attempting to cross Edmondson Avenue near his home."

Commenting on Bill's death, Bill Seabreeze, W3IY, wrote the following: "Bill was one of the VHF-UHF enthusiastic guys who gave me incentive to be active on 432 MHz back in the 1970s. He always had a good signal from Rock Hall, MD, and was a great guy to ragchew with. We will miss him greatly."

In addition, Ed Kucharski, K3DNE, wrote: "This indeed is very sad news. I have very fond memories of working Bill both from his Baltimore and Rock Hall QTHs dating back to the late 1970s. He was one of my first 432 MHz contacts. Bill was always a true gentleman and seemed to always find time to get on during a contest to give out points even if he wasn't working the contest. In recent years he could be found almost daily on 6 meters listening for that new country. It's ironic that he lost his life on the way home from a baseball game, as we spent many QSOs talking baseball and the O's. He will be missed."

RMG and NTMS Joint Meeting

The following are excerpts from Roadrunners Microwave Group secretary Lloyd Crawford, N5GDB's minutes of the RMG and North Texas Microwave Society joint meeting that took place at the Belton (TX) Hamfest on October 4, 2003 (photo 6):

Stanford Stockton, K5GO, has a new beacon up on 2304 MHz that is located slightly south of San Antonio. All Austin beacons are operational; the 1296 MHz beacon is an outstanding performer and has been heard in Tennessee.

Joe Juricka, N5PYK, described rain-scatter studies in McKinney, TX. He indicated that the optimal band for rain scatter is 10 GHz. The receiver needs to have a noise figure lower than 5 dB. The best location of storm for rain scatter is directly between one's own station and the other station. There are useful links on rain scatter on <http://www.jurecka.net>.

Al Ward, W5LUA, continued with rain scatter, part 2. He pointed out that for practical operation, 1 watt is the minimum power needed. One should send dashes while trying to acquire a contact. Al discussed distance records, classification of the path, and how to classify records. The NTMS website will be used to post rain-scatter information. Al is soliciting record distances via rain scatter. Send e-mails to him at <al_ward@agilent.com>.

Tom Haddon, K5VH, described a New Triangular Dual-Band Feed. This feed has less blockage than coffee-can dual-band feeds. It uses 60-degree triangle ground planes for which no machining is required, as they are made from PC-board material. There are two full-wave loops coaxially mounted. The whole assembly must be slid in and out from the dish to find the optimum location. Tom will publish a description of this feed in the April 2004 Southeast VHF Conference *Proceedings*. Isolation between the two feeds is poor, so notch filters (about 30 dB notch) are needed in both feedlines for the other frequency. The notch filters are achieved by using a coaxial "Tee" fitting and a 1/4-wave stub.

Bob Templin, W5OE, described an improved high-current power supply that corrects elements of the WW2R design; see <http://www.linear.com> for details on the regulators used. The final-output regulators are in parallel for increased output, and they require only two feet of #18 wire as ballast resistors for each regulator. Bob showed lots of diagrams. He will write up the presentation and post it on the <http://www.k5rmg.org>Technical Forum page.

The two Texas-based microwave-specialty clubs pretty much encompass all of Texas, with RMG covering the

southern portion and NTMS covering the northern portion. This was no small meeting. There was a total of 42 attendees. Among them, 29 members of NTMS, 24 members of RMG, 38 members of the ARRL, and 14 members of AMSAT. Of the NTMS and RMG members, 15 are members of both organizations. They plan a once-a-year joint meeting at the fall Belton Hamfest, which provides a way for each group to get caught up on what the other is working on or developing.

Current Meteor Showers

December: Two showers occur this month. The first, the *Geminids*, is predicted to peak around 1510 UTC on 14 December. The actual peak can occur 2.5 hours before or after the predicted peak. It has a broad peak and is a good north-south shower, producing an average of 100–110 meteors per hour at its peak.

The second, the *Ursids,* is predicted to peak around 0100 UTC on 23 December. It is an east-west shower, producing an average of greater than 12 meteors per hour, with the possibility of upwards of 90 at its peak.

January: The *Quandrantids,* or *Quads,* is a brief, but very active meteor shower. The expected peak is around 0450 UTC on 4 January. The actual peak can occur three hours before or after the predicted peak. The best paths are north-south. Long-duration meteors can be expected about one hour after the predicted peak.

For more information on the above meteor-shower predictions see Tomas Hood, NW7US's "Propagation" column elsewhere in this issue. Also visit the International Meteor Organization's website: <http://www.imo.net>.

And Finally . . .

I have been inspired! As mentioned above, the fall issue of *CQ VHF* magazine contains an article by Jason Baack, N1RWY, concerning using amateur television in a radio-controlled toy. Reading his article for the magazine got me hooked. I am now the proud owner of a radio-controlled Hummer® H2 sold exclusively at Wal-Mart stores and via their website, <http://www.walmart.com>.

It may be a bit ambitious, but I hope to debut my ATV RC at the Tulsa Green Country Hamfest in March 2004. If not then, at least I will have it on display at the CQ booth at Dayton. Those of you who read Jason's article will know that Jeff Basting, N8QPJ, who built a homebrew ATV RC, inspired him. I, too, am inspired by Jeff's accomplishment. For more info on Jeff's car, see <http://www.detroitatvrepeater.com/car.htm>.

Someone once said something about ages of boys and the size of their toys. Yes, I am guilty of being a child at heart. It is, however, in being a child at heart that we can approach the future generation of ham radio operators with the sincerity that they will respect. With that respect we will be able to enter into their lives to inspire them to become a part of our great hobby.

What are you doing to inspire young people to get involved in our hobby? Please let me know. If it is a unique idea, write about it and maybe we will publish it in a future issue of *CQ* or *CQ VHF* magazine.

In the meantime, however, please also keep me informed of the fun you are having on the VHF-plus ham bands. This column is yours to let the rest of us know what you are doing on our favorite ham bands. Thank you again so very much for making it the success that it is.

Finally, my wife, Carol, W6CL, joins me in wishing you the best of the holiday season and a happy, prosperous, and inspirational New Year.

Until next month (and year) . . .

73, Joe, N6CL

dx

BY CARL SMITH,* N4AA

Upcoming Peter I DXpedition

It has been an interesting fall DX season so far, it being early October as I write this. We've had several DXpeditions to chase after, with more to look forward to in the next few months. I must note the situation with the Annobon DXpedition. After being on the air for several days, the operation abruptly ended. It was a few days before we learned that the operators had been ordered to shut down and leave the island. As of this writing we still do not know what brought about this problem. Three of the four operators were allowed to leave, but Elmo, EA5BYP, remained. Hopefully by the time you read this we will have learned more about Elmo and the reason for the sudden stopping of the 3C0V operation.

Out in the Pacific now we find Mike, KM9D, and Jan, KF4TUG, island hopping and bringing a number of those islands to the Deserving. Vlad, UA4WHX, was island hopping as well, signing FW/AC4LN, followed by 3D2VB/R on Rotuma, a nice one. Henryk, SMØJHF, was active from Senegal as 6W/SMØJHF and then moved on to The Gambia as C56JHF. The German team did a great job from Christmas Island as VK9XW before moving on to Cocos Keeling as VK9CD.

Eddy, 3W22S, obtained this special event callsign, valid from October 1 to December 31. Vietnam is hosting the 22nd South East Asia Games this year. Eddy's website (www.qsl.net/3w22s) has more on this, as well as on-line logs. Eddy is active on 160–6 meters on SSB, CW, RTTY, and PSK31.

4U1UN at the UN Headquarters in New York City always generates large pile-ups when the station is active. My friend Pedro, HK3JJH, was expected to operate from there on October 12 for a period of time, and possibly another day the following week.

Edi Giorgadze, 4L4FN (on the left), the man who gave a North Korea contact to thousands, having dinner with Laurie Margolis, G3UML, in Ankara, Turkey in April 2003. Laurie was on assignment for BBC News in Turkey and found out that Edi was working in the country for the UN World Food Programme. Edi is one of a team of well-known DXers who were in Iraq to help restore the telecommunications infrastructure. He was to move to Angola and hoped to be back on the air. (Photo courtesy Laurie, G3UML)

Peter I DXpedition

This month I have a special feature for you concerning the upcoming DXpedition to Peter I, scheduled for January/February 2004. Mike Mraz. N6MZ, one of the team members, provides us with some insight into the location, a bit of its amateur radio history, and some of the planning for the 2004 DXpedition to Peter I:

It's always fun to observe a DXpeditioner chatting with non-ham friends. Inevitably, the subject of the conversation turns to the most recent DXpedition, and at that point, the listeners' faces slowly twist into that quizzical "You went *where* to do *what*?" expression. Surely, the upcoming 2004 Peter I Island DXpedition will cause many amusing expressions come this winter!

Peter I Island is one of the most inhospitable, albeit starkly beautiful, locations on the DXCC entity list. Other than the research bases on the Antarctic continent, 3Y/p is the southernmost DXCC entity on the planet. Located just a hair north of 69 degrees south latitude in the Bellingshausen Sea, Peter I is 650 statute miles closer to the South Pole than Thule Island in the South Sandwich group, 1000 miles closer than Bouvet, and 1100 miles closer than Heard Island.

Russian Imperial Navy captain Fabian Gottlieb von Bellingshausen discovered Peter I on January 21, 1821, and historians generally consider it the first land mass discovered south of the Antarctic Circle. Well over a century later, on February 2, 1929, Ola Olstad made the first successful landing, claiming Peter I for Norway. The island's area is 158 square km (61 square miles, or 39,000 acres), and glaciers cover about 95% of it. Lars Christensen Peak, the extinct volcano that forms the island's highest point, climbs 1755 m (5,760 ft.) into the Antarctic sky.

One of the most challenging features of the island from an expedition point of view is that there is essentially no way to access the habitable portion of the island (that is, the flat top of the northernmost glacier) without a helicopter. There are a few tiny rocky beaches, but the unstable, crumbling sheer cliffs of the glaciers are about 45 m (150 ft.) high at the "beach," and only a winged creature would dare to make that ascent! Speaking of creatures, wildlife on Peter I is nearly non-existent.

Weather-wise, Peter I is about what you'd expect for an Antarctic island in mid-summer. As expedition

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co-leader Ralph Fedor, KØIR, explains, "We'll see air temperatures ranging from –5°C to +5°C (23°F to 41°F), and winds from calm to 60 knots plus (70 mph plus). Visibility will vary from flawlessly clear to total white-out in blizzards, and four continuous days of zero-visibility fog is a common occurrence."

Having led the last DXpedition to Peter I, Ralph knows first-hand the brutality of this island's weather. "In 1994, we experienced true blizzard conditions. During one storm, the snowfall was so intense that the generators became covered with two feet of snow, which then froze into a block of ice. The generators stopped running and we had to wait until the storm subsided to rescue them. Driven by 60 mph winds, the snow blew into every tiny crack in the shelters; one morning we found a 2 foot high pile of snow in a corner of the sleeping tent!"

Understandably, amateur radio operations from Peter I have been exceedingly

The WAZ Program

10 Meter SSB

555 ..... N6DKZ

15 Meter SSB

600 ..... JA1BON
601 ..... HL5BMX

20 Meter SSB

1115 ..... AC4XL
1116 ..... HL3GOB

12 Meter CW

43 ..... HB9DDZ

15 Meter CW

315 ..... IV3IYH

17 Meter CW

52 ..... HB9DDZ

20 Meter CW

538 ..... IKØHBN

30 Meter CW

57 ..... N4NX

160 Meters

187 ..... N2NU (32 zones)
188 ..... G3KWK (30 zones)
189 ..... N5RG (30 zones)

All Band WAZ SSB

4883 ..... N7PV
4884 ..... KB8UUZ
4885 ..... K7LOU
4886 ..... HL5BMX

Mixed

8256 ..... DLØKB
8257 ..... KM5WR
8258 ..... JA7GUT
8259 ..... JA2BVS
8260 ..... 4Z5CX
8261 ..... 9A5V
8262 ..... 9A7Z
8263 ..... KF7TY

All CW

388 ..... HL3GOB
389 ..... W2CDO
390 ..... EI4BZ

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Paul Blumhardt, K5RT, 2805 Toler Road, Rowlett, TX 75089. The processing fee for all *CQ* awards is $6.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $12.00 for nonsubscribers. Please make all checks payable to Paul Blumhardt. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. K5RT may also be reached via e-mail: <k5rt@cq-amateur-radio.com>.

The WPX Program

SSB

2877 .....AK6I 2878 .....YBØCBI

Mixed

1928.....WB5JID

CW: 1400 JH3SAC. 1900 W8UK. 4850 W1CU.

SSB: 450 EA3FYD. 550 K2PH. 700 OM7CA. 1500 NG9L. 2000 W9IL. 3000 KF2O.

MIXED: 500 WB5JID. 2800 W9IL. 3600 KF2O.

15 Meters: OM7CA

S. America: G4PWA

Award of Excellence Holders: N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GQ, W4BQY, IØJX, WA1JMP K0JN, W4VQ, KF2O, W8CNL, W1JR, F9RM, W5UR, CT1FL, WA4QMQ, W8ILC, VE7DP, K9BG, W1CU, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, I8YRK, SMØAJU, N5TV, W6OUL, ABØP, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POF, DJ4XA, IT9TQH, ONL-4003, W5AWT, KBØG, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1PO, K9LNJ, YBØTK, K9QFR, 9A2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MC, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, KZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, S53EO, DF7GK, I7PXV, S57J, EA8BM, DL1EY, KØDEQ, KUØA, DJ1YH, OE6CLD, VR2UW, 9A9R, UAØFZ, DJ3JSW, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RAØFU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A, IZ5BAM, W4BP, K4LQ, KØKG, DL6ATM, VE9FX, DL2CHN.

160 Meter Endorsement: N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8RSW, W8ILC, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF, N4NX, SM0DJZ, DK3AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR1QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N8JV, ONL-4003, W5AWT, KBØG, F6BVB, YU7SF, DF1SD, K7CU, I1POR, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, WBØDD, IØRIZ, I2MQP, F6HMJ, HB9DZZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA5CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, KØDEQ, DJ1YH, OE6CLE, HB9BIN, N1KC, SM5DAC, S51U, RAØFU, UAØFZ, CT4NH, W1CU, EA7TV, LY3BA, RW9SG, K1NU, W1TE, UA3AP, OK1DWC, KX1A, IZ5BAM, W4GP, DL6ATM.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage if airmail desired) to "CQ WPX Awards," P.O. Box 593, Clovis, NM 88101 USA. ***NOTE:*** *WPX will not accept prefixes/calls which have been confirmed by computer-generated electronic means.*

5 Band WAZ

As of October 15, 2003, 639 stations have attained the 200 zone level and 1347 stations have attained the 150 zone level.

New recipients of 5 Band WAZ with all 200 zones confirmed:

N2NU

The top contenders for 5 Band WAZ (zones needed, 80 meters):

N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
WØPGI, 199 (26)
W2YY, 199 (26)
VE7AHA, 199 (34)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40m)
NN7X, 199 (34)
IK1AOD, 199 (1)
DF3CB, 199 (1)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W6SR, 199 (37)
W3NO, 199 (26)
K4UTE, 199 (18)
HB9DDZ, 199 (31)
RU3FM, 199 (1)
HB9BGV, 199 (31)
N3UN, 199 (18)
OH2VZ, 199 (31)
K5MC, 199 (22)
W1JZ, 199 (24)
K2UU, 199 (26)
W1WAI, 199 (24)
W1FZ, 199 (26)
SM7BIP, 199 (31)
PY5EG, 199 (23)
SP5DVP, 199 (31 on 40)
W8AEF, 199 (40)
K8RR, 199 (26)
UU5JR, 199 (4)
W8GF, 199 (22)
N4NX, 199 (26)
OE2BZL, 199 (1)
EA5BCX, 198 (27, 39)
G3KDB, 198 (1, 12)
KG9N, 198 (18, 22)
JA1DM, 198 (2, 40)
9A5I, 198 (1, 16)
K5PC, 198 (18, 23)
K4CN, 198 (23, 26)
KF2O, 198 (24, 26)
G3KMQ, 198 (1, 27)
N2QT, 198 (23, 24)
OK1DWC, 198 (6, 31)
W4UM, 198 (18, 23)
US7MM,198 (2, 6)
K2TK, 198 (23, 24)
K3JGJ, 198 (24, 26)
W4DC, 198 (24, 26)
N4XR, 198 (22, 27)
N4PQX, 198 (24, 26)
RU3DX, 198 (1, 6)
UT5JAJ, 198 (12, 30)
N6HR/7, 198 (34, 37)
N4MM, 198 (24, 26)
OE2LCM, 198 (1, 31)
EA7GF, 198 (1, 27)
W7SX, 198 (18, 23)

The following have qualified for the basic 5 Band WAZ Award:

DL2KQ (190 zones)
W2OO (170 zones)
G3KWK (196 zones)

Endorsements:

OE2LCM (198 zones)
EA7GF (198 zones)
KY7M (200 zones)
UA4PO (200 zones)
DF9ZA (200 zones)
W7SX (198 zones)
N4GG (191 zones)

****Please note: Cost of the 5 Band WAZ Plaque is $80 ($100 if airmail shipping is requested).**

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Paul Blumhardt, K5RT, 2805 Toler Road, Rowlett, TX 75089. The processing fee for the 5BWAZ award is $10.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $15.00 for nonsubscribers. An endorsement fee of $2.00 for subscribers and $5.00 for nonsubscribers is charged for each additional 10 zones confirmed. Please make all checks payable to Paul Blumhardt. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. K5RT may also be reached via e-mail: <k5rt@cq-amateur-radio.com>.

Ever wonder where some of those big signals on 40 meters come from? Here's a 40 meter quad that Robbie, W9RSR, and Bob, KC9AWS, built and put up for Robbie near Mexico, Indiana. They built it mostly from parts from their respective antenna scrap piles, the majority being used Hy-Gain parts. It took both of them working for nearly two weeks to build and install it. Robbie says he has about $250 in new materials in the antenna and it works great all over the world. (Photo courtesy Bob, KC9AWS)

rare. The inaugural DXpedition occurred in January/February 1987 by LA1EE and LA2GV, using callsigns 3Y1EE and 3Y2GV. They made about 17,000 QSOs. Ralph, KØIR, led the next expedition in January/February 1994; that team made about 60,000 QSOs, easily moving Peter I out of the Top 10 Most Wanted DXCC entities list for several years.

According to expedition co-leader Bob Allphin, K4UEE, "It seems that there's about a 10-year wait until a rare DXCC entity works its way back into the 'Top 10 list' again." It's been almost 10 years since the last operation, and sure enough, Peter I is ranked #7 by *The DX Magazine* and #4 by the '425 DX News.'" Says K4UEE, "It's time to go back!"

As you would expect, a safe and successful expedition to a location such as Peter I is an incredibly expensive endeavor. K4UEE, the team expert on transportation, notes, "Chartering a ship that operates in Antarctic waters, of sufficient size to transport a team of 15 along with all necessary life-support gear and expedition equipment and provisions, *and* capable of carrying a helicopter and its associated support equipment and crew, is the single largest expense. And believe me, it's a *very large* expense!" According to Bob, the search for a charter vessel took almost a year. "We negotiated with several private ship owners before deciding upon *M/V Ushuaia*, an 88 m (290 ft.) former NOAA vessel with an ice-strengthened hull. We had serious discussions with the National Science Foundation and the US Coast Guard, which operate two huge Seattle-based icebreakers in the Antarctic, *Polar Sea* and *Polar Star*. We even looked into flying to the island in the LC-130 Hercules aircraft that operates on the Antarctic continent. For a number of reasons, we decided that *Ushuaia* was the way to go." Appropriately, the team's ship operates out of Ushuaia, Argentina, the southernmost town in the world.

THE WPX HONOR ROLL

The WPX Honor Roll is based on the current confirmed prefixes which are submitted by separate application in strict conformance with the CQ Master Prefix list. Scores are based on the current prefix total, regardless of an operator's all-time count. Honor Roll must be updated annually by addition to, or confirmation of, present total. If no up-date, files will be made inactive.

MIXED

5167 9A2AA	3770 YU1AB	3233 WB2YQH	2824 W2ME	2436 W7LM	2018 HA9PP	1697 Z35M	1369 KW5USA	742 K5IC
4641 W2FXA	3726 I2PJA	3140 I2EOW	2772 YU7GMN	2390 W8UMR	2005 VE6BF	1674 YB0AI	1226 EA2BNU	738 AK6I
4257 W1CU	3668 N4MM	3140 K9BG	2655 WA1JMP	2376 JN3SAC	1999 I2EAY	1587 W2EZ	1163 K6UXO	710 KØCF
4154 F2YT	3548 N9AF	3121 PAØSNG	2643 W9IL	2361 W6OUL	1976 DJ1YH	1561 N1KC	1130 PY1NEW	697 KL7FAP
4098 EA2IA	3489 SM3EVR	3088 KØDEQ	2627 W3AP	2340 K5UR	1958 CT1EEB	1535 AI6Z	953 PY4WS	
4014 9A2NA	3465 N5JR	3008 IK2ILH	2585 9A4W	2304 OZ1ACB	1837 AA1KS	1521 NG9L	933 SM7GXR	
3999 N4NO	3376 I2MQP	3005 HAØIT	2531 W9OP	2212 PY2DBU	1772 VE9FX	1502 KX1A	865 N5DD	
3833 N6JV	3334 KF2O	2952 W2WC	2510 K9UQN	2203 W4UW	1724 W7CB	1487 WT3W	852 W2OO	
3823 VE3XN	3281 S53EO	2944 IT9QDS	2454 K2XF	2126 WB3DNA	1705 KØKG	1472 OK1DWC	803 VE3NQK	

SSB

4446 IØZV	3211 9A2NA	2816 KF2O	2350 IN3QCI	1969 CT1EEB	1839 I3ZSX	1538 VE9FX	1193 I2EAY	903 N9DI
4050 ZL3NS	3198 I2MQP	2741 PAØSNG	2337 W2WC	1954 CT1EEN	1736 K3IXD	1533 KI7AO	1190 K4CN	893 KX1A
4018 VE1YX	3165 EA2IA	2734 4X6DK	2325 CX6BZ	1943 W3AP	1721 DK5WQ	1520 DF7HX	1162 EA5DCL	822 K1BYE
3705 I2PJA	3121 N4NO	2646 LU8ESU	2301 HAØIT	1937 I8LEL	1704 IT9SVJ	1460 NG9L	1148 AG4W	812 KU6J
3649 F6DZU	3049 F2VX	2594 I8KCI	2259 K5RPC	1933 W9IL	1685 W6OUL	1385 JN3SAC	1082 VE7SMP	793 KU4BP
3354 EA8AKN	2960 I4CSP	2513 KF7RU	2094 LU5DV	1893 NQ3A	1670 K8MDU	1384 LU3HBO	1078 EA3KB	776 YBØAI
3260 CT4NH	2938 CT1AHU	2509 EA5AT	1994 W4UW	1864 K2XF	1562 W2ME	1238 LU4DA	1048 EA3EQT	733 AK6I
3243 OZ5EV	2885 N5JR	2455 EA1JG	1988 K5UR	1862 EA7TV	1562 SV3AQR	1218 WT3W	1043 AI6Z	
3234 N4MM	2817 I2EOW	2388 OE2EGL	1978 N6FX	1852 W7OM	1555 W2FKF	1194 N1KC	990 HA9PP	

CW

4273 WA2HZR	2831 9A2NA	2341 KA7T	2106 W3AP	1868 VE6BF	1679 EA7AAW	1342 WO3Z	1118 HB9DOT	767 VE9FX
3834 N6JV	2583 W2ME	2325 KF2O	2102 N6FX	1847 IK3GER	1671 DJ1YH	1309 AC5K	1081 W4UW	642 PP6CW
3558 N4NO	2578 N5JR	2312 JA9CWJ	2047 JN3SAC	1846 KS4S	1668 I2EAY	1282 DF6SW	1075 WA2VQV	
3476 K9QVB	2558 N4MM	2197 W8UMR	1955 G4SSH	1834 W9IL	1531 I2EOW	1235 AI6Z	988 KX1A	
3469 VE7CNE	2428 W2WC	2149 K9UQN	1938 LU2YA	1803 W6OUL	1520 4X6DK	1158 YU1TR	898 WT3W	
3178 EA2IA	2399 HAØIT	2147 I7PXV	1919 K2XF	1798 W7OM	1483 EA6AA	1146 K6UXO	830 N1KC	
2948 LZ1XL	2386 EA7AZA	2112 OZ5UR	1898 K5UR	1694 I2MQP	1430 EA2CIN	1118 EA2BNU	809 KU6J	

Carlos, D44AC, turned 50 on September 4th this year. Better known by his nickname "Pulu," he lives in Mindelo, Sao Vincente, Cape Verde Islands. According to Henryk, SMØJHF, Pulu is very hospitable and generous. He likes to meet visitors, and anyone visiting Mindelo can easily spot his white house on the slope overlooking the Mindelo harbor. He recently helped serious contest-minded Alex, 4L5A, set up a very efficient contesting station on the top of Monte Verde hill, some 774 meters above sea level on Sao Vincente Island. Alex operates as D4B from Monte Verde. (Photo courtesy Henryk, SMØJHF)

The 1997 VKØIR Heard Island expedition demonstrated that careful selection of team members is extremely important to expedition success. KØIR, also co-leader of VKØIR, explains, "As you can imagine, bringing 15 or 20 near-strangers together on a stressful, uncomfortable, and potentially dangerous trip to an isolated, uninhabited island has plenty of potential for interpersonal friction." Ralph adds, "On VKØIR, the expedition leaders put every team member through a very rigorous selection process, and the result was amazing. Believe it or not, during those six weeks everyone got along incredibly well, and we all bonded and worked together for the common goals of a successful expedition and high personal satisfaction. It was an incredible experience, something that's difficult to describe."

Bob and Ralph have used a similar screening process to select the team for the Peter I expedition. According to K4UEE, "When an expedition is done correctly, there's a certain camaraderie that grows among the team members. Regardless of their nationality, they inevitably become lifelong best friends, sharing something that few people get to experience. It's like members of the same platoon who have been in combat together—a special bond. If you don't believe me, the next time you're at the Dayton Hamvention and you see DXpedition team members reunited, notice all the emotional hugs."

The carefully selected team of 15 experienced amateurs from five countries plans to operate at least five high-power stations for up to three weeks in January 2004. They plan to set new standards for satisfaction of the deserving and are trying some new ideas to add fun and excitement

CQ DX Awards Program

SSB

2415 K4DXA 2416 W6OUL

CW

1053 W6OUL

SSB Endorsements

320 K1UO/334 320 W6OUL/321
320 K4DXA/328

CW Endorsements

320 WA8DXA/328 310 OZ5UR/319
320 W6OUL/327 300 UA9SG/309

RTTY Endorsements

320 WB4UBD/330

The basic award fee for subscribers to *CQ* is $6. For non-subscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. All updates and correspondence must include an SASE. Rules and application forms for the CQ DX Awards may be found on the <www.cq-amateur-radio.com> website, or may be obtained by sending a business-size, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Currently we recognize 335 active countries. Please make all checks payable to the award manager.

to the operation. Stay tuned to the team website, <http://www.peterone.com>, for more information.

As you can imagine, this is a *huge* project. KØIR, K4UEE, and the other expedition organizers have been working overtime for the past year, planning the expedition and recruiting top operators. Fifteen fellow DXers will contribute six to seven weeks of their personal time and write very large personal checks to make this operation a success. Please consider a generous contribution to the 2004 Peter I DXpedition. Checks from individuals for $250 or more can be made via the Northern California DX Foundation (NCDXF, see <http://www.ncdxf.org>), and these donations should be tax deductible for United States taxpayers (please consult your tax advisor). All other checks should be made payable to: Bob Allphin/Peter I Expedition, c/o Wes Lamboley, W3WL, 690 Hunter Hill Way, Roswell, GA 30075.

Next year, try to catch members of the team at Dayton, and see how their faces look when they talk about the 2004 Peter I DXpedition! —*Mike, N6MZ*

This is a very ambitious project to be sure and a country that many DXers need. It is an experienced team that knows the perils of operating from the Antarctic region. They are sure to cause Peter I to drop dramatically on the Most Wanted lists for at least another ten years.

Until next time, I hope you have a great holiday season as we look forward to a New Year. 73, Carl, N4AA

Andy, UA3AB, attended a local DX/IOTA meeting in Lipetsk City. Among those in attendance were the above Russian DXCC Honor Roll # 1 holders (left to right): Vlad, UA1BS; Andy, UA3AB; Ark, UA4CC; and Victor, UA4HBW. (Photo courtesy Andy, UA3AB)

QSL Information

1A6SBO via KE7EQ
1X5AA via W3HNK
3A/IK1SLP via I1YRL
3A3WPX via DJ9ZB
3B8DB via NA5U
3B9DB via NA5U
3B9DR via DJ9ZB
3CØA via DJ9ZB
3CØF via DJ9ZB
3CØNNN via DJ9ZB
3CØR via DJ9ZB
3CØV via DJ9ZB
3C2JJ via F5OGL
3D2IF via KQ1F
3D2MG via ZS6MG
3D2MN via DF8AN
3D2NC via AC6DD
3D2NR via YU1NR
3D2PR via KQ1F
3D2RH via KB7NK
3D2TT via YU1DX
3DAØMT via NA5U
3DAØWPX via ZS6WPX
3E1AA via WC4H
3E1CW via WC4H
3E1DX via WC4H
3E5ØØXVH via WC4H
3F2XVH via WC4H
3G1P via XQ1IDM
3W8GL via F5OGL
3XY2D via W3HNK
3XY5A via K4ZLE
3YØAC via KE7EQ
4D71X via NZ7X
4K6DI via W3HNK
4LØDXP via K1WY
4L1R via W3HNK
4L8A via OZ1HPS
4M7X via WA4WTG
4M9YY via 4M9YY
4N1YL via K1WY
4N4AX via WA4WTG
4N4CX via WA4WTG
4N5JA via Z36W
4N5KV via Z35M
4N7ØDX via YU1DX
4O1V via YU1DX
4S7DA via W3HNK
4S7OF via KØJN
4S7RO via DJ9ZB
4S7VK via DJ9ZB
4UØITU via KC7V
4U1ITU via I1YRL
4W1AF via DJ9ZB
4W1ZB via DJ9ZB
4W3CW via G3WQU
4W6AN via VK4AAR
4X/K7NJ via WA4WTG
4X/NP3D via W3HNK
4X1UH via W3HNK
4X2BYB via WA4WTG
4X3A via WA4WTG
4X4BYB via WA4WTG
4X4DH via AA6AD
4X4FF/5N4 via WA4WTG
4X4NJ via WA4WTG
4X4UF via WA4WTG
4X6FR via 4X6OM
4X6NBO via AF2C
4X9HQ via AA6AD
4Z4HF via WA4WTG
4Z4LF via WA4WTG
4Z4VB via WA4WTG
5A1HA via DJ9ZB
5A21PA via K1WY
5A24PA via PC1A
5A3Ø via K1WY
5B4/EU1AA via W3HNK
5B4/NP3D via W3HNK
5B4AGM via W3HNK
5B4AHJ via G3PMR
5H1F via KQ1F
5H1F/3 via KQ1F
5H1X via KQ1F
5H1X/2 via KQ1F
5H1X/3 via KQ1F
5H2MN via DF8AN
5H3PM via I1YRL
5I3A via KQ1F
5JØJ via N1WON
5NØDKV via ZS6MG
5NØEVR via LZ3XV
5NØHVC via OK1DXE
5NØNAS via KZ5RO
5NØSVL via WA4WTG
5N4/4X4FF via WA4WTG
5N4ROF via K1BV
5N6/KE6GEM via K4ZLE
5R8/F2CSS via KE7EQ
5R8EO via DC8TS
5R8ET via K1WY
5R8OP via F6BFH
5T5AO via DC8TS
5T5AZ via KB7NK
5T5PBV via JA1PBV
5T5ZZ via K1BV
5U2K via I2YSB
5U3T via I2YSB
5U7JB via ON5NT
5U7JK via I2YSB
5U7MF via KC7V
5U7Z via DJ9ZB
5V7MF via KC7V
5V7MN via DF8AN

(The table of QSL Managers is courtesy of John Shelton, K1XN, editor of "The Go List," 106 Dogwood Dr., Paris, TN 38242; phone 731-641-4354; e-mail: <golist@golist.net>.)

BY TED MELINOSKY,* K1BV

Opportunity Calling . . .

A recent e-mail inquired how many states offer a version of an all-counties worked award. I checked this out and learned that 24 states offer at least one: AR, AZ, CA, CO, CT, DE, FL, LA, MD, MN, NC, NH, NJ, NY, ND, OH, PA, SC, TX, VT, WA, WV, WI, and WY. Technically speaking, MA, RI, and ME are included in the Worked All New England Award, but don't offer a separate certificate. That means 26 states don't offer an "all-counties award" of their own. There's a perfect opportunity! If your state is not included in the list above, you might want to volunteer your expert services to your local club to develop and sponsor one of your own. Most clubs have (or know of) a graphic artist who can design a great certificate. Also, with high-quality ink-jet printers available for under $100, it's possible to avoid high-priced print shops and print them only when the certificates are needed. I'll gladly send you a sheet of tips and suggestions to get your club's project off and running. Just supply an SASE to my mailing address shown at the bottom of this page.

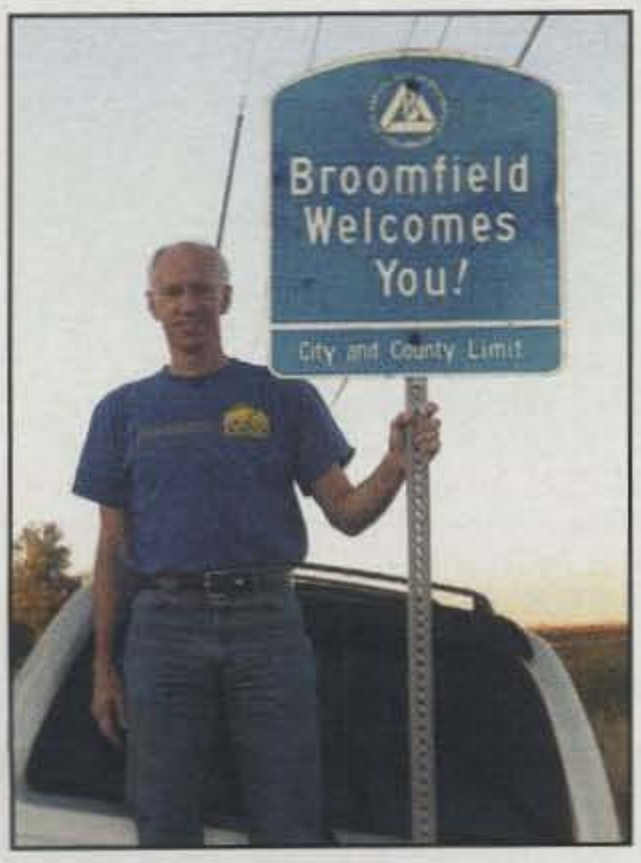
County Hunter's Special Achievement

On April 15, 1987, F. Alan Fischer, K8CW, added several endorsements to his USA-CA #539—All mobile, All SSB, and All CW. Unfortunately, he never received the endorsements. In the meantime, Alan worked sufficient new counties on 40 meters so that his award now has only 40 meter contacts as well. Alan now has his endorsements, both old and new, and we congratulate him on this unique and special effort.

Larry Benko, WØQE, USA-CA #1074

This month we hear from Larry, WØQE, USA-CA #1074, September 26, 2003:

I am 53 years old and have been licensed since 1964. I was first licensed as WN3BLE in Pittsburgh, Pennsylvania, and later as WA3BLE. I have always enjoyed all modes of amateur radio operation, with CW being my favorite. I spent thousands of hours in the NTS system when I was younger. I graduated from college with a BS in Electrical Engineering, followed by a MS also in EE, and have been an engineer all my life. Most of my career has been in telecommunications, and I have also started two companies along the way. I upgraded to Extra in 1968. I previously held the non-vanity call ACØB, and in 1999 changed to the vanity call WØQE.



Larry Benko, WØQE, USA-CA All Counties #1074, September 26, 2003.

USA-CA Special Honor Roll

Larry Benko, WØQE
USA-CA All Counties #1074
September 26, 2003

Terry Dummler, WQ7A
USA-CA All Counties #1075
September 26, 2003

USA-CA Honor Roll

500		2500	
WØVD	3260	WØQE	1185
1000		**3000**	
WØVD	1638	WQ7A	1096
2000		WØQE	1097
WØQE	1265		

The total number of counties for credit for the United States of America Counties Award is 3077. The basic award fee for subscribers is $6.00. For nonsubscribers it is $12.00. To qualify for the special subscriber rate, please send a recent CQ mailing label with your application. Initial application may be submitted in the USA-CA Record Book, which may be obtained from CQ Magazine, 25 Newbridge Road, Hicksville, NY 11801 USA for $2.50, or by a PC-printed computer listing which is in alphabetical order by state and county within the state. To be eligible for the USA-CA Award, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated June 1, 2000. A complete copy of the rules may be obtained by sending an SASE to Ted Melinosky, K1BV, 12 Wells Woods Road, Columbia, CT 06237 USA. DX stations must include extra postage for airmail reply.

My primary amateur radio interests are high-speed CW (although not quite as fast as when I was younger), on-foot international-style ARDF *(amateur radio direction finding—ed.)*, other forms of hidden transmitter hunting, occasional contesting, and recently county hunting. I am active on all bands from 160 meters through 70 cm and have completed Worked All States on CW on all nine bands from 160–10 meters. I still need four states on 6 meters, but may need to wait for the next solar cycle to complete band #10. I also enjoy troubleshooting and solving RF interference issues and quite often run a kilowatt with small antennas in a neighborhood with quarter-acre lots with no interference issues. Non-radio interests include long-distance mountain running, and I have run to the top of Pikes Peak many times, starting from Manitou Springs.

I live in Broomfield, Colorado, which county hunters know as the "new" county. Nearly 50 years ago the town of Broomfield was a stop along the railroad from Denver to Boulder. However, as the front range of Colorado grew, the city found itself with four counties (Adams, Boulder, Jefferson, and Weld) and jurisdictionally the city needed to do something. A statewide vote created the new county of Broomfield from parts of the four surrounding counties effective November 15, 2001. I received sporadic e-mails about the county in the months before the effective date, and I became interested in county hunting. I confirmed the county for several hundred stations in the months following November 2001, which was fun.

One of the most enjoyable aspects of county hunting has been operating CW mobile. I always assumed it was too difficult to do while in motion (especially with a manual transmission), but in fact I find it easier to do than to operate SSB. I am looking forward to more mobile contacts someday when I no longer work for a living. I value the many friends I have made while hunting counties and look forward to meeting many of them in the future. *—Larry, WØQE*

DX Awards

Belgian UBA Post Code Award. One of the rarer point-value methods used to earn a certificate is the

**12 Wells Woods Rd., Columbia, CT 06237*
e-mail: <k1bv@cq-amateur-radio.com>

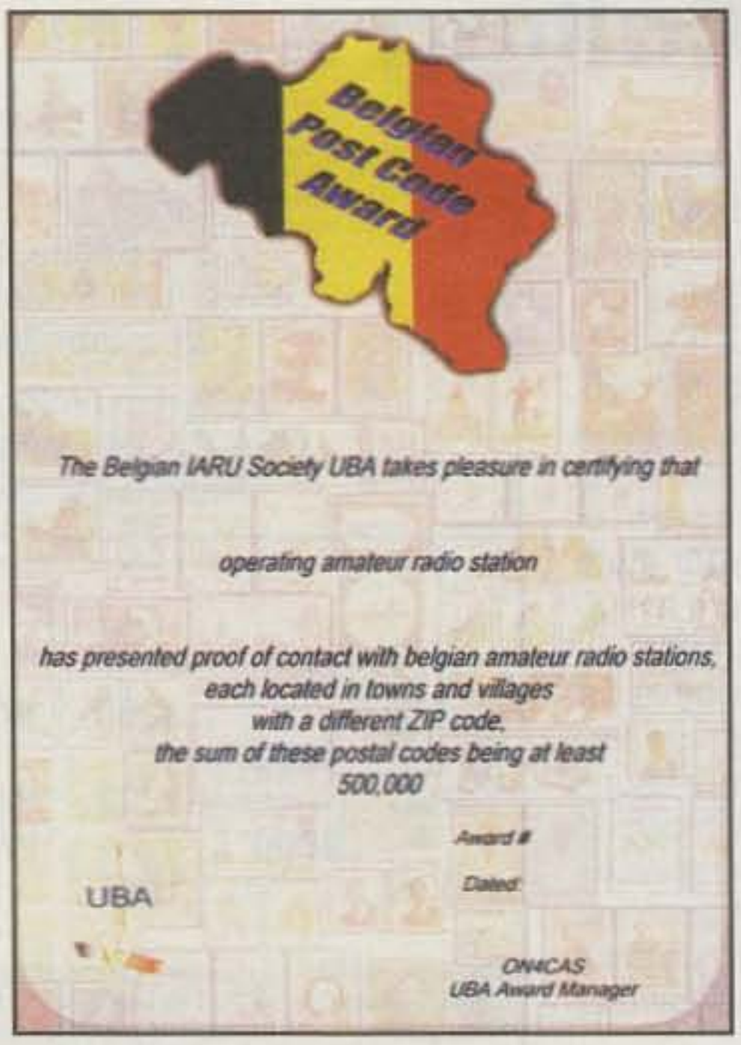
requirement to add postal codes until a qualifying level is reached. The point value is usually set high enough to make sure that you have to contact a fairly large number of the cities, towns, and villages of a particular country. The Belgian UBA has recently begun to offer their version of this kind of award. The Belgian Post Code Award uses as a background a representative collection of actual postage-stamp designs from the present time and going back over a hundred years. The Belgians have a reputation for printing some of the finest stamp designs in Europe.

The UBA Post Code Award is available for contacting Belgian stations in towns and villages each having a different postal code. SWL okay. No date limits. All bands and modes are accepted, however no use of packet or repeaters. Each postal code should be contacted only once, regardless of bands or modes used. The postal code is the four-digit number shown immediately before the city or town. Your score is the sum of all different Belgian postal codes confirmed by QSL cards.

The basic award requires 500,000 points. The first endorsement sticker requires 750,000 points with 8 different provinces. A second endorsement sticker requires 1,000,000 points with 9 different provinces. A trophy is available for a score of 1,500,000 points with all 10 provinces.

A special Excel worksheet has been created to facilitate application and score calculation. Applicants are encouraged to use this worksheet when applying for the award. This file on diskette may be accepted as an application form. The file can be downloaded from the UBA Award Mailing list webpage (http://users.pandora.be/egbert.hertsen/Postcode.html) at the "files" section. Anyone not wishing to use this file may send his/her application in form of a GCR list. Besides the usual QSL data, this list must contain the postal code of each contacted station. Every GCR list should be sorted by ascending postal codes. The award fee is 5 Euros. Endorsements are free if applied for at the same time as the initial award application. If not, an SAE plus 1 Euro should be provided. The cost of the trophy is 30 Euros. Apply to the UBA Award Manager: Egbert Hertsen, ON4CAS, Postbus 85, Mechelen 2, B-2800 Mechelen, Belgium.

Council Areas of Scotland Award (CAOSA). Just as I was unaware that France used the "canton" as a governmental unit, I was surprised to learn that Scotland uses "Council Areas" (see accompanying sidebar). The things you learn in the wonderful world of certificate hunting! Yuri, MMØDFV, supplied the rules for this new award and maintains a website at <http://www.qsl.net/mm0dfv/caosarules.htm>. Application forms are found on the website, as well as aids in identifying the Council Areas.



The UBA Post Code Award is available for contacting Belgian stations in towns and villages each having a different postal code.

Submit proof of having contacted each of the 32 Council Areas of Scotland. Endorsements available for band and/or mode. All bands and modes may be used. Contacts must be made from the same location, or from locations no ten of which are more than 100 miles apart, which is affirmed by signature of the applicant on the application. Club station applicants should include in a clear manner the club name and callsign of the club station.

Contacts since April 1, 1996 are valid for the award. Written cards must be submitted (no photocopies) and must show your callsign and indicate that two-way communication was established. Applications for specialty awards must submit confirmations that clearly confirm two-way contact on the specialty mode/band. Specialty awards are available for 160, 80, 40, 30, 20, 17, 15, 12, 10, 6, and 2 meters, Satellite, CW, SSB, FM, RTTY, SSTV, PSK31, and QRP. Any or all modes/bands may be used for the QRP award. QRP is defined as 10 watts input (or 5 watts output) for the applicant only and is affirmed by signature of the applicant on the application.

No use of repeater contacts. All stations contacted must be "land stations." Contact with ships, anchored or otherwise, and aircraft cannot be counted. Permanently docked exhibition or historic ships will be considered land based.

The sponsor reserves the right to spot check callsigns in inspecting QSL cards of applications verified by an award manager. QSLs, application form (SRARS-A-001), and record sheet (SRARS-S-001) should be submitted to the Award Manager: Tom Hughes, GM3EDZ, 8 Ossian Avenue, Ralston, Paisley, PA1 3AY, Scotland, U.K. When QSL cards are presented for verification, be sure to sort them alphabetically by Council Area, as listed on the record sheet. All QSL cards sent to the award manager must be accompanied by sufficient postage for their safe return (registered mail is recommended, because it is traceable). All applications sent to the award manager must include the appropriate fee—£6, US$10, 10 Euros, or 12 IRCs—plus return postage for each CAOSA.

To earn the Council Areas of Scotland Award, submit proof of having contacted each of the country's 32 Council Areas.

Portuguese Islands Award. School children are taught of the exploits of the Portuguese explorers as they launched the Age of Discovery, sending their ships first to the islands of the Atlantic, and then moving down the coast of Africa. The Portuguese Islands Award shows an ancient map of southern Europe and

Scottish Council Areas

ABERDEEN CITY	AD
ABERDEENSHIRE	AS
ANGUS	AG
ARGYLL AND BUTE	AB
CITY OF EDINBURGH	EB
CLAKMANNANSHIRE	CM
COMHAIRLE NAN EILEAN SIAR	ES
DUMFRIES AND GALLOWAY	DG
DUNDEE CITY	DN
EAST DUNBARTONSHIRE	ED
EAST AYRSHIRE	EA
EAST RENFREWSHIRE	ER
EAST LOTHIAN	EL
FALKIRK	FK
FIFE	FF
GLASGOW CITY	GL
HIGHLAND	HL
INVERCLYDE	IC
MIDLOTHIAN	ML
MORAY	MR
NORTH LANARKSHIRE	NL
NORTH AYRSHIRE	NA
ORKNEY ISLANDS	OR
PERTH AND KINROSS	PK
RENFREWSHIRE	RF
SCOTTISH BORDERS	SB
SHETLAND ISLANDS	SH
SOUTH LANARKSHIRE	SL
SOUTH AYRSHIRE	SA
STIRLING	SR
WEST LOTHIAN	WL
WEST DUNBARTONSHIRE	WD

Send proof of contact with a minimum of ten different Portuguese islands after 1 January 1985 to qualify for the Portuguese Island Award.

The Home Haven Award issued for contacting not only /MM stations from Odessa, but also fixed contacts with stations in Odessa itself.

northern Africa, creating a strikingly beautiful certificate that would be well worth framing for your shack.

Contact a minimum of ten different Portuguese islands after 1 January 1985. SWL okay. A complete list of the eligible islands is shown on the website <http://gpdx.netpower.pt/diplomas/dip/dip.htm>. When applying, use the twoletter prefix (province or region) and the two-digit number. The award is available for SSB, CW, and Mixed modes. Send GCR list and fee of 5 Euros, US$10, or 14 IRCs. Endorsements for 15, 20, 25, etc., islands are available for SASE only. Apply to the DIP Award Manager, Carlos Moreira, CT1AHU, P.O. Box 1156, P-2736-996 Agualva, Portugal.

Ukraine's Home Haven Award. Odessa has been a seaport for centuries, and like any port, it is "home" for its seamen. This is an interesting award that has modest requirements for contacting not only /MM stations from Odessa, but also fixed contacts with stations in Odessa itself.

This award is issued by radio amateur seamen of Odessa city. Earn 50 points for contacts with Ukraine maritime mobile stations after 1 August 1991 as shown below. All bands and modes are valid, and the same station may be contacted on different bands. Contacts through VHF repeaters do not count.

A. Two QSOs with Ukrainian maritime mobile stations are required; each counts as 15 points.

B. (/MM) QSO with cities/ports of Odessa region = 2 points.

C. QSOs with expeditions of local hams count 10 points.

D. Each QSO with a station from Odessa counts 5 points.

Cities/ports of the Odessa region include Odessa, Yuzhny, Illichivsk, Izmail, Bilhorod-Dnestrovsky, Vilkovo, Kilia, and Reni, and they are located on the shores of the Black Sea and the Danube River.

Send GCR list and fee of US$5 to: Award Manager, Eugeny V. Reutov, P.O. Box 2, Odessa, 62 65062 Ukraine.

URL of the Month

Thumbnail images of about 30 Polish awards are located at: <http://www.dyplomy.prv.pl/>. This is a beautiful montage of the designs that characterize so many Polish awards. A click on each image takes you to the club or group that sponsors the award and provides rules. However, all of them seem to be in Polish, and try as I might, I can't find a free translation service on the internet which will convert the text to English. If you know Polish, or want to see a unique way of displaying awards, this is a very interesting site.

Happy Holidays to all!

73, Ted, K1BV

BY JOHN DORR,* K1AR

Do You Have the Right Timing?

December's Contest Tip

Do you find that sometimes you're having a great run and all of a sudden the rate drops to nothing? A good solution for that problem is to ask someone who calls you a simple question: "Is my frequency clear?" I do this quite often during a contest, especially in the early and late portions of band openings as well as on the low bands—mostly on SSB. More often than not, what seems to be a perfectly clear frequency to you is a mess on the other end. This is one question that will add many points to your next contest score!

Calendar of Events

Nov. 15–16	RSGB 1.8 MHz CW Contest
Nov. 15–17	ARRL SSB Sweepstakes
Nov. 22–23	LZ DX Contest
Nov. 29–30	**CQ WW DX CW Contest**
Dec. 5–7	ARRL 160M Contest
Dec. 13–14	ARRL 10M Contest
Dec. 19	Russian 160M Contest
Dec. 20	OK DX RTTY Contest
Dec. 20–21	Croatian CW Contest
Dec. 27	RAC Canada Winter Contest
Dec. 27–28	Stew Perry Topband Distance Challenge
Jan. 1	ARRL Straight Key Night
Jan. 3–4	ARRL RTTY Roundup
Jan. 4	Kid's Day Contest
Jan. 10–11	North American CW QSO Party
Jan. 17–18	Hungarian DX Contest
Jan. 17–18	North American SSB QSO Party
Jan. 24–25	**CQ WW 160M CW Contest**

It's well understood that the skill of timing in pile-ups is a valuable asset in your contest-operating arsenal. Now while I hardly feel like a guru on this topic, I thought it would be useful to bring up the topic for discussion this month.

Let's take a straw poll in written form and see where you end up. How many of you eventually work most of the stations you're calling in a pile-up? How many of you work a good deal of the stations you call in a pile-up on the first attempt? How many of you routinely work stations in a pile-up with your feet up on the table and a cigar sitting in the ashtray while yelling into the mic from across the room and reading a newspaper? The fact is that finesse needs to be a part of every contest operator's skill set, whether it's at W3LPL's or KX1XYZ's QTH. Let's invest a few words in the concepts behind timing and calling in pile-ups.

I most often call stations with short and rapid repeats. I've found that allowing for split-second breaks during the calling process provides valuable information about what's happening in the pile-up. You'll also make more friends by not being one of those incessant callers who prefer to transmit on top of the station they're calling rather than just working him.

Perhaps one of the most common tricks used in pile-ups is the addition of a small delay prior to the start of your calling sequence. Human nature forces us to enter "attack mode" as soon as the DX station's VOX lets up. You can differentiate yourself by dragging your feet for half-a-second (or more) and allowing the tail end of your callsign to stand by itself (naturally, that assumes you're signing your entire callsign, right?!). This is especially useful if you're not the loudest guy (or gal) on the block. If you've ever been on the other end of a big pile-up, you'll recall that more often than not, stations tend to blend together in pile-ups with no one being especially dominant. This is why timing can be such a valuable tool when calling.

If you have the good fortune to be using a recognizable call or one that is short and sweet, take advantage of that fact. There are generally two types of pile-ups. First, there are those who just roll along at a fast and steady pace. They are experienced at the skill of information processing and work lots of stations in short order. Then there is the tedious pile-up scenario we all hate in which a fair amount of calling time takes place in between QSOs. This is when a quick, non-phonetic "K1AR" call can sneak in and work someone. It's very similar to tail-ending techniques—and it works!

On CW, a related method to pile-up timing is frequency management. I've spent the past few years operating with mediocre antennas from my home station. What I've learned over this period of time is how to perfect the skill of working CW QSOs by calling slightly off frequency. This technique simply takes advantage of what is common sense to many operators: If you're in the middle of a mess of dots and dashes and another station is just a brief RIT spin away, who do you think will be the first to be worked in many cases?

Now despite the temptation, I wholeheartedly deplore the concept of using partial callsigns in pile-ups. Unfortunately, it has become a widely accepted and used operating practice. I've even begun hearing it used on CW! Yes, it does sometimes help you to get through a pile-up by simply squeezing through an "Alpha Radio" during a brief pause in the pile-up. However, it's frequently a burden to the station you're calling by forcing him to take extra time to fill in your call even though it probably would have been copied in its entirety on the first pass. If you've ever operated a contest from "the other side," there is nothing more frustrating than having one of the louder stations call you with a partial call. It not only messes up your timing, it also raises the blood pressure a bit. Please, don't do it!

How about a real-life illustration to make the point here? A few minutes ago as I was waiting to get started on my laptop here at home, I went down-

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stairs to check out the bands and heard YJØAMY on 7003 with a huge pile-up of USA and JA stations calling him. Again, my antenna is nothing more than an 80 meter dipole at about 55 feet, tuned to support the other bands. The first step was for me simply to listen for a minute. Why? I wanted to see what he was working. I also did a quick inventory of his operating practices. For example, was he working tail enders? Did he answer callers off his primary frequency? Eventually I was ready, and I tuned off the pile-up slightly so that I was all by myself about 0.6 kHz above his transmit frequency. Yes, he came right back with one call. Now for you Yagi types, there is no big deal about all of this. However, for the rest of us mortals, a lesson may have just been learned. Patience and finesse were the keys to this operating kingdom and a nice entry in my logbook.

If you really want to practice this skill, I suggest you also invest some serious time in calling stations in DX pile-ups in between contests. You may even want to try working guys barefoot to add an extra challenge. The bottom line of this discussion is that pile-up timing is nothing more than perfecting a skill so that you're calling when most of the other guys are not. It's having the ability to use a very short VOX delay to your advantage and slipping that callsign in when everyone else is figuratively drinking a cup of coffee. The important thing to remember is that the majority of folks who break through pile-ups are not always the loudest guys.

This may sound more like a lesson in DXing than contesting, but the fact is that these interests share a common denominator called *operating skill*. Being a skilled DXer doesn't automatically imply you'll be a winning contester, nor does being a world-class contester guarantee that you'll top the DX ranks. Both require an investment in skill and experience. However, there is one fact that holds true in both operating areas: Timing truly is everything!

WRTC 2006 To Be Held in Brazil

The World Radiosport Team Championship Sanctioning Committee, LABRE (Liga de Amadores de Radio Emissão), and the GADX Araucaria DX Group are pleased to announce that the next WRTC competition, in 2006, will be held in Brazil.

Following in the footsteps of previous WRTC competitions held in Seattle, San Francisco, Slovenia, and Finland, this event showcases amateur radio competition at the highest level. For this Olympic-type event the competitors are among the best operators in the world. The previous WRTC competitions have demonstrated the high degree of friendship in ham radio activity, together with an enormous sense of ethical competitiveness. WRTC 2006 will be held in Florianopolis, capital of the Santa Catarina State in southern Brazil, in July. This event is open to everyone, competitors and spectators alike. For more information, contact Steve Morris, K7LXC, WRTC Sanctioning Committee Chairman, via his qrz.com contact info.

Final Comments

Hopefully you'll be able to add a few dB to your operating abilities this month. Experience and hard work make one a better operator in our hobby.

In just a few short days I'm off to the Caribbean for the CQ WW SSB Contest to experience a unique flavor of contesting—high rates, huge fun! However you define contest fun, I hope you make sure you do it this contest season. There's still some life left in our current solar cycle, so make the most of it!

Finally, as I write these last few words for this month, I'm noticing that there are still plenty of leaves on the trees. However, when you read this the holiday season will almost be upon us. With that in mind, blessings for a wonderful time with your friends and family, and remembering to cherish what's really important in life.

73, John, K1AR

CQ WW DX Contest Errata

In the results of the 2002 CQ WW DX CW Contest the following calls were placed in the wrong category in the scores listing. It was a bookkeeping error on our part, and we apologize. Awards will be correctly assigned and certificates sent. L = low power; Q = QRP; A = Assisted.

4Z5LO	L3.5	PA3BNT	L3.5
6Y8A	Q3.5	PR7AR	L3.5
DJ1CW	L3.5	RW3VZ	Q3.5
DK7AN	L3.5	RW3WM	L3.5
DL1CW	L3.5	RW6AH	L3.7
DL1LH	L3.5	S51NM	L3.5
DL5RBR	L3.5	S51VC	L3.5
EU6DX	L3.5	S51W	L3.5
EW8OU	L3.5	S52W	L3.5
F6FJE	L3.5	S57NRO	L3.5
F8PDR	L3.5	SM3CCT	Q3.5
G3LZQ	L3.5	SP3GTS	A3.5
G3WGV	L3.5	SP8GNF	L3.5
GM3YOR	L3.5	SP9DNO	L3.5
HG9M	L3.5	SP9DUX	L3.5
HT9T	L3.5	SP9XCN	L3.5
JAØGZ	L3.5	SQ2HEB	L3.5
JA1IZZ	L3.5	SV5/SV1DKL	L3.5
JA7EMH	Q3.5	T94MZ	Q3.5
JF2BDK	L3.5	T94OL	L3.5
JK3DGX	A3.5	TA3DD	L3.5
JM1OZP/2	Q3.5	UAØFDX	L3.5
JM7TKK	L3.5	UA3LBE	L3.5
K3TW	Q3.5	UA3LIZ	L3.5
N7IR	Q3.5	UR5IOK	L3.5
OH2BEC	Q3.5	UR7EQ	L3.5
OH4ML	L3.5	UY2RO	L3.5
OK1FOG	L3.5	VK4XY	L3.5
OK1FPS	L3.5	W7DRA	L3.5
OK1SI	L3.5	YL2GQT	L3.5
OK2AB	L3.5	YU1KT	L3.5
OK2BZM	L3.5	YZ1SG	L3.5
OK2HWP	L3.5	Z31MM	L3.5
PAØMBD	L3.5	ZC4DW	L3.5

Also in the CW contest, OHØZ (Op. OH2MA) is the winner for the Single Operator, 14 MHz, Europe category with a score of 833,360 points; in addition, OHØZ is the winner of the G3FXB Memorial, Europe 14 MHz trophy. K8IA should have been listed as K8IA/7, and W8AEF as W8AEF/7. The ops at 9M6A were OK2SG, OK2WH, OK2PBM.

In the CQ WW Phone All-Time Records (October issue of *CQ*), the record holder for Multi-Multi Europe should be as follows: M6T ('99), 29,338,624 Points, 14,655 QSOs, 188 Zones, 836 Countries.

73, Bob, K3EST
CQ WW Contest Director

A Note on 60 Meter Propagation

BY TOMAS HOOD,* NW7US

Flash!

CQ WW DX CW Contest Forecast Looks Excellent!

The 2003 CQ WW DX CW Contest will start with a bang at 0000 UTC Saturday, November 29 and continue with very good conditions until 2400 UTC Sunday, November 30. Expect propagation to be Above Normal for both contest days! The Planetary *A* (*Ap*) index should remain below 10 for both days, making for great propagation during the day on the highest bands, while providing excellent nighttime conditions on the lower frequencies. The 10.7 cm flux should be about 110 for both days, providing the possibility of great conditions even on 10 meters.

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for December 2003

	Expected Signal Quality			
Propagation Index.....	**(4)**	**(3)**	**(2)**	**(1)**
Above Normal: 2-6, 18-23, 25-27, 29-31	**A**	**A**	**B**	**C**
High Normal: 1, 7, 13-14, 17, 24, 28	**A**	**B**	**C**	**C-D**
Low Normal: 11-12, 16	**B**	**C-B**	**C-D**	**D-E**
Below Normal: 10, 15	**C**	**C-D**	**D-E**	**E**
Disturbed: 8-9	**C-D**	**D**	**E**	**E**

Where expected signal quality is:

A—Excellent opening, exceptionally strong, steady signals greater than S9.

B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S3, with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing on the following pages.

2. With the *propagation index*, use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 3 will be good (B) on Dec. 1st, excellent (A) on the 2nd through the 6th, good (B) again on the 7th, etc.

Some very strong openings have occurred this fall on 60 meters. From my QTH in Washington State in the Pacific Northwest, I have made very reliable contacts with stations in the New England states, as well as many locations in the Midwest, during October. Reports from both sides of the paths were S-9 levels, with little fading.These openings took place after 8 PM, with the strongest signals between 10 PM and 11 PM.

Jim Livengood, WØNB (ex-KP2L), wrote to me regarding 60 meter propagation:

I was on St. John, Virgin Islands during August and packed along the requisite 60 meter dipole to see what I could work from there. I was on a beach with the dipole horizontal using three palm trees, center up 35 feet, power carefully adjusted peaking 40 watts. I channelized the band on my ICOM IC-735, which lives in a storage unit between trips. For the first 20 days I did not hear one readable signal through the tropical noise. On August 20 at 0025 I heard Cory, KG4CM, on Guantanamo Bay calling CQ. With 5×7 signals each way on 5.405 we made the first 60 meter QSO between the Virgin Islands and Guantanamo. It was the first 60 meter QSO for each of us after many hours of listening and calling.

Cory had been able to copy some stateside signals which were probably very strong to each other, but none stood by long enough for him to be heard, he said. After swapping reports with David, KG4DP, also on the Guantanamo expedition, I decided to hang in for a while.

An hour later, stateside signals came up and I was able break KE4UYP and K4AVC, who were kind enough to spot me and stand by while KP2/WØNB worked 27 stations through the confederacy and up to New England and the Midwest. The OH2AQ DX packet cluster showed that we were heard in Europe and Canada by operators with quieter receiving conditions.

My experience indicates that 60 meters should be a good regional, national, and international band if operators take the time to build quiet receiving antennas, or wait for winter's improved conditions.

Remember, with only five channels, it's courteous to count to three before transmitting on your buddy's next over. There may be DX calling you from the the U.K. or U.S. territories.

You hit the nail on the head in your September column. Success on the 60 meter band is going to depend on quiet receiving antennas, and perhaps some help from the newer digitally enhanced radios.

*P.O. Box 213, Brinnon, WA 98320-0213
e-mail: <cq-prop-man@hfradio.org>

Current Solar Cycle Progress

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for September 2003 is 49, quite a bit down from September 2002, when it was 109.6.The 12-month running smoothed sunspot number centered on March 2003 is 74, again down from the March 2002 figure of 113, and about five points down from February. The lowest daily sunspot value during September 2003 was recorded on September 9 with a count of 17. The highest daily sunspot count for September was 79 on September 27. IPS Radio and Space Services, Australia, forecasts a smoothed sunspot count of 48 for December 2003, while SIDC (Belgium) suggests 57.

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7 cm observed monthly mean solar flux of 112 for September 2003, compared to 176 a year ago (September 2002) and down from August's 122. The 12-month smoothed 10.7 cm flux centered on March 2003 is 140, down from 196 for March 2002, and down from February's 145. The predicted smoothed 10.7 cm solar flux for December 2003 is about 101, give or take about eight points.

The observed monthly mean planetary *A*-index (*Ap*) for September 2003 is 19. The 12-month smoothed *Ap*-index centered on March 2003 remains 19. Expect low to moderate geomagnetic activity during December.

December Propagation

A moderate to low level of solar activity is expected during December. The density of ionization in

A Quick Look at Current Cycle 23 Conditions

(Data is rounded to nearest whole number)

Sunspots
Observed Monthly, September 2003: 49
Twelve-month smoothed, March 2003: 74

10.7 cm Flux
Observed Monthly, September 2003: 112
Twelve-month smoothed, March 2003: 140

***Ap*-index**
Observed Monthly, September 2003: 19
Twelve-month smoothed, March 2003: 19

the Northern Hemisphere is expected to increase more rapidly after sunrise than during other seasons. Static and atmospheric noise levels will be at seasonally low values during the month, although we expect a fair amount of geomagnetic storminess, as we are still in the active period of the 11-year geomagnetic cycle. Reasonably strong signal levels are expected on most of the open bands, while the higher bands will not be as hot as during the peak years. While improbable, keep a lookout for one or two short 6 meter openings toward the end of December and into the early part of January. Solar activity will be low, but a surprise may await us.

Continue to expect fair to good daytime openings on 10, 12, and 15 meters. Openings will be shorter than at the same time last year, but these should still hold a lot of promise for paths into most parts of the world. Ten meters showed great performance as early as the end of September, but especially during October, with openings in many areas of the world. This will continue as we enter into winter.

Ten and 12 meter DX openings should be possible during much of the daylight hours, especially where the propagation paths cross the sunlit regions. Fairly good DX openings are also expected on 17 and 15 meters, remaining open towards the west during the early evening. However, 20 meters will be the hottest of all daytime bands, starting with early-morning openings in all directions until about an hour or two after sunrise, and then remaining open into one place or another through the day until early evening. Thirty meters will be a strong player for DXing as well, following the pattern of 20 meters. When conditions are Above Normal, 30, 20, and 17 meters are likely to remain open towards the south and west from early evening until about midnight, especially for DXers in the lower latitudes.

On 40 meters, regional daytime openings will remain strong for most of the day, while great DX will open early in the afternoon. From midnight to sunrise, 40 promises some of the hottest nighttime DX during December. The first DX openings should be toward Europe and the east during the late afternoon, then move across the south through the hours of darkness, while remaining open into most parts of the world. Just after sunrise, openings will be in a more westerly direction. Low seasonal noise will make DXing a pleasurable endeavor.

DX openings on 160 and 80 meters during the hours of darkness and into the sunrise period, with considerably decreased static levels, are a sure bet during the longer hours of darkness in the northern latitudes. Look for openings toward Europe and the south from the eastern half of the United States and towards the south, the Far East, Australasia, and the South Pacific from the western half of the country. Eighty meters becomes a reliable long-distance band throughout the entire period of darkness during December. Openings on 80 meters should peak towards Europe and in a generally easterly direction around midnight, then open in a generally westerly direction with a peak just after sunrise. The band should remain open towards the south throughout most of the night.

Overall, expect good DX conditions on the higher bands above 15 meters, with excellent DX openings on 15 through 20 meters during most of the daylight hours. As night falls, move to 30, 40, and 80 meters for openings all over the DX world.

For short-skip openings during December, try 80 and 40 meters during the day for paths less than 250 miles, and 80 or 160 meters at night for these distances. For openings between 250 and 750 miles, try 40 meters during the day, and both 80 and 160 at night. For distances between 750 and 1300 miles, 20 and 30 meters should provide daytime openings, while 40 and 80 will be open for these distances from sunset to midnight. After midnight, 80 meters will remain open out to 1300 miles until sunrise. Try 30 and 40 meters again for about an hour or so after sunrise. For openings between 1300 and 2300 miles, openings will occur on 20, 17, and 15 meters, with fewer on 12 and 10 meters, during the daylight hours. From sundown to midnight, check 20, 30, and 40 meters for these long-distance openings, and then check 40 and 80 meters after midnight until sunrise. Try 40 meters again for an hour or so after sunrise.

VHF Conditions

While there might be occasional geomagnetic storms due to coronal-hole activity, auroras will be less common than during the last few years. When conditions are Disturbed or Below Normal, there is a possibility for field aligned irregularities (FAI) and auroral-*E* propagation. In addition, a slight increase in sporadic-*E* propagation is possible on both 6 and 2 meters. Check the Last-Minute Forecast at the beginning of this column for those days during December that are expected to be in these categories.

Quite a bit of meteor-shower activity is expected this month, and this should result in improved conditions for meteor-scatter openings on the VHF bands for distances up to about 1000 miles.

Meteor-scatter propagation is a mode in which radio signals are refracted off the ionized plasma trails left by dust and small particles that have entered into our atmosphere at thousands of miles per hour. The ionized trail is produced by vaporization of the meteor. Meteors no larger than a pea can produce ionized trails up to 12 miles in length in the *E*-

layer of the ionosphere. Because of the height of these plasma trains, the range of a meteor-scatter contact is between 500 and 1300 miles. The frequencies that are best refracted are between 30 and 100 MHz. However, with the development of new software and techniques, frequencies up to 440 MHz have been used to make successful radio contacts off these meteor trains.

On the lower frequencies, such as on 6 meters, contacts may last from mere seconds to well over a minute. The lower the frequency, the longer the specific opening made by a single meteor train. A meteor train that supports a 60 second refraction on 6 meters might only support a 1 second refraction for a 2 meter signal. Special high-speed methods are used on these higher frequencies to take advantage of the limited available time.

A great introduction to working meteor scatter by Shelby Ennis, W8WN, is found at <http://www.amt.org/Meteor_Scatter/shelbys_welcome.htm>. Links to various groups, resources, and software are found at <http://www.amt.org/Meteor_Scatter/default.htm>.

The annual *Geminids* meteor shower will peak on the night of December 13–14. This is one of the better showers, since as many as 60 visual meteors per hour may occur. Note that propagation of radio signals can occur for even faint meteors. The actual meteor hourly rate is quite a bit higher than the visual rate. The *Geminids* is a great shower for those trying the meteor-scatter mode of propagation, since one doesn't have to wait until after midnight to catch this shower. The radiant rises early, but the best viewing and operating time will be after midnight local time. This shower also boasts a broad maximum, lasting nearly one whole day, so no matter where you live, you stand a decent chance of catching sight of some *Geminids*. The actual peak will occur around 0400 UTC on the December 14.

After the *Geminids* comes the *Quadrantids*, December 28 to January 7, with a zenith hourly rate (ZHR) of about 50, peaking on January 4 at 0450 UTC. There are many smaller showers, as well. Check out <http://comets.amsmeteors.org/meteors/calendar.html> for a good look at what is in store.

There is considerably less likelihood for 6 meter trans-equatorial (TE) openings during December, but look for a possible opening between the southern states and locations deep in South America. The best time to look for these is between about 8 and 11 PM local time.

73, Tomas, NW7US/AAMØEWA

HOW TO USE THE DX PROPAGATION CHARTS

1. Use chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8, KP4, KG4, and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9, and 0 areas; the Western USA Chart in the 6 and 7 areas; and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 meters) for a particular DX region, as shown in the left-hand column of the charts. An * indicates the best time to listen for 160 meter openings. An ** indicates best time to check for 6 meter openings.

3. The propagation index is the number that appears in ( ) after the time of each predicted opening. The index indicates the number of days during the month on which the opening is expected to take place as follows:

(4) Opening should occur on more than 22 days
(3) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific *propagation index* is likely to occur, and the signal quality that can be expected.

4. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. Appropriate *standard* time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 8 hours in PST Zone, 7 hours in MST Zone, 6 hours in CST Zone, and 5 hours in EST Zone. For example, 13 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 04 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts CW, or 1 kw, PEP on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level; for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce, Boulder, Colorado 80302.

December 15, 2003 - January 15, 2004
Time Zone: EST (24-Hour Time)
EASTERN USA To:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	09-11 (1)	07-08 (1) 08-09 (2) 09-11 (3) 11-13 (2) 13-14 (1)	06-07 (1) 07-09 (4) 09-11 (3) 11-13 (4) 13-14 (3) 14-15 (2) 15-17 (1)	15-16 (1) 16-17 (2) 17-19 (3) 19-00 (4) 00-02 (2) 02-03 (3) 03-05 (1) 17-19 (1)* 19-20 (2)* 20-02 (3)* 02-03 (2)* 03-04 (1)*
Northern Europe & European CIS	08-10 (1)	07-08 (1) 08-10 (2) 10-12 (1)	06-07 (1) 07-09 (3) 09-12 (2) 12-14 (1)	16-19 (1) 19-23 (2) 23-03 (1) 19-02 (1)*
Eastern Mediterranean & Middle East	08-10 (1)	08-09 (1) 09-10 (3) 10-11 (2) 11-12 (1)	06-09 (1) 09-10 (2) 10-13 (3) 13-15 (2) 15-17 (1)	18-20 (1) 21-22 (2) 22-00 (1) 20-23 (1)*
Western Africa	09-11 (1) 11-13 (2) 13-15 (1)	07-08 (1) 08-09 (2) 09-12 (3) 12-14 (4) 14-15 (3) 15-16 (2) 16-17 (1)	06-07 (1) 07-09 (2) 09-13 (1) 13-15 (2) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	18-22 (1) 22-00 (2) 00-03 (1) 03-04 (2) 00-02 (1)*
Eastern & Central Africa	10-13 (1)	08-10 (1) 10-12 (2) 12-13 (3) 13-15 (2) 15-16 (1)	07-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	18-00 (1)
Southern Africa	09-10 (1) 10-12 (2)	07-09 (1) 09-12 (2)	07-09 (1) 12-14 (1)	18-19 (1) 19-21 (2)

	12-13 (1)	12-14 (3) 14-15 (1)	14-15 (2) 15-17 (3) 17-18 (2) 18-20 (1)	21-00 (1) 19-21 (1)*
Central & South Asia	*Nil*	08-10 (1) 17-19 (1)	06-07 (1) 07-09 (2) 09-11 (1) 18-21 (1)	06-08 (1) 20-22 (1)
Southeast Asia	*Nil*	08-11 (1) 17-19 (1)	06-07 (1) 07-09 (2) 09-12 (1) 19-21 (1)	06-08 (1) 20-22 (1)
Far East	*Nil*	16-17 (1) 17-19 (2) 19-20 (1)	06-07 (1) 07-09 (2) 09-11 (1) 16-18 (1) 18-20 (2) 20-21 (1)	05-08 (1) 05-07 (1)*
South Pacific & New Zealand	13-17 (1)	11-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-20 (1)	03-07 (1) 07-09 (2) 09-11 (1) 16-18 (1) 18-20 (2) 20-22 (1)	01-02 (1) 02-04 (2) 04-07 (3) 07-08 (2) 08-09 (1) 04-05 (1)* 05-07 (2)* 07-08 (1)*
Austral-asia	16-18 (1)	09-12 (1) 15-16 (1) 16-18 (2) 18-20 (!)	06-07 (1) 07-10 (2) 10-14 (1) 14-16 (2) 16-18 (1) 18-20 (2) 20-22 (1)	03-05 (1) 05-07 (2) 07-09 (1) 05-08 (1)*
Caribbean, Central America & Northern Countries of South America	09-10 (1) 10-12 (2) 12-14 (1) 14-16 (2) 16-17 (1)	07-08 (1) 08-11 (3) 11-13 (2) 13-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	06-07 (2) 07-09 (4) 09-11 (3) 11-15 (2) 15-17 (3) 17-18 (4) 18-19 (3) 19-20 (2) 20-22 (1) 22-00 (2) 00-06 (1)	17-18 (1) 18-19 (2) 19-21 (3) 21-04 (4) 04-05 (3) 05-06 (2) 06-07 (1) 19-20 (1)* 20-22 (2)* 22-02 (3)* 02-04 (2)* 04-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	09-12 (1) 12-15 (2) 15-16 (1)	07-08 (1) 08-10 (2) 10-12 (1) 12-14 (2) 14-16 (4) 16-17 (3) 17-18 (1)	13-14 (1) 14-15 (2) 15-17 (3) 17-18 (4) 18-19 (3) 19-20 (2) 20-22 (1) 22-00 (2) 00-03 (1) 05-06 (1) 06-08 (2) 08-09 (1)	19-21 (1) 21-02 (2) 02-05 (1) 21-03 (1)*
McMurdo Sound, Antarctica	*Nil*	07-10 (1) 16-18 (1)	07-09 (1) 17-18 (1) 18-22 (2) 22-00 (1) 00-02 (2) 02-03 (1)	00-05 (1)

Time Zones: CST & MST (24-Hour Time) CENTRAL USA To:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Southern Europe & North Africa	09-11 (1)	07-08 (1) 08-09 (2) 09-11 (3) 11-12 (2) 12-13 (1)	06-08 (1) 08-09 (2) 09-12 (3) 12-13 (2) 13-15 (1) 22-00 (1)	16-18 (1) 18-20 (2) 20-00 (1) 00-02 (2) 02-03 (1) 17-20 (1)* 20-01 (2)* 01-02 (1)*
Northern & Central Europe & European CIS	*Nil*	07-08 (1) 08-10 (2) 10-12 (1)	07-08 (1) 08-11 (2) 11-13 (1) 23-01(1)	17-19 (1) 19-22 (2) 22-01 (1) 19-00 (1)*
Eastern Mediter-ranean & Middle East	*Nil*	08-11 (1)	06-09 (1) 09-12 (2) 12-14 (1) 22-00 (1)	18-20 (1) 20-22 (2) 22-23 (1) 20-22 (1)*
West & Central Africa	08-10 (1) 10-12 (2) 12-13 (1)	07-09 (1) 09-11 (2) 11-13 (3)	09-11 (1) 11-13 (2) 13-16 (3)	18-21 (1) 21-23 (2) 23-01 (1)
Eastern Africa	10-12 (1)	07-11 (1) 11-13 (2) 13-14 (1)	06-12 (1) 12-14 (2) 14-16 (3) 16-17 (2) 17-19 (1)	19-23 (1)
Southern Africa	08-09 (1) 09-12 (2) 12-13 (1)	07-09 (1) 09-11 (2) 11-13 (3) 13-15 (2) 15-16 (1)	07-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-20 (1) 23-01 (1)	18-19 (1) 19-21 (2) 21-23 (1)
Central & South Asia	*Nil*	08-10 (1) 19-21 (1)	06-07 (1) 07-09 (2) 09-11 (1) 19-22 (1)	06-08 (1) 19-21 (1)
Southeast Asia	*Nil*	08-11 (1) 17-20 (1)	07-08 (1) 08-10 (2) 10-12 (1) 16-17 (1) 17-19 (2) 19-20 (1)	04-07 (1)
Far East	*Nil*	07-09 (1) 16-17 (1) 17-19 (2) 19-20 (1)	06-07 (1) 07-09 (2) 09-11 (1) 15-17 (1) 17-19 (2) 19-21 (1)	02-04 (1) 04-06 (2) 06-07 (1) 04-07 (1)*
South Pacific & New Zealand	12-14 (1) 14-16 (2) 16-18 (1)	10-12 (1) 12-14 (2) 14-17 (3) 17-19 (2) 19-20 (1)	06-07 (1) 07-09 (3) 09-12 (2) 12-15 (1) 15-17 (2) 17-20 (3) 20-21 (2) 21-22 (1) 02-04 (1)	23-01 (1) 01-02 (2) 02-06 (3) 06-07 (2) 07-08 (1) 03-07 (1)*
Austral-Asia	14-15 (1) 15-17 (2) 17-18 (1)	09-11 (1) 13-15 (1) 15-17 (3) 17-19 (2) 19-20 (1)	06-07 (1) 07-08 (2) 08-10 (3) 10-12 (2) 12-18 (1) 18-21 (2) 21-22 (1)	02-04 (1) 04-07 (2) 07-09 (1) 03-06 (1)*
Caribbean, Central America & Northern Countries of South America	08-10 (1) 10-14 (2) 14-16 (1)	07-08 (1) 08-09 (2) 09-13 (3) 13-16 (4) 16-17 (2) 17-19 (1)	06-07 (2) 07-11 (3) 11-14 (2) 14-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1) 22-00 (2) 00-06 (1)	18-20 (1) 20-22 (2) 22-03 (3) 03-05 (2) 05-07 (1) 19-21 (1)* 21-01 (2) 01-04 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	08-11 (1) 11-15 (2) 15-17 (1)	07-08 (1) 08-13 (2) 13-15 (4) 15-16 (3) 16-17 (2) 17-19 (1)	05-06 (1) 06-08 (2) 08-10 (1) 12-14 (1) 14-15 (2) 15-17 (3) 17-19 (4) 19-20 (2) 20-22 (1) 22-00 (2) 00-03 (1)	19-21 (1) 21-02 (2) 02-05 (1) 21-04 (1)*
McMurdo Sound, Antarctica	*Nil*	07-09 (1) 16-18 (1)	06-07 (1) 07-09 (2) 09-11 (1) 17-18 (1) 18-22 (2) 22-00 (1) 00-02 (2) 02-03 (1)	22-05 (1)

Time Zone: PST (24-Hour Time) WESTERN USA To:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Southern Europe & North Africa	*Nil*	07-08 (1) 08-10 (2) 10-11 (1)	05-07 (1) 07-10 (2) 10-12 (1) 23-01 (1)	18-20 (1) 20-23 (2) 23-01 (1) 19-23 (1)*
Central & Northern Europe & European CIS	*Nil*	07-09 (1)	06-07 (1) 07-10 (2) 10-13 (1) 23-01 (1)	17-00 (1) 19-23 (1)*
Eastern Mediter-ranean & Middle East	*Nil*	07-09 (1)	06-07 (1) 07-09 (2) 09-11 (1) 21-23 (1)	18-21 (1)
Western & Central Africa	09-12 (1)	07-09 (1) 09-10 (2) 10-12 (3) 12-13 (2) 13-06 (1)	06-10 (1) 10-13 (2) 13-16 (3) 16-18 (2) 18-19 (1)	18-22 (1)
Eastern Africa	*Nil*	08-11 (1)	08-10 (1) 13-16 (1) 21-23 (1)	18-20 (1)
Southern Africa	08-11 (1)	06-08 (1) 08-10 (2) 10-12 (3) 12-13 (2) 13-14 (1)	07-11 (1) 11-13 (2) 13-16 (3) 16-18 (2) 18-19 (1) 00-02 (1)	18-20 (1)
Central & South Asia	*Nil*	09-11 (1) 17-19 (1)	08-10 (1) 17-19 (1) 19-20 (2) 20-21 (1)	05-07 (1) 18-20 (1)
Southeast Asia	15-18 (1)	09-11 (1) 15-16 (1) 16-18 (2) 18-19 (1)	07-09 (1) 09-11 (2) 11-16 (1) 16-19 (2) 19-20 (1)	03-08 (1)
Far East	15-17 (1)	14-15 (1) 15-16 (2) 16-17 (3) 17-18 (2) 18-19 (1)	08-10 (1) 13-14 (1) 14-15 (2) 15-18 (3) 18-19 (2) 19-21 (1)	00-01 (1) 01-03 (2) 03-06 (3) 06-08 (2) 08-10 (1) 02-08 (1)*
South Pacific & New Zealand	12-14 (1) 14-16 (2) 16-17 (1)	09-12 (1) 12-14 (2) 14-16 (4) 16-17 (3) 17-18 (2) 18-20 (1)	07-08 (1) 08-10 (2) 10-15 (1) 15-16 (2) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1) 03-05 (1)	22-00 (1) 00-03 (2) 03-06 (3) 06-07 (2) 07-08 (1) 00-03 (1)* 03-06 (2)* 06-07 (1)*
Austral-Asia	13-15 (1) 15-17 (2) 17-18 (1)	08-12 (1) 12-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	07-08 (1) 08-10 (3) 10-12 (2) 12-17 (1) 17-18 (2) 18-20 (3) 20-21 (2) 21-22 (1)	01-03 (1) 03-06 (2) 06-08 (1) 01-03 (1)* 03-02 (2)* 06-07 (1)*
Caribbean, Central, America & Northern Countries of South America	09-11 (1) 11-14 (2) 14-16 (1)	06-07 (1) 07-08 (2) 08-12 (3) 12-14 (4) 14-15 (3) 15-16 (2) 16-17 (1)	06-07 (2) 07-09 (3) 09-13 (2) 13-15 (3) 15-17 (4) 17-18 (3) 18-20 (2) 20-22 (1) 22-00 (2) 00-06 (1)	18-20 (1) 20-22 (2) 22-02 (3) 02-04 (2) 04-05 (1) 19-21 (1)* 21-01 (2)* 01-04 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	10-12 (1) 12-14 (2) 14-15 (1)	08-14 (1) 07-09 (2) 09-13 (1) 13-14 (2) 14-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	13-15 (1) 14-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-23 (1) 23-01 (2) 01-06 (1) 06-08 (2)	20-22 (1) 22-01 (2) 01-04 (1) 22-02 (1)*
McMurdo Sound, Antarctica	*Nil*	07-09 (1) 12-15 (1) 15-17 (2) 17-18 (1)	16-18 (1) 18-19 (2) 19-22 (3) 22-01 (2) 01-03 (1) 07-09 (1)	23-05 (1)

**Indicates best times to listen for 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2) or higher.*

For 12 meter openings interpolate between 10 and 15 meter openings.

For 17 meter openings interpolate between 15 and 20 meter openings.

For 30 meter openings interpolate between 40 and 20 meter openings.

Propagation charts prepared by George Jacobs, W3ASK.

Results of the 2003 CQ WW DX 160 Meter Contests *(from page 29)*

Number groups after calls denote score, total QSOs, W/VE multiplier, countries worked. Total multiplier is the addition of the W/VE and countries. Multi-op scores follow single-op listings. An asterisk (*) denotes low power. State, province, and country certificate winners are listed in bold.

CW RESULTS
SINGLE OPERATOR
NORTH AMERICA
UNITED STATES

CONNECTICUT

K1VW	**199,836**	**767**	**54**	**37**
W1CU	161,100	641	54	36
K1KI	148,584	448	48	34
W1AMF/QRP	**19,160**	**208**	**37**	**3**
W1JQ*	**18,120**	**188**	**34**	**6**
W1CTN*	17,472	175	38	4

MASSACHUSETTS

K5ZD	**167,943**	**406**	**48**	**41**
K1GU	**140,560**	**652**	**52**	**28**
W1TW/QRP	**28,959**	**249**	**42**	**7**
KZ1M	19,040	208	38	2
N1DC*	**17,766**	**176**	**37**	**5**
K1EP*	12,736	175	32	0
K1RV	6,075	101	23	2
K1MZ/QRP	3,496	70	23	0
K2LP	3,268	20	2	17

MAINE

W1CEK/QRP	**17,685**	**166**	**40**	**5**

NEW HAMPSHIRE

W1ECT	**253,170**	**785**	**52**	**45**
WC1M	27,324	204	42	22
K1HT*	**20,070**	**175**	**38**	**7**

RHODE ISLAND

K1DFT	**112,104**	**503**	**51**	**30**
AB1BX*	**12,615**	**192**	**28**	**1**
WA1LAD*	1,548	37	18	0

VERMONT

K1KD*	**36,288**	**335**	**47**	**1**

NEW JERSEY

N2NT	**446,538**	**1055**	**55**	**59**
NO2R	**361,990**	**858**	**52**	**54**
N2ED	146,334	642	54	33
K1NK*	**102,970**	**623**	**54**	**29**
KR2Q	88,396	386	47	30
N2NC*	69,168	391	46	20
W2OO	33,335	226	48	11
K2PS	29,988	267	44	5
W5KI	17,296	147	41	6
K2YLH*	16,605	173	37	4
W2LRO*	11,050	143	34	0
W2CVW*	8,225	95	32	3
W2JEK/QRP	**6,291**	**103**	**27**	**0**
N2LK*	3,344	67	22	0
WA2TWS*	3,048	56	24	0
K2JT/QRP	230	10	10	0

NEW YORK

N2BA	**174,680**	**728**	**55**	**33**
K2FU	**104,904**	**603**	**51**	**21**
W2IB	70,720	460	53	11
K2NV	60,187	324	45	23
NA2M	42,588	248	47	16
W2MU*	**39,710**	**317**	**50**	**5**
WB2HJV	31,772	257	44	8
K2SX	28,254	239	45	9
NY6DX/QRP	**19,135**	**199**	**40**	**3**
WB2DVU*	15,392	183	34	3
NS2P*	13,579	164	37	0
W3BW	12,669	134	38	3
K2CS*	6,222	77	32	2
N2CK*	4,175	73	25	0
WB2ART*	2,750	58	22	0

DELAWARE

AA1K	**540,096**	**1262**	**56**	**60**
N8NA*	**67,275**	**425**	**48**	**17**
NY3C*	1,940	44	20	0

MARYLAND

K3ZO	**238,900**	**646**	**52**	**48**
N3UM	**139,806**	**634**	**50**	**31**
W3EF*	**64,170**	**422**	**49**	**13**
AI3M*	63,669	499	48	9
NS3T*	31,467	272	46	5
N3AM	28,662	234	41	10
W3CP*	28,150	231	43	7
W3AZ	24,745	219	45	4
W2GG*	21,032	192	37	7
K3DSP*	20,572	251	36	1
N3FX*	18,207	154	45	6
K2PLF	12,852	150	32	4
W3ZMN/QRP	**5,256**	**96**	**24**	**0**
WK3H*	3,960	69	24	0

PENNSYLVANIA

W3BGN	**446,576**	**1046**	**55**	**58**
WE3C	**294,000**	**901**	**54**	**46**
W3TS	258,588	884	57	42
W3GH	249,696	818	56	46
W3TDF	91,323	461	50	23
K4JLD	78,570	309	49	32
K3SWZ*	**59,830**	**407**	**50**	**12**
WW3S*	59,400	469	48	7
AD8J*	33,744	310	42	6
NA3V*	23,092	215	40	6
KB3IEO	22,815	210	39	5
W3UHP*	22,419	220	45	2
K3QOF	16,650	157	42	3
WA3AAN*	15,155	191	32	3
W3AP	13,832	157	37	1
AA3TL	4,150	80	24	1

ALABAMA

KA9EKJ*	**75,980**	**593**	**50**	**8**
K4WI*	68,922	480	52	11
AF4OD*	44,880	363	49	6
N4JF*	40,252	297	50	8
W4NTI*	33,150	298	44	6
K4IQJ*	20,064	177	43	5

FLORIDA

N4PN	**271,690**	**979**	**56**	**45**
K1TO	**208,923**	**804**	**54**	**38**
W4AA*	**95,095**	**472**	**53**	**24**
N4UM	72,657	442	51	18
N4AO	64,722	346	48	19
K5KG	61,446	371	47	19
K4GKD*	59,995	383	50	15
N4PSE*	30,305	224	43	12
N4BP	28,992	274	43	5
K9ES*	25,900	313	40	10
W7QF	25,551	220	44	7
K9HUY	23,322	227	40	6
KN4Y*	23,288	266	38	3
W4SAA*	22,589	207	44	5
K4MM*	14,696	145	40	4
W4TMM	10,140	110	34	5
NF4A*	9,176	112	35	2
KA6R*	5,190	82	30	0
K4JAF*	5,152	65	29	3
W8IM*	4,350	72	28	1
W4UM	3,654	49	26	3
NF4DX	470	15	8	2

GEORGIA

W8JI	**641,576**	**1406**	**57**	**67**
K4BAI	**317,645**	**1163**	**55**	**46**
N4NX	90,948	433	51	27
K4UEE	69,190	436	50	24
KU8E*	**36,134**	**263**	**49**	**9**
N4WD*	19,264	202	40	3
WB6BWZ/QRP	**14,292**	**184**	**33**	**3**
N4XMX*	9,180	120	34	2
K4OGG*	8,832	122	29	3

KENTUCKY

WB4ZDU	**30,078**	**245**	**50**	**4**
K4WW*	**21,264**	**198**	**46**	**2**
K4SAC*	16,992	162	46	2
KO4OL*	1,672	35	22	0

NORTH CAROLINA

W4ZV	**398,460**	**1000**	**56**	**60**
N4AF	**250,978**	**793**	**52**	**46**
N4CW	186,490	853	55	30
N4XD	151,384	576	50	39
K4CIA	129,948	500	54	37
WJ9B	**94,192**	**636**	**52**	**14**
NR3X*	73,776	558	47	11
WA4DOU*	39,102	302	51	6
W4TMR/QRP	**37,338**	**355**	**44**	**5**
WB4MSG*	34,800	321	48	2
AD4TJ*	32,880	310	46	2
NX9T	18,864	173	44	4
K4QPL*	12,432	130	42	0
K4DGJ*	11,703	112	42	5
N4UH	9,912	90	36	6
N4TL	7,840	112	31	1
N4NTO*	7,050	104	27	3

SOUTH CAROLINA

K4DLJ	**191,672**	**659**	**52**	**45**
K4CNW*	**73,644**	**446**	**53**	**15**
N2FY	66,941	334	51	22
WA4AOS*	20,010	198	44	2

TENNESSEE

KØEJ	**178,524**	**897**	**55**	**26**
K4RO	**124,575**	**556**	**51**	**24**
N4IR	105,501	647	52	17
K4LTA	97,444	617	52	16
W4NZ*	**81,496**	**611**	**51**	**10**
K4WX	48,756	437	45	6
NY4N*	40,749	405	47	2
AC4G*	32,028	264	45	6
N4DW*	28,305	237	44	7
K4BEV*	27,404	234	47	5
W4HZD*	24,525	253	43	2
NY4T*	16,380	198	37	2
WA4AA*	15,312	150	39	5
KE4OAR*	14,820	175	38	1
K4AMC*	9,360	147	30	0
WA4GLH*	7,210	90	34	1
W4TDB*	2,160	45	24	0
W4OGG	2,000	40	25	0
W4BCG*	1,760	41	20	0

VIRGINIA

K4JA	**481,740**	**1107**	**55**	**56**
K4OAQ	**232,290**	**998**	**56**	**33**
K7SV*	**145,704**	**775**	**53**	**25**
W4DF*	107,540	565	53	23
WF3J	78,065	505	49	16
W4YE	76,383	443	50	19
WA4PGM/QRP	**70,977**	**541**	**50**	**9**
K4ZW	64,239	352	47	22
K4ORD*	61,047	475	50	7
K4SV	58,194	394	46	15
N4MM	54,940	315	50	17
W4PM*	54,864	460	46	8
N3JB	43,896	299	47	12
W2YE	37,791	272	46	11
WK4Y*	36,920	317	47	5
K1KO	29,106	254	41	8
W3BP	24,297	258	34	5
WA3SXX*	18,744	184	42	2
W4HJ	15,523	145	37	6
K4EU*	15,008	212	32	0
K3MZ*	4,590	73	27	0
K4RDU*	4,340	57	28	3
N4JED*	3,328	61	26	0
WR4I/QRP	1,760	41	20	0

ARKANSAS

W5ON	**122,256**	**745**	**55**	**17**
N5SAN*	**10,240**	**122**	**40**	**0**
K5ACO*	10,218	119	38	1

LOUISIANA

W5TVW*	**35,955**	**319**	**47**	**4**
KC5R*	11,020	139	36	2

MISSISSIPPI

NI5F*	**27,092**	**227**	**46**	**6**

NEW MEXICO

N5UL	**95,832**	**632**	**54**	**12**
N6ZZ	57,737	435	54	13
K5AM	8,320	84	36	4

OKLAHOMA

K7LFY	91,874	545	54	17
K5YAA	62,776	478	52	7
K2BA*	46,475	386	48	37
WA5AAA*	7,289	97	37	0
AB5ZA*	3,520	76	21	1
NEØP*	2,525	46	23	3

TEXAS

K5RX	**229,768**	**1070**	**57**	**31**
N5RG	**159,042**	**854**	**56**	**22**
WØUO*	**126,735**	**783**	**55**	**16**
K5NZ	61,760	396	49	15
K5GO	60,704	494	49	7
N5ZK	36,750	344	44	5
W5ZO*	22,150	201	45	5
AC5HF	21,667	207	42	5
KB5NJD*	16,785	165	40	5
NA4M	16,512	139	40	8
W5ODD*	11,180	107	38	5
W5GAI*	1,827	32	17	4

CALIFORNIA

N6RO	**180,026**	**912**	**57**	**20**
K6SE	**157,425**	**782**	**57**	**18**
K6OY	75,911	448	52	15
W6IXP	66,965	504	53	6
N6MU	65,260	421	53	12
K6TA	60,769	338	51	16
N6NF*	**58,528**	**389**	**50**	**12**
W6JTI*	55,860	388	50	10
K6NA	45,940	277	51	13
NF6S*	42,630	297	49	9
K6NR	39,788	265	51	13
K6NY	32,966	268	48	5
K6LRN	31,300	250	46	7
KH6DX/W6	28,892	147	49	13
W6OA*	23,628	237	40	4
W6RKC	22,200	187	44	6
W6HG	22,184	204	42	5
KI6T	22,055	161	47	8
N6WG/QRP	**19,823**	**207**	**39**	**4**
N6HC*	19,321	206	41	2
WA6FGV*	18,392	192	39	5
KE6QR*	17,130	108	30	1
K6EM	14,797	129	43	6
W6ISQ	11,925	108	38	7
N6HY	10,710	108	37	5
K6MO	10,332	115	31	5
AA6EE*	9,999	130	30	3
WA6BOB	7,616	102	29	3
WA2BHJ	5,940	80	31	2
KG6AO	5,880	95	27	1
KI6PG*	5,495	63	31	4
K6ASK*	4,131	72	27	0
K6DGW*	3,312	85	18	0
K6EI/QRP	2,980	66	19	1
K2RDX*	2,948	67	22	0
AD6WL*	2,496	38	22	4
AC6QV*	1,140	38	13	2
WN6K*	1,133	50	11	0
W7SW*	1,089	48	11	0
KA6UMO*	768	32	12	0
K6MI/QRP	238	13	6	1
KØDI/QRP	238	17	7	0
K6PKO/QRP	8	2	2	0
WB6ETY*	6	3	1	0

ARIZONA

N6SS	**134,174**	**636**	**55**	**18**
KC7V	**112,761**	**699**	**53**	**14**
K7WP	35,112	270	49	7
AC7A*	**33,660**	**259**	**48**	**7**
W7YS*	22,984	188	46	6
N7IR/QRP	**20,150**	**174**	**45**	**5**
KJ7WY*	17,850	140	44	7
K8IA/QRP	9,324	116	35	2
KN5H*	2,438	50	21	2

IDAHO

KG7H	**83,948**	**503**	**54**	**8**
K7YVZ*	**6,358**	**85**	**43**	**1**

MONTANA

K7BG	**16,740**	**160**	**42**	**3**

NEVADA

N7PU/QRP	**4,577**	**88**	**21**	**2**
NU7T/QRP	1,144	41	13	0

OREGON

W2VJN	**112,464**	**502**	**53**	**18**
K7ZS	39,558	282	47	10
K7RAT	37,418	394	47	6

UTAH

WA7LNW	**128,180**	**847**	**55**	**13**
KD7AEE/QRP	**37,538**	**311**	**49**	**5**
W7HS*	**29,682**	**259**	**46**	**5**
KB7NZG*	11,696	120	40	3
WA7YAZ*	3,960	78	24	0
K7RJ*	1,530	41	18	0
WJ7L*	168	14	6	0

WASHINGTON

K7OX	**121,691**	**593**	**55**	**18**
WA7LT	**104,397**	**631**	**54**	**15**
W7RM	103,224	636	49	17
N7LOX*	**29,796**	**249**	**47**	**5**
K7UIR	28,560	274	47	1
W7DRA*	27,648	250	42	6
N7WA*	21,620	204	42	4
K7QBO*	15,004	152	42	2
W7WKR*	13,902	140	39	3
W7LGG	12,816	116	40	8
N6HR	10,368	115	33	3
W7SNH*	10,222	112	34	4
AB7RW*	8,738	104	32	2
W7QN*	7,590	100	32	1
KX7L/QRP	**2,318**	**55**	**19**	**0**
K7MH*	284	23	6	0

WYOMING

WG7Y*	1,062	28	18	0

MICHIGAN

W8MJ	**163,856**	**930**	**56**	**20**
N8EA	**125,631**	**615**	**56**	**25**
N8LJ	40,252	291	48	10
NE8O*	**32,895**	**327**	**42**	**3**
W8DCQ	27,450	241	45	5
K8RS	27,025	247	41	6
W8RU	23,868	187	44	8
K8CV/QRP	**15,796**	**157**	**42**	**2**
K8IR*	5,735	82	31	0
W8ROS*	4,422	64	31	2

OHIO

W8QID	**206,712**	**967**	**57**	**30**
W8CAR	**142,196**	**777**	**53**	**23**
W8FT	109,227	685	54	15
AD8P*	**103,818**	**703**	**54**	**12**
KV8Q*	72,300	540	51	9
N8AA*	60,140	405	50	12
N8BJQ	53,160	378	49	11
KA4IQD*	42,250	386	47	3
AB8NI*	38,012	339	48	4
ND8DX	36,894	190	47	19
W8IQ*	36,452	306	46	6
WB8RTJ/QRP	**31,344**	**298**	**46**	**2**
K8MR*	25,728	240	44	4
W8PN*	22,222	247	39	2
K8KSN*	20,112	175	45	3
K8AB*	19,008	198	44	0
W8TK*	14,432	146	42	2
N8XP	13,845	161	37	2
N8A/QRP	12,470	126	40	3
W8VE	9,828	120	34	2
W8IDM*	5,886	100	27	0
K8NVR*	2,400	40	20	4

WEST VIRGINIA

K2UOP	**166,960**	**849**	**53**	**27**
N8II	125,775	690	49	26
K8OQL	21,532	164	44	8
W8ZA	14,238	149	40	2
N4ZR	12,169	109	36	7
K8OWL/QRP	**5,626**	**97**	**29**	**0**
WA3HQK/QRP	5,250	73	29	1

ILLINOIS

K9DX	**327,318**	**1164**	**59**	**43**
K2AAW*	**102,603**	**689**	**57**	**12**
K9MMS*	102,051	642	55	14
W9YYG	90,228	505	51	22
K9QVB*	66,440	564	42	6
WO9S	55,680	416	48	10
N9NE*	41,520	400	44	4
WX9U*	37,015	296	48	7
K9IJ*	29,309	226	47	6
W9SE/QRP	**25,110**	**258**	**41**	**4**
KK9DX*	21,696	154	46	2
N2BJ	20,553	178	48	3
KG9X	18,179	150	42	7
K9ZO*	18,040	198	40	1
K9JE*	12,616	153	37	1
WA9GQT/QRP	12,232	123	41	3
KK9A	11,760	131	36	4
K9CW*	10,296	117	38	1
WB9AYW*	10,152	129	34	2
K9JU/QRP	8,892	107	36	0
W9LYA*	5,124	89	28	0

INDIANA

K9NW	**148,932**	**701**	**56**	**28**
WA9IRV	**136,218**	**820**	**57**	**16**
W9RE	122,382	642	54	24
W9IU	119,000	752	56	14
K9WJU*	**102,980**	**689**	**53**	**13**
NS2X*	45,582	422	44	3
K9WNT*	43,008	415	46	2
WT9U*	41,313	398	42	5
K9BG*	33,074	336	43	3
KJ9C*	23,276	221	42	4
NM9P*	20,727	196	45	2
K9SG*	17,625	162	42	5
AC9X*	13,320	161	35	2
N4TZ*	9,842	114	32	5
K9MI*	9,695	122	34	1

WISCONSIN

WØAIH	**153,440**	**970**	**56**	**14**
K9OT*	**104,000**	**726**	**56**	**9**
WA9TZE	81,558	500	57	12
K9AY	65,391	350	52	19
WI9WI	55,564	439	53	5
WA1UJU*	47,481	433	48	3
K9DAF*	40,851	365	47	4
W9LO*	33,173	303	45	4
WE9V*	31,148	157	44	8
K9MA	27,081	229	47	4
NI9C*	17,542	153	45	4
W9OA	15,265	154	39	4
K9TY*	10,296	123	39	0

COLORADO

W1XE	**106,760**	**689**	**56**	**12**
K7SCX	70,950	468	54	12
KØUK	66,917	492	52	9
KØFX*	**32,010**	**253**	**49**	**6**
WØETT*	22,256	182	46	6
WUØL/QRP	**16,236**	**168**	**42**	**2**
KC7QY*	10,794	114	40	2
N3AIU*	3,857	65	29	0
KIØII/QRP	720	30	12	0

IOWA

NØNI	**167,200**	**956**	**56**	**20**
KEØFT*	**37,968**	**300**	**50**	**6**
WØNFL*	15,876	140	46	8
WØETC/QRP	**7,820**	**103**	**31**	**3**
KBØSK*	7,072	103	32	0

KANSAS

WØUY	**70,432**	**512**	**54**	**8**
KGØUA	30,750	273	44	6

MINNESOTA

WØOR	**98,454**	**749**	**54**	**7**
KTØR	80,064	555	54	10
KSØT*	**63,984**	**461**	**54**	**8**
K4IU	30,726	248	50	4
WØSEI/QRP	**27,162**	**225**	**50**	**4**
W$4HW	26,312	211	47	5
ACØW*	23,128	214	46	3
KØAD*	13,244	142	40	3
KØKX	11,711	75	37	12
KIØF*	6,816	79	31	1
WA2HFI*	4,290	63	30	3
WØQF*	2,500	50	25	0

MISSOURI

K4VX	**198,774**	**1032**	**57**	**24**
KU1CW	**128,376**	**774**	**56**	**16**
KØJPL	110,160	661	56	16
KAØGGI*	**77,066**	**554**	**51**	**11**
NØTT/QRP	68,882	500	54	8
WØTT	67,466	492	52	9
KØOU*	35,316	288	48	6
KI7WO*	23,322	234	44	2
WØTY	10,280	111	37	3
WAØIYY*	6,107	90	30	1

SOUTH DAKOTA

K7RE*	**58,524**	**542**	**54**	**4**
KCØCGR*	32,648	280	50	3

CANADA

NEWFOUNDLAND

VO1HP	**146,175**	**310**	**39**	**36**
VO1MP*	**20,631**	**99**	**27**	**12**

NEW BRUNSWICK

VE9WH	**7,722**	**63**	**25**	**1**

QUEBEC

VE2SB*	**28,379**	**163**	**37**	**0**
VE2AWR*	25,410	153	33	2
VE2XAA/QRP	936	18	12	0

ONTARIO

VE3EJ	**543,998**	**1083**	**55**	**43**
VE3AT	**317,475**	**861**	**53**	**22**

VE3QAA	256,022	590	50	34
VE3PN	252,588	591	57	33
VE3NE*	**245,847**	**731**	**54**	**15**
VE3KZ	225,610	662	54	16
VE3DO	214,182	592	52	21
VE3CSK*	207,298	632	54	13
VE3KP	174,826	584	51	10
VE3OSZ*	171,864	558	50	13
VE3STT*	115,398	441	50	4
VE3CR*	66,700	279	46	4
VY2MGY/QRP	**56,196**	**275**	**39**	**3**
VA3DX*	48,785	183	47	8
VA3IX*	43,215	210	41	2
VE3BNO*	41,706	206	38	4
VE3FU*	40,200	209	38	2
VE3SS*	27,094	150	35	3
VE3RCN*	20,880	150	30	0
VE3DZ/QRP	19,924	125	33	1
VE3WZ/QRP	15,072	99	31	1
VE3OBU*	11,430	78	30	0

SASKATCHEWAN

VA5DX	**73,032**	**294**	**46**	**5**
VE5SF*	**6,266**	**50**	**26**	**0**

ALBERTA

VE6BF*	**2,044**	**31**	**13**	**0**
VE6JY	1,452	27	11	0

BRITISH COLUMBIA

VE7UF	**102,297**	**338**	**49**	**12**
VA7DX	95,536	348	47	9
VE7JKZ	29,982	159	33	5
VE7ZBK	4,600	48	19	1
VA7MM/QRP	**954**	**23**	**9**	**0**

YUKON

VY1JA	160	6	3	2

BELIZE

V31YN	**83,440**	**292**	**46**	**10**

CAYMAN ISLANDS

ZF2NT	**604,395**	**1123**	**56**	**43**

CUBA

CO8TW*	**19,684**	**105**	**28**	**9**

MARTINQUE

FM5GU	**771,684**	**1233**	**58**	**49**

MEXICO

XE1V	**62,964**	**228**	**44**	**10**
XE2AC*	**47,517**	**203**	**44**	**3**
XE1MM	45,552	189	43	5

US VIRGIN ISLANDS

KV4FZ	**347,200**	**584**	**52**	**48**

AFRICA

CANARY ISLANDS

EA8ZS	**54,850**	**112**	**23**	**27**
EA8CN*	**23,170**	**68**	**9**	**26**

CAPE VERDE ISLANDS

D4B	**1,513,105**	**1255**	**49**	**72**

ASIA

ASIATIC RUSSIA

UA9AT	**435,372**	**660**	**3**	**70**
UA9AM	**142,250**	**313**	**0**	**50**
UA9AMF*	**101,655**	**256**	**1**	**44**
UA9QA*	94,686	245	0	43
UA9CR*	94,424	238	0	44
UA9SP*	75,465	193	1	42
UA0ANW*	55,616	164	0	44
RU9CI*	41,448	140	0	33
RW9QA	40,110	149	0	30
UA9AX*	36,543	108	0	39
UA9QFF	29,916	130	0	27
UA9ZZ*	15,376	60	0	31
RX9WN*	15,204	62	0	28
RA9MJ*	13,566	41	0	38
UA9MDP*	11,730	38	0	34
UA0ACG*	11,000	70	0	20
UA9MQR*	10,488	76	0	19
UA9KM	8,712	68	0	18
RX9TX	7,786	60	0	17
UA0AGI	6,664	60	0	17
UA0AZ	4,680	43	0	16
UA0LCZ*	4,662	102	0	9
UA9XF*	3,320	34	0	10
RK9CZO*	2,886	27	0	13
RU0AT	952	20	0	8

AZERBAIJAN

4K9W*	**37,370**	**112**	**0**	**37**

BAHRAIN

A92ZE*	**41,140**	**102**	**7**	**37**

BRITISH SOVERIGN BASES CYPRUS

ZC4DW*	**40,425**	**121**	**0**	**35**

CYPRUS

P3F	**446,113**	**597**	**16**	**63**

GEORGIA

4L1FX*	**103,360**	**283**	**0**	**40**

HONG KONG

VR2BG	**16,434**	**123**	**0**	**22**

INDIA

VU2BGS*	**1,617**	**16**	**0**	**11**

ISRAEL

4X3A	**543,701**	**645**	**22**	**67**

JAPAN

JH4UYB	**98,448**	**286**	**9**	**39**
JH2FXK	39,780	121	11	34
JM2FCJ/9*	**6,205**	**91**	**5**	**12**
JE4CIL	4,680	42	2	16
JI1NJC	4,560	56	7	9
JA5IP*	3,510	51	4	11
JE1TSD*	2,925	58	3	10
JR3NZC	2,576	35	4	10
JE1SPY*	2,290	73	3	7
JH7XMO*	888	28	0	8
JA7MJ	824	31	2	6
JA1CP*	546	33	0	6
JK2VOC*	468	50	0	4
JHØNVX/1*	300	20	0	5
JE1DXC*	300	20	0	5
JA1IZZ*	246	8	0	6

KAZAKHSTAN

UN2O*	**103,356**	**253**	**0**	**44**
UN6P*	26,013	99	0	29
UN7JX*	18,090	76	0	27

KUWAIT

9K9O*	**107,712**	**275**	**0**	**44**

MONOGOLIA

JT1CO	**115,908**	**306**	**0**	**52**

TAIWAN

BW3/UA3VCS*	**225**	**14**	**0**	**3**

TAJIKISTAN

EY8MM	**346,275**	**535**	**4**	**71**

TURKEY

TA3BN*	**1,892**	**18**	**0**	**11**

EUROPE

ALAND ISLANDS

OHØR	**270,840**	**864**	**5**	**55**
OHØZ	112,944	416	1	51

AUSTRIA

OE8SPW*	**67,326**	**266**	**4**	**45**
OE8CIQ*	14,664	124	0	24

BELARUS

EW3LN	**83,260**	**346**	**1**	**45**
EU1SA	41,650	235	0	35
EW8OS*	**36,040**	**205**	**0**	**34**
EW6MM/QRP	**4,250**	**50**	**0**	**17**

BELGIUM

ON7GB	**425,128**	**858**	**25**	**63**
ON6AA	294,354	682	18	61
ON6TJ*	**22,540**	**133**	**0**	**35**

BOSNIA

T95A*	**89,472**	**364**	**0**	**48**

BULGARIA

LZ2UZ*	**74,336**	**308**	**0**	**46**
LZ7X*	40,014	210	0	46

CROATIA

9A8A	**510,123**	**943**	**23**	**74**
9A6C*	**90,936**	**321**	**3**	**51**

CZECH REPUBLIC

OK1RF	**405,496**	**823**	**19**	**72**
OK2WM	**264,717**	**781**	**12**	**55**
OK1FDY	231,150	617	17	58
OK1TP	221,112	584	12	62
OK1AVY	219,336	596	13	61
OK1WF	200,668	594	11	57
OK1MNW*	**160,776**	**531**	**10**	**53**
OK1EP	158,080	486	15	50
OK1FPS*	152,712	568	5	51
OLØA*	144,304	514	6	52
OK1DOS	117,450	464	6	47
OK1IBP*	110,605	428	3	52
OK1IF*	89,629	438	0	47
OK1AD	88,920	314	10	47
OK1JOK*	88,344	539	4	50
OK1XJ	87,450	334	5	50
OL6M*	80,478	335	7	44
OK1DXR	77,050	328	7	43
OK1FKD/QRP	**75,118**	**362**	**3**	**43**
OK1VBA*	72,810	359	1	44
OK1HGM*	63,296	288	2	44
OK1CRM*	59,560	340	0	40
OL5Y*	58,464	254	6	42
OK1MCW*	48,300	222	2	44
OK2VWB*	47,838	245	3	39
OK1DSX*	47,608	232	1	43
OK1DDO*	44,384	254	0	48
OK2BPL*	42,640	229	0	40
OK1GS*	39,368	240	0	37
OK2PTS	39,120	197	0	40
OK1FOG*	38,270	185	1	42
OK1AXB	34,224	152	3	43
OK1ES/QRP	34,056	163	1	43
OK1VD*	33,440	178	1	39
OK1FIA*	32,240	171	0	40
OK1DX	32,100	84	15	35
OK1YM*	28,500	157	1	37
OK2WTM/QRP	27,456	184	0	33
OK1DXW	27,265	168	1	43
OK1DWJ	22,620	60	6	54
OK1MMN*	20,328	126	2	31
OK1FWW*	20,039	161	0	29
OK1TD*	17,787	162	0	37
OK1FCA/QRP	14,400	138	0	25
OK1XR*	14,202	113	0	27
OK2ZAW/QRP	13,825	125	0	25
OK2BDF*	13,804	101	0	29
OK1DOL*	12,501	100	0	27
OK1FC/QRP	12,376	100	0	28
OK1FHI*	10,736	112	0	22
OK2PMG/QRP	9,959	98	0	23
OK1SRD*	8,736	72	0	37
OK1MZO*	3,855	200	2	40
OK1WWJ*	3,189	195	0	36
OK1DSU*	720	16	0	9

DENMARK

OZ7YY	**555,758**	**1025**	**21**	**77**
OZ8AE*	**58,338**	**284**	**0**	**47**
OZ5WQ	54,868	242	6	38
OZ5UR*	10,200	85	0	24

ENGLAND

G3XTT	**357,396**	**740**	**27**	**61**
G4OBK	**321,120**	**736**	**26**	**54**
G6PZ	258,931	622	21	52
G3XGC	126,852	366	14	52
G3TXF	88,908	260	17	45
G4VGO*	**69,012**	**223**	**10**	**44**
G4IIY*	60,525	270	6	39
G3UFY	46,872	220	3	39
G3SEK*	41,738	198	5	36
G4IRN*	33,981	137	6	41
GØMTN*	18,944	122	0	32
G4WFQ*	11,252	80	0	29
G3YMC/QRP	**11,200**	**100**	**1**	**24**
G3JJG	9,750	75	0	26
G4BJM	9,342	69	1	26
G3RSD*	8,400	68	1	24

ESTONIA

ES1AJ	**252,057**	**688**	**6**	**63**
ES2DJ	133,925	465	1	54
ES6PZ*	**85,800**	**329**	**2**	**48**

FINLAND

OH1MM	**319,060**	**876**	**6**	**64**
OH9W	**248,344**	**630**	**11**	**63**
OH6NIO	149,296	520	1	55
OH5NE	130,611	500	2	49
OH3XR	115,710	391	6	52
OH2BO	110,656	317	7	57
OH6XX	55,563	290	0	39
OH2CI*	**43,600**	**222**	**0**	**40**
OH7A	34,683	210	0	33
OH3WD	24,381	123	1	42
OH2BYS*	2,240	23	0	20
OH1UP*	160	10	0	5

FRANCE

F6CWA	**84,042**	**235**	**13**	**50**
F6GOX	30,534	134	7	35

GERMANY

DJ4AX	**455,580**	**977**	**24**	**66**
DLØXAX	**385,470**	**868**	**20**	**70**
DJØMDR	335,569	805	19	64
DH1TW	334,985	768	23	62
DL7CX	252,970	613	22	60
DL7UCX*	**145,520**	**421**	**12**	**56**
DJ2MX	123,281	420	11	50
DL1WA*	120,792	462	6	50
DK3RA*	91,000	346	3	53
DJ8UV/P*	74,920	294	6	46
DK3LM*	74,250	379	2	43
DL8UAT*	73,132	336	3	44
DL5YM	71,080	401	0	40
DJ9RR	69,842	317	2	45
DL5JS*	62,479	316	4	39
DL3ZAI*	61,200	263	5	43
DF6JC*	59,831	280	1	46
DJ5AA*	56,559	239	1	50
DL1SAN*	55,272	243	6	41
DL4JYT*	54,325	292	0	41
DL9GFB*	43,764	225	2	40
DL2RUG*	36,756	221	0	36
DLØDX*	35,532	221	3	33
DK7KW*	34,920	188	4	36
DL1GGT*	34,398	186	1	38
DJ2YE*	32,504	185	0	38
DJ2BC*	30,657	203	0	33
DK3YD*	29,504	209	0	32
DL4KUG*	28,140	176	0	35
DJ3RA*	24,024	156	1	32
DK7FP*	23,528	151	0	34
DL2RYL*	22,916	128	0	34
DL3ARM*	22,720	159	0	32
DJ6QT	21,576	151	0	31
DL3BRA*	20,580	165	0	28
DL1JFM*	19,530	149	0	30
DL3DRN	16,410	118	0	30
DLØMFL*	16,276	101	0	26
DL9SEV*	15,232	117	2	26
DK3KD	14,916	92	4	29
DF6WE*	13,878	114	0	27
DL1DTC*	13,078	112	0	26
DL3BZZ*	11,872	95	0	28
DJ8MT*	11,680	77	1	31
DL6RBH*	11,440	120	0	22
DL8UVG*	9,131	89	0	23
DL1YFF*	7,317	57	2	25
DJ9AO*	7,260	84	0	20
DL1LAW/QRP	**6,517**	**77**	**0**	**19**
DL3KWR*	5,301	60	0	19
DM5JBN	4,488	60	0	17
DL9ZWG*	4,208	61	0	16
DF1DX/QRP	3,695	57	0	16
DL3AS	2,890	37	0	17
DL2AXM*	2,624	37	0	16
DL6GV*	1,560	27	0	13
DF5RF*	288	12	0	6
DJ6QO*	2	1	0	1

GREECE

SV8CS	**27,324**	**114**	**5**	**39**

GUERNSEY ISLANDS

GU4YOX	**299,896**	**731**	**19**	**57**

HUNGARY

HA8DU	**559,800**	**963**	**22**	**78**
HA8IB	**324,249**	**696**	**17**	**70**
HA8BE	297,996	727	8	68
HA1CW*	**163,602**	**534**	**8**	**53**
HG9M*	102,960	380	4	51
HA5FA*	65,688	255	1	50
HA1ZH*	65,121	264	5	44
HA4XG*	43,515	197	4	41
HA6IAM/QRP	**20,034**	**158**	**0**	**27**
HAØHW*	10,478	86	0	26
HA5PT*	2,724	41	0	19

IRELAND

EI6BT	**248,017**	**519**	**29**	**48**

ITALY

I4IKW	**386,460**	**735**	**25**	**70**
IØZUT*	**64,220**	**332**	**8**	**44**
IK4AUY	53,018	200	8	41
IK2ANI	43,945	179	6	41
IK4MGP	37,412	148	9	38
IK2SND	26,560	133	3	37
I2WIJ/QRP	**20,905**	**115**	**0**	**37**
IK3ORD*	20,232	113	1	35
IZ2DMW*	13,446	105	0	27
IK4VET	7,038	61	1	22
IK3WUZ*	5,984	58	0	22
IV3JVJ/QRP	2,355	17	8	7

KALININGRAD

UA2BD	**77,166**	**265**	**8**	**46**

LATVIA

YL2GN	**305,064**	**822**	**11**	**61**
YL2PQ	300,630	857	9	57
YL2LY*	**175,680**	**536**	**10**	**57**
YL2CR	30,535	199	0	31

LIECHTENSTEIN

HBØ/DL3OCH*	**20,076**	**144**	**0**	**28**

LITHUANIA

LY7Z	**549,500**	**993**	**24**	**76**
LY2IJ	**475,452**	**927**	**17**	**77**
LY3UM	367,752	794	12	72
LY3BA*	**166,096**	**579**	**5**	**51**
LY2OU	157,122	511	8	50
LY2OX	100,430	353	9	46
LY2BBF*	41,440	227	0	37
LY1CM*	29,888	194	0	32
LY2GW*	13,554	100	0	27
LY2DX*	12,038	98	0	26
LY2OO	1,680	30	0	14

LUXEMBOURG

LX1NO	**296,667**	**920**	**10**	**53**
LX/DL2JRM*	120,252	544	0	44
LX/DL5SE*	68,843	311	3	40

MACEDONIA

Z32AU	**501,700**	**885**	**24**	**76**

MALTA

9H1ZA	**241,640**	**645**	**9**	**61**

NETHERLANDS

PA5KT	**216,360**	**547**	**21**	**51**
PA3AAV*	**76,140**	**263**	**9**	**45**
PA$4LOU	67,734	286	5	48
PAØBWL*	58,296	280	2	40
PA3AFF*	50,227	204	8	39
PA3GVI*	43,103	194	6	37
PAØJED*	25,120	158	1	32
PI4ALK	21,846	136	0	33
PA5WT*	18,038	128	0	29
PA3CNI*	16,626	96	5	29
PA$4JNH	13,728	86	0	32
PAØMRN	3,255	31	0	21
PAØLSK*	175	7	0	5
PA3ELD*	125	5	0	5

NORWAY

LA3BO*	**33,728**	**211**	**0**	**32**
LA8WG	28,576	149	0	38
LA7SI*	10,270	79	0	26
LA9YV*	1,938	21	0	19
LA5EKA/QRP	**1,704**	**25**	**0**	**16**
LA5FH*	1,568	23	0	14

POLAND

SN7Q	**681,757**	**1154**	**27**	**76**
SO2R	**585,758**	**1086**	**20**	**78**
SN8F	312,389	764	10	67
SN3R*	**183,490**	**615**	**6**	**53**
SP4Z	143,451	439	7	56
SP4ZO*	118,111	506	0	47
SP5JTF*	99,135	450	0	45
SP4TKR/QRP	**96,800**	**391**	**0**	**50**
SP7JQQ	92,976	358	2	50
SP3VT*	67,440	339	0	40
HF7ØI/QRP	56,520	253	3	42
SP6LV*	55,272	267	1	41
SP9GFI/7*	47,845	280	0	35
SP5LCC*	43,206	229	0	38
SP6BEN*	32,860	221	0	31
SP5AKG/QRP	30,721	202	0	31
SP5KP*	25,080	175	0	30
SN1A*	24,780	183	0	28
SP5DIR*	24,764	116	0	41
SQ9FMU*	22,847	153	1	30
HF7ØG*	20,520	158	0	27
SP6GJY*	20,367	137	0	31
SP3GXH*	13,618	131	0	22
SQ6ADB*	11,377	77	0	31
SP3OL*	11,256	98	0	24
SP3HUU	9,765	49	0	35
SP6EKS*	8,624	62	1	27
SP5GH	7,524	39	0	36
SP2AVE*	5,334	52	0	21
SQ9MZ*	4,879	61	0	17
SN8M/QRP	4,734	54	0	18
SP9EMI*	3,744	44	0	18
SP3GTS	3,240	22	3	17
SP2PMW/2*	1,034	20	0	11
SP6AEG	544	12	1	7
SP7HQ*	405	9	0	9

PORTUGAL

CT1FJK	**175,182**	**317**	**28**	**58**

ROMANIA

YO2IS*	**149,580**	**475**	**8**	**52**
YO5KAD	119,450	608	0	46
YO3APJ*	39,997	211	0	37
YO3JR/QRP	**16,276**	**127**	**0**	**26**

RUSSIA

RW4PL	**222,534**	**502**	**2**	**76**
RW3GB*	**179,904**	**552**	**1**	**63**
UA1QM*	147,540	491	1	59
RV1CC	145,908	466	4	59
RW4FZ	118,664	408	0	56
UA3AB	103,545	345	1	58
RV6ASU	101,906	341	4	54
UA1QV	99,705	395	0	51
RU1AO	95,580	357	1	53
UA6LFQ	95,247	328	0	57
UA4RC	91,960	326	0	55
RV3FW	84,647	365	0	47
UA4FER*	72,495	322	0	45
RA4LW	70,668	270	0	52
RK3BX	69,740	325	0	44
UA3XAC	68,525	307	0	47
RA3NN	66,552	281	0	47
RN6AL	49,708	228	0	43
UA4HJ*	33,840	189	0	36
UA3AMZ*	30,442	222	0	31
RU6YY*	28,273	101	0	49
RV3LO*	27,778	171	0	34
RW3SK	25,128	123	0	34
UA3TCJ	23,616	116	0	41
UA4LCH	20,832	119	0	31
RK6BZ	19,798	121	0	38
UA3SAQ*	19,668	128	0	33
RW3XX*	18,711	117	0	33
RZ4AA/QRP	**18,270**	**130**	**0**	**30**
RA4PO	15,372	117	0	28
UA4FEN*	15,080	112	0	29
RA3YO*	13,332	74	0	33
UA4NF*	12,850	103	0	25
RW3SU*	10,540	68	0	31
RD4M	10,192	74	0	28
RN1AO/QRP	6,100	69	0	20
UA6XT*	3,791	51	0	17
RU3WR*	3,444	60	0	14
RA3DNC*	2,945	31	0	19
RA3NZ*	1,936	57	0	8
RA1AR	930	19	0	10
UA4WLI*	805	18	0	7
UA6LP*	350	8	0	7
RZ6AZO	90	3	2	1

SARDINIA

ISØOMH*	**26,505**	**168**	**1**	**38**

SICILY

IT9GSF	**261,908**	**579**	**21**	**61**

SLOVAKIA

OMØWR	**398,898**	**898**	**14**	**69**
OM3IAG	**282,340**	**697**	**12**	**64**

OM3OM*	**205,986**	**597**	**7**	**59**
OM6TY*	99,300	398	2	48
OM7JG*	80,650	320	3	47
OM4DN*	90,850	400	0	46
OM1LA*	80,605	327	4	45
OM3BA*	36,610	217	0	35
OM7PY*	23,384	126	0	37
OM1AF*	14,432	135	1	21
OM3DX	6,422	36	6	20
OM7VF*	4,629	263	0	36
SLOVENIA				
S58A	**530,048**	**935**	**28**	**73**
S50C	**480,904**	**921**	**25**	**69**
S57DX	333,880	733	16	69
S530	312,782	680	20	66
S57UN	275,700	704	13	62
S52A	272,496	603	17	67
S53F*	**178,992**	**536**	**9**	**57**
S57L*	169,620	511	9	57
S58Q*	157,640	420	16	54
S57J*	116,700	371	11	49
S54A*	100,263	351	7	50
S57IIO/QRP	**86,940**	**328**	**7**	**47**
S51W*	66,352	316	0	44
S54X*	63,963	264	5	43
S57U*	49,676	229	4	40
S59W*	36,815	209	0	37
S51VI*	27,676	158	3	34
S51DI*	2,388	111	4	38
S51DX	792	15	0	12
S59GMA*	238	8	0	7
S51RE*	200	11	0	5
S53AU*	99	9	0	3
SPAIN				
EA2LU/P	**302,345**	**596**	**32**	**53**
EA4ML*	**218,862**	**470**	**25**	**56**
EA4NP*	52,488	171	11	43
EA3QA	44,325	196	2	43
EA7AJR*	40,446	124	16	38
EA7NW*	25,456	102	14	29
EA1EVA*	20,604	119	4	30
EA4DAT*	8,918	72	0	26
EA2URD/QRP	**5,901**	**59**	**0**	**21**
EA4EFJ*	4,425	35	2	23
EA2AGB*	4,202	38	0	22
EA5AAJ*	2,774	30	0	19
EA7CA*	1,582	23	0	14
EA7MT*	1,133	23	0	14
SWEDEN				
7S2E	**157,135**	**550**	**2**	**53**
7S7V*	**94,864**	**437**	**1**	**43**
SM3X	77,136	314	2	46
SM6WQB	52,710	253	1	41
SMØBSB	50,160	201	2	46
SM7CQY	49,192	219	2	42
SM6BUV*	27,040	134	0	40
SM7BHM	20,580	138	0	30
SM7E	20,280	138	0	30
SM6IQD*	16,875	149	0	41
SM7DLK*	15,314	96	1	30
SM7EH*	10,769	84	0	26
8SØW*	9,300	68	0	30
SM4XIH*	1,358	20	0	14
SL5ZXR*	450	10	0	9
SWITZERLAND				
HB9CQL	**55,809**	**286**	**0**	**39**
HB9CZF*	**26,880**	**124**	**10**	**30**
HB9QA*	3,200	31	0	20
HB9DOT*	3,150	45	9	14
UKRAINE				
UXØFF	**398,000**	**714**	**22**	**78**
UR8QX	**317,668**	**640**	**8**	**74**
UX5NQ	195,540	649	7	53
UT5UGR	145,290	497	1	57
UT5DL*	**143,577**	**449**	**7**	**56**
UT1FA*	130,088	459	4	52
UYØZG	119,011	377	6	55
UY5ZZ	107,439	346	5	54
UR7ET*	102,429	350	3	54
UR5E	87,776	330	4	48
UW7F	83,148	318	4	48
UX2MF*	83,006	328	0	49
UT2UB	81,600	321	0	51
UR6IJ*	73,085	308	1	46
US3IZ	67,050	261	0	50
UT5ECZ	65,100	313	1	41
UU2JQ*	64,133	198	1	58
UX8IX/QRP	**64,032**	**272**	**0**	**46**
US9QA*	61,131	301	1	40
US5II*	60,660	263	0	45
UT8IT*	47,970	232	0	41
UT4NW*	41,480	214	0	40
US7IB*	30,673	163	0	37
UT4EK*	24,752	147	0	34
UYØIX*	21,534	105	0	37
UR4III*	19,950	141	0	30
UY5TE*	16,172	137	0	26
UX1IL*	16,104	137	0	24
UU2JA*	12,177	70	0	33
UR5NKW*	6,808	61	0	23
UT1YW/QRP	4,556	59	0	17
UT5UGQ/QRP	3,916	37	0	22
UY2ZA/QRP	2,480	34	0	16

WALES				
GW3JXN	**234,186**	**630**	**15**	**54**
GW4ALG/QRP	**6,972**	**67**	**0**	**21**
YUGOSLAVIA (SERBIA)				
YT6T	**449,236**	**872**	**26**	**66**
YU7AV	**386,302**	**852**	**16**	**66**
YU1EA*	**298,076**	**637**	**15**	**71**
YU1ZZ*	207,328	511	14	62
YU1AB	130,036	419	6	53
4N7M*	124,152	431	7	49
YU7DP*	106,029	403	8	43
YU1RA/QRP	**72,471**	**283**	**1**	**50**
YU1WC*	61,619	288	0	43
4N1JA*	35,600	226	0	40
YU1CC*	9,984	59	2	30
YU1UA*	2,546	24	0	19

OCEANIA

AUSTRALIA				
VK3IO	**66,975**	**151**	**34**	**12**
VK6VZ	44,198	114	21	20
HAWAII				
KH7X	**444,744**	**628**	**54**	**18**
NH7O	162,008	295	45	11
KH6ZM*	**8,586**	**54**	**13**	**5**
KH6B*	1,134	21	6	1
INDONESIA				
YEØX	**399**	**8**	**1**	**6**
MARIANA IS				
WHØV	**21,420**	**123**	**5**	**13**
PHILIPPINES				
DU9/NØNM	**18,900**	**109**	**5**	**13**

SOUTH AMERICA

ARGENTINA				
LU2EE*	**168**	**8**	**0**	**4**
LU1EWL*	88	4	0	4
ARUBA				
P4ØRH	**27,935**	**77**	**29**	**8**
BRAZIL				
PV8DX	**15,435**	**243**	**46**	**19**
PY2NY*	343	8	0	7
FERNANDO DE NORONHA				
PRØF	**517,146**	**535**	**45**	**53**
VENEZUELA				
YV4GLD*	**80,132**	**158**	**39**	**13**
YV7QP*	21,488	65	26	8
YV5MBX*	11,300	47	21	4
YV5AMH*	7,925	34	18	7

MULTI-OPERATOR

NORTH AMERICA

UNITED STATES

CONNECTICUT				
W1QK	**156,060**	**587**	**53**	**32**
N8RA	78,522	439	47	22
MASSACHUSETTS				
W1FJ	**624,960**	**1149**	**55**	**69**
K1TTT	408,760	1021	55	55
W1QA	191,835	806	52	35
K1NU	74,802	298	49	29
NF1A	16,584	151	36	10
NEW HAMPSHIRE				
KC1XX	**700,050**	**1263**	**57**	**73**
KØTV	264,960	889	53	43
WA1Z	119,686	535	52	31
NEW JERSEY				
W2GD	**665,250**	**1295**	**54**	**71**
KD2I	189,128	690	53	41
NEW YORK				
W2XL	**229,599**	**810**	**55**	**42**
W2GDJ	53,410	267	46	24
MARYLAND				
K3DI	**137,170**	**646**	**53**	**29**
W3HVQ	126,560	622	50	30
N3OC	119,496	626	54	24
N3II	39,884	332	46	6
PENNSYLVANIA				
K3WW	**370,332**	**1007**	**54**	**54**
K3NM	150,724	401	50	48
W3FV	120,123	562	57	30
WY3T	61,650	301	65	21
N3ZA	16,677	117	41	10
W3FVT	11,005	161	31	0
ALABAMA				
KS4YT	**49,644**	**331**	**52**	**11**
FLORIDA				
NU4Y	**255,337**	**860**	**58**	**45**
N4WW	179,070	639	54	40
WS4Y	129,314	620	55	28
N8PR	105,270	374	49	38

NORTH CAROLINA				
K3KO	**107,723**	**526**	**50**	**27**
W3GQ	26,350	223	42	8
W4WNT	2,808	57	24	0
SOUTH CAROLINA				
AA4V	**332,896**	**1052**	**56**	**47**
N4IQ	38,586	274	49	10
TENNESSEE				
N4VV	**67,782**	**273**	**50**	**29**
K4BP	7,425	102	33	0
VIRGINIA				
N4RV	**306,535**	**1087**	**55**	**46**
W4MYA	302,253	877	54	57
W4DR	63,747	174	40	41
ARKANSAS				
WD5R	**187,783**	**1019**	**57**	**22**
NEW MEXICO				
W6TER	**103,740**	**714**	**54**	**11**
OKLAHOMA				
W5TM	**194,532**	**1075**	**57**	**21**
TEXAS				
N5TW	**216,644**	**1052**	**57**	**25**
K5PTC	143,364	744	56	22
K5NA	88,478	396	53	29
N3BB	50,960	310	48	17
N8SM	40,635	251	51	12
NX5M	20,034	138	41	13
CALIFORNIA				
N6KI	**34,650**	**298**	**45**	**5**
ARIZONA				
N7GP	**194,112**	**1002**	**56**	**16**
UTAH				
N7JW	**287,984**	**1129**	**58**	**24**
NS7K	87,978	587	56	10
WASHINGTON				
K7FL	**20,923**	**155**	**41**	**8**
MICHIGAN				
K8XXX	**280,524**	**1138**	**58**	**39**
N8IA	17,554	186	41	2
OHIO				
N8TR	**82,458**	**332**	**50**	**31**
NO8C	30,465	305	41	4
N8KM	23,700	192	42	8
WEST VIRGINIA				
W8BAR	**196,779**	**881**	**53**	**36**
WA8WV	39,150	347	45	5
ILLINOIS				
WB9Z	**286,533**	**1246**	**58**	**35**
KB9CRY	15,604	129	39	8
INDIANA				
N9RV	**255,131**	**906**	**57**	**46**
WB9CIF	48,776	277	50	17
COLORADO				
KØSX	**98,112**	**681**	**54**	**10**
MISSOURI				
KØLIR	**121,647**	**789**	**56**	**13**
AAØA	10,955	149	35	0

CANADA

PRINCE EDWARD ISLAND				
VY2ZM	**1,180,010**	**1330**	**55**	**75**
QUEBEC				
VE2OJ	**256,632**	**770**	**54**	**14**
ONTARIO				
VA3EC	**7,992**	**72**	**24**	**0**
BRITISH COLUMBIA				
VE7SV	**254,535**	**717**	**54**	**17**

AFRICA

MADERIA ISLAND				
CT3FN	**855,621**	**835**	**45**	**58**

ASIA

ASIATIC RUSSIA				
RT9W	**31,260**	**115**	**0**	**30**
RWØAR	18,239	104	0	23
JAPAN				
JA3YBK	**13,392**	**82**	**5**	**22**
JAØZRY	6,380	56	5	15
JG2ZUP	249	36	0	3
JORDAN				
JY9QJ	**187,920**	**343**	**4**	**54**
LEBANON				
OD5/OK1MU	**260,370**	**405**	**9**	**57**

EUROPE

AUSTRIA				
OE2LCM	**74,568**	**278**	**0**	**52**
OE1TKW	59,820	175	5	55
OE2VEL	11,850	339	9	56
BALEARIC IS				
EA6IB	**431,431**	**827**	**30**	**61**
BELGIUM				
OT3A	**384,744**	**735**	**25**	**67**
ON4ATW	284,240	687	20	56
CROATIA				
9A1P	**700,980**	**1133**	**31**	**74**
9A5Y	513,968	1005	20	71
9A1A	501,504	920	24	72
CZECH REPUBLIC				
OK5DX	**496,248**	**993**	**24**	**69**
OL5Q	328,713	852	17	60
OL4W	220,184	662	10	58
OL1C	217,971	647	13	56
OL2U	145,114	697	2	51
OK2KRT	119,650	514	0	50
OL7Q	14,621	514	5	54
ENGLAND				
M2D	**408,070**	**880**	**19**	**67**
ESTONIA				
ES5Q	**345,280**	**784**	**8**	**72**
FINLAND				
OH4AB	**172,197**	**590**	**2**	**55**
OH3BU	23,590	135	1	34
GERMANY				
DJ5IW	**370,014**	**898**	**19**	**64**
DLØAO	**327,976**	**745**	**22**	**54**
DFØSAX	317,772	852	16	62
DL9YX	261,408	625	17	67
DLØMB	239,538	665	15	74
DL6LAU	233,475	643	12	63
DH1NFL	178,620	588	12	53
DKØIW	150,192	518	11	52
DF9ZP	129,980	387	16	49
DJ9MH	86,435	295	8	51
DJ2YA	55,252	95	12	64
DL2MY	52,765	217	5	46
DJ9NMH	49,860	237	1	44
DKØNS	41,536	199	1	43
DK3GI	4,000	43	0	20
HUNGARY				
HG3DX	**523,712**	**958**	**20**	**78**
HG1S	434,142	893	19	70
HG5A	389,752	856	13	73
HG1R	128,010	498	5	48
IRELAND				
EI6IZ	**131,089**	**400**	**12**	**49**
ITALY				
IK2NCJ	**399,556**	**732**	**28**	**64**
IV3TDM	117,320	423	2	54
IK2WXQ	42,504	203	2	40
KALININGRAD				
RW2F	**579,168**	**1062**	**20**	**76**
RV2FW	419,094	995	14	64
LATVIA				
YLØA	**128,992**	**414**	**3**	**55**
LITHUANIA				
LY1YK	**294,652**	**736**	**12**	**64**
LY7A	254,898	769	5	58
LY2CX	232,185	639	11	58
LY2WJ	20,648	147	0	29
LUXEMBOURG				
LX5A	**570,573**	**1177**	**21**	**68**
BOSNIA				
Z36W	**444,609**	**1005**	**16**	**65**
NETHERLANDS				
PA5MW	**459,641**	**935**	**21**	**70**
PA3BAS	166,736	464	13	55
PA3FDO	21,024	118	2	34
NORWAY				
LA8W	**200,340**	**663**	**4**	**56**
POLAND				
SP3KFH	**200,005**	**590**	**12**	**53**
3ZØPRK	24,900	170	0	30
RUSSIA				
RN6BN	**613,180**	**860**	**26**	**89**
RU1A	488,970	992	16	74
UA6LV	409,070	737	13	82
RK4UWR	268,240	566	3	77
RU3DX	225,680	635	6	64
RK3VYA	96,672	399	0	48
RK4FWX	42,264	245	0	38
SLOVAKIA				
OM7M	**665,680**	**1080**	**24**	**82**

SLOVENIA				
S57M	**529,200**	**942**	**23**	**75**
SPAIN				
EA1WX	**217,987**	**504**	**22**	**55**
EA5BY	154,650	357	21	54
UKRAINE				
UU7J	**348,832**	**702**	**11**	**77**
UT7L	180,230	491	4	63
US0Q	40,385	197	0	41
UT4UXW	1,638	23	0	14
YUGOSLAVIA (SERBIA)				
YZ7A	**404,460**	**810**	**18**	**72**

OCEANIA

NEW ZEALAND				
ZL6QH	**97,155**	**200**	**36**	**15**

SOUTH AMERICA

BRAZIL				
PY2FUS	**2,957**	**68**	**28**	**19**
CURICAO				
PJ2X	**1,085,729**	**1028**	**56**	**51**
FRENCH GUIANA				
FY5KE	**405,195**	**475**	**51**	**34**

CW CHECK LOGS

Thanks to the following stations for their valuable CW check logs:
DJ6TK, DK5OS, DL6RO, F8ATS, HA5PT, LA2O, LA6XF, M4T(GØVQR), NH7OD, NO2D, OH6XX, OK1ADM, OL1JDC, OM1ADN, PAØRBS, PA5TT, RA3DNC, RA4AI, RU3DG, RV3ID, RW3SU, RX3AEX, SM7DLK, SP3CUG, SP8HKT, UA9ZZ, W7LR, WA9YAZ

SSB RESULTS

SINGLE OPERATOR

NORTH AMERICA

UNITED STATES

CONNECTICUT				
K1VW	**145,986**	**613**	**55**	**32**
W1CTN*	**27,750**	**223**	**40**	**10**
W1AMF/QRP	**5,082**	**102**	**22**	**0**
MASSACHUSETTS				
K5ZD	**22,389**	**114**	**32**	**19**
WG1Z*	**17,898**	**196**	**35**	**3**
KA1BXB	10,656	133	30	2
W1TW/QRP	**6,692**	**102**	**27**	**1**
K1EP*	90	6	5	0
MAINE				
AA1UT*	**11,470**	**136**	**36**	**1**
N1LW*	8,568	107	33	1
W1CEK/QRP	**4,284**	**67**	**28**	**0**
N1YIS*	1,980	39	20	0
NEW HAMPSHIRE				
AF1T	**74,387**	**374**	**53**	**20**
NE1B	16,600	101	36	14
RHODE ISLAND				
N1HRA*	**28,320**	**180**	**48**	**12**
VERMONT				
K1KD*	**24,192**	**256**	**43**	**5**
NEW JERSEY				
K1NK*	**51,030**	**329**	**50**	**13**
NJ2L*	33,807	234	51	8
K2PS	10,592	144	28	4
K2YLH*	9,695	118	34	1
N2ED	8,621	106	37	0
N2NYR*	6,641	101	29	0
K2FL*	6,048	101	27	0
K2AF	5,511	66	31	2
N2IHN	5,432	87	27	1
N2NT	4,844	55	20	8
W2OO	2,420	49	21	1
KR2Q*	2,210	59	17	0
NEW YORK				
WA2JQK*	**25,450**	**222**	**46**	**4**
K2CS*	10,664	101	38	5
N2DBI*	8,995	109	33	2
N2BZP*	5,800	90	28	1
N2VR	3,744	63	25	1
WB2DVU*	3,212	58	21	1
NS2P*	806	25	13	0
DELAWARE				
AA1K/1	264	15	8	0
MARYLAND				
N3HBX	**160,310**	**796**	**59**	**23**
N3UM	39,538	331	45	8
W3ARS*	**38,988**	**296**	**48**	**9**
W3LL*	29,713	320	41	2
K3ZO	28,198	277	45	1
W2GG*	11,507	142	37	0
N3VOP*	11,480	146	35	0
K3DNE*	9,579	138	29	2

WK3H*	4,750	86	25	0
KC3T*	3,294	55	27	0
K3TW/QRP	429	18	11	0
PENNSYLVANIA				
W3BGN	**219,978**	**710**	**59**	**42**
W3TS	**152,554**	**773**	**59**	**24**
K3NM	126,252	595	58	26
W3GH	107,120	528	58	22
K3WW	55,920	394	46	14
K4JLD	41,152	247	50	14
W3AP	18,213	211	37	2
AA3TL	16,691	37	19	1
K3OO	13,640	99	30	14
WW3S*	**9,628**	**148**	**28**	**1**
K3OOO	7,968	106	29	3
K3MD	5,720	95	25	1
W1NN*	4,470	70	30	0
AA3B	4,296	82	24	0
W3FVT	2,760	63	20	0
W03X*	1,080	33	15	0
ALABAMA				
AF4OD*	**15,552**	**142**	**44**	**4**
K4WI*	15,456	148	41	5
W4NTI*	456	19	12	0
FLORIDA				
KC4PX	**52,509**	**308**	**51**	**18**
AA4MM	43,810	270	48	17
K4PB	7,128	80	32	4
K9HUY	5,824	68	22	10
GEORGIA				
N4NX	**43,776**	**289**	**53**	**11**
WA4TII	22,302	179	49	5
K4JRB	20,923	182	44	5
K4BAI	7,848	100	33	3
KENTUCKY				
W4KP	**18,834**	**198**	**41**	**2**
KD4ULE	658	22	14	0
NORTH CAROLINA				
NX9T	**40,229**	**375**	**44**	**9**
KE4SCY	32,270	201	49	13
K3KO	27,612	200	52	7
K4SV	27,246	197	47	10
KG4NEP*	**11,193**	**130**	**36**	**3**
K4MA	5,304	100	23	1
N4UH	5,216	74	31	1
WB4MSG*	4,030	73	26	0
N4CW	3,920	64	28	0
KR4LO*	3,725	64	23	2
SOUTH CAROLINA				
K4CNW*	**12,056**	**122**	**41**	**3**
NC4SC	6,816	102	32	0
TENNESSEE				
WB4YDL	**49,440**	**371**	**52**	**8**
K4JNY	41,152	344	48	7
W4PV	26,124	296	41	1
KØEJ	19,110	225	38	1
KØBJ*	**18,411**	**154**	**45**	**6**
AC4G*	8,103	102	36	1
WN4M*	5,250	80	30	0
K4WX*	1,460	35	20	0
WA4JA*	1,380	33	20	0
W4OGG*	1,160	29	20	0
VIRGINIA				
W4MYA	**320,862**	**1103**	**59**	**47**
K4JA	**103,411**	**454**	**53**	**26**
N4DSL	26,544	295	40	2
N4GG	22,231	229	40	3
K4YT	21,062	200	50	3
W4DF	18,696	193	37	4
WK4Y*	**12,544**	**178**	**30**	**2**
K1KO	10,791	136	28	5
AF4CD*	9,366	366	12	0
N4MM*	8,240	80	36	4
KU4FP	3,151	64	23	0
N4JED*	440	22	10	0
K3MZ*	429	15	11	0
W4ZYT*	297	15	9	0
MISSISSIPPI				
N5YW	**3,720**	**51**	**30**	**1**
NEW MEXICO				
K5AM	**2,331**	**51**	**20**	**1**
OKLAHOMA				
W5PUF*	**16,039**	**169**	**40**	**3**
AC5TE	11,628	154	35	1
KA5BAY*	1,444	35	19	0
TEXAS				
W5PR	**82,855**	**468**	**53**	**20**
K5RX	18,700	69	50	18
NØRQ*	2,782	49	24	2
CALIFORNIA				
N6AA	**18,750**	**156**	**45**	**5**
N6NF*	**16,810**	**180**	**38**	**3**
KG6AO	11,324	125	35	3
W7CB	11,308	102	39	5
K6SE	9,032	103	35	3
N6HY	9,030	94	40	2
AJ6T	7,945	100	34	1
WA6FGV*	5,400	105	23	1
W6VM*	5,049	71	31	2
K6LRN	3,894	80	20	2
W6RKC	2,673	39	24	3
N6VOA*	2,134	41	20	2
KE6QR*	2,115	66	15	0
WB6FRM*	1,665	47	13	2
KI6PG*	1,176	36	13	1
K6NA	1,062	22	15	3
AA6EE*	192	16	6	0
ARIZONA				
NF7E	**34,599**	**265**	**49**	**8**
K6TIM*	**20,706**	**175**	**46**	**5**
KC7V	16,284	152	41	5
W7ZMD*	8,995	115	34	1
NN7D*	288	13	8	1
W7YS*	216	12	7	1
IDAHO				
KG7H	**68,904**	**529**	**53**	**5**
K7ZO	1,272	50	11	1
MONTANA				
KK7DP	**26,936**	**223**	**48**	**4**
NB7V*	**3,276**	**57**	**25**	**1**
NEVADA				
N7ZT	**54,044**	**402**	**52**	**7**
OREGON				
W7ACD	**4,930**	**59**	**30**	**4**
UTAH				
NS7K	**7,614**	**125**	**25**	**2**
WASHINGTON				
K7OX	**48,950**	**393**	**49**	**6**
N7LOX*	**10,693**	**122**	**33**	**4**
K7UIR	8,520	93	38	2
KC7QR*	4,860	77	25	2
W7SNH*	3,354	57	24	2
K7AWB*	2,832	50	24	0
W7SAW*	2,622	51	22	1
W7KTY*	175	11	6	1
WYOMING				
NQ7Q/QRP	650	22	11	2
MICHIGAN				
N8LJ	**21,000**	**192**	**48**	**2**
N8YEL*	**15,834**	**171**	**41**	**1**
KC8MNO	15,265	161	42	1
AB8PD*	8,575	112	35	0
WB8NXG*	2,100	48	20	0
N8DGD*	1,738	35	22	0
OHIO				
ND8DX	**234,324**	**1014**	**59**	**33**
NØFW*	**168,510**	**893**	**58**	**24**
AD8P*	23,091	242	42	1
N4GXP*	20,276	259	37	0
WB8TCT*	19,787	180	42	5
K8NVR*	10,600	83	46	4
N8KM	8,514	170	31	2
W8KNO*	4,560	70	30	2
KO8HIO	2,806	55	23	0
NA8W*	2,664	51	24	0
N8UZE*	2,016	42	21	0
K8MR	1,005	32	15	0
N8XA/QRP	700	25	14	0
WEST VIRGINIA				
WA3HQK/QRP	**11,894**	**133**	**35**	**3**
WA8WV	6,235	100	28	1
K2UOP	5,191	68	24	5
WRØN*	**4,525**	**80**	**25**	**0**
ILLINOIS				
N2BJ	**61,389**	**504**	**53**	**4**
K9ZO*	**32,704**	**265**	**53**	**3**
WX9U*	29,811	230	53	4
K9FO*	29,260	242	55	2
K9IDQ	24,365	195	51	4
K9IJ*	16,932	148	13	0
W9LYN*	14,042	144	44	2
W9SE*	4,930	62	33	1
W9TMW	4,290	64	30	0
KG9IL*	1,037	29	17	0
K9JS*	728	28	13	0
INDIANA				
K9SG	**65,514**	**488**	**55**	**6**
W9RE	37,536	346	48	3
WISCONSIN				
WA9TZE	**53,040**	**394**	**57**	**3**
K9TY	22,900	205	49	1
K9UW*	**11,298**	**121**	**42**	**0**
WI9M*	8,436	99	36	1
KB9LIE	4,416	48	28	4
COLORADO				
KØUK	**31,050**	**284**	**46**	**4**
KØGAS	30,750	275	47	3
WØ/VO1NO*	**30,127**	**288**	**45**	**2**
WØETT*	11,914	113	45	1
KKØQ/QRP	**1,870**	**38**	**21**	**1**
KIØU/QRP	1,764	39	20	1
KØCO*	85	7	5	0
KANSAS				
WØPT*	**34,170**	**308**	**50**	**1**
KØRH*	13,120	148	41	0
NØAG	4,200	60	27	3
WØNEB	1,160	26	20	0
MINNESOTA				
N7AIN*	**66,965**	**511**	**57**	**2**
KØKX*	28,611	242	47	4
K4IU	3,267	50	27	0
MISSOURI				
KØJPL	**63,744**	**446**	**57**	**7**
KAØGGI*	**33,337**	**289**	**51**	**2**
AE9B	24,420	195	49	6
KI7WO*	14,444	139	44	2
AAØA	7,735	100	35	0
NØTT	2,925	51	25	0
NEBRASKA				
KBØARZ*	**928**	**26**	**16**	**0**
SOUTH DAKOTA				
K7RE*	**2,862**	**50**	**27**	**0**
KØHW*	1,870	41	22	0
CANADA				
PRINCE EDWARD ISLAND				
VY2ZM	**727,088**	**973**	**58**	**58**
NEWFOUNDLAND				
VO1TA	**15,040**	**90**	**22**	**10**
NEW BRUNSWICK				
VE9XA*	**10,726**	**69**	**26**	**5**
ONTARIO				
VE3PN	**272,049**	**620**	**58**	**29**
VE3ESE*	**108,072**	**394**	**57**	**6**
VE3NE*	106,731	381	52	7
VE3KZ/QRP	**41,160**	**205**	**42**	**0**
VE3KP	22,542	120	46	3
VE3GLO*	9,288	84	24	0
VY2MGY/3	5,980	58	23	0
VE3NQM*	4,136	40	22	0
VE3RCN*	3,518	45	18	0
VA3IX*	3,276	40	18	0
VE3EJ*	1,166	22	10	1
VE3OIL*	240	8	6	0
MANITOBA				
VE4RTB*	**17,936**	**98**	**37**	**1**
SASKATCHEWAN				
VA5DX	**198,250**	**630**	**54**	**11**
VE5SF*	**20,862**	**114**	**36**	**2**
ALBERTA				
VE6JY	**84,111**	**331**	**49**	**4**
VE6BF*	**7,743**	**57**	**28**	**1**
BRITISH COLUMBIA				
VE7JKZ	**12,209**	**88**	**26**	**3**
ALASKA				
NL7Z	**4,930**	**56**	**14**	**3**
COSTA RICA				
TI2KAC*	14	2	0	2
MARTINQUE				
FM5GU	**53,265**	**194**	**33**	**20**
MEXICO				
XE2TG*	**47,196**	**205**	**41**	**5**
PUERTO RICO				
KP4KE*	**22,527**	**104**	**29**	**12**
WP4LNY*	5	1	0	1
U.S. VIRGIN ISLANDS				
WP2Z	**10,296**	**57**	**21**	**12**

AFRICA

CANARY ISLANDS				
EA8/OH2BYS	**565,222**	**606**	**33**	**61**
EA8/DL7CX*	1,968	19	1	11
CAPE VERDE ISLANDS				
D4B	**627,715**	**624**	**46**	**55**
MOROCCO				
CN2R	**237,116**	**352**	**19**	**49**

ASIA

ASIATIC RUSSIA				
RA9MJ	**42,908**	**212**	**0**	**34**
UA9AMF*	**24,164**	**96**	**0**	**28**
UA9ACJ*	19,375	87	0	25
RK9CZO	10,840	65	0	20
UA9AM	7,254	50	0	18
RW9QA*	4,250	36	0	17
UA9MQR*	116	5	0	4
UA9XF*	24	2	0	2
ISRAEL				
4X1IM	**32,820**	**113**	**0**	**30**
KIRGHIZIA				
EX8AA*	**9,450**	**53**	**0**	**21**
EX8MK*	1,500	14	0	12
LEBANON				
OD5/OK1MU	**8,190**	**40**	**0**	**21**

EUROPE

AZORES				
CU2AF*	**12,020**	**61**	**7**	**26**
BELGIUM				
OR3T	**378,102**	**781**	**28**	**59**
BOSNIA				
T95A*	**2,414**	**28**	**0**	**17**
BULGARIA				
LZ2UZ*	**1,104**	**17**	**0**	**12**
CROATIA				
9A3B	**142,320**	**452**	**8**	**52**
9A4X	136,080	467	5	51
CZECH REPUBLIC				
OK1RF	**218,025**	**538**	**16**	**59**
OK2WM	**105,000**	**427**	**4**	**46**
OK1TP	93,636	357	3	51
OK2BEN*	**19,618**	**117**	**1**	**33**
OK1ES/QRP	**15,147**	**99**	**0**	**33**
OK1FC*	14,849	99	1	30
OK1WWJ*	12,000	74	0	32
OK2SG	11,563	73	0	31
OK1CZ/QRP	7,775	82	0	25
OK1KFW	5,390	51	0	22
DENMARK				
OZ3SK	**177,016**	**617**	**3**	**53**
OZ1HXQ	137,392	415	12	50
OZ8AE*	**6,350**	**50**	**0**	**25**
OZ4O	1,455	20	0	15
ENGLAND				
G4VGO*	**135,730**	**350**	**21**	**49**
G3VAO*	42,144	163	9	39
G3XTT	26,956	102	8	38
G3NAS	26,312	105	8	36
GØMTN*	128	7	0	4
ESTONIA				
ES1AJ	**84,960**	**338**	**1**	**47**
ES6PZ*	**17,391**	**101**	**0**	**33**
ES6KW*	670	13	0	10
FINLAND				
OH5NE	**49,335**	**252**	**0**	**39**
OH6NIO	40,872	206	0	39
OH3JR	19,476	105	0	36
OH2BO	17,176	85	1	37
FRANCE				
F5BBD	**33,558**	**153**	**3**	**39**
F6GOX	4,462	37	1	22
GERMANY				
DJ4PT	**307,776**	**715**	**24**	**60**
DJ6QT	**114,426**	**462**	**7**	**47**
DH6LS*	**106,201**	**368**	**13**	**48**
DJ8UV/P*	52,875	273	6	39
DK6WL	34,914	155	6	40
DL9NDS*	32,760	174	4	36
DJ6TK*	32,308	162	4	37
DK5JM*	18,655	115	1	34
DF6WE*	9,334	79	0	26
DL6FBL	6,348	63	0	23
DK6CQ*	5,610	55	0	22
DJ2IA*	3,380	37	1	19
DL6RBH*	2,625	41	0	15
GREECE				
SY8A	**253,595**	**769**	**6**	**61**
SV1DPP*	**19,760**	**99**	**1**	**37**
SV1DPI*	14,868	78	1	35
GUERNSEY ISLANDS				
MU3EFB/QRP	**5,500**	**40**	**1**	**24**
HUNGARY				
HA8BE*	**131,274**	**471**	**3**	**51**
HG5Z*	37,800	188	1	39
HA5FA/QRP	**5,376**	**45**	**0**	**24**
ITALY				
IC8POF*	**100,062**	**396**	**3**	**48**
IK8UND	64,150	265	2	48
IZ3DVW*	50,694	248	1	41
I4CSP	11,424	62	0	28
IK3ORD*	2,752	37	0	16
IK4VET*	216	9	0	6
LATVIA				
YL2KF	**35,131**	**149**	**1**	**42**
YL2CR*	**15,872**	**100**	**1**	**30**
LITHUANIA				
LY2FY	**381,133**	**1000**	**10**	**63**
LY3UM	**244,732**	**768**	**5**	**56**
LY2HM	117,530	503	2	44
LY2OU*	**101,473**	**421**	**2**	**45**
LY1DR	41,538	186	0	42
LY2TA	32,164	143	2	41
LY2BW	17,070	109	0	30
LY3BA*	3,648	42	0	19
NETHERLANDS				
PA3GVI*	**38,764**	**168**	**4**	**40**
PAØIJM	36,482	198	0	37
PA3AAV*	5,720	43	0	26
PA8KW*	1,417	23	0	13
PAØMRN*	1,300	20	0	13
POLAND				
SP7MTF/7	**131,727**	**440**	**10**	**47**
SP6LUV*	**99,800**	**399**	**2**	**48**
SP9QMP	86,802	385	1	45
HF7ØI/QRP	**39,376**	**200**	**1**	**38**
SP5NZA*	12,852	98	0	27
SQ7BCG*	11,088	84	0	28
SP9CIH*	9,725	82	0	25
SP1RWK*	9,204	75	0	36
SP6EKS*	8,775	66	0	27
SP6CJK*	8,568	62	1	27
SP4CQU*	7,682	71	0	23
SP9CLO*	6,624	60	0	23
SP9HZF/QRP	6,160	59	0	22
SQ9FMU*	5,757	43	0	19
SP6GTN*	5,616	48	0	24
SQ4MP*	3,822	27	0	26
SP3GTS*	1,824	24	0	16
SP3CUG*	1,808	25	0	16
SP5AKG/QRP	1,326	21	0	13
PORTUGAL				
CT1AHU	**38,587**	**149**	**8**	**39**
ROMANIA				
YO5KAD*	**64,814**	**270**	**1**	**42**
YO9HP	19,152	100	1	35
RUSSIA				
RV1CC	**67,725**	**362**	**0**	**43**
RU6LA	48,024	208	2	44
RN3OG*	**14,308**	**108**	**0**	**28**
RA6DB	12,930	83	0	30
RU3SD*	11,250	77	0	30
UA3SAQ*	7,040	61	0	22
RA3YO*	6,960	60	0	24
RN1AO/QRP	**5,083**	**44**	**0**	**23**
UA3DPX*	4,998	48	0	21
UA1WBV*	3,870	46	0	18
UA3BZ*	2,812	31	0	19
RA6LBS*	2,210	24	0	17
UA3LHL/QRP	1,742	28	0	13
RD4M	416	10	0	8
UA4RC*	245	8	0	5
UA3TT/QRP	78	5	0	3
RK3TYA/QRP	75	3	0	3
RZ3TWW/QRP	75	3	0	3
RV6ASU*	10	1	0	1
SLOVAKIA				
OMØWR	**215,280**	**633**	**8**	**57**
OM6TX*	**20,992**	**130**	**1**	**31**
OM6TY*	20,842	121	0	34
SLOVENIA				
S57M	**240,312**	**589**	**16**	**60**
S5ØA	**161,370**	**464**	**9**	**57**
S57DX	146,340	483	7	53
S57NMQ*	**55,982**	**240**	**3**	**43**
S57NDT*	33,320	167	1	39
S59AA	27,900	155	0	36
S57IIO*	27,892	149	1	37
S51DI*	15,748	103	0	31
S57OAN*	14,586	87	0	33
S54A*	10,382	68	0	29
S51RE*	814	16	0	11
S51DX	620	12	0	10
S53T*	68	4	0	4
SPAIN				
EA3CCN	**32,625**	**137**	**3**	**42**
EA3QA	28,490	157	1	36
EA3GBU*	**9,193**	**60**	**0**	**29**
EA3FAJ*	9,193	60	0	29
EA7HY*	2,980	26	2	18
EA7EWX*	371	11	0	7
EA3CIS*	350	10	0	7
EA3EJI	330	7	0	6
EA7CA*	210	7	0	5
SWEDEN				
SM6C*	**20,706**	**121**	**0**	**34**
SM7E	18,272	113	0	32
SM6IQD*	5,082	49	0	21
SM4XIH*	100	5	0	4
EUROPEAN TURKEY				
TA1BM*	675	13	0	19
UKRAINE				
UT7DK	**124,232**	**580**	**3**	**50**
UX5NQ*	**104,091**	**404**	**2**	**49**
UR7M*	50,029	203	2	47
UR5ASB	33,684	152	1	41
UT5UGR	11,250	71	0	30
UR5E	8,451	61	0	27
UR5FO*	5,405	46	0	23
UYØZG	3,180	31	0	20
US8IEU/WRP	**1,974**	**28**	**0**	**14**

Riki, 4X4NJ, operated as 4X3A in the CW contest and came away with the Single Op, Asia plaque for his effort.

UT8EL	1,316	19	0	14
UR5ZLK/QRP	432	11	0	8
YUGOSLAVIA (SERBIA)				
YZ1GD*	**13,552**	**96**	**0**	**28**
YU1EA*	6,528	51	0	24
OCEANIA				
CENTRAL KIRIBATI				
T31MY*	**525**	**9**	**3**	**4**
SOUTH AMERICA				
BRAZIL				
PY3CEJ	**3,864**	**24**	**6**	**15**
PY3CAL	76	5	0	4
PY3PA	4	2	0	1
VENEZUELA				
YV2IF	**32,852**	**83**	**25**	**18**
YV5LIX/QRP	205	7	0	5
MULTI-OPERATOR				
NORTH AMERICA				
UNITED STATES				
MASSACHUSETTS				
W1TO	**16,154**	**141**	**31**	**10**
K1RV	13,760	136	40	3
NEW HAMPSHIRE				
WA1Z	**51,805**	**319**	**50**	**15**
RHODE ISLAND				
K1DAM	**135,000**	**555**	**56**	**34**
NEW JERSEY				
KD2I	**163,936**	**649**	**59**	**35**
DISTRICT OF COLUMBIA				
K3VOA	**4,175**	**76**	**25**	**0**
4U1WB	420	21	10	0
DELAWARE				
AA1K	**47,637**	**234**	**44**	**23**
MARYLAND				
K3DI	**68,657**	**399**	**55**	**16**
K3IXD	7,385	88	32	3
PENNSYLVANIA				
WE3C	**194,582**	**730**	**59**	**38**
WY3T	66,882	382	54	17
W3FV	19,229	210	38	3
ALABAMA				
N4ION	**28,350**	**242**	**50**	**4**
KENTUCKY				
K4UZ	**46,740**	**382**	**55**	**2**
NORTH CAROLINA				
K4YFR	**13,040**	**130**	**32**	**8**
SOUTH CAROLINA				
AA4V	**55,327**	**392**	**49**	**12**
W4UNP	26,657	172	49	12
W4GFA	19,082	182	42	5
TENNESSEE				
K4BP	**27,700**	**253**	**46**	**4**
N4VV	6,624	83	27	5
VIRGINIA				
W4DR	**69,840**	**198**	**43**	**37**
W4HZ	57,680	468	48	8
W4NF	30,052	302	38	6
ARKANSAS				
WD5R	**83,008**	**593**	**54**	**10**
MISSISSIPPI				
W5DJW	**29,095**	**241**	**49**	**6**
CALIFORNIA				
W6YRA	**11,222**	**172**	**30**	**1**
ARIZONA				
N7GP	**103,224**	**672**	**55**	**13**
N7PWZ	37,632	350	47	2
NEVADA				
N7X	**70,150**	**508**	**52**	**9**
N7WL	168	14	6	0
OREGON				
NK7U	**45,942**	**353**	**51**	**6**
WASHINGTON				
W7WA	**31,790**	**246**	**48**	**7**
OHIO				
N8TR	**54,239**	**268**	**53**	**20**
AF8C	506	20	11	0
WEST VIRGINIA				
K8OQL	**28,950**	**249**	**45**	**5**
ILLINOIS				
K9NR	**295,862**	**1217**	**59**	**39**
KB9CRY	7,140	83	29	5
WISCONSIN				
WA9IRV	**16,335**	**158**	**43**	**2**
KANSAS				
WØNO	**136,008**	**817**	**57**	**15**
MINNESOTA				
NØFP	**9,400**	**100**	**38**	**2**
MISSOURI				
KØLIR	**18,286**	**211**	**40**	**1**
CANADA				
NOVA SCOTIA				
VE1JF	**5,928**	**29**	**3**	**21**
QUEBEC				
VE2UMS	**52,120**	**278**	**39**	**1**
ONTARIO				
VE3DC	**201,853**	**581**	**55**	**16**
BELIZE				
V31MD	**62,744**	**196**	**47**	**15**
COSTA RICA				
TI8/K4UN	**6,624**	**39**	**25**	**7**
MEXICO				
XE1RCS	**295,070**	**556**	**54**	**41**
ASIA				
CYPRUS				
5B4/UA9MA	**796,388**	**1100**	**12**	**62**
P3F	180,127	315	5	54
EUROPE				
AUSTRIA				
OE2VEL	**55,507**	**228**	**2**	**45**
OE1TKW	19,800	105	1	35
BALEARIC ISLANDS				
EA6CA	**7,750**	**58**	**0**	**25**
CZECH REPUBLIC				
OL1C	**114,393**	**457**	**7**	**44**
OK1KMG	11,004	83	0	28
DENMARK				
OZ5ESB	**73,931**	**305**	**4**	**47**
ENGLAND				
G6PZ	**140,427**	**441**	**18**	**44**
G4IIY	10,368	61	1	31
M3C	6,270	57	1	21
FRANCE				
F5PYJ	**63,699**	**246**	**8**	**43**
GERMANY				
DJ5IW	**162,096**	**501**	**12**	**54**
DLØMB	**102,080**	**406**	**9**	**46**
DK2OY	93,995	375	8	47
DL5RMH	74,160	359	4	44
DH1NFL	71,750	323	6	44
DH1NHI	54,234	259	2	44
DJ9MH	24,805	128	2	39
DKØDO	1,410	22	1	14
DLØDRI	710	18	1	9
HUNGARY				
HG1S	**251,424**	**654**	**11**	**61**
IRELAND				
EI7M	**351,370**	**701**	**30**	**52**
ITALY				
IV3OWC	**215,941**	**635**	**11**	**56**
LATVIA				
YLØA	**16,236**	**94**	**0**	**33**
LITHUANIA				
LY7A	**125,161**	**516**	**2**	**45**
LUXEMBOURG				
LX9UN	**257,790**	**772**	**10**	**55**
LX4A	137,032	471	9	47
POLAND				
SO2R	**278,208**	**745**	**10**	**62**
SP3KFH	98,226	351	7	47
SP4PBI	62,883	240	2	49
RUSSIA				
RN6BN	**77,616**	**260**	**4**	**52**
SICILY				
IT9EQO	**108,544**	**308**	**17**	**47**
SPAIN				
ED5GCT	**80,653**	**255**	**11**	**48**
EA5BY	60,648	202	7	49
ED7VG	14,553	84	3	30
SWITZERLAND				
HB9CXZ	**166,808**	**558**	**8**	**50**
UKRAINE				
UU7J	**216,450**	**818**	**5**	**60**
US8IZM	16,089	124	0	31
YUGOSLAVIA (SERBIA)				
YZ7W	**234,360**	**629**	**12**	**58**

SSB CHECK LOGS

Thanks to the following stations for their valuable SSB check logs: DL1MGB, DL3FF, DL6RO, DM2AWM/P, OK2ZJ, PAØLOU, PA5TT, RA3TT, SP6HRK, SP9CVY, UA4RC, VE2DSK, W4BCV, W7LR, YO8AII

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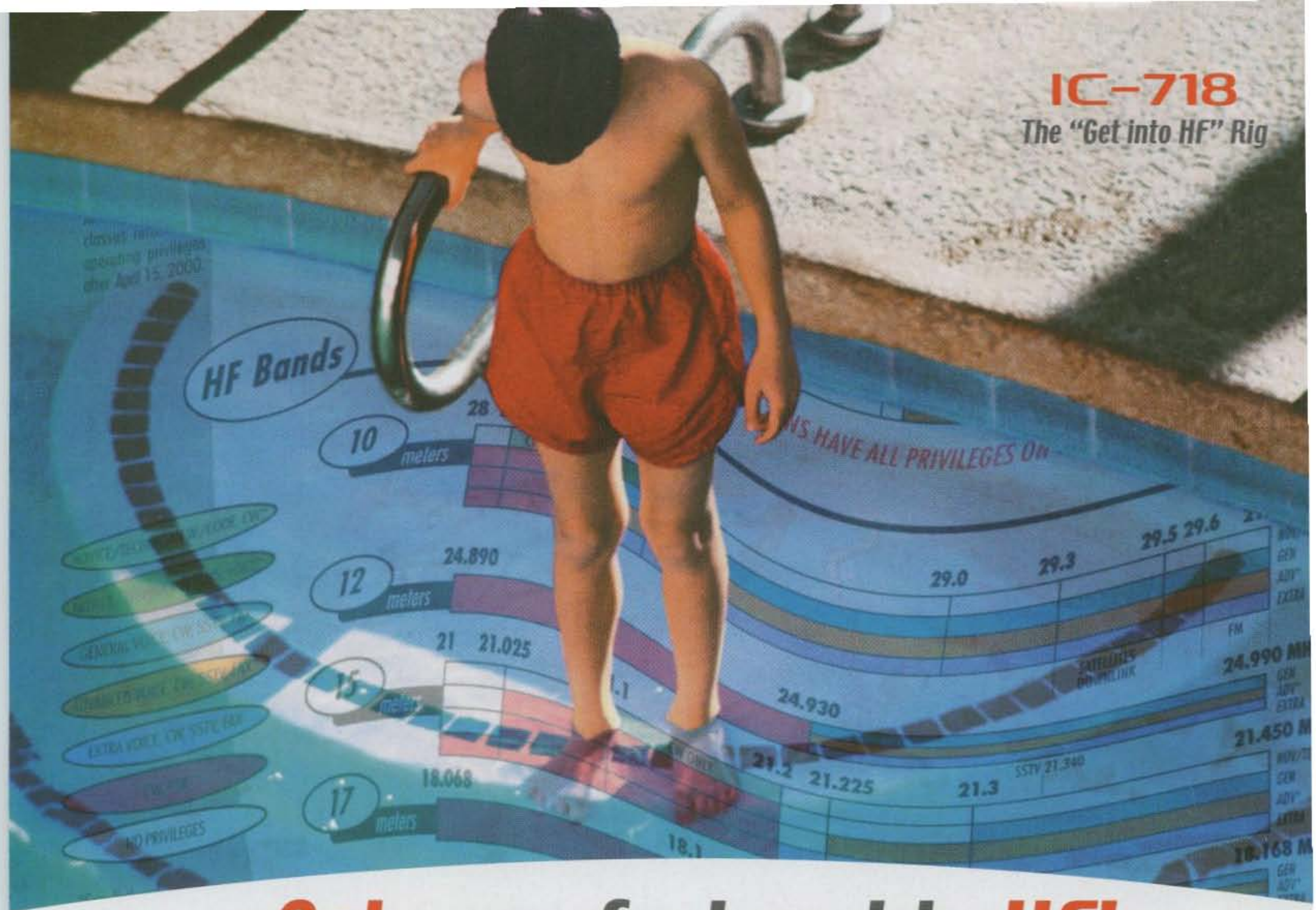

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