Amateur Radio

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COMMUNICATIONS & TECHNOLOGY

DECEMBER 2009

CQ

- **A Contest for the Ages, p. 13**
- ***CQ* Reviews: Ten-Tec RF Speech Processor, p. 24**
- **Holiday Treats for Hams, pp. 38, 68 & 72**

On the Cover: Bill (K4LTA) and Ruby (K4UPS) O'Kain of Oak Ridge, Tennessee. See pages 8 and 22.

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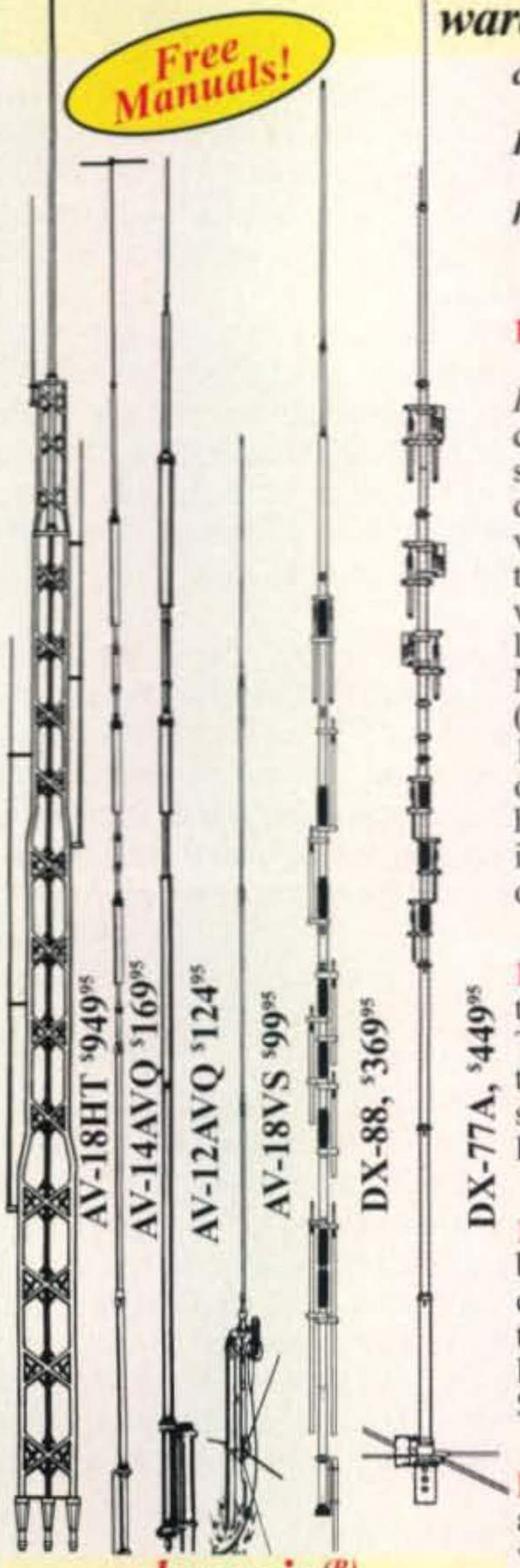

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AV-12AVQ, $124.95. (10, 15, 20 Meters). 13 ft., 9 lbs. **AV-12AVQ** also uses Thunderbird beam design air dielectric traps for extremely Hy-Q performance. This is the way to go for inexpensive tri-band performance in limited space. Roof mount with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

AV-18VS, $99.95. (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.

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Model #	Price	Bands	Max Power	Height	Weight	Wind Surv.	Rec. Mast
AV-18HT	$949.95	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	$124.95	10/15/20 M	1500 W PEP	13 feet	9 pounds	80 MPH	1.5-1.625"
AV-18VS	**$99.95**	**10 - 80 M**	**1500 W PEP**	**18 feet**	**4 pounds**	**80 MPH**	**1.5-1.625"**
DX-88	$369.95	10 - 80 M	1500 W PEP	25 feet	18 pounds	75 mph no guy	1.5-1.625"
DX-77A	**$449.95**	**10 - 40 M**	**1500 W PEP**	**29 feet**	**25 pounds**	**60 mph no guy**	**1.5-1.625"**

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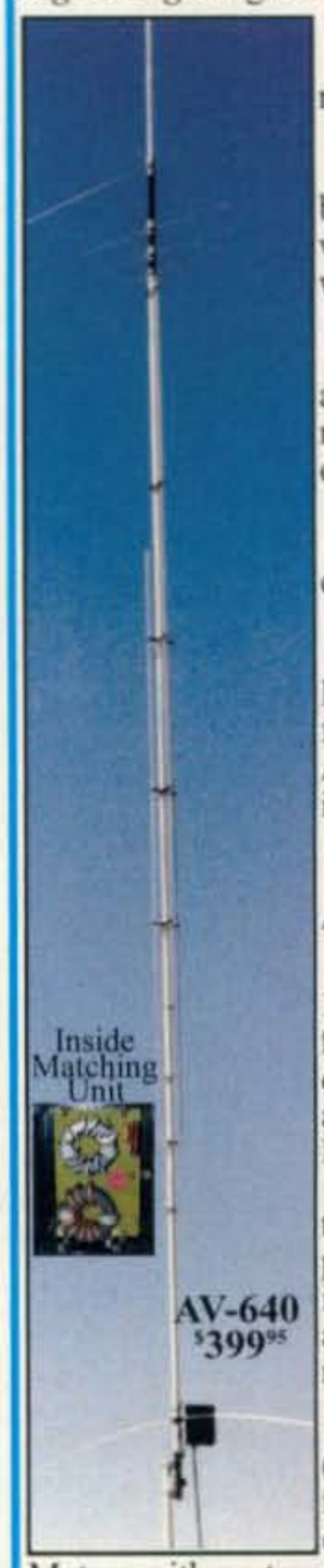

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AV-640, $399.95. (6,10,12, 15,17,20,30,40 Meters). 25.5 ft., 17.5 lbs. The AV-640 uses quarter wave stubs on 6, 10, 12 and 17 meters and efficient end loading coil and capacity hats on 15, 20, 30 and 40 meters -- no traps. Resonators are placed in parallel not in series. End loading of the lower HF bands allows efficient operation with a manageable antenna height.

AV-620, $299.95. (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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ham radio news

Four Hams Killed in Plane Crash

A plane crash has taken the lives of four well-known contesters heading to the Bahamas for the single sideband weekend of the CQ World Wide DX Contest. Pete Radding, W2GJ/C6APR, the pilot; and passengers Ed Steeble, K3IXD/C6AXD; Randy Hargenrader, K4QO/C6AQO, and Dallas Carter, W3PP, were killed instantly when Radding's plane crashed just after takeoff from Summerville Airport in Jedburg, South Carolina, before dawn on October 22. The cause of the crash is still under investigation, but an investigator for the National Transportation Safety Board told the Summerville *Journal Scene* newspaper that it appears the plane climbed to at least 90 feet and banked to the left before crashing some 250 yards east of the runway. The members of the C6APR contest team were planning to fly to Florida to pick up additional operators before making the final leg of the trip to the Bahamas.

Three Killed in Antenna Accident

Three members of the same family were electrocuted when a ham radio antenna they were installing fell onto a power line. According to the ARRL, the three, who were not hams, were putting up a 50-foot vertical antenna—at night—for the man's mother, Barbara Tenn, KJ4KFF, outside her Palm Bay, Florida home. They lost control of the antenna and it hit the 13-kilovolt power line. The three were identified as 55-year-old Melville Braham; his wife, Anna; and their 15-year-old son, Anthony.

Antenna safety rule #1: Never install an antenna where it can possibly fall onto a power line.

Hamvention Attendance Up in 2009

The Dayton Amateur Radio Association says nearly 1000 more people came to the Dayton Hamvention® in 2009 than in 2008. According to *Newsline*, DARA reported that the 2009 attendance was 18,877 vs. 17,800 the previous year. Officials at the world's second largest hamfest—the "Ham Radio" show in Friedrichshafen, Germany—reported that attendance was up at their 2009 show as well, reaching 17,400.

Griffin, KE7LJA, is New Army MARS Chief

Jim Griffin, KE7LJA, has been appointed to succeed Stuart Carter as head of Army MARS, the Military Affiliate Radio System. Griffin spent 20 years as a uniformed member of the Army Signal Corps, then returned as a civilian employee and has continued to serve in that capacity for the past 20 years. Since 2007, he has worked with Carter as Deputy Chief of Army MARS, as the service transformed its role from primarily sending messages home from service members overseas to providing communications support for the Department of Homeland Security.

Senate Companion Introduced to HR-2160

Senators Joseph Lieberman of Connecticut and Susan Collins of Maine have introduced a Senate companion bill to the ARRL-backed HR-2160. That bill in the House of Representatives would direct the Department of Homeland Security to study "the uses and capabilities of Amateur Radio Service communications in emergencies and disaster relief" and report back to Congress with recommendations within six months. The Senate bill is S-1755. HR-2160, meanwhile, has picked up five more co-sponsors, according to the *ARRL Letter*, bringing the total number of Congressional co-sponsors to 30.

FCC, ARRL, Try to Clarify Disaster Drill Rules

Both the FCC and the ARRL have responded to confusion generated by the FCC's strict interpretation of the "no communication on behalf of an employer" rule as applied to disaster drills. The FCC issued a Public Notice on October 20, further explaining the rule and providing guidance for public safety agencies to request waivers if they believe it is essential for hams who are also their employees to participate in an upcoming drill. Such requests must be made in advance, and only by government entities. The FCC's Bill Cross, W3TN, made it clear in an e-mail to David Coursey, N5FDL, that the waiver provisions do not apply to ongoing events, such as regularly scheduled drills. He suggested using Part 90 public safety radios instead.

In addition, the ARRL issued a position paper which brings the matter down to the question of "Who benefits?" If public safety is the principal beneficiary of the communications, then it generally is permitted; but if the entity for which the ham in question works stands to benefit, then other radio services should be used. The ARRL scheduled a webinar in late October to further discuss and explain the issue.

Meanwhile, N5FDL—joined by Tom Blackwell, N5GAR, and Gordon West, WB6NOA—has filed a petition for rule-making with the FCC seeking to add a provision to the "authorized transmissions" section specifically permitting participation in training and drills, "without regard to whether the amateur operator has related employment," as long as the communications "are for the exclusive use of amateur radio operators for noncommercial purposes." At press time, the FCC had not responded to the petition.

Old IRCs Expire December 31

If you have any "Beijing Model 2" International Reply Coupons (IRCs), you need to use or exchange them before the end of this year. According to the *ARRL Letter,* old IRCs may be exchanged for "new" IRCs, known as the "Nairobi Model." In addition, U.S.-issued IRCs may be cashed in at postal "retail associates" for one cent less than their face value. The Nairobi Model IRCs will continue to be accepted for international airmail postage (if you can find a post office that knows what they are!).

Newest Ham Satellite is SO-67

South Africa's SumbandilaSat, the most recent amateur satellite to be successfully launched and activated, has been designated as SumbandilaSat-OSCAR 67, or SO-67, according to the AMSAT News Service. Former AMSAT-NA President Bill Tynan, W3XO, is the internationally-designated OSCAR Number Coordinator and issues numbers to amateur satellites once they are put into service, upon request by the sponsoring organization.

AMSAST-North America, meanwhile, has committed itself to get back into the satellite building and launching business, focusing on small "cubesats" after U.S. government restrictions forced it to end its partnership with Germany's AMSAT-DL on building the next high-end amateur radio satellite.

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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Photo : From 1eft HC-1.5KAT (HF 1.5kW Tuner with Auto Band set Feature), HL-2.5KFX (HF 1.5kW MOSFET Linear) and IC-7700 Tnansceiver

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HF 600W Linear

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HL-1.5KFX

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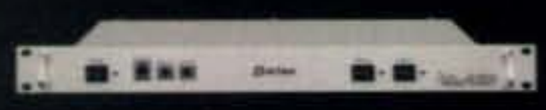

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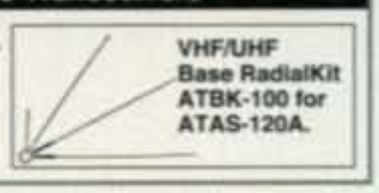

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zero bias – a CQ editorial

BY RICH MOSESON,* W2VU

Friendship and Fellowship

It was cold. It was windy. It was muddy. I was in a tent, having a great time on the radio. I was guest operating W2R, a special event station at the Great Swamp National Wildlife Refuge in New Jersey. The operation was put together by the New Providence Amateur Radio Club as part of a nationwide effort by hams to help observe National Wildlife Refuge Week (I'll have a full report in an upcoming issue). Propagation was decent, the bands were busy, and we were making lots of contacts. It was a lot of ham radio fun. But it was only half of what was going on. The other half was happening outside the tent, where about a dozen people were gathered, drinking coffee and talking. What's so special about that?

Well, sometimes it takes someone standing outside the circle to get a clear view of what's happening inside. In this case, the perspective had been provided a week earlier, in one of those "only in ham radio" coincidences. On Columbus Day weekend, my wife and I went to visit our son, Dan, KC2OOM, at Syracuse University. Also in town that weekend, up from Tennessee, were the parents of one of Dan's housemates, another graduate student named Paul. After we all were introduced, Dan mentioned that he had been talking to Paul's father, a retired minister, about ham radio, and I said I had some ham radio friends in Tennessee.

"I had a couple of ham operators in my congregation," Paul's dad said to me. "Do you know Bill O'Kain?"

At first, the name didn't ring a bell, probably because there wasn't a callsign attached. As he told me a little more about Bill, though, something clicked. "Wait," I said. "Is his wife's name Ruby?"

"Yes," he said. "They're both hams, I believe."

At this point, the look on Dan's face told me what he was thinking: "*Of course* he knows them. Here we are in Syracuse, New York. Paul lives 800 miles away in Tennessee. His parents know two hams … and my dad knows them! What else is new?"

"Well, I don't know them personally," I responded, "but I do know who they are. In fact, I have a photo of them for a cover sitting in my office, just waiting for the right issue to come along."

Paul's dad then observed, "Ham radio provides a lot of friendship and fellowship, doesn't it?"

It occurred to me that, in that short sentence, he'd put his finger on what this hobby really is all about. Yes, we have public service and emergency communications; important stuff, to be sure. Yes, we have our tradition of technical innovation that stretches back to the dawn of radio. Yes, we have in our ranks so many innovators and leaders in so many fields that we've lost count. Yes, we have competition in our contests and award programs and adventure in DXpeditions and even in DXing from home. But at the base of it all—the foundation on which everything else is built—are people, our fellow hams, instant friends around the world. A perfect example is in this month's USA-CA Award All Counties profile of Mark Pinsky, W8MP, on page 86. Mark's experiences are so typical of how hams relate … or as the Rev. Lee Morris put it so succinctly, standing in our sons' living room, "Ham radio provides a lot of friendship and fellowship, doesn't it?"

Especially at this holiday season when we wish each other blessings of peace and happiness, we all should be thankful for the friendship and fellowship provided by our hobby. We are constantly making new friends, whether it's on the air or at meetings, conferences, or events, or in the cold outside a tent at a national wildlife refuge. It is the thread that binds us all together in friendship and fellowship—kind of string theory for humans.

So thank you, Rev. Morris, for reminding us so eloquently what ham radio is all about … and of course, I realized that this must be the right issue on which to put Bill, K4LTA, and Ruby, K4UPS, on the cover. You can read more about them on page 22. (Bill, by the way, was amazed when I called and told him about this. "He was my pastor for about ten years," Bill told me. "We were great friends. We used to go to football games together. I had four season tickets for the University of Tennessee, and he and his wife would go with Ruby and me.")

C6APR Team

As we were about to go to press, we learned that four hams en route to the Bahamas for the SSB weekend of the CQ World-Wide DX Contest were killed when their small plane crashed on takeoff from an airport in South Carolina (see News on page 2 for more details). The C6APR team had been featured in the April issue of our sister magazine, *WorldRadio Online*. Our condolences go out to the families of these devoted hams.

Details of the accident were posted on the website of the Summerville, South Carolina, *Journal Scene* newspaper, which also provides space for posting comments about news stories. *CQ* book author Ted Cohen, N4XX, having no idea what I was writing about this month, forwarded a link to the newspaper's website, saying, "Read the comments at the end of the article; they are from all over the world. This shows the bonds within the amateur radio community." Indeed it does. As of the morning after the crash, more than 150 comments had been posted, almost entirely by hams, from a variety of countries … once again bringing into focus the friendship and fellowship that defines us as hams.

Issue Notes

Due to space limitations, we were unable to run "Kids' Korner" this month. It will appear in the January issue. We welcome John Wood, WV5J, as our new New Products Editor. And this issue, our 780th, concludes our 65th consecutive year of publication!

Holiday Greetings…

It is that time of year once again, as the days grow short (at least up here in the northern hemisphere) and we use the occasion of such holidays as Christmas and Hanukah to bring some extra light into our lives. May your holiday lights bring you joy throughout the coming year … and may ham radio continue to bless you with friendship and fellowship.

73, W2VU

*e-mail: <w2vu@cq-amateur-radio.com>

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HAM IV and HAM V Rotator Specifications	
Wind Load capacity (inside tower)	15 square feet
Wind Load (w/mast adapter)	**7.5 square feet**
Turning Power	800 in.-lbs.
Brake Power	**5000 in.-lbs.**
Brake Construction	Electric Wedge
Bearing Assembly	**dual race/96 ball bearings**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight	26 lbs.
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TAILTWISTER Rotator Specifications	
Wind load capacity (inside tower)	20 square feet
Wind Load (w/ mast adapter)	**10 square feet**
Turning Power	1000 in.-lbs.
Brake Power	**9000** in.-lbs.
Brake Construction	Electric Wedge
Bearing Assembly	**Triple race/138 ball brngs**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight	31 lbs.
Effective Moment (in tower)	**3400 ft.-lbs.**

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CD-45II Rotator Specifications	
Wind load capacity (inside tower)	8.5 square feet
Wind Load (w/ mast adapter)	**5.0 square feet**
Turning Power	600 in.-lbs.
Brake Power	**800 in.-lbs.**
Brake Construction	Disc Brake
Bearing Assembly	**Dual race/48 ball brings**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight	22 lbs.
Effective Moment (in tower)	**1200 ft.-lbs.**

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For medium antenna arrays up to 15 square feet wind load area. Similar to the HAM IV, but includes *DCU-1 Pathfinder* digital control unit with gas plasma display. Provides automatic operation of brake and rotor, compatible with many logging/contest programs, 6 presets for beam headings, 1 degree accuracy, auto 8-second brake delay, 360 degree choice for center location, *more!*

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For compact antenna arrays and large FM/TV up to 3.0 square feet wind load area. Dual 12 ball bearing race. Automatic position sensor never needs resetting. Fully automatic control -- just dial and touch for any desired location. Solid state, low voltage control, safe and silent operation. 2 1/16 inch maximum mast size. MSLD light duty lower mast support included.

AR-40 Rotator Specifications	
Wind load capacity (inside tower)	3.0 square feet
Wind Load (w/ mast adapter)	**1.5 square feet**
Turning Power	350 in.-lbs.
Brake Power	**450 in.-lbs.**
Brake Construction	Disc Brake
Bearing Assembly	**Dual race/12 ball bearings**
Mounting Hardware	Clamp plate/steel bolts
Control Cable Conductors	**5**
Shipping Weight	14 lbs.
Effective Moment (in tower)	**300 ft.-lbs.**

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HDR-300A Rotator Specifications	
Wind load capacity (inside tower)	25 square feet
Wind Load (w/ mast adapter)	**not applicable**
Turning Power	5000 in.-lbs.
Brake Power	**7500 in.-lbs.**
Brake Construction	solenoid operated locking
Bearing Assembly	**bronze sleeve w/rollers**
Mounting Hardware	stainless steel bolts
Control Cable Conductors	**7**
Shipping Weight	61 lbs.
Effective Moment (in tower)	**5000 ft.-lbs.**

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Automatically controls T2X, HAM-IV, V rotators. 6 presets for favorite headings, 1° accuracy, 8-sec. brake delay, choice for center of rotation, crisp *plasma* display. Computer controlled with many logging/contest programs.

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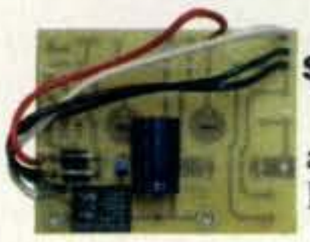

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announcements

The following special event stations are scheduled for December:

W2W, from Pearl Harbor Remembrance Day, Baltimore, Maryland; ARC of the National Electronics Museum; 1400–2200Z December 5 and 6 on 7.187, 14.241, 7.041, 14.041 MHz. For certificate send QSL and 9×12 SASE (for QSL only, send business-size SASE) to ARCNEM, Box 1693 MS 4015, Baltimore, MD 21203. <http://k3nem.org/>

WX3MAS, from the annual Christmas greetings from the Twin Christmas Cities; Nazareth-Bethlehem, Pennsylvania; Christmas City and Delaware-Lehigh ARCs; 1400–0200Z December 12 and 13 on 28.465, 21.365, 14.265, 7.270, 3.970 MHz. Certificate upon request. QSL to: CCARC/DLARC WX3MAS, Greystone Building Gracedale Complex, RR8, Nazareth, PA 18064. <www.dlarc.org>

KC5OUR, from celebration of Christmas from Bethlehem, Belen (Bethlehem), New Mexico; Valencia County ARA; 1400–2300Z December 19 on 7.273, 14.273, 21.373, 28.373 MHz. For QSL send SASE to: VCARA, P.O. Box 268, Peralta, NM 87042.

The following hamfests, etc., are scheduled for December:

Dec. 5, **Superstition Hamfest**, Mesa Community College southwest parking lot, Mesa, Arizona. Contact Brian Romine, KC5CAY, or <hamfest 2009@wb7tjd.org>. (Talk-in 147.12 [162.2 Hz], 449.60 [100 Hz] in northeast Mesa, and 449.20 [100 Hz] in Phoenix; eaxms registration 8 AM, testing 9 AM)

Dec. 5–6, **Tampa Bay Hamfest & ARRL State Convention**, Manatee Civic Center, Palmetto, Florida. For details go to: <www.tampabayhamfest.org>.

our readers say

Online Equipment Registry

Editor, *CQ*:

If your radio equipment was stolen could you remember its serial number? Have you recorded it somewhere safe? Would you like to notify people who might potentially purchase it? Have participating shops checking on repairs and second-hand purchases?

Sign up with *The Rig Register,* a free service, at <http://www.therigregister.com> and record your equipment details in a safe and easy to find place. Your equipment can marked as lost or stolen for others to check.

The Rig Register isn't just for stolen equipment. Groups and clubs can use it as an asset register, and a shared login between committee and leaders would allow access to the group's or club's asset list. Many thanks.

Hugh, G7UOD

Vietnam POWs With Radios?

Editor, *CQ*:

I was licensed back in 1974 (but) my license expired. I have many amateur friends, and we keep hearing myths about Vietnam vets in Hanoi communicating with short-range CW rigs. I was in Vietnam and was familiar with the tap code, and of course we used CW for communications. But I can't imagine a rig made in a POW camp. What would be the source of power? The myth includes wire, a nail, and a razor. Any ideas would sure help out.

Bill Donnelly, ex-WB3IBA

W2VU responds: We checked with a couple of Vietnam vets on our staff and they, too, recall hearing these stories but have nothing factual to back them up. So we'll turn the question over to our wonderful readers, at least one of whom is likely to have an authoritative answer. Anybody know the origins of this story and whether there is any truth to it?

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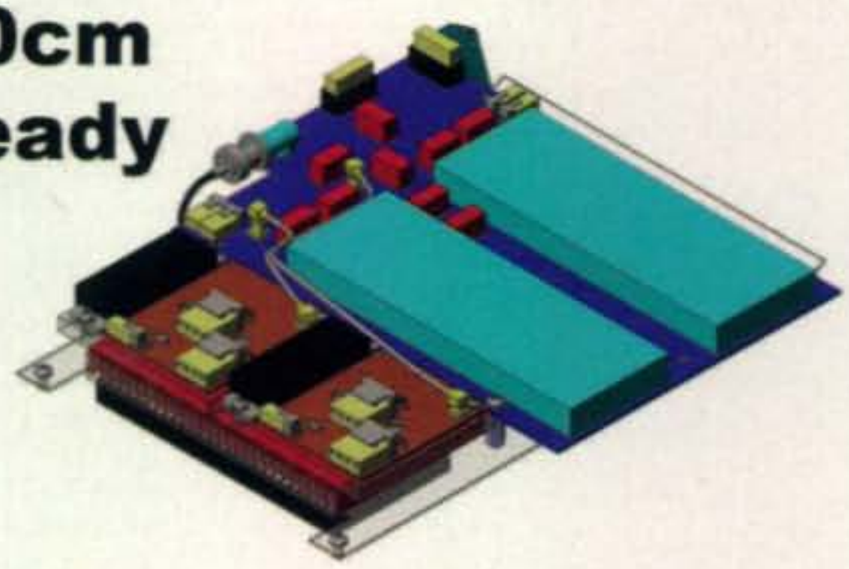

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A Contest for the Ages

Results of the 2009 CQ WW DX 160 Meter Contests

BY ANDY BLANK,* N2NT

If you've ever wondered what a single-band contest would be like on 20 meters, the 2009 version of the CQ WW DX 160 CW Contest just may have been it. What a weekend. Fabulous conditions at the bottom of the cycle. DX was plentiful and worked from virtually anywhere. Records were shattered across the board. It was truly a contest for the ages.

A review of the solar conditions from Spaceweather.com for the CW contest dates showed extremely quiet conditions. The *K*-index remained at zero all three days. While this is not always a good predictor of 160-meter propagation, it produced a fantastic weekend. Just how good were the conditions? Here is a list of just some of the records that were broken on CW:

Single Operator Europe by GM3POI	2,058,632
Multi-Operator Europe by ES9C	2,011,320
Multi-Operator North America by VY2ZM	2,423,796
Multi-Operator South America by PJ2T	2,065,700
Single Operator USA by K1DG	1,263,414
Multi-Operator USA by W2GD	1,227,944
Single Operator LP USA by WA1Z	426,532
Single Operator QRP USA by K9AY	205,202
Single Operator LP Canada by VE3DO	783,972

A great job by all the stations involved. Barring a repeat performance from the propagation gods, these records may last a long time.

The top number of multipliers worked on CW was 95 by the crews at HG8DX and UU7J, closely followed by ES9C and RK2FWA with 94. Such totals were never dreamed of just a few years ago. As an illustration of the type of conditions here are two log extracts:

QSO:	1834 CW 2009-01-25 0813 K1DG	599 ME	RAØLV	599 19
QSO:	1834 CW 2009-01-25 0815 K1DG	599 ME	AE6Y	599 CA
QSO:	1834 CW 2009-01-25 0816 K1DG	599 ME	OH1LEU	599 15
QSO:	1834 CW 2009-01-25 0818 K1DG	599 ME	W7IZL	599 NE
QSO:	1834 CW 2009-01-25 0819 K1DG	599 ME	NN7ZZ	599 UT
QSO:	1812 CW 2009-01-25 0829 K1DG	599 ME	CX6VM	599 13
QSO:	1814 CW 2009-01-25 0834 K1DG	599 ME	JH2FXK	599 25
QSO:	1814 CW 2009-01-25 0836 K1DG	599 ME	W6NWS	599 NC
QSO:	1814 CW 2009-01-25 0841 K1DG	599 ME	PAØWRS	599 14
QSO:	1814 CW 2009-01-25 0843 K1DG	599 ME	K3NM	599 PA
QSO:	1814 CW 2009-01-25 0844 K1DG	599 ME	JA7NI	599 25
QSO:	1814 CW 2009-01-25 0848 K1DG	599 ME	PY5EW	599 11
QSO:	1814 CW 2009-01-25 0848 K1DG	599 ME	G3LZQ	599 14
QSO:	1814 CW 2009-01-25 0852 K1DG	599 ME	LA1PHA	599 14
QSO:	1814 CW 2009-01-25 0856 K1DG	599 ME	KØMD	599 MN
QSO:	1814 CW 2009-01-25 0858 K1DG	599 ME	AAØAW	599 MN
QSO:	1814 CW 2009-01-25 0858 K1DG	599 ME	LA8AJA	599 14
QSO:	1814 CW 2009-01-25 0901 K1DG	599 ME	JQ2VVH	599 25
QSO:	1814 CW 2009-01-25 0903 K1DG	599 ME	OH3SR	599 15
QSO:	1841 CW 2009-01-25 0922 K1DG	599 ME	WF4U	599 UT
QSO:	1843 CW 2009-01-25 0928 K1DG	599 ME	KH6CC	599 31

Note that these QSOs were made from the farthest point northeast in the USA, and K1DG was working almost every continent at the same time! It was broad daylight in Europe yet Scandinavian stations being near the gray line still had propagation. JA stations from Maine are a rarity indeed, but were not on this 160 CW weekend.

*e-mail: <director@cq160.com>

Here is the USA CW champ, Doug, K1DG, at his island QTH in Maine, proud to set a new record!

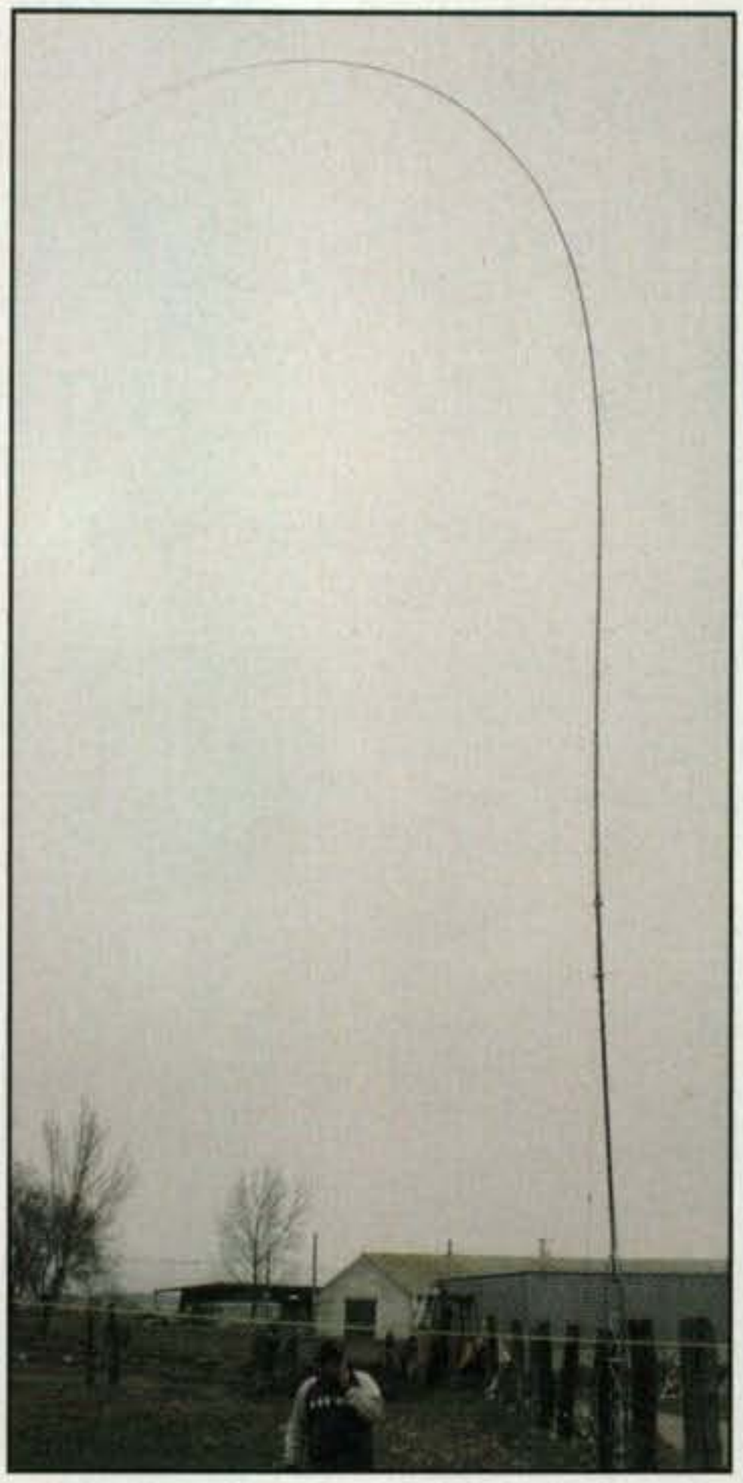
Similarly, look at the same time period in the VY2ZM log:

QSO:	1823 CW 2009-01-25 0923 VY2ZM	599 PEI	JR1IJV	599 25
QSO:	1821 CW 2009-01-25 0931 VY2ZM	599 PEI	JA8BNP	599 25
QSO:	1821 CW 2009-01-25 0931 VY2ZM	599 PEI	JA7OEM	599 25
QSO:	1821 CW 2009-01-25 0932 VY2ZM	599 PEI	JI1NJC	599 25
QSO:	1821 CW 2009-01-25 0933 VY2ZM	599 PEI	JA9CHI	599 25
QSO:	1821 CW 2009-01-25 0934 VY2ZM	599 PEI	JA3USA	599 25
QSO:	1821 CW 2009-01-25 0935 VY2ZM	599 PEI	JA8DMB	599 25
QSO:	1821 CW 2009-01-25 0935 VY2ZM	599 PEI	JK1GKG	599 25
QSO:	1821 CW 2009-01-25 0937 VY2ZM	599 PEI	JH2RMU	599 25
QSO:	1821 CW 2009-01-25 0938 VY2ZM	599 PEI	JA1EOD	599 25
QSO:	1821 CW 2009-01-25 0938 VY2ZM	599 PEI	JA1FNA	599 25
QSO:	1821 CW 2009-01-25 0939 VY2ZM	599 PEI	JH1OGC	599 25
QSO:	1821 CW 2009-01-25 0940 VY2ZM	599 PEI	JH7NTJ	599 25
QSO:	1821 CW 2009-01-25 0940 VY2ZM	599 PEI	JA1HSF	599 25
QSO:	1821 CW 2009-01-25 0941 VY2ZM	599 PEI	JK1OPL	599 25
QSO:	1821 CW 2009-01-25 0942 VY2ZM	599 PEI	JR3GWZ	599 25
QSO:	1821 CW 2009-01-25 0943 VY2ZM	599 PEI	JK1BQS	599 25
QSO:	1821 CW 2009-01-25 0943 VY2ZM	599 PEI	JH1HDT	599 25
QSO:	1821 CW 2009-01-25 0944 VY2ZM	599 PEI	JA1XQC	599 25
QSO:	1821 CW 2009-01-25 0944 VY2ZM	599 PEI	JA1ADT	599 25
QSO:	1821 CW 2009-01-25 0945 VY2ZM	599 PEI	UAØSR	599 18
QSO:	1821 CW 2009-01-25 0945 VY2ZM	599 PEI	JF2SKV	599 25
QSO:	1821 CW 2009-01-25 0947 VY2ZM	599 PEI	JA7KY	599 25
QSO:	1821 CW 2009-01-25 0948 VY2ZM	599 PEI	JP1FHC	599 25
QSO:	1821 CW 2009-01-25 0949 VY2ZM	599 PEI	JA1EOD	599 25
QSO:	1821 CW 2009-01-25 0950 VY2ZM	599 PEI	JH4IFF	599 25

What a run of JAs from Prince Edward Island! Also, there were more than these. Working just one JA station from there in prior years was considered quite an accomplishment.

It seemed that stations at the northern latitudes had a "duct," as it was not quite as good to the south. However, it was good enough such that scores across the board were much higher than usual.

Another notable accomplishment was that of VE3EY. Nick grabbed the top spot in Canada on both CW and SSB! This year we offered a new trophy for the combined winner of CW and



The Multi-Op team at EC1KR used this "vertical" to claim the number 2 spot in Spain on SSB.

SSB, which Nick also grabbed for a total of three trophies! Better make some wall space, Nick.

CW Results

Valery, RD3AF, operated from the zone 33 super station of EA8AH and just edged out Clive, GM3POI, for the world top spot in Single Operator. The scores were very close. This was quite an accomplishment by Clive, due to the point structure of the contest. GM3POI managed over 600 more QSOs than EA8AH, but needed just one more multiplier to put him over the top. Nevertheless, it was a great competition, with M6T and OHØE following close behind.

In the USA, congratulations go to "topband newcomer" Doug, K1DG, operating from his island QTH in Maine and winning the Single Op category for the USA. The competition was fierce, with W8JI, K3ZM (last year's champ), and K9DX all within 10% of each other. Special mention goes to K7RAT and W2VJN from the west coast of the USA with scores that in "normal" years would have made the top ten! In Canada, VE3EY took top spot, with VE3EJ and VE2TZT in a dead heat close behind.

In the Low Power section, Ivan, VE3DO, ran away with the world top spot.

The neat shack at ES9C with Arvo, ES2MC, and Tonno, ES5TV, who took number 4 world Multi-Op CW with over 2-million points!

Why is this man smiling? The number 1 SSB score in the world outside W/VE went to Joseph, F6CTT.

VE3DZ and 9A2AJ grabbed the next two slots, and special mention to Bob, WA1Z, for sneaking into the top six from the USA.

In QRP, Gary, K9AY, used his famous loops to grab the number 1 spot in the world! Perennial QRPer Pat, N8VW, was close behind along with Jarda, OK7U. Jarda has written an article about the contest and his experience along with some audio recordings at <http://www.599.cz/view.php?cisloclanku=2009090901>. You can see how even with less than 5 watts, good conditions on topband can produce worldwide QSOS.

In the Multi-Operator division, huge scores were made. The world leader was the team at CT9M with over 2.4 Meg! But wait, as VY2ZM was also over 2.4 Meg and PJ2T had over 2 Meg. But wait again . . . so did ES9C! What a great competition in Multi-Op, with CN3A, MD4K, and others not far behind. Considering the point structure, having VY2ZM so close to a station in Africa is also quite an accomplishment.

In the USA, the competition was just as fierce. The gang at W2GD just edged out

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The 4Z5J team of 4Z5KJ, 4X6ZK, RV2FW, and 4Z5TA proudly display their "Millionaire" score after the contest was over.

WE3C by a margin of only 7000 points! There was only a difference of 20 QSOs in the two logs. While WE3C had six more multipliers, the GD boys worked more10-pointers to take the victory. K9RS and K1LZ were not far behind the leaders either in this fiercely competed category.

The new Assisted category proved to be very popular, especially in Europe. Harry, RA3AUU, operated from his Cyprus QTH at P33W for the world top spot. SN3R and SP3BQ took the next two slots with very close scores from SP-land. LY2IJ and ON4UN also had big Assisted scores. In the USA, N2NT (your reporter) decided to try Assisted, knowing I could not compete with the "big guns." Somehow I slid by the always top-showing Bob, W4MYA . K5NA and K1LT had great scores as well from much farther west.

Millionaires Club

This year there were so many big scores in the CW contest that we decided to include a list of all stations scoring over 1-million points (see the Millionaires Club box). Hopefully, the list will be that long next year, but it could be a once-in-a-lifetime lengthy list. Congratulations to all the Millionaires for a great achievement!

SSB Results

A repeat performance of the CW conditions was a tall order and not expected. While not the once-in-a-lifetime conditions of CW, they were pretty good, to say the least. I, who do not rank 160 SSB as one of my favorite modes, had a nice run of DX stations around EU sunrise, as did many others. This made the contest a lot more fun than the usual grind.

In the Single Op category, F6CTT took the world top spot with over 600K, a great job by Joseph, who credits his Beverage arrays with helping him receive the weak ones. He was followed closely by HG3A, ZF2AM, and EA8AH. In the USA, Jerry, WB9Z, edged out Paul, N4PN, from the QTH of Tom, W8JI, by less than 1 %. Paul had more multipliers, but Jerry's extra 250 QSOs did the trick. On the Canadian side, VE3EY ran away with over 786K, followed by VA3KA and VE3AP.

Single Op Low Power yielded some nice competition from the Caribbean. Tony, KP4KE, took the top spot with topband regulars CM6RCR and HI3TEJ, third and fourth, respectively. Another regular, Yasar, TA3D, was number 2. In Canada, VA3YP grabbed the top spot, followed by VE3UK. The USA had a very tight competition between K1EP and K1HTV with K1EP a mere 2% ahead.

Millionaires Club 2009

CT9M	2,447,836	W8JI	1,249,032
VY2ZM	2,423,796	*ON4UN	1,242,210
EA8AH	2,078,352	DR1A	1,230,516
PJ2T	2,065,700	W2GD	1,227,944
GM3POI	2,058,632	WE3C	1,220,632
ES9C	2,011,320	K3ZM	1,211,763
CN3A	1,908,748	K9RS	1,187,894
MD4K	1,849,637	SK7DX	1,184,375
*P33W	1,820,799	G3BJ	1,177,671
OM8A	1,815,328	ON4WW	1,155,066
HG8DX	1,776,600	LX7I	1,138,878
RK2FWA	1,724,310	ERØWW	1,115,979
M6T	1,723,275	4O3A	1,115,934
OHØE	1,709,907	K9DX	1,107,744
TM6M	1,622,888	VE3EJ	1,094,300
OM7M	1,607,886	VE2TZT	1,089,533
OK5W	1,484,304	K1LZ	1,077,780
S51TA	1,479,324	UP2L	1,064,805
*SN3R	1,467,955	I4EAT	1,062,720
4Z5J	1,400,704	XE1RCS	1,061,739
OZ7YY	1,397,451	OG2P	1,058,445
UA2FW	1,394,976	*UA6LV	1,058,205
*SP3BQ	1,368,840	*ES5QX	1,052,323
VE3EY	1,366,774	OH8X	1,048,875
CU2X	1,358,532	W1UE	1,044,725
HG3A	1,354,782	DL1AUZ	1,021,853
E7DX	1,351,104	YU1EXY	1,017,875
K1DG	1,263,414	DJØMDR	1,016,064
*LY2IJ	1,261,656	K1TTT	1,006,236
UU7J	1,254,448	*Assisted*	

WB4MSG, S59D, and W4TMR fought for the QRP top spot in the world with very close scores. Sam, WB4MSG, won the world with almost 54K! Great job by all. SSB contesting on 160 is hard enough let alone with less than 5 watts!

The gang at HG8DX took the top Multi-Op spot with over 800K, the highest score in the contest. There were no Millionaires on SSB, compared to 59 on CW. E7DX and DR1A were second and third from the DX side. In the USA, top honors went to the WE3C crew, who edged out K1LZ and N2CW. Multi-Op USA has become hotly contested with more and more challengers each year.

Of the over 1000 logs submitted, 200 were in the new Assisted category, showing great support. S57DX and LY4A took first and second in the world separated by only 6 %. N8TR took number 3 world and number 1 USA with almost 350K! OE3DWC and CT9L had nice scores on the EU side. K3WW was number 2 in the USA, and VA3DX grabbed the number 1 spot in Canada.

Special mention goes to Paige, N2PKP, who made 254 QSOs at the age of 9, and to W4OGG, who made 42 QSOs at the age of 91! Great job by both. Can anyone top that?

Club Scores

Once again the Bavarian Contest Club (BCC) showed it is the king of the CQ 160 M Contest with 187 entries. They blew away the USA clubs, Yankee Clipper Contest Club (YCCC) and Potomac Valley Radio Club (PVRC) by almost 10-million points! Great job! Remember, the Club competition is just for fun and bragging rights. Please remember to use the approved name and abbreviation of the club, otherwise the scores will not be counted properly.

Rule Changes for 2009

The overwhelming consensus was that the rule changes were a complete success. The contest had the sound of a typical CQWW with DX stations sending their zones instead of the old arbitrary country abbreviation. The addition of an Assisted category was very well received. There were no complaints about the hours limitation for multi-ops, probably because almost

2009 PLAQUE DONORS AND WINNERS

CW

SINGLE OPERATOR

WORLD by Bill Tippett, W4ZV (DJ8WL Memorial): Winner EA8AH (Op. Valery Komarov, RD3AF)
USA by Ken Byers, K4TEA: Winner Doug Grant, K1DG
CANADA by Alabama Contest Group: Winner Nick Lekic, VE3EY
ZONE 3 by Milt Jensen, N5IA: Winner K7RAT (Op. Larry "Tree" Tyree, N6TR)
ZONE 4 by Steve Schmidt, K4WA: Winner John Battin, K9DX
USA ZONE 5 by Paul H. Newberry, Jr., N4PN: Winner W8JI (Op. Jim Roberts, VE7ZO)
AFRICA by James "Skip" Riba, WS9V: Winner Larry Arneson, VQ9LA
ASIA by Missouri DX/Contest Club: Winner Nodir Tursoon-Zadeh, EY8MM
EUROPE by John Battin, K9DX: Winner Clive Penna, GM3POI
SOUTH AMERICA by John Rodgers, WE3C: Winner Al Van Buren, CE1/K7CA
OCEANIA by John Battin, K9DX: Winner Mirek Rozbicki, VK6DXI
JAPAN by Alabama Contest Group: Winner Masaki Okano, JH4UYB
NORTH AMERICA by *CQ* magazine (N4IN Memorial): Winner Richard Strand, KL7RA
ASSISTED WORLD by Andy Chesnokov, UA3AB: Winner P33W (Op. Igor Booklan, RA3AUU)
ASSISTED EUROPE by Carsten-Tomas Dauer, DL2OBO: Winner Bogdan Chorazyk, SN3R
ASSISTED USA by Akira Nagi, JA5DQH: Winner Andrew Blank, N2NT
LOW POWER WORLD by Ed Parish, K1EP: Winner Ivan Payne, VE3DO
LOW POWER USA by Rich Kennedy, N4ESS: Winner Bob Raymond, WA1Z
LOW POWER CANADA by Contest Club Ontario: Winner: Yuri Onipko, VE3DZ
QRP WORLD by Wayne Mills, N7NG: Winner Gary Breed, K9AY
QRP USA by Bob Raymond, WA1Z: Winner Pat Collins, N8VW
QRP EUROPE by Gary Breed, K9AY: Winner Jaroslav Chmelik, OK7U

MULTI-OPERATOR

WORLD by Hugh Valentine, N4RJ: Winner CT9M (Ops. OM3BH, OM3GI)
USA by W8UVZ, WØCD, K8GG: Winner W2GD (Ops. K2PS, K2SG, K2TW, N2HM, N2OO, W1GD, W2CG, W2GD, W2NO, W2OB, W2RQ)
Zone 3 by Riki Kline, K7NJ/4X4NJ: Winner: NK7U (Ops. NK7U, KL2A)
EUROPE by SKY Contest Club: Winner: ES9C (Ops. ES2DW, ES2MC, ES2RR, ES5JR, ES5RY, ES5GP, ES5TV)

SSB

SINGLE OPERATOR

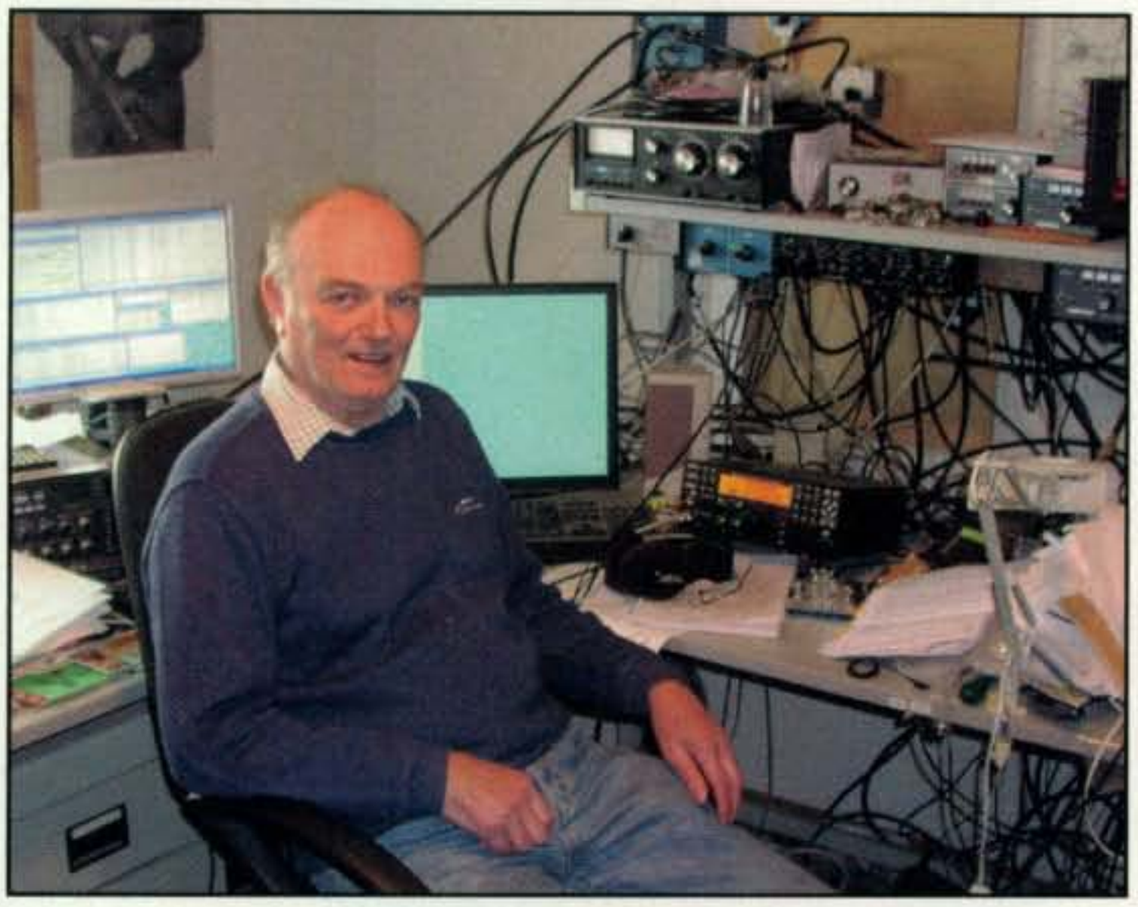
WORLD by Bill Barr, N4NX: Winner Joseph Cornee, F6CTT
USA by David Thompson, K4JRB: Winner Jerry Rosalius, WB9Z
CANADA by Alabama Contest Group: Winner Nick Lekic, VE3EY
USA ZONE 3 by Dr. Larry Flegle, N4TMW: Winner Jim Stevenson, W6YI
USA ZONE 4 by Alabama Contest Group: Winner Mike Kelly, WØEWD
USA ZONE 5 by Jim Monahan, K1PX: Winner Paul Newberry, N4PN
AFRICA by Carl Henson, WB4ZNH: Winner Pekka Kolehmainen, EA8AH
ASIA by Ed Campbell, NX7TT: Winner: Yasaar Gocet, TA3D
EUROPE by James "Skip" Riba, WS9V: Winner Istvan Vajda, HG3A
NORTH AMERICA by *CQ* magazine (K2EEK Memorial): Winner: John Barcroft, ZF2AM
SOUTH AMERICA by John Rodgers, WE3C: Winner Alberto Pincay, HC2AQ
OCEANIA by Al Teimurazov, 4L5A: Winner Ron Tremayne, VK3IO
ASSISTED WORLD by Ray Sokola, K9RS: Winner Slvko Celarc, S57DX
ASSISTED EUROPE by Braco Memic, OE1EMS: Winner Rolandas Jokubauskas, LY4A
ASSISTED USA by Mississippi Valley DX and Contest Club: Winner Pete Michaelis, N8TR
LOW POWER WORLD by Howard Klein, K2HK: Winner: Tony Ramos, KP4KE
LOW POWER USA by Boring ARC Winner: Ed Parish, K1EP
LOW POWER EUROPE by Contest Club Ontario: Winner Bela Nagy, HA8BE
LOW POWER CANADA by Rudy Bakalov, N2WQ: Winner Rasim Raco Hirkic, VA3YP
QRP WORLD by Mike Schwieterman, K7MS: Winner Samuel Bowman, WB4MSG

MULTI-OPERATOR

WORLD by Southeast DX Club: Winner HG8DX (Ops. HA4FF, HA8DJ, HA8DU, HA8DZ, HA8EK, HA8FM, HA8FW, HA8JV)
USA by Jerry Rosalius, WB9Z: Winner WE3C (Ops. WE3C, W3FV, NN3Q, KQ3V, KF3B)
Zone 3 by Riki Kline, K7NJ/4X4NJ: Winner NK7U (Ops. NK7U, K7ZO)
EUROPE by SKY Contest Club: Winner E7DX (Ops. E70T, E77DX)

SINGLE OPERATOR CW/SSB

WORLD COMBINED by Alex Tkatch, KU1CW: Winner Nick Lekic, VE3EY



Here is a rare photo of Clive, GM3POI, operating from his Orkney QTH. Clive came oh so close to winning the world on CW.

everyone broke their respective records! The earlier start times also produced very few complaints.

There were a total of 2232 logs, including checklogs, received for CW (1529 Single Op, 449 Assisted, 178 Multi-Op) and 1096 for SSB (790 Single Op, 200 Assisted, 87 Multi-Op). Thanks to all for your participation and log submission. Each year these totals are increasing, showing the CQ 160 to be growing in popularity every year.

An Experiment in Log Checking

As technology progresses, there are more and more tools available to the average contester. One such tool is the CW Skimmer. Use of the Skimmer puts an operator into the Assisted category. However, what if it were used in reverse? How about recording the entire contest?

Well, thanks to the efforts of K3LR, PA5KT, N4ZR, N8BJQ, EA1/DH1TW, and K1DG, we successfully placed Skimmers around the world to record the contest. We actually were able to listen to log segments from virtually any station. It was an enormous amount of data, fitting only on a 500-GB HDD. After the contest, the disks were sent to the committee for analysis. In conjunction with the log-checking software written by Tree,

TOP 10 SCORES

CW

SINGLE OPERATOR

USA

K1DG	1,263,414
W8JI	1,249,032
K3ZM	1,211,763
K9DX	1,107,744
W4ZV	929,920
WØSD	919,170
AA1K	903,258
K8PO	889,127
NR4M	862,960
WB9Z	862,635

VE

VE3EY	1,366,774
VE3EJ	1,094,300
VE2TZT	1,089,533
CG3AT	997,542
VE3JM	970,266

West Coast USA

K7RAT	695,394
W2VJN	481,850
W7EW	406,593
AC6DD	382,336
K8IA	375,273

QRP

K9AY	205,202
N8VW	198,048
OK7U	174,120
VE3MGY	138,915
OK2BYW	118,030

DX

EA8AH	2,078,352
GM3POI	2,058,632
M6T	1,723,275
OHØE	1,709,907
OZ7YY	1,397,451
CU2X	1,358,532
HG3A	1,354,782
G3BJ	1,177,671
LX7I	1,138,878
ERØWW	1,115,979

LOW POWER WORLD (TOP 6)

VE3DO	783,972
VE3DZ	554,830
9A2AJ	515,790
HA8BE	490,723
WA1Z	426,532
YT8A	411,445

LOW POWER W/VE (TOP 6)

VE3DO	783,972
VE3DZ	554,830
WA1Z	426,532
N2WN	350,436
K1EP	346,896
W3EF	290,398

QRP W/VE (TOP 5)

K9AY	205,202
N8VW	198,048
VE3MGY	138,915
VE3FRX	101,931
K9FO	96,152

MULTI-OPERATOR WORLD

CT9M	2,447,836
VY2ZM	2,423,796
PJ2T	2,065,700
ES9C	2,011,320
CN3A	1,908,748
MD4K	1,849,637
OM8A	1,815,328
HG8DX	1,776,600
RK2FWA	1,724,310
TM6M	1,622,888

MULTI-OPERATOR W/VE

VY2ZM	2,423,796
W2GD	1,227,944
WE3C	1,220,632
K9RS	1,187,894
K1LZ	1,077,780

ASSISTED WORLD

P33W	1,820,799
SN3R	1,467,955
SP3BQ	1,368,840
LY2IJ	1,261,656
ON4UN	1,242,210
UA6LV	1,058,205
ES5QX	1,052,323
OH4A	992,960
YU1LA	977,900
UW2M	940,632

ASSISTED W/VE

N2NT	936,526
W4MYA	909,696
K5NA	767,181
K1LT	685,952
N3KS	633,906

SSB

SINGLE OPERATOR

USA

WB9Z	512,316
N4PN	508,320
K8PO	370,032
W3BGN	323,442
WØEWD	320,070
W3TS	234,987
NR5M	232,116
K3ZO	228,475
K5NA	206,486
N3HBX	201,920

VE

VE3EY	786,912
VA3KA	489,365
VE3AP	425,800
VE3TA	158,508
VE3PN	156,744

Zone 3

W6YI	158,688
WA7LT	105,927
N5LZ	57,000
KØTO	52,896
N7VF	50,692

QRP

WB4MSG	53,979
S59D	50,750
W4TMR	40,061
OK2BYW	38,920
HA6IAM	26,424

DX

F6CTT	620,524
HG3A	590,526
ZF2AM	515,419
EA8AH	512,631
SP7MTF	367,852
9A2DQ	347,340
YT3A	345,197
CT3DL	335,900
OK1NY	307,233
*KP4KE	306,022

LOW POWER WORLD (TOP 6)

KP4KE	306,022
TA3D	258,506
CM6RCR	206,125
HI3TEJ	192,231
HA8BE	161,823
VA3YP	148,080

LOW POWER W/VE (TOP 6)

VA3YP	148,080
K1EP	116,698
K1HTV	113,764
VE3UK	112,277
KØRH	101,304
VE3MGY	85,250

QRP W/VE (TOP 5)

WB4MSG	53,979
W4TMR	40,061
KDØR	6,195
N1TM	6,049
WF4U	5,376

MULTI-OPERATOR WORLD

HG8DX	805,194
E7DX	705,665
WE3C	545,589
DR1A	512,424
K1LZ	490,526
UU7J	464,048
SN3R	450,120
RW2F	441,840
N2CW	402,153
S56P	376,820

MULTI-OPERATOR W/VE

WE3C	545,589
K1LZ	490,526
N2CW	402,153
ND8DX	372,993
W2MF	349,783

ASSISTED WORLD

S57DX	399,000
LY4A	376,156
N8TR	349,297
OE3DWC	328,716
VA3DX	308,740
CT9L	291,662
9A3B	275,575
K3WW	274,000
VE3RZ	273,568
W8MJ	249,429

ASSISTED W/VE

N8TR	349,297
VA3DX	308,740
K3WW	274,000
VE3RZ	273,568
W8MJ	249,429

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N6TR, we were able to accurately score more logs than ever before. Although there were no disqualifications, there were some questionable logs and warning letters were sent to the suspected stations.

Thanks to all for a great job and a major undertaking. Our hope is a more level playing field in the future will result from these efforts. If anyone is interested in the process used to make these recordings or the results, feel free to contact us at <questions@cq160.com>.

Expanded Results

For expanded results of the 2009 160 Meter Contest, inclusing more QRM and a list of guest operators, go to the CQ website at: <www.cq-amateur-radio.com>.

Correction to the 2008 Results

Our apologies to Win, DK9IP, whose log was accidentally lost. His score of 678,824 placed him number 2 Single Op CW in Germany.

Special Thanks

The CQ 160 Contest Committee consists of all volunteers whose time and efforts are much appreciated. This year the awards and trophy programs were headed up by Doug, K1DG, whose efforts resulted in many trophies being added. There were a total of 52 trophies offered this year, with gratitude to all the sponsors. We are also mostly caught up to prior years' awards. On the certificate side, Barry, W5GN, has vastly simplified and enhanced the process. All certificates should be mailed out shortly and be in winners' hands by the time of this publication. It is only through his generosity that this can get done so quickly.

On the log-checking side, once again Tree, N6TR, used his considerable software skills to score the logs. Tree has pro-

2009 CLUB SCORES

(Minimum of 3 three entries required for listing)

Score	#Entries	Club
25,419,962	158	BAVARIAN CONTEST CLUB
18,934,355	78	YANKEE CLIPPER CONTEST CLUB
17,510,622	128	POTOMAC VALLEY RADIO CLUB
14,437,325	67	CONTEST CLUB ONTARIO
12,539,876	52	FRANKFORD RADIO CLUB
11,418,113	81	RHEIN RUHR DX ASSOCIATION
8,601,508	19	CONTEST CLUB FINLAND
7,662,799	63	SOCIETY OF MIDWEST CONTESTERS
7,349,766	30	MAD RIVER RADIO CLUB
6,853,969	42	BLACK SEA CONTEST CLUB
6,429,109	53	UKRAINIAN CONTEST CLUB
6,399,429	22	SLOVENIAN CONTEST CLUB
5,196,059	5	UA2 CONTEST CLUB
4,377,106	24	KAUNAS UNIV. OF TECH. RADIO CLUB
4,106,156	39	TENNESSEE CONTEST GROUP
4,054,755	15	LATVIAN CONTEST CLUB
4,028,118	39	SP DX CLUB
4,006,502	16	CROATIA CONTEST CLUB
3,971,515	17	URAL CONTEST GROUP
3,894,095	17	ALABAMA CONTEST GROUP
3,617,024	30	TEXAS DX SOCIETY
3,509,114	6	HA DX CLUB
3,473,832	4	TARTU CONTEST TEAM
3,411,621	12	YU CONTEST CLUB
3,278,523	20	SOUTH EAST CONTEST CLUB
3,084,973	22	FLORIDA CONTEST GROUP
2,973,847	14	CHILTERN DX CLUB
2,728,838	9	BELOKRANJEC CONTEST CLUB
2,633,618	43	MINNESOTA WIRELESS ASSN
2,572,406	5	LITHUANIAN CONTEST GROUP
2,211,163	6	BORING AMATEUR RADIO CLUB
2,122,770	3	BHCC
2,084,028	36	NORTHERN CALIF. CONTEST CLUB
1,872,336	17	RUSSIAN CONTEST CLUB
1,849,783	5	HUNGARIAN DX CLUB
1,831,376	21	CENTRAL ARIZONA DX ASSOCIATION
1,736,711	6	DANISH DX GROUP
1,647,509	9	CONTEST GROUP DU QUEBEC
1,616,280	10	VYTAUTAS MAGNUS UNIV. RADIO CLUB
1,455,355	8	BRITISH COLUMBIA DX CLUB
1,384,442	7	WESTERN NEW YORK DX ASSOCIATION
1,305,751	7	LOW COUNTRY CONTEST CLUB
1,233,938	11	VRHNIKA CONTESTERS
1,202,793	18	HUDSON VALLEY CONTESTERS & DXERS
1,123,684	8	WORLD WIDE YOUNG CONTESTERS
929,711	14	GRAND MESA CONTESTERS OF COLORADO
750,453	18	DEUTSCH AMATEUR RADIO CLUB
739,133	6	BELARUS CONTEST CLUB
709,721	5	NORTHERN ROCKIES DX ASSOCIATION
663,051	4	TOP OF EUROPE CONTESTERS
656199	16	SOUTHERN CALIFORNIA CONTEST CLUB
635,822	7	CTRI CONTEST GROUP
573,422	7	KENTUCKY CONTEST GROUP
563,372	3	LYNX DX GROUP
539,494	9	NORTH COAST CONTESTERS
531,378	4	LU CONTEST GROUP
496,062	3	JABLANIK BEARS CONTEST CLUB
489,766	9	SPOKANE DX ASSOCIATION
489,326	3	ORENBURG CONTEST CLUB
466,995	11	MARITIME CONTEST CLUB
463,297	4	ORDER OF BOILED OWLS OF NEW YORK
461,993	9	MOTHER LODE DX & CONTEST CLUB
461,961	5	MOSCOW CONTEST CLUB
403,499	5	MISSOURI DX/CONTEST CLUB
390,958	4	VOLYN CONTEST GROUP
390,279	6	ALRS ST PETERSBURG
363,318	4	SOUTHWEST OHIO DX ASSOCIATION
358,723	3	NEW MEXICO BIG RIVER CONTESTERS
340,692	3	LOUISIANA CONTEST CLUB
338,850	9	MAGNOLIA DX ASSOCIATION
328,096	6	UTAH DX ASSOCIATION
322,039	8	WESTERN WASHINGTON DX CLUB
313,004	7	REDMOND TOP KEY CONTEST CLUB
307,185	3	CENTRAL SIBERIA DX CLUB
294,704	5	VERON
281,026	3	CZECH CONTEST CLUB
262,840	10	WILLAMETTE VALLEY DX CLUB
245,538	9	WEST PARK RADIOPS
203,303	6	CAROLINA DX ASSOCIATION
178,667	4	KANSAS CITY DX CLUB
178,224	7	ALLEGHENY VALLEY RADIO ASSOCIATION
163,830	3	ARAUCARIA DX GROUP
156,269	4	ROCHESTER DX ASSOCIATION
155,167	5	RU-QRP
129,089	4	RADIOAMATOR
112,536	5	DONBASS
111,920	5	SRR
111,737	3	MARRAD
93,283	3	SAMARA RADIO CLUB
85,950	3	HAROS RADIO CLUB
78,507	4	METRO DX CLUB
74,652	3	GERMAN DX FOUNDATION
73,385	5	AMSTERDAM DX CLUB
57,718	3	AUSTRIAN CONTEST CLUB
40,529	5	PORTAGE COUNTY ARS
40,449	3	UKRAINIAN DX CLUB

vided us with the most accurately scored logs in the contest's history. In conjunction with the worldwide Skimmer program, it was clear that the log-checking software was a very fair judge and all participants were scored in the correct order.

Also thanks to K5TR, K3BU, and the gang at the CQ WW Contest Committee for maintaining the web records and other information. There were many volunteers who helped type handwritten logs into the database. Please try to submit Cabrillo logs to minimize the amount of work necessary to score the contest.

Thanks to all the participants in this truly amazing year's event. See you next year!

73, Andy, N2NT

CW QRM

Hardest 20 contacts ever . . . **3A/K3OX**. Thank to all calling us! Nice propagation to USA on firstst night. Hope that new Asian record was set. Will try to improve results next year! . . . **4Z5J**. Another Field Day-style effort from the QARS gang here in Qatar. Great stuff, what a band! . . . **A71BX**. On 160 you put something, anything, up and then improve on it from there with al lot of help from your friends . . . **AD5VJ**. Great condx on Saturday morning. Never worked so many US and VE stations in one day! We missed our senior op DL9YX, who was out of order. Volker, we start next year again . . . **DF1HF**. 100 watts and a short inverted-L brings not much opportunity on 160. Nobody answered my long CQ TEST calls. Only some well-ear'ed chaps did it! . . . **EA3ALV**. Wow! All has been said already . . . **F6BEE**. The rule changes (i.e., 22z start and use of CQ Zone) are both most welcome. Congrats to *CQ* on picking a weekend with such good top band conditions! . . . **G3TXF**. Condx very good throughout, especially first night. Went to bed early on Saturday intending to arise early. The best intentions of mice and men? . . . **GW3JXN**. Worked last state, South Dakota! Tnx for "WØSD"! Big activity, nice contest, thanks for all QSOs! . . . **HA8BE**. My first contest on 160 band; it's great fun. Three verticals in wire with capacitance hats, in phase. PC program CT by K1EA . . . **IZ3ALF**. The conditions were the best in years. I heard 6 continents (AF: VQ9LA, SA: CE1/K7CA) and worked 5 continents (except CE1/K7CA by pile-up). My best QSO VY2ZM, Jeff, from PEI! . . . **JE1SPY**. There were always stations on noon to midnight. Wow, great band! . . . **K2VX**. Wow, what can I say. I have never experienced propagation to Europe from southern California on 160 like I did this weekend. I worked 43 EU stations in 24 different countries; that is two more EU countries than I have previously worked in my entire 160 meter career . . . **K6NR**. First time ever worked Europe on 160! . . . **K7DR**. Once in a lifetime conditions. We will be talking about this for years . . . **K9DX**. Had a great time. Condx were mostly quiet, heard DX, even if I couldn't crack the pile-ups, and found that even adding 3 new radials to my inverted-L improved it considerably. The usual "tip of the hat" to those great ops who pulled my 5W signal out of the noise . . . **KX7L**. Very difficult to work with low power from a valley but nice to hear many DXCCs also when I was not able to work all . . . **LX1ER**. Best conditions I have witnessed on 160m; worked over 600 USA alone, double our normal rate! . . . **MD4K**. In a word . . . outstanding!! I have never heard 160 meters in better shape, and that is for both nights of the contest. Lots of great signals, lots of great operators, lots of fun! . . . **N1LN**. Spectacular conditions made this one contest that won't soon be forgotten! Never would I have imagined working 49 states and 57 DXCC on 160m in one weekend. That's almost as many DXCC as I have worked in the past 10 years

on 160! . . . **N2WLG**. Wow. Just Wow . . . **N9ADG**. Great condx. First time we heard and worked zone 1 and zone 19 on top band . . . **OE2S**. Fantastic propagation. Once-in-a lifetime North Pole opening to KH6 and KL7 . . . **OHØE**. What makes me happy is to see how many stations are now active on top band and how many have built excellent stations and are putting up very respectable scores . . . **ON4UN**. We have never worked so many JA stations on top band from the PJ2T station! We had a great time! . . . **PJ2T**. Good contest! See you in the next year! . . . **RV3LO**. Thanks for the contest . . . **RV4LC**. Directions to the west and east seemed to bring weak signals. All the game this time had been played over the North Pole. Thanks to all who called me, 73 Sergei UX1UA aka UV5U . . . **UV5U**. What absolutely AMAZING conditions! This was the first time that I'd ever had the pleasure of seeing 160 behave like an around-the-clock, open-24-hours type of band. How refreshing to work stations at high noon here for a change, and steadily, too, at that! . . . **VE3CUI**. Thanks to all those who called us in the contest. Polar conditions were superb at sunrise both mornings. We worked over 100 JA stations, many UA9's and UAØ's and XU7ACY! . . . **VY2ZM**. This contest had it all. By far the best conditions I've ever seen on 160m during a contest. It was an absolute thrill of a lifetime . . . **W7RH**. Best conditions ever, more than 200 Europeans in the log. Working Nodir, EY8MM, was the cherry on top of our ice cream sundae . . . **XE1RCS**. This was my 9th CQ 160 CW contest in

Where are the loops? Here is Gary, K9AY, winner of the world QRP category on CW.

This neat station belongs to Bob, WA1Z, who took top honors USA Low Power on CW.

row! Excellent conditions. Got PJ2T for SA and so my 160m WAC! Improved my best CQ 160 CW score by 20%! . . . **YO2IS**.

SSB QRM

Like every year in QRP. My best result ever, worked 33 countries. Mny tnx to all ops who listened to me . . . **DL7UMK**. First QSO with the USA on 160m . . . **DL8NBJ**. Our first multi participation in this fantastic contest. Happy to work nice DXCC on top band . . . **EC1KR**. SSB contesting on 160m is not for the faint-hearted! . . . **G3TXF**. Surprised myself by the number of countries that I could work with a limited aerial. Thanks to all who replied to my call . . . **GM4UBJ**. First attempt in a top band contest. Amusing and engaging. Due to Murphy's law discontinued participation . . . **IZ3IBL**. These were the first SSB QSOs I've ever made on 160. Highlight was AO1L actually hearing me for my first EU QSO on 160 . . . **K3TN**. Not many strong East Coast stations could hear me calling them. Some of those who did pull me out thanked me for a new mult. So you may ignore that weak station calling but it may be a new mult . . . **K7ACZ**. Highlights, C6 and KP2 land , and all the good friends :-). See you next year again, but hope in high power . . . **LX1ER**. Hard work. Congrats to everybody who heard me. Some very good ears on the band! . . . **OE9MON**. First time in a 160m contest, using my homemade 80m dipole and working barefoot . . . **PHØAS**. My first contest ever. Got my licence 8 days before the start of the contest. Happy for 28 countries! . . . **SA6BET**. Propagation was not very good, especially not to NA and even worse to Asia. Never worked or even heard JA or BY. A VU station was heard. Had hopes for A4 heard and worked a few stations in the West Indies but competition was big. Did however get my #102 with HI. My #101 was also worked within Europe in C3. So I am happy . . . **SG6T**. CQ WW 160 is one of our favourite contests. Bad cndx to NA first night but good opening during second one. CU next year! . . . **UU7J**. This is one of the busiest contests, making it a challenge to find a spot to call CQ. We mostly worked North America with a great participation this year. We had fun working so many people . . . **VE3DC**. A good time was had by all. We had a new ham who gave HF and contesting a go and loved it . . . **W4NSC**. Fun as usual . . . **XE1RCS**. TNX contest QSOs! GL! . . . **YL2PP**.

(Continued on page 105)

On the Cover

The O'Kains—Bill, K4LTA, and Ruby, K4UPS—have been ham radio fixtures in Oak Ridge, Tennessee for a half century. Bill says he owes both his hobby and his career to a ham in Little Rock, Arkansas.

Bill explained that he had been attending the University of Tennessee on a baseball scholarship in 1954 when a still-unexplained retinal hemorrhage robbed him of his eyesight. Attending a rehab center for the blind in Little Rock, Bill met Dick Freling, a successful insurance agent and W5TIZ. "We became great friends," said Bill, "and he was a great influence on my life."

After visiting Dick two or three times, Bill decided that he also wanted to go into the insurance business. He started his own agency back in Oak Ridge in January 1956, and ran it for 40 years before retiring. Toward the end of 1956, Bill got his ham license, and in 1960 Ruby became a ham as well.

On the air, Bill primarily enjoys CW contesting and DXing. His station consists of "pretty much all Ten-Tec gear," including two Omni-VIs, two Hercules amplifiers, and matching power supplies. He also has an Elecraft K2 for QRP (low power) work and a Kenwood TS-480 mobile rig in his van. The computer is used for logging and for sending code. "I use the keyboard if I'm at all serious about a particular contest," Bill noted. He says Ruby, who is retired from the computer science division of one of the companies in Oak Ridge, is not currently active on the air, but helps him out as his QSL manager and computer guru.

Bill and Ruby also enjoy traveling and plan to make their ninth trip to Grenada—and 19th to the Caribbean—in February. See more about Bill and Ruby in this month's "Zero Bias" editorial. *(Cover photo by Larry Mulvehill, WB2ZPI)*

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Ten-Tec brings back a 40-year-old concept with an outboard RF speech processor that not only makes your audio sound better but increases your average power output as well. WB6NOA has our review...

CQ Reviews:

Ten-Tec Model 715 RF Speech Processor

BY GORDON WEST,* WB6NOA

Every morning, 0830 to 0915 Pacific time, we conduct a 40-meter net on 7250 kHz, working stations up and down the West Coast. Our directed net encourages net members and visitors to experiment with their antenna and radio systems with fellow first-hop skywave operators. Almost every net, we hear from operators trying out something new at their stations, receiving multiple reports from others on the net.

One skywave net member regularly checked in, and I encouraged him to speak closer to the microphone, because the initial mic "click" indicated his voice output needed a boost. Close-talking the mic, he sounded better. We then asked him to turn on speech processing, and his signal came up a little bit more.

He then switched on his Ten-Tec model 715 speech processor, and his signal went instantly from a relatively normal-sounding signal to Wow! No splatter, no excessively wide signal, just powerful modulation with sparkling highs and booming lows, as well as an amazing increase in signal strength.

"There was little comparison between his rig's usual speech processor and the huge improvement with the Ten-Tec speech processor," comments Bill Alber, WA6CAX, one of the net regulars, adding, "you could tune either side of the signal and it was clean."

I contacted Ten-Tec and ordered one of these processors for evaluation. They explained I should see up to 6 dB increase in average power output on most low-priced and mid-priced rigs that may only offer built-in speech compression. It was indicated that simple built-in compression circuits may use just an audio frequency "clipper," without the capability to remove or change either harmonic distortion or intermodulation (IM) distortion. The simple rig's on/off compression circuit may not have a fraction of the audio characteristics found in the Ten-Tec 715.

If you have a high-priced transceiver, with menu selections for tailoring audio frequency levels, and you have matched your equipment to a high-quality microphone, then chances are your audio will be in good shape. However, the 715 does something even the audio tailoring on the high-priced rigs doesn't: It increases your average power output. Thus, it can help boost your signal regardless of what kind of rig you have.

The Ten-Tec Model 715 RF speech processor not only tailors your transmit audio but actually converts it into a low-level SSB signal before processing it and turning it back into audio to feed into your rig's mic input. This results in higher average output power along with better-sounding audio.

How it Works

The Ten-Tec model 715 mixes input audio from your microphone with a local

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About RF Speech Processing

The idea and basic technology of RF speech processing are not new. Ten-Tec credits Harold Collins, W6JES, in a January 1969 *QST* article, with first writing about its basic theory and use. A copy of that article is even included with the model 715. After reading it you will begin to understand how the internal mini-SSB modulator ultimately drives a purer audio signal into your own SSB transceiver.

Ten-Tec's Scott Robbins says the main advantage of converting audio to a low-level SSB signal, filtering it, and converting it back to audio is that low-gain, high-amplitude audio peaks are suppressed. These, he says, contribute to a loss of audio "punch" in a signal. Plus, he adds, with those low-gain peaks minimized, power is directed into higher gain audio peaks, which equals more power output from the radio.

According to Robbins, a couple of RF speech processors came onto the market in the 1970s but never gained popularity because they drove the duty cycle of a transmitter higher than is typically found in single sideband. Early solid-state transceivers had trouble handling the higher duty cycle, he said, so the RF speech processor idea fell out of favor and has been dormant for the last 25 years or so. Today's solid-state transmitters are much hardier, though, and Ten-Tec felt the time was right to bring the concept back into the ham marketplace.

oscillator to output a 455-kHz, double-sideband, suppressed-carrier signal inside the black box. Ten-Tec's specially selected filters remove the opposite sideband, and then the resulting signal is amplified, clipped, and fed to additional filters to remove harmonics and intermodulation distortion.

"Harmonic distortion tends to be more grating than IM distortion," comments Scott Robbins, W4PA, of Ten-Tec.

"The resulting amplified and clipped 455-kHz SSB signal is then converted back into audio, for output to almost any brand of transceiver, using our microphone-plug conversion assembly," adds Ten-Tec. (For more on the technology and its history, see the sidebar, "About RF Speech Processing.")

The processor comes with a heavy transformer-type wall-wart power supply, 15 volts DC output, center pin hot. Twelve volts coming from your station's DC voltage source will work, too, and this way you don't have the wall-wart constantly on in circuit, giving off heat. However, Ten-Tec says it designed the system this way on purpose for two reasons. First, it hopes that having a separate power source will eliminate the possibility of setting up a ground loop with the transceiver, which can introduce hum or noise into the audio. Second, it gave them more control over the power supply quality, as the 715's performance may be affected by running off even a somewhat "dirty" 12-volt supply. Therefore, if you get great results with your rig's power supply, great. If there's hum or noise on your signal, try Ten-Tec's wall-wart before calling technical support.

It Should Work with Your Rig

They tell me this Ten-Tec processor works with virtually any high-frequency SSB ham rig. There's a supplied jumper for use with ICOM and ICOM-wired microphones that share the audio line and polarizing voltage for powering the mic element on the same pin. There have been changes in ICOM mic plug wiring over the years, so if you have an ICOM transceiver, you will need to check your rig's manual to see how to

set up that jumper, depending on the model you're using.

As the equipment is shipped with the stock microphone connector, it will fit metal 8-pin Ten-Tec and Yaesu products, and Ten-Tec supplied me with the Kenwood mic adapter. The ICOM jumper is included, too.

If your transceiver needs greater drive power—especially if it's a very old one—an internal potentiometer can take output higher. I recommend that you specify which transceiver you plan to use with this equipment, and this way you end up with all the right cables between the black box and your microphone input.

Off-Air Testing First!

If you have a pair of HF transceivers, you can conduct your own off-air adjustment. The transceiver with the new speech processor will transmit into a dummy load, adjusting power all the way down. Some older radios do not have a power control, so make sure your dummy load can handle 100 watts for a few seconds if you can't turn down the output power.

The other transceiver, which is going to be your test receiver, is best operated with a set of headphones, absolutely no antenna, and the noise blanker turned off. Dial in to the same frequency on both, and with the Ten-Tec box set in the OUT position, test your normal microphone setting with any built-in transceiver processing turned off as well. If the receiver's meter pegs on signal strength, you somehow need to reduce sensitivity to get about an S-5 reading.

OK, you're transmitting 5 watts of power into the dummy load, your other transceiver without an antenna picks up your signal about S-5, and your headphones keep the audio from going into feedback. Listen to your transmit signal with your stock mic and no built-in speech compressor. Next turn on your rig's built-in compression (if it has it), and hear your voice with a little more bravado. Now switch off the built-in compression. With all levels on the black box turned to minimum, turn on the Ten-Tec speech processor. Now adjust the front-panel processing gain control and get enough LED bars to light about two or three. My! Your voice sounds majestic, doesn't it?

Next, on the rear of the Ten-Tec black box adjust processing LEVEL while monitoring the ALC level on your transceiver. Then readjust the front-panel processing GAIN control. Wow, sounds good, right?

It can get even better. . . . Now work with the PASSBAND control on the Ten-Tec 715. This lets you add more bass or treble when speaking into your microphone. This passband control internally sets the beat frequency oscillator in relation to the ceramic filters used for SSB generation, and helps eliminate distortion. It has no effect on the amount of clipping. The amount of clipping is determined with the processor gain control.

OK, you now sound like the Voice of America. Switch the Ten-Tec processor out and listen to yourself with and without your transceiver's processing circuit. Wimpy!

You won't see any increase in *peak* output power, as this speech processor removes low-energy, high-amplitude peaks, which do not contribute to articulation. It specifically leaves in speech-level components to increase *average* power output, and that, says Ten-Tec, is what sets the 715 apart from anything else in the ham market today, including its own transceivers!

Before switching over to a live antenna and your buddy 400 miles away on 40 meters, listen again to your modulation and make sure you're not sounding like a CBer "good buddy" with a power mic turned all the way up with room echoes all over the place. This you don't want.

You are now on the air, and your 40-meter friends will definitely hear the difference. Have them tune to each side of your signal to ensure that you are remaining clean on the air. Keep track of your ALC, and everyone will be amazed at the quality of your voice, and your signal, from this Ten-Tec speech-processing product.

Thus, if you are a regular on high frequency, and especially if you are using equipment more than a couple of years old, minus graphic equalization on mic input, consider the boost in your voice quality and your average power that will come with the Ten-Tec processor.

Just be sure to order the correct plug for your brand and model of transceiver. Ten-Tec even has 4-pin plugs, too! Then get some amazing signal reports that begin with, "Wow, great audio!"

Retail price for the model 715 is $249 plus shipping and includes one cable of your choice. For more info, or to order, go to <www.tentec.com>.

M²

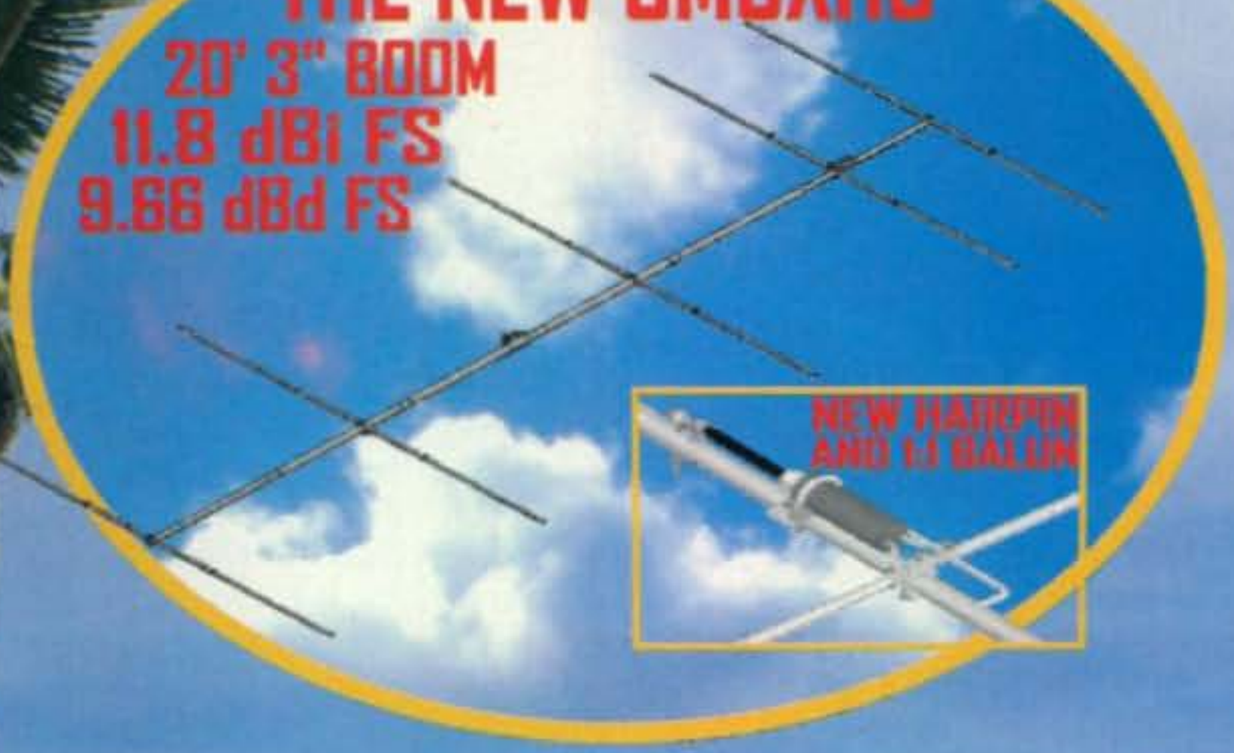
WORLD CLASS PRODUCTS

GET READY FOR YOUR NEXT DXPEDITION

The New 6M5XHG has been engineered using the latest computer optimization available. Designed for the serious DX'er in mind, the 6M5XHG has increased gain while keeping the boom length to 20' 3". The boom and element sections have been shortened to no longer than 45", for portability. Rugged 1/2" center element sections with 3/8" element tips and newly designed element clamps, make this antenna perfect for trips. The 6M5XHG also uses our newly designed hairpin design, with our high powered fairrite 1:1 balun.

THE NEW 6M5XHG

20' 3" BOOM
11.8 dBi FS
9.66 dBd FS



THE NEW 6M8GJ

42' 9" BOOM
14.2 dBi FS
12.0 dBd FS

The 6M8GJ Yagi is the culmination of many years & countless versions of the "40 Foot Trip Yagi." Inspired by W7GJ who, for years tirelessly promoted 6M EME & DXpedition activity. Computer optimized for the exact conditions we find in most DXpedition locations, a height of 20 to 30 feet. Boom sections are 2 1/2" diameter and the rest of the sections all telescope in 1/2" or 1/4" increments. The entire boom breaks down to a 2 1/2" x 5" x 45" bundle. Rugged 1/2" x 40" element center sections and 3/8" diameter tips mount to boom sections with commercial grade clamps. A new Fairite 1:1 Balun for extended service. Optional items include: Nylon carry bag & portable 20+ foot mast that telescopes as well and fits in the same carry bag with the antenna. The mast comes with Dacron guys, slip ring & anchors.

The New 10M4DX-TS, has been designed for performance and portability. Calculations taken from the original 10M4DX, make this antenna a natural for DXpeditions. Wind area is kept to a minimum using light duty 1/2" center element sections and 3/8" element tips. Antenna boom sections are kept to a minimum of 72" for portability. CNC boom to element clamps slide onto the boom making assembly a snap. Excellent performance characteristics on both CW and Phone bands. A hairpin type match, coupled with our new 1:1 Fairrite balun, will provide years of trouble free DXpeditions.

THE NEW 10M4DX-TS

24' 2" BOOM
10.14 dBi FS
8.0 dBd FS

M2 Antenna Systems, Inc.
4402 N. Selland Ave.
Fresno, CA 93722
Phone (559) 432-8873 Fax (559) 432-3059
www.m2inc.com

M2 Offers many HF Logs, Monobanders and Multiband products.
Not to mention our full line of VHF, UHF and Microwave antennas.
We are your one stop shop for all of your High Quality Antenna needs.
Check us out on the web at www.m2inc.com

Announcing:

The 2010 CQ DX Marathon

2009 Logs Due by January 31, 2010

This year's DX Marathon ends December 31, so it's time to go back through your log, see what you have worked, enter it onto the DX Marathon spreadsheet, and then update it with any additional contacts through the end of the year. Last year's winning QSO was made on December 21st, so take advantage of the holiday season to boost your score. At the very least, you will give yourself a goal to beat in 2010! See rule 5 in the main text or the DX Marathon website for details on how and where to submit your log. Remember, log submission deadline for the 2009 CQ DX Marathon is **January 31, 2010.**

The 2010 edition of the CQ DX Marathon begins at 0000 UTC on January 1, 2010 and runs through 2359 UTC on December 31, 2010. The goal, as always, is to work as many countries and CQ zones as possible at least once during the calendar year.

There are only minor changes to the rules for 2010, mainly clarifications on Formula Class antennas plus a requirement to declare Formula Class options and describe Formula Class antennas. Once again we will use a downloadable Microsoft Excel® template that may be filled in and e-mailed to a special address as your log entry. Conversion programs are available to automatically populate the template from your logging program. See the DX Marathon website (http://www.dxmarathon.com) for details. Here are the 2010 rules for the CQ DX Marathon:

Rules, 2010 CQ DX Marathon

(1) Activity period: The CQ DX Marathon is a year-long activity, beginning at 000 UTC January 1 and ending at 2359 UTC December 31. Each year's event is separate.

(2) Frequencies: Any authorized amateur frequency may be used. Contacts through repeaters or satellites are not allowed for credit, nor are contacts with maritime or aeronautical mobile stations. All contacts must be made entirely over amateur radio frequencies—i.e., Echolink-type contacts do not count.

(3) Modes: Any authorized amateur mode may be used. Three modes will be recognized in the DX Marathon—CW, SSB, and Digital. All modes other than CW and SSB will count as Digital. Submissions with all contacts utilizing a single mode will be recognized.

(4) Categories: All awards are for single operator only. Entries with two or more callsigns will only count as a single entry if all contacts were made by the same (single) operator at the same station using the same antennas. There are two entry classes, "Formula" and "Unlimited."

(a) Formula: An entrant may choose one of two options in this class: (1) All contacts must be made with a maximum output power of 10 watts, regardless of band or mode; or (2) the operator may run a maximum of 100 watts output to a simple antenna, such as a vertical or dipole (see the appendix below for further rules on antennas used in either option for Formula Class). An operator in Formula Class must select QRP (10 watts or less) or 100 watts and limited antennas at the beginning of the year's DX Marathon and may not switch between entry modes during the year. All contacts must be made without assistance of any sort, including, but not limited to, lists, passes, or use of higher power or prohibited antennas to initially secure the contact. Use of spotting nets such as a DX Cluster® is allowed.

(b) Unlimited: Any antenna may be used, along with any power level for which the operator is licensed. Use of spotting nets such as DX Cluster® is allowed.

(5) Scoring: Each country worked is worth one point. Each CQ zone worked is worth one point. The total score is the sum of zones and countries worked, on any mode and any authorized band. There are no multipliers of any kind. Each country and zone count only once. A single QSO may count for both a country and a zone. If in the course of the year you work 238 countries and 37 zones, your score is 275. If you work all 40 zones and 150 countries, your score is 190. The CQ DX Countries List and the CQ Zone List constitute the official lists. The lists are available on the DX Marathon website. In the case of ties, the operator whose last scoring contact was earlier chronologically will be judged the winner. Decisions of the Marathon Manager are final.

(6) Submissions: Submissions must be made electronically, via e-mail to <scores@dxmarathon.com>. A Microsoft Excel® template into which contacts may be entered is available for download from the CQ DX Marathon website at <http://www.dxmarathon.com>. All scores must be received by January 31 following the close of each DX Marathon.

(7) Verification: QSLs are not required. The operator is expected to claim contacts only from stations the operator has every reason to believe are legitimate, and only to claim contacts in which an accurate two-way exchange was clearly accomplished (see Appendix for further explanation). Scores will be adjusted by the DX Marathon committee for claimed contacts with pirates or any station not considered legitimate. Submissions may be penalized or voided in cases of fraud or poor sportsmanship. Submissions that do not provide clear descriptions of Formula Class antennas to show that the antennas meet the Formula Class antenna rules may be re-classified to Unlimited Class. Decisions of the Marathon Manager are final.

(8) Clubs: Clubs are strongly encouraged to use the framework of this contest for intramural and regional competitions.

(9) Claimed Scores: Competitors are encouraged to submit claimed scores to the DX Marathon website throughout the year. The claims will be updated regularly and posted on the website.

(10) Results: The final listing of official scores will be post-

ed on the DX Marathon website after the annual summary of the winning scores and details are published in *CQ* magazine.

(11) Awards:

Certificates: Certificates will be issued to the winners from each CQ zone and each CQ country. Where there is sufficient activity, additional certificates may be issued for other high scorers or for scores using a single mode.

The CQ DX Marathon Committee will award plaques to the top scorer in each class. Additional sponsors are welcome.

(12) In all cases, the rulings of the CQ DX Marathon Committee and the CQ DX Marathon Manager are final.

Appendix

(a) Formula Class, option 1: Operators selecting the 10-watt option are limited to antennas on a single tower and whose height does not exceed 65 feet or 20 meters above ground elevation within 330 feet or 100 meters of the tower base. Wire antennas may also be used but must meet the criteria of the 100-watt option, and may be tower-supported at only one point.

(b) Formula Class, option 2: Antennas for operators choosing the 100-watt option must be either simple verticals or wire antennas lacking significant gain. No arrays are allowed, whether vertical or horizontal, nor are long wires exceeding 130 feet, or 40 meters, except on 80 and 160 meters. Dipoles, long wires, or other horizontal antennas must not exceed 60 feet, or 18 meters, above ground and may not be supported by more than one tower. The base of vertical antennas used must not be more than 33 feet, or 10 meters, higher than the station floor and may not exceed 65 feet or 20 meters in total height. Yagis, quads, or tower-mounted antennas (except wire antennas as noted) may not be used in this category.

(c) Contacts: Each contact for a claimed country or zone must be a solid contact. The station claiming a contact with another station is expected to have had his or her callsign fully and accurately received and transmitted by the other station, and to have copied his/her own call being correctly sent by the other station. For example, K2MGA may not claim credit for a QSO with a DX station who had his call as K3MGA, even though in many cases the DX station would QSL the contact with the correction made (after receiving a card from K2MGA, realizing the error and correcting his/her log). For a contact to count, both stations must correctly copy all of both callsigns.

BY FREDERICK O. MAIA,* W5YI

The Perils and Pitfalls of Getting a Vanity Callsign

We have covered this subject before, but judging by your telephone calls and letters, radio amateurs are still confused about how the vanity callsign system works and how to increase their chances of getting a desirable station callsign. Sadly, fewer than half of all radio amateurs get the vanity callsign they want. Most applications are dismissed (denied) because the applicants were not qualified for the callsigns they chose, had competition for the same callsign, or filed too early or too late.

The vanity callsign rules are, admittedly, quite complex and somewhat scattered. Basically, the system provides the "best" callsigns to higher class licensees. Some rules are found in the Amateur Service's Part 97 Rules (See Section 97.19.), but most of the eligibility data is found on the FCC's Amateur Service Web pages. (To get there, go to: <http://wireless.fcc.gov/services/index.htm> and click on "Amateur Radio Service." Then click on "Vanity" on the next page under "Call Sign Systems.")

The W5YI-VEC has a vanity callsign filing service and 99% of our applicants get their vanity callsigns. The difference is knowing what the rules are and how and when to properly file the application.

Let's go over this again, this time in a question-and-answer format. If you are still confused after reading this, call us at (817) 461-6443 and we will help you with your application.

Q. What is a "Vanity" station callsign?

A. A "vanity" callsign is like a "vanity" automobile license plate. It is an amateur callsign that, subject to availability and certain rules, is personalized to the radio amateur's wishes. A vanity callsign can only be obtained to replace an existing callsign. Vanity calls have been issued by the FCC since 1996.

Vanity callsigns are assigned from a list submitted by the applicant. You must meet certain license class criteria in selecting your callsign and list the exact prefix, numeral, and suffix for each selected callsign. Some callsign formats (1-by-2 and 2-by-1) are in very short supply. You may select several callsigns of the appropriate format and the first available one on your list will be assigned to you. If none of those callsigns is assignable, the applicant's previous callsign is automatically re-assigned.

Q. Appropriate format? What's that?

A. There are five different four- and five-character formats used in U.S. amateur radio callsigns. They are so-called 1-by-2, 2-by-1, 2-by-2, 1-by-3, and 2-by-3 formats.

- A 1-by-2 format has one prefix letter (K, N, or W), a numeral (Ø through 9) and two suffix letters (AA through ZZ).
- A 2-by-1 format has two prefix letters (KA–KZ, WA–WZ, NA–NZ, and AA–AL (but *not* AM–AZ), a numeral, followed by one suffix letter (A–Z).
- A 2-by-2 format has two prefix letters (KA–KZ, WA–WZ, NA–NZ, and AA–AL), a numeral, followed by two suffix letters (AA–ZZ.)
- A 1-by-3 format has one prefix letter (K, N, or W (but *not* the single letter "A"), a numeral, and three suffix letters (AAA–ZZZ).
- And a 2-by-3 format callsign has two prefix letters (KA–KZ, WA–WZ (but *not* AA–AL and NA–NZ), a numeral and three suffix letters (AAA–ZZZ.)

Q. What general rules apply to obtaining a vanity callsign?

A. There are several prerequisites, rules, and policies that all applicants for a vanity callsign should be aware of. Failure to follow them will result in dismissal (denial) of your application.

- You must hold an unexpired amateur operator/station license of the proper operator class to request a vanity callsign for your station.
- To request a vanity callsign for a club station, you must also hold an unexpired club station license listing you as the license trustee. Only the trustee is authorized to change a club station's callsign to a vanity callsign.
- Go to the FCC's Universal Licensing System at <http://wireless.fcc.gov/uls/> and click on the Log In button to submit an application for a vanity callsign. You will need your FRN (FCC Registration Number) and ULS/CORES password to access your FCC record. (You may also submit a paper document application on the FCC website.)
- The callsign you are requesting may not already be assigned. This includes expired callsigns that are still in the two-year grace period for renewal. Refer to the FCC's Universal Licensing System online License Search at <http://wireless.fcc.gov/uls/> for verification.
- To be assignable, a callsign must be unassigned (inactive) for more than two years. The callsign must either not be found when querying the FCC's licensee database or show a status of expired or cancelled. Station callsigns are available two years plus one day following expiration or cancellation, whichever is sooner. (See exceptions below.)
- Do *not* use any other database except the one posted by the FCC to do your research, as they won't show needed expiration or cancellation information.

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e-mail: <w5yi@cq-amateur-radio.com>

• If you have recently upgraded by passing an exam, do *not* file for a vanity callsign of a higher group until your upgrade shows up in the FCC database.

• Be aware that (due to certain exclusions—see below) a specific callsign may not be available even where a callsign does not appear in the FCC's database.

• Vanity callsign assignment is not limited to your callsign district. You may apply for a callsign with any radio district numeral, 1 through 9. It is recommended, however, that you stick with your callsign district, since it generally tells other radio amateurs where you are located.

• Your name and mailing address as shown on your current license (FCC record) must be correct. FCC rules (Section 97.23) provide that returned (undeliverable) licenses can be revoked. Call: (800) 669-9594 or (817) 461-6443 for information on how to change your address.

• A regulatory fee—currently $13.40 for a ten-year term (payable to the FCC in advance)—applies to all vanity callsigns. This is usually paid by submitting FCC Form No. 159 online. (It also may be paid by mailing a check, money order, or giving a credit card number.)

• If your license has expired (or is in the two-year grace period for renewal), you must first renew the license. After the renewal is granted, you may file a vanity callsign request. Call (800) 669-9594 or (817) 461-6443 if you need information on how to renew.

• Vanity callsigns of applications filed online are issued exactly 18 days after filing, excluding weekend and holidays.

• Military recreation and RACES stations are not eligible to request vanity callsigns.

Q. Who is eligible to select a specific vanity station callsign format?

A. Effective March 24, 1978, the FCC began issuing all initial amateur radio station callsigns "systematically"—that is, in strict alphabetical order within four format blocks called Group A, B, C, and D. The shorter (and theoretically more desirable) callsigns were allocated to Group "A"; the longest (2-by-3 format) callsigns were allocated to Group "D."

Any legal Group A, B, C, and D format callsign may be chosen by Extra Class level amateur radio operators. Group B, C, and D can be selected by the Advanced Class; Group C and D by Technicians and the General Class. Novices may select only Group D (2-by-3) format callsigns. Note: There are some callsign exclusions (see below).

Group	License Class	Call Sign Format
Group A	Extra Class	1-by-2 callsigns beginning with the prefix letter K, N or W; 2-by-1 callsigns beginning with the prefix letters AA–AK, KA–KZ, NA–NZ, and WA–WZ, and 2-by-2 callsigns beginning with the prefix letters AA–AK. Certain two letter prefixes are not available to mainland U.S. radio amateurs. (See below.)
Group B	Advanced Class	2-by-2 callsigns beginning with the prefix letters KA–KZ, NA–NZ, and WA–WZ, but not AA–AK.
Group C	Technician and General Class	1-by-3 callsign formats beginning with K, N, or W, but not the single prefix letter "A."
Group D	Novice	2-by-3 callsign formats beginning with KA–KZ and WA–WZ, but not NA-NZ or AA–AK.

Table I– Vanity callsigns for stations with mailing addresses located in the 48 ontiguous (mainland) United States.

Table I indicates the callsign groupings for the various license classes for radio amateurs with continental U.S. (the 48 contiguous states) mailing addresses, followed by those with mailing addresses outside the mainland United States.

Vanity Callsigns for Stations Outside Mainland U.S.

Certain 2-letter prefixes are reserved for amateurs with mailing addresses outside of the 48 contiguous states.

- All AH, KH, NH, and WH prefixes are reserved for the Pacific Area (Hawaii, Guam, American Samoa, and certain other small U.S. island possessions).
- All AL, KL, NL, and WL prefixes are reserved for Alaska.
- All KP, NP, and WP prefixes are reserved for the Atlantic Area (U.S. Virgin Islands, Puerto Rico, and certain other small U.S. Caribbean and South Atlantic island possessions).

These 2-letter prefixes may *not* be selected under the Vanity callsign System by radio amateurs with mailing addresses located in the 48 (mainland) U.S. states. (Note: It is not required that you reside in these areas, only that you can receive mail there. You may use a friend's address or a mail forwarding service to meet the mailing address requirement.)

Under the Vanity callsign System, amateur Extra Class radio operators (and club trustees) qualify for Group A, B, C, or D station callsign formats. Advanced Class operators qualify for Group B, C, or D formats. Technician and General Class operators qualify for Group C or D. Novice operators qualify only for a Group D callsign.

Q. What vanity callsigns may Novice operators choose?

A. A Novice operator with a mainland (lower 48) U.S. mailing address may only apply for a Group D (2-by-3) callsign format. A Group D callsign has two prefix letters followed by any numeral—Ø through 9—and any available three suffix letters (for example, KA1AAA). The prefix must be from the KA to KZ or the WA to WZ prefix blocks. Important: 2-by-3 callsigns beginning with AA to AL and NA to NZ are *not* available to any U.S. amateur radio station and may not be selected. There are some other exceptions as well.

Q. What vanity callsigns may Technician or General Class operators (or club trustees) choose? (There are very few Tech Plus operators left; most have been converted to the Technician Class.)

A. Technician and General Class operators with a mainland mailing address may only apply for a Group C or D (1-by-3 or 2-by-3) callsign format. A Group C callsign has one prefix letter followed by any numeral and any three available suffix letters (for example, K1AAA). Many Technicians with 2-by-3 callsigns change to shorter 1-by-3 format callsigns once they upgrade to the General Class level.

A Group C prefix must be either K, N, or W, and not the single letter "A." Group C callsigns beginning with W or K seem to be the most popular. A popular vanity callsign selection is the applicant's current 2-by-3 callsign with the two beginning prefix letters changed to a single W, K, or N. Many amateurs request a 1x3 callsign with their three initials or nickname as the suffix.

Q. What vanity callsigns may Advanced Class operators (or club trustees) choose?

A. Advanced Class operators with a mainland U.S. mailing address may apply for a Group B, C, or D (2-by-2, 1-by-3 ,or 2-by-3) callsign format. A Group B callsign has two prefix letters followed by any numeral and any two available suffix letters. The prefix must be from the KA to KZ, NA to NZ, or the WA to WZ prefix blocks, but not the AA to AK prefix block which are Group A format callsigns. (For example, KA1AA is a Group B callsign.)

Q. What vanity callsigns may Amateur Extra Class operators (or club trustees) choose?

A. Extra Class operators with a U.S. mainland mailing address may apply for any available Group A, B, C, or D (1-by-2, 2-by-1, 2-by-2, 1-by-3, or 2-by-3) callsign format. Group A callsigns have certain one or two prefix letters followed a numeral and any available one or two suffix letters. They include three different formats:

1. A single prefix letter (Group A) callsign must begin with K, N, or W followed by any numeral Ø through 9 and any two available suffix letters. (For example, K1AA.) Group A callsigns beginning with the single letter "A" are not available.
2. A two-letter (Group A) prefix includes the AA to AK, KA to KZ, NA to NZ, and WA to WZ prefix followed by any numeral and any one available suffix letter. (For example, AA1A.)
3. A two-letter (Group A) prefix includes the AA to AK prefix followed by any numeral and any two available suffix letters. (For example, AA1AA.)

Q. What callsigns are not available to the Vanity callsign System?

A. The following callsigns are not available for assignment to anyone under the vanity callsign program:

1. KA2AA through KA9ZZ, KC4AAA through KC4AAF, KC4USA through KC4USZ, KG4AA through KG4ZZ, KC6AA through KC6ZZ, KL9KAA through KL9KHZ, and KX6AA through KX6ZZ. These are used by the U.S. military.
2. To eliminate confusion, any callsign having the letters SOS or QRA through QUZ as the suffix are not assignable. SOS is a distress call; the others are "Q" signals used by CW operators.
3. Any callsign having the single letter "A" or letters AM–AZ as the prefix.

These prefixes are assigned to other countries by the International Telecommunication Union (ITU).

4. Any 2-by-3 format callsign having the letter "X" as the first letter of the suffix. These are assigned to experimental (non-amateur) stations.

5. Any 2-by-3 format callsign having the letters AF, KF, NF, or WF as the prefix and the letters EMA as the suffix. These have been allocated to Federal Emergency Management Agency (FEMA) stations.

6. Any 2-by-3 format callsign having the letters AA–AL, NA–NZ, WC, WK, WM, WR, or WT as the prefix. These are not assignable to anyone.

7. Any 2-by-1, 2-by-2 or 2-by-3 format callsign having the letters AH, AL, KH, KL, KP, NH, NL, NP, WH, WL, or WP as the prefix unless your mailing address is outside of the 48 contiguous U.S. states. These prefixes are available *only* to radio amateurs with non-contiguous U.S. mailing addresses in the states of Alaska and Hawaii and certain U.S. possessions (such as Guam, American Samoa, U.S. Virgin Islands, Puerto Rico, and other small island possessions).

8. Any 1-by-1 format callsign. These are reserved by the Special Event callsign System. (For example, K1A.) Note: 1-by-1 callsigns with a "X" suffix letter are not assignable.

9. Station callsigns that have been inactive for less than two years. As a general rule, a callsign may not be reassigned under the Vanity callsign System unless it has been inactive for a minimum of two years following expiration, revocation, cancellation, relinquishment, or death of the applicant. There are exceptions for reclaiming former callsigns, and the assignment of deceased amateur callsigns wanted by a family member or club to which the deceased amateur belonged.

Q. How do I determine which vanity callsigns are available to me?

A. There are nearly 15-million possible callsign combinations available to the U.S. Amateur Radio Service, of which nearly 750,000 are currently assigned or are in the two-year grace period. It is important that you check the FCC's online callsign database to verify that the callsign you want is not already assigned. The FCC's Amateur Service ULS (Universal Licensing System) licensee database can be accessed at <http://wireless.fcc. gov/uls/>. Click on the button labeled License Search.

A callsign not found is usually (but not always) available. If it is found, pay particular attention to the expiration and cancellation date. As noted above, a callsign is available two years plus one day following expiration or cancellation, whichever is sooner.

Q. How does the FCC award a callsign when more than one person applies for it?

A. Thousands of vanity callsigns are issued every year and someone else may also be requesting the same available callsign you want. When more than one radio amateur selects the same callsign, it is awarded randomly (by lottery) by the FCC's computer to an individual who selected it on the earliest available day. It makes no difference what time the callsign is applied for during a day. The lottery process kicks in when there are competing applications filed during the same 24-hour day. It is always a good idea to select as many callsigns as possible to increase your chances of getting a vanity callsign.

Q. How do I get my old callsign back?

A. Under the Vanity callsign System's Former Holder provision, you may request to be reassigned a *previously*

held callsign. You do not have to wait the two-year period after expiration or cancellation to reclaim your previously held callsign, but you must be sure to file under the Former Holder provision. After two years, your old call is fair game for anyone and you no longer have any special claim on it. At that point, you file an application for it as you would for any other vanity callsign.

Q. How do I obtain the callsign of a deceased radio amateur but whose license has not yet expired?

A. The active callsign of a deceased amateur who died more than two years ago is available for immediate reassignment once it has been canceled. You can get the callsign canceled from the FCC's licensee database by submitting a signed request for license cancellation accompanied by a copy of a death certificate, a newspaper obituary, or data from the Social Security Death Index that shows the date of death to: FCC, Amateur Section, 1270 Fairfield Road, Gettysburg, PA 17325-7245. File your vanity callsign request promptly after you confirm that the license status in the FCC database has been changed to cancelled.

Q. How do I obtain the callsign of a deceased family member?

A. When the holder dies, his/her callsign is immediately assignable to a "close relative" once it is no longer in the database. You do not have to wait two years before you apply for the callsign. The FCC defines a close relative of a deceased amateur as a spouse, child, grandchild, stepchild, parent, grandparent, stepparent, brother, sister, stepbrother, stepsister, aunt, uncle, niece, nephew, or in-law. You must indicate your relationship to the deceased person on the vanity callsign application.

You must be able to provide supporting documentation showing that you are a family member. Do not, however, send this documentation to the FCC unless you are specifically instructed to do so. Retain it in your station records.

There is an important catch! You must hold a callsign in a Group equal to, or higher than, the deceased. For example, you must be an Amateur Extra Class operator if the deceased held a Group A callsign.

Q. How can our club obtain a vanity callsign for our new club station?

A. You must first apply for a club station license by filing an application with a Club Station callsign Administrator (CSCSA.) After the license has been granted, your club station license trustee may file an application for the vanity callsign. The vanity callsign must conform to the class of operator license held by your trustee. Call (800) 669-9594 for assistance by an FCC-approved CSCSA.

Q. How does our club apply for the callsign of a deceased club member?

A. A deceased club member's callsign may replace a club's current callsign "in memoriam" and may be requested even if it has been less than two years since the death of the club member. You must, however, have a written statement in your station records (do not send to FCC unless requested) from a family member of the deceased confirming the deceased person's association with the club and showing consent of the relative to your request. The callsign group of the trustee must be equal to, or higher than, the callsign of the deceased. For example, you must be an Amateur Extra Class trustee to apply for a deceased member's Group A callsign.

While an individual amateur radio operator may hold only one station callsign, there is no limit to the number of station callsigns held by the same club—but you must be able to justify why you need more than one club callsign.

You must apply through a Club Station callsign Administrator (CSCSA) to obtain an *additional* callsign "in memoriam" for your club (without changing your club's callsign). The callsign addition must also be approved by an officer of your club. Once the callsign is initially assigned, it may be changed to the deceased member's callsign under the vanity callsign program. Call (800) 669-9594 for assistance by an FCC-approved CSCSA.

We hope this helps clear up any confusion and/or questions you may have regarding the rather complex process of successfully applying for a vanity callsign. 73, Fred, W5YI

See RIGblaster duo Product Review in Nov 2009 CQ

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Both of these stations do the same thing!

with a *RIGblaster duo*

Money back guarantee! If after 30 days you don't find your station with two radios to be neater, more efficient, better sounding (on transmit and receive), and above all, more fun to operate, we will give you a full refund, less shipping.

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Irwin Math's notes

BY IRWIN MATH,* WA2NDM

More Food for Thought for Experimenters

This month we will conclude our series of potential experimenter topics with a couple of interesting new optical components. To begin, Vishay Corporation has introduced a new line of high-power LEDs that could find application for optical communications. The VSLB3940, for example, is an infra-red LED at a wavelength of 940 nm that produces an output power level as high as 40 milliwatts. This might be a good light source for the type of optical transmitters we have discussed in prior columns. This wavelength is also within the range of inexpensive silicon photo-diodes, so there would be no special expensive detectors needed. Details and data sheets can be found on the company's website at <www.vishay.com>.

Another very interesting LED (actually a composite LED) has been introduced by Avago Technologies (www.avago.com). This device is the ASMT-MT100. Packaged in a small housing, the device is actually a three-color LED comprised of separate closely spaced red, green, and blue LEDs. While normally intended for specialty lighting and display purposes, the combination can produce as much as a watt of optical output power. Furthermore, by varying the current to each of the LEDs within the package, you can produce virtually any color from white (all LEDs on) to black (all LEDs off). Sample charts on the data sheet show what these levels should be. This means that by constructing a circuit similar to the one shown in fig. 1, you could possibly come up with a tunable light source that could then be modulated (either analog or digital) to allow optical communication anywhere within the visible spectrum. This would extend the range of light frequencies available and consequently the number of channels of communications possible in any one area. You would have to change the three resistor values shown in the diagram for the desired wavelength (color). You could also connect several voltage-controlled resistors driven by a properly configured DC source to produce a continuously tunable light source from a single knob, much like a conventional lower frequency VFO. Of course, you would need to develop a similar tuned detector arrangement, but that is what experimentation is all about.

As a hint for those less technical, optical filters are available for almost any color you could want if you cannot figure out how to build a suitable tunable detector. Another hint that might not be as well known is that many LEDs at specific wavelengths can also be used as photodiodes at that same wavelength. You would hook up the LEDs in the same way that you would hook up a standard photodiode, and it will produce an output when light of the specific wavelength (of the LED) is present. I am not sure just how sensitive or selective such a detector would be, but that, again, is what experimentation is all about.

Those of you who read last month's column will also remember the military investigation of ultra-violet LEDs for scattered light communications applications that are not specifically limited to a direct line-of-sight path (around corners, for example). The same series of LEDs from Avago is also available in single-wavelength (color) versions, and there is even a high-power blue LED in the series.

So what are you waiting for? The next generation of revolutionary optical communications could not only be upon us, but even the necessary devices may be available if you are not afraid of thinking "outside of the box." Don't make the mistake of Thomas Edison, who not only actually built a working vacuum-tube diode (way before Alexander Fleming), but even noted its characteristics. However, since it did not solve his light-bulb blackening problem, he never realized that it was an excellent, sensitive RF detector, far superior to the coherer or galena crystal in common use at the time.

Now that I have "fired you up" and hopefully given you something to fill some of those dreary winter days and nights, I would like to wish you all a very happy holiday season. I hope all of your dreams and wishes come true in 2010, and would sincerely like to thank you for your thoughts, comments, and even criticisms over the past years. They all are welcomed and appreciated.

73, Irwin, WA2NDM

*c/o CQ magazine

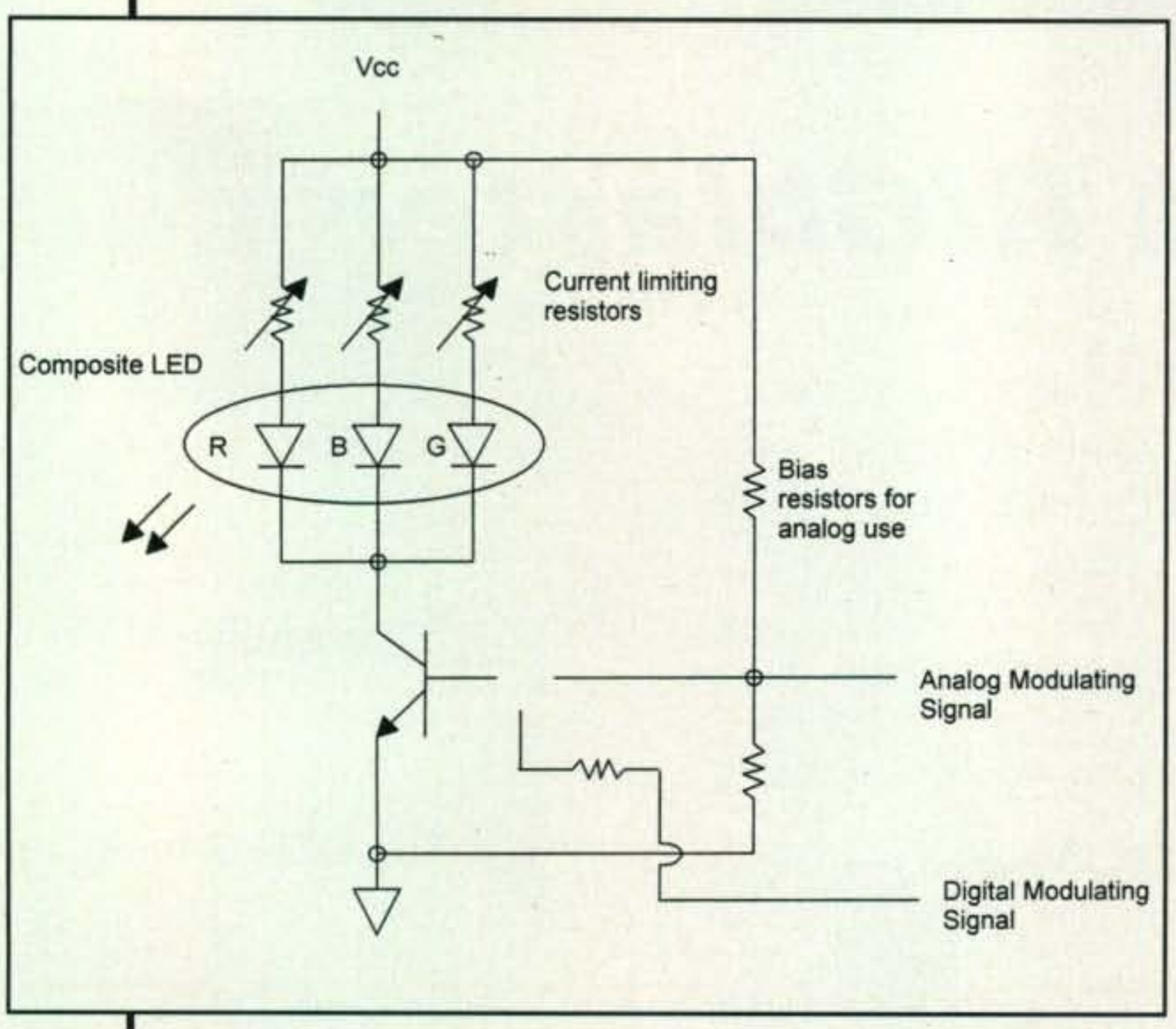

Fig. 1– Tunable optical light source.

MFJ 160-6 Meter Antenna

Self-supporting 43 foot vertical -- no guy wires required . . . 1500 Watts . . . exceptional performance . . . low-profile . . . includes base mount and legal limit balun . . . assembles in an hour . . .

MFJ-2990
$359.95

New!

Operate all bands 160 through 6 Meters at full 1500 Watt with this self-supporting, 43 feet high performance vertical! It assembles in less than an hour and its low-profile blends in with the sky and trees -- you can barely see it from across the street.

Exceptional Performance

The entire length radiates to provide exceptional low angle DX performance on 160 through 20 meters and very good performance on 17 through 6 Meters. You can shorten it by telescoping it down for more effective low angle radiation on higher bands if desired.

With an automatic antenna tuner there's no fuss -- just talk!

A wide-range automatic or manual antenna tuner *at your rig* easily matches this antenna for all bands 160-6 Meters. There's no physical tuning adjustments on the antenna -- you simply put it up!

An optimized balun design allows *direct coax feed* with negligible coax loss (typically less than ½ dB 60-6 Meters and less than 1 dB 160-80 M with good quality, low-loss coax).

Fully self-supporting, Extremely low wind loading, Very low visibility . . .

With just 2 square feet wind load, the fully self-supporting MFJ-2990 -- *no guy wires needed* -- has the lowest wind-loading and lowest visibility of any vertical antenna! The key is a six foot section of tapering diameter *stainless steel* whip that flexes in strong wind instead of stressing the bottom sections. Its 2-inch O.D. and .120 inch

thick walled tubing bottom section makes it incredibly strong -- it'll stay up!

Weighs just 20 pounds -- you can easily put it up by yourself because its corrosion resistant *6063 aircraft aluminum* tubing and stainless steel construction make it light *and* super-strong.

Assembles in an hour

You can easily assemble it in an hour! Ground mounting lets you completely hide its antenna base in shrubbery. Includes ATB-65 high-strength antenna mount. Requires ground system -- at least one radial. More extensive ground system will give much better performance.

Great for Stealth Operation in antenna restricted areas

This very low-profile antenna is perfect for stealth operation in antenna restricted areas. Hide it behind trees, fences, buildings, bushes. Use it as a flagpole. Telescope it down during the day. Put it up at night and take it down in the morning before the neighbors even notice!

Quick and easy installation makes it great for DXpeditions, field day and other portable and temporary operations.

MFJ *Automatic* Tuners

MFJ-998
$699.95

For legal limit 1500 Watt SSB/CW amplifiers. Auto-ranging LCD and Cross-Needle SWR/Wattmeter, antenna switch, amp bypass, matches 12-1600 Ohms, 1.8-30 MHz.

MFJ-993B
$259.95

Dual power range -- 300 Watt range matches 6-1600 Ohms. 150 Watt/6-3200 Ohms. Auto-ranging LCD and Cross-Needle SWR/Wattmeter, antenna switch, 1.8-30 MHz.

MFJ *Manual* Tuners

MFJ-989D
$389.95

1500 Watts SSB/CW, 1.8-30 MHz. Active peak-reading Cross-Needle SWR/Wattmeter, balun, dummy load, antenna switch, aircore roller inductor.

MFJ-949E
$179.95

World's most popular tuner! 300 Watts, 1.8-30 MHz. Peak/Average Cross-Needle SWR/Wattmeter, 8 pos. antenna switch, dummy load, 1kV capacitors.

Window Feedthru

MFJ-4602
$69.95

Bring 3 coaxes, balanced line, random wire, ground thru window. Connectors mounted on *stainless steel* panel. ¾" thick *pressure-treated* weather-proof wood.

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world of ideas

BY DAVE INGRAM,* K4TWJ

Holiday Treats for Hams

Happy holiday greetings, friends! We hope this issue of *CQ* finds you in good health and enjoying amateur radio to the max. Supporting those thoughts, we again make our traditional December column diversion to highlight some special goodies aimed at making your life in amateur radio even better. We did some heavy-duty searching to find these gems, so enjoy the views and remember that ordering items early sidesteps sold-out dilemmas or shipping delays. Remember, too, highlighted items are available directly from their listed sources, not from me. I am simply your guide on this tour via printed page. Let's start with two unique items for the ham who has everything.

Glamorizing Your Call

More than names, our amateur radio callsigns are distinctive identifiers recognized around the world, identifiers we all can justifiably be proud to claim. Many amateurs display their callsigns on a QSL in the shack and ponder if something with a bit more glitz is available. Yes, indeed.

*3994 Long Leaf Drive, Gardendale, AL 35071
e-mail: <k4twj@cq-amateur-radio.com>

Photo A– Looking for a special little frill to spice up your shack? Consider the stained-glass callsign "sun catchers" handmade in styles from mild to wild by Jos Liefkens in Ireland. These multicolor items are not cheap, but they are definitely classy. More views plus ordering info are at <www.littleoakglass.ie>.

Photo B– Dim shack? Brighten it up like never before with a genuine neon sign with your call letters on it. This handmade beauty measures approximately 4 inches tall and 12 inches long and comes complete with power supply for instant use. Contact <cyduncan@aiconnect.com> for details.

Check out the sun catcher or stained-glass callsign plaque shown in photo A. This item is individually handmade by Jos Liefkens, EI1525, an IRTS (Irish Radio Transmitters Society) registered SWL in Ireland. Jos makes these plaques from bits of glass he cuts, stains, and fires in a kiln, plus adds special trim along the way. As a result, production and curing time plus shipping time to the U.S. take a couple of weeks. Ordering early is definitely encouraged if you want one before Christmas. A wide variety of styles is available. See <www.littleoakstainedglass.ie> for some samples, and via e-mail contact <Jos@littleoakglass.ie> for more details and pricing.

Remember those flashy Budweiser and Miller beer neon signs that were super-popular a few years ago? Now you can get one with your own callsign (but without the beer logo!) in that same neon styling—and it adds a real touch of class to the wall of any ham shack (photo B). The neon callsigns are handmade by Charlie Duncan, N1QAA, and come supplied complete with power supply ready for "plug-and-play" enjoyment. For more views go to <www.cyduncansigns.com>, or via e-mail contact <cyduncan@aiconnect.com> for details.

Morse Magic

CW is hotter than ever today, and there's no better way to enjoy operating CW than with a new key. That is especially true when it is economically priced and easy to use. Proudly filling those criteria is the new "Bushwhacker" single-lever paddle designed by Doug Hauff, W6AME, of American Morse Equipment (photo C). This little beauty is available as a completely finished and quick-to-assemble kit and includes full gap, tension, and arm travel adjustments, plus it has three arm pivot points you can select to mate with your particular CW "fist." A number of newer amateurs tell me they find single-lever paddles easier to use than trying

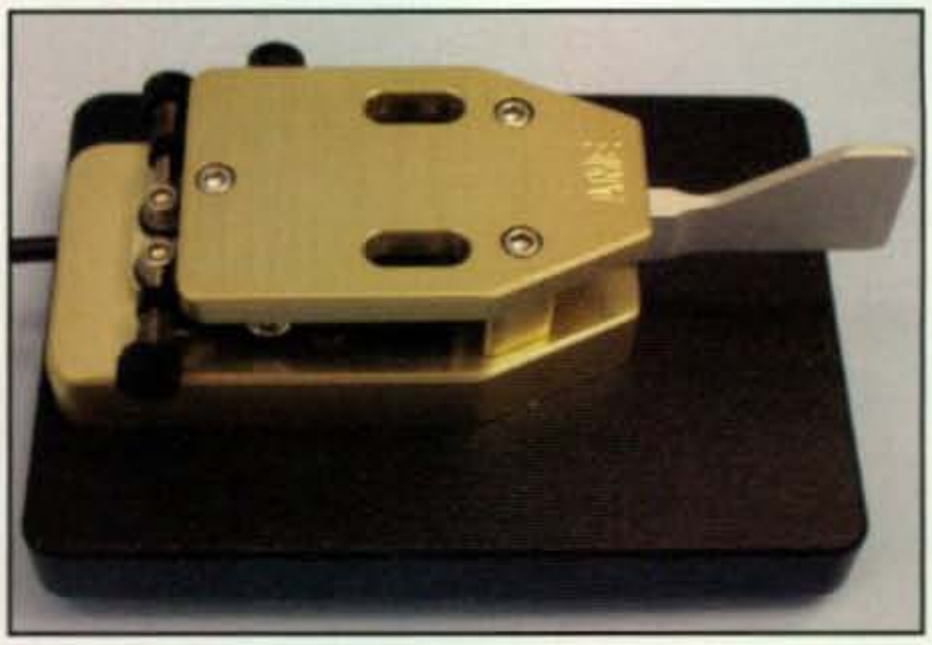


Photo C– New amateurs and old-pro CW ops alike appreciate the easy can't-miss action of a single-lever paddle, and this new "Bushwhacker" kit paddle offers good performance plus an exceptional range of adjustments at a fair and square price. Paddle measures 4"L × 2.5"W × 2"H. More details at <www.americanmorse.com>.

Photo D –This miniature 2009 Christmas Key from MorseX.com measures approximately 1.5" × 1.0" and includes full adjustments for big-time CW operation anytime and anywhere. It is a lot of engineering in a tiny palm-size package.

to master iambic action with a dual-lever paddle, and old pros with arthritis say single-lever paddles are easier on the wrist. Serious CW buffs also enjoy occasionally connecting dot-and-dash contacts together for some sideswiping fun, so the Bushwhacker promises to be a multi-purpose winner. You can order one or read more details at <www.americanmorse.com> or you can e-mail Doug at <dhauff@digitalputty.com>.

Prefer a genuine miniature hand key for your CW ventures? Morse Express "Christmas Key 2009" showing in photo D is a good choice. This tiny chrome and wood delight is made by Japan's leading manufacturer of keys, GHD. It sports a bright chrome mechanism with ball-bearing movement, precise gap and tension adjustments, custom-cut knob, and rubber-cushioned base to hold in place during use. Nice! The Christmas Key is available from <www.MorseX.com> or telephone 1-877-368-3274. *(For a more detailed description of the Christmas Key, see the "What's New" column elsewhere in this issue.)*

Neat Goodies and Good Bargains

Finding all your HT antennas and accessories during inclement weather or when quickly preparing for weekend outings can be a hassle, but a "Go Bag" from Universal Radio of Ohio helps you keep everything organized and in one place (photo E). It is padded, insulated, and has a front pocket for loose ends and a shoulder strap. Looking for a new HT or HF rig? Universal Radio is tops there, too. They take trades—HTs on HTs or HFs or vice versa or shortwave receivers, and even buy used gear outright. Now that's full service! Look up the company at <www.universalradio.com> or telephone 1-800-431-3939 and get that new rig you have been wanting for the holidays!

Looking for a quick and easy mobile antenna mount? Check out the new MFJ-2820 showing in photo F. This stainless-steel plate installs behind your vehicle's license plate and has holes that accept an SO-239/NMO VHF/UHF or 3/8-24 thread antenna mount. The plate can be installed with its antenna bracket in the lower-left or upper-right tag area. An extra brace and ground strap to the vehicle's body may be necessary if the tag area is plastic and/or insulated from the vehicle's metal body. Mounts are available from <mfjenterprises.com>, telephone 1-800-647-1800, or from amateur radio equipment dealers nationwide.

Antenna analyzers are marvelous little test instruments, as they help us check SWRs, tweak antenna-element lengths, and even preset tuner controls without transmitting even one watt of power. The only drawback is they are rather pricey. Enter the famous and oh-

Photo E– Emergency preparedness is a foremost consideration in amateur radio today, and <www.universal-radio.com> supports that fact with inexpensive 8" x 8" x 6" "Go Bags" as shown here. The bag is insulated, padded, and ideal for storing/carrying HT, extra battery packs, charger, and repeater directory or a full QRP setup. As explained in the text, Universal also makes special deals on all types of amateur radio and shortwave gear.

so-affordable noise bridge (photo G). You connect this gem between your antenna and transceiver, it produces noise over the receiver's full range, and then you quick-tune the receiver over the antenna's general area of frequency coverage. When you cross the antenna's resonance frequency the noise drops and you read the resonant frequency on your transceiver's dial. You then adjust the bridge's front "resistance" control to null out noise and read its ohmic value on the bridge's hand-calibrated scale. You can also tune your receiver up or down frequency, check ohmic value, and determine if antenna length should be shortened or extended to reduce SWR at preferred band points. If you use an antenna tuner, you can connect the noise bridge between the tuner and rig, set the bridge to 50 ohms, the rig to your desired operating frequency, and then adjust the tuner's control to null the noise. After adjusting, remove the noise bridge, connect your transceiver, recheck antenna SWR, and hit the airwaves in style. MFJ Antenna Bridges are available from amateur radio dealers nationwide, or via the contact information mentioned above.

Three Good Reads

The holidays are an ideal time for reading, reflecting back, and planning ahead, and three new books shown in photos H, I, and J support those thoughts.

Ten-Tec the First 40 Years, by Nancy Williams, NR4RR, overviews the company's mission and visions, founder Al Khan's infatuation with radio communications, the E-V mic connection, and the evolutions in Ten-Tec gear over the past four decades. A fair number of amateurs are true Ten-Tec fans (especially dedicated CW operators, as they love the smooth QSK operation), so this new book promises to be a winner.

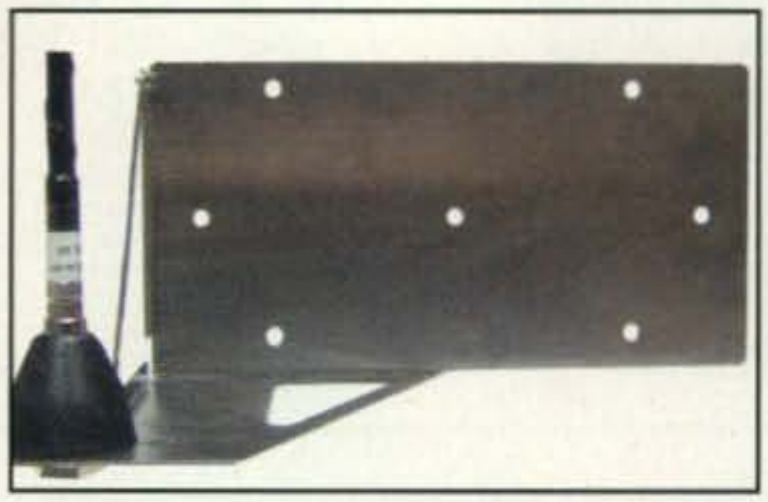


Photo F– This new MFJ-2820 stainless-steel antenna mount installs behind a vehicle's license plate and supports a VHF/UHF antenna with a SO-239/NMO or HF "stick-type" antenna with standard 3/8-24 thread base. It can be installed so antenna the is in the lower left or upper right area. Additional metal brace and ground strap to the vehicle's body are required if the vehicle's tag area is plastic.

Photo G– Meet the poor-man's antenna analyzer—the noise bridge. When used in conjunction with your HF receiver or transceiver, it measures an antenna's resonant frequency and feedpoint impedance. The item shown is the MFJ model 202B, available from amateur radio dealers nationwide.

Contact Nancy at <nlwilliamswriter@comcast.net> for more details or to order a copy.

Up the Tower, by Steve Morris, K7LXC, is an excellent reference book for anyone seeking technical details on installing and maintaining a tower and beam. Steve is a professional tower installer, and his unique book covers numerous considerations from dealing with CC&Rs to calculating every tower variable imaginable. It also covers cables, rotor maintenance, and other

Photo H– A creditable number of amateurs (especially CW devotees) are quite keen on Ten-Tec gear, and this new Ten-Tec: The First 40 Years *book by Nancy Williams, NR4RR, details evolutions in the company and the gear during the last four decades quite admirably. Copies are available direct from <nlwilliamswriter@comcast.net>.*

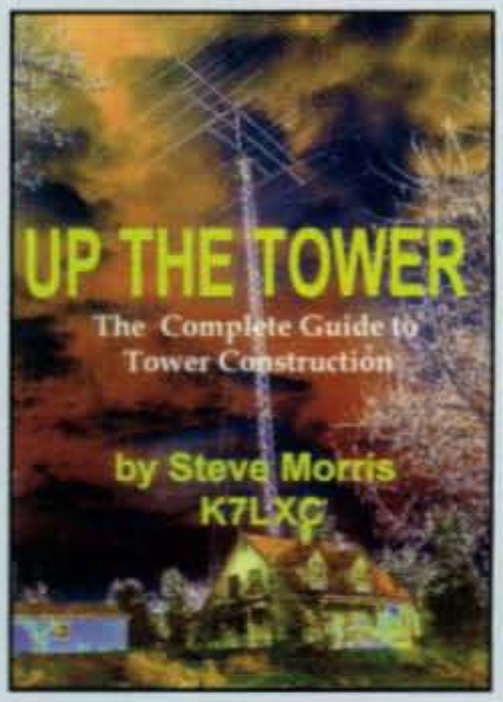


Photo I–Dreaming of a big tower and beam antenna but confused over all the special considerations and engineering "know how" associated with their installation and maintenance? Up the Tower, *by Steve Morris, K7LXC, gives you all the details in one spot. It is surely the most elaborate book on towers ever published. More info at <www.championradio.com>.*

topics too extensive to list in this column's limited space. The book is a winner, and you can get a copy by e-mailing <championradio@aol.com> or telephoning 1-888-833-3104.

Big beams a bit beyond your physical, financial or CC&R limits? Fret not: *Sloper Antennas,* written by Juergen Weigl, OE5CWL, sheds new light on these ever-popular wire antennas. This is not a cutting and assembly guide like other antenna books, but an in-depth study of how and why some slopers work better than others. It focuses on wire angles, ground conductivity, bandwidth, etc., you apply to your own home-brewed sloper. It is a good reference book, and it is available from CQ Communications. (See the ads for the book elsewhere in this issue of *CQ*.)

Conclusion

Our final offering is the gift that keeps on giving month after month throughout the year: a subscription to every radio amateur's favorite magazine(s): *CQ, Popular Communications,* and/or *CQ VHF* (photo K). The sunspot count is starting to rise, DXing, contesting, and new circuits for QRP are flourishing, EME and new modes such as JT65 and QRSS are gaining strength, and CQ's trio of magazines keep you informed on what's happening in those areas and more. Special subscription rates are in effect right now; see the ads in this issue for details. Happy Holidays to all!

73, Dave, K4TWJ

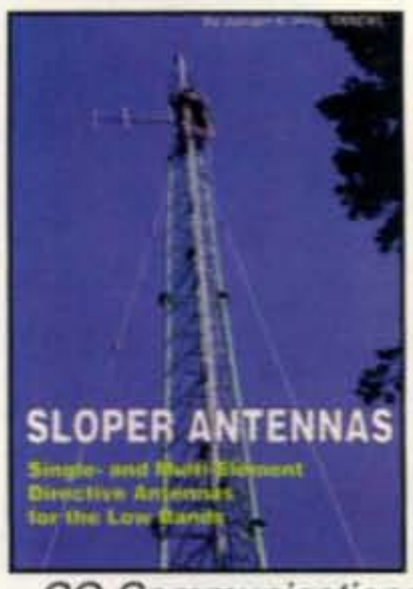


Photo J– Are your visions of a nice beam and tower stifled by CC&Rs? A sloper antenna may be the ideal alternative, and Sloper Antennas, *by Juergen Weigl, OE5CWL, and published by CQ Communications, can help you obtain top performance from this popular wire antenna. The book answers questions such as how high, what angle, what type feed, single- or multi-element type, and much more. (See the ads for the book elsewhere in this issue.)*

Photo K– Staying abreast of all the latest happenings in amateur radio is a cinch with subscriptions to CQ, Popular Communications, *and* CQ VHF *magazines. Special subscription rates are in effect for the holidays and ordering is as easy as ringing up CQ at 1-800-853-9797 or going to <www.cq-amateur-radio.com>.*

BY RICHARD FISHER,* KI6SN

EmComm in Focus:

The Well-Oiled Baltimore County Auxiliary-Communications Service

The September 2009 Public Service column, "Pieces of the EmComm Puzzle Come Together in New York State," detailing the development of a statewide packet radio system, got the attention of a lot of *CQ* readers.

Many found the Empire State radio amateurs' plans really interesting and inspiring and asked if we would be featuring other EmComm groups in other states. What are they doing to advance capabilities for disaster communications in terms of organizational and emergency communications infrastructure?

Well, this month, Maryland's Baltimore County Auxiliary Communications Service (BaCo ACS) is front-and-center, and its mission statement goes to the soul of the organization: "To establish and maintain the leadership and organizational infrastructure necessary to provide emergency, back-up and supplemental communications support to the Office of Homeland Security and Emergency Management, its affiliated agencies and the citizens of Baltimore County."

Taking in elements of the Radio Amateur Civil Emergency Service (RACES), Amateur Radio Emergency Service (ARES), Radio Emergency Associated Communications Team (REACT), and Community Emergency Response Teams, and Neighbors Helping Neighbors (CERT/NHN), the BaCo ACS was founded in 2006. For background on how this highly coordinated and well-run organization was developed and is maintained, we turned to Joseph Krysztoforski, AJ3X, BaCo ACS County Radio Officer, who has played a critical role in the start-up and ongoing operation of the organization.

CQ: *Why was BaCo ACS formed—and how? Whose idea was it?*

AJ3X: The Director of Homeland Security and Emergency Management was considering dropping amateur radio from the County EOP (or Emergency Operations Plan), due to a number of organizational, training, and EmComm management problems. The director saw a need but wasn't sure if the existing structure could satisfy the need. An exploratory committee was formed and tasked with determining if a viable program could be developed and implemented.

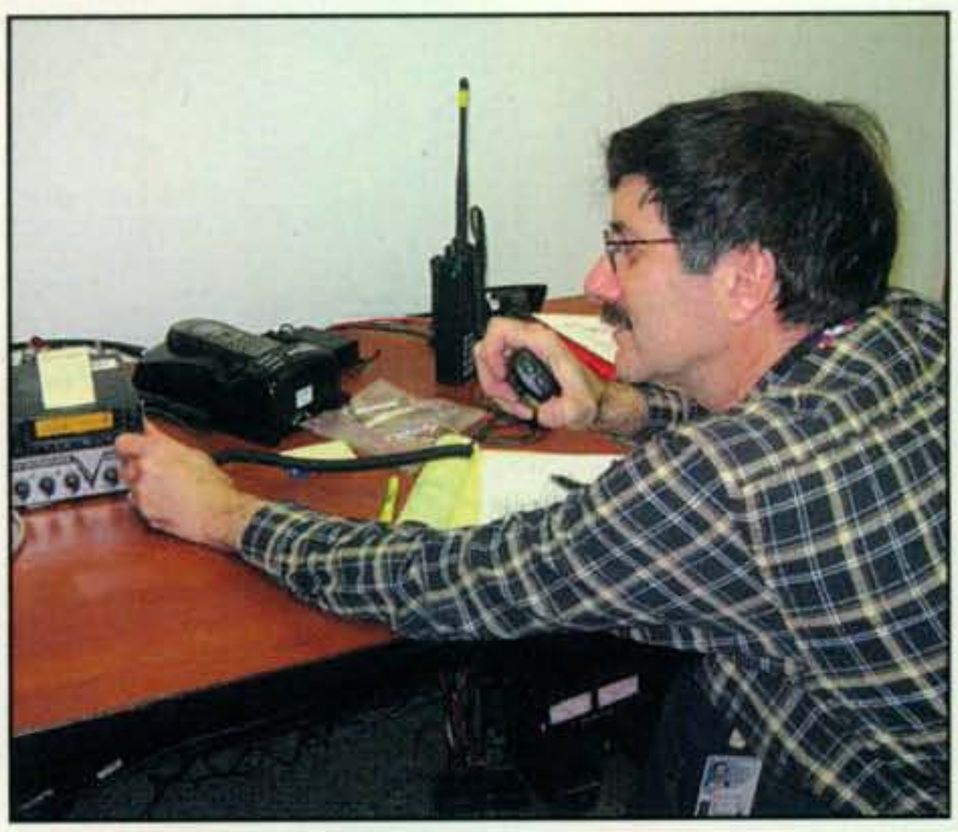
The current County Radio Officer was appointed to head the committee and the resulting organization was the Baltimore County Auxiliary Communications Service. What exists now is a true partnership with BaCo ACS personnel being viewed in the same light as volunteer fire fighters and volunteer Emergency Medical Service personnel: "Professionals in every sense of the word."

Bud Governale, W3LL, of the Baltimore County Auxiliary Communications Service (BaCo ACS), serves as net control at the Emergency Operations Center station during an emergency sheltering exercise. (Photos courtesy of BaCo ACS)

CQ: *How was such an ambitious initiative managed? How often do the key players gather to assess and fine-tune BaCo ACS' operation plan?*

AJ3X: Public safety agencies in Baltimore County are very dependent on each other during major incidents because resources are very limited. When a major incident occurs, agencies throughout this entire area will respond.

Knowing this, the BaCo ACS made a firm commitment in 2006 to build interoperability into our backup and supplemental communications plan. The objective is to ensure agencies responding to



John La Costa, N3SBP, operates at the Command Center during the inauguration of President Barack Obama in January.

*1940 Wetherly Way, Riverside, CA 92506
e-mail: <ki6sn@cq-amateur-radio.com>

an event are able to communicate when primary systems fail or become overloaded.

One of the first tasks taken on by the County Radio Officer was to establish an advisory committee. The advisory committee consists of six members. Five are appointed by the County Radio Officer and source from personnel with at least five years of practical experience in emergency communications and completion of the Emergency Communicator training program. The sixth member is a representative of the Office of Homeland Security and Emergency Management (OHSEM) and is appointed by the Director.

Each member of the committee serves for a period of two years. At the end of the two-year period, he or she may be reappointed or his/her seat on the committee may be offered to another emergency communicator.

The committee meets monthly to review operations, update the Emergency Operations Plan (EOP) and Standard Operating Procedures (SOP) based on after-action reports filed by team leaders, and develop scenarios for future exercises. Additionally the committee makes recommendations for the acquisition of equipment and improvement of the amateur radio emergency communication systems in place throughout the county.

The committee serves at the pleasure of the County Radio Officer, who in turn, serves at the pleasure of the Director of OHSEM.

CQ: *With RACES, ARES, REACT, CERT/NHN, Homeland Security and Emergency Management involved, how are coordination and interoperability accomplished? What challenges have been faced and overcome? What challenges still exist?*

AJ3X: Coordination with Emergency Management is not as difficult a task as it would seem to be on the surface—at least not in Baltimore County and its sister community of Harford County.

Seeing the need early on for coordination between providers of emergency services, the players formed the County Emergency Management Task Force.

Representatives from county hospitals, universities, and colleges (used as surge centers, where an evacuation site is designated to handle the overflow of non-critical patients from nearby hospital emergency rooms during an incident), fire, police, health, social services, American Red Cross, BaCo ACS, and other stake-holders are members. The Task Force meets monthly to review pre-

paredness status, work out memoranda of understanding (MOUs), review training plans, interoperability issues, etc.

In Baltimore County, Harford County and a number of other jurisdictions in the state, there is no real distinction between emergency communication volunteers. For all intents and purposes, there is no RACES, ARES, etc. However, there is a dedicated group of trained volunteer emergency communicators willing and ready to serve when called.

The volunteers all complete the same training program and are registered with the Auxiliary Communications Service, which, in turn, is registered with the local jurisdiction. The biggest challenge we had to overcome, in counties where ACS is active, was resistance from a number of people who could not see the forest through the trees.

However, as time went on, the benefit of a unified organization overrode most objections and resistance. Those who could not reconcile the concept and realize the benefits of cooperation vs. competition (the old RACES vs. ARES vs. REACT vs. whatever...) dropped out of the program.

By eliminating the antagonism among emergency communication groups in Baltimore and Harford counties, we have been able to remove one of the biggest obstacles we faced in being taken seriously and being viewed as professional communicators by emergency managers.

The Advisory Committee goes a long way in helping with the integration of volunteers. All county agencies and a number of private organizations (for example, telco, power, and Red Cross) have command positions in the EOC. BaCo ACS, as a volunteer agency, operates in the EOC alongside other agencies.

CQ: *On what frequencies and using what modes is information passed? And what is the nature of that information in a disaster vs. public service event?*

AJ3X: Our primary mode of communication is FM voice on 2 meters, since most natural and manmade disasters are local and most traffic tactical in nature. We use two local repeaters for net operations, simplex frequencies to transfer formal traffic, and when needed, 70 cm for local on-site handheld communications.

For data transfer we are set to use 1.25 meters and MT63. Tactical messages are usually requests for resources or equipment, transfers of medicine, accident reports, shelter operations, neighborhood situational awareness reports, etc. When necessary, noncritical emergency responder traffic is passed on amateur frequencies to prevent overload of county frequencies.

Formal messages, using ICS-213, are used for SITREPS (situation reports). To communicate inter-county, the 6-meter band is used; and for cross-state communications and for long-haul, the 60-, 20-, 80-, and 40-meter bands are used.

Public service traffic characteristically consists of requests to track runners/walkers, locate event officials, and route traffic. Our public service communications activities typically support organizations such as the March of Dimes, Multiple Sclerosis Society, and other community-based groups.

CQ: *Describe the "command structure" during an emergency or exercise. Who reports to whom and how many operators are generally involved?*

AJ3X: BaCo ACS and groups in Harford and Cecil counties adhere to Incident Command policies and procedures. During an incident, ACS is part of the Service Branch within the Logistics Section. All personnel have, at a minimum, completed IC-700.a and IC-100.a (training). Many of our team leaders have gone on to complete IC-800, IC-300 and IC-400. Team members report to team leaders who are responsible to the site Incident Communications Manager (ICM). At the end of the day, all team leaders and members report to and are responsible to the County Radio Officer, who in turn reports to the OHSEM Director.

Incidents start with a call-up and dispatch of key ACS personnel (County RO, Net Control) to the EOC.

During the incident briefing an assessment is made and additional personnel are called and dispatched to field locations and facilities as needed.

CQ: *How is BaCo ACS outreach/recruiting handled? How difficult, or not, is it to get the numbers of volunteers necessary to keep things going?*

AJ3X: The initial recruiting effort (late 2005) consisted of a mailing to 700 amateurs from the Director of Homeland Security on department letterhead. The list was an extract from the FCC ULS of all amateurs in Baltimore County zip codes, which was then scrubbed to include only newly licensed amateurs and amateurs who renewed their license six months prior to extract date. We find it easier to recruit newly licensed amateurs rather than those who have been licensed for seven-plus years.

Letters were mailed in late December

inviting the amateurs to attend an orientation session scheduled in late January. A reminder was mailed a week prior to the meeting, and 120 amateurs attended the two-hour orientation and before the end of the meeting, 70 (of them) enrolled in the program. Recruiting is an ongoing, never-ending process to ensure we have an adequate number of trained personnel.

For quick deployment emergency communications, BaCo ACS has assembled "go kits," consisting of a dual band 2-meter/70-cm transceiver, D-STAR ID-1 transceiver, laptop PC, portable antenna system, data modem, and a high-capacity battery backup.

From the original 70, the group has been pared down to 60 active with a core group of 28. The core group consists of personnel who participate in all drills and exercises. The remaining personnel swap in and out depending on the time and date of the exercise.

We repeat the mailing every six to eight months—mailing to approximately 100 amateurs and usually picking up three to four additional personnel each time to back-fill those lost to attrition. We also promote the group over the air, at county events (fairs, etc.) through volunteer coordination agencies, club meetings, and at CERT and Neighbors Helping Neighbors training sessions.

CQ: *Are there regular nets to disseminate internal information?*

AJ3X: BaCo ACS schedules weekly information and training nets on the first Tuesday, third Friday, and last Sunday of the month. We alternate days to give everyone an opportunity to participate in a net. We found that restricting the net to a set day of the week, every week, limited the number of participants. By alternating the days, we open up participation to those who have to work late on a Tuesday, have a family obligation on a Sunday, etc.

The second Tuesday of every month is reserved for a deployment exercise. Three days before the exercise we announce the incident (BAD BUG, DARK SKY, etc). Thirty minutes before the start of the exercise, personnel deploy to county agencies and facilities for an hour-long drill.

Net Control reads the full scenario over the air at the start of the exercise. Facility Emergency Managers prepare tactical and formal injects for passing by BaCo ACS personnel that are appropriate to the scenario and accelerated timeline. In addition to the on-air training nets, BaCo ACS—in con-

Looking Ahead in CQ

Here are some of the articles we're working on for upcoming issues of *CQ*:

- Marconi's First Great Miracle, by Stew Gillmor, W1FK
- Results, 2009 CQ WPX SSB Contest
- A High-Performance Regenerative Receiver, by N1TEV

Do you have a ham radio story to tell? See our writers' guidelines on the CQ website at <http://www.cq-amateur-radio.com/guide.html>.

Joseph Krysztoforski, AJ3X, BaCo ACS County Radio Officer, right, spreads the EmComm message during the Baltimore County Department of Aging's Baby Boomer Expo/Senior Expo in 2008.

junction with neighboring county ACS groups—schedules quarterly classroom training.

***CQ:** What are some of the specific incidents (disasters) or events BaCo ACS has supported and how did they play out?*

AJ3X: BaCo ACS deployed personnel during the 2009 Presidential Inauguration. The operation ran from 0600 Saturday, January 17, through 0030 Sunday, January 18, during the President-elect's train ride to Washington, and again from 0600 Monday, January 19 through 0015 Wednesday, January 21.

Teams were deployed to the County Command Center, EOC, Department of Human Resources EOC, and two emergency shelters. Each team operated one shift and consisted of a team leader and two to three operators. To reduce stress and burnout, shifts were limited to six hours. The event was supported by a total of 44 ACS personnel from Baltimore and Harford counties.

During the summer of 2008 and the winter of 2009, BaCo ACS deployed a total of four times to support emergency management and the opening of shelters by Department of Social Services. During these activations personnel were assigned to the shelters and the County EOC to handle tactical and formal messages.

BaCo ACS leadership receives information about pending incidents directly from the OHSEM via conference calls, e-mail, Short Message Service (SMS, or text messages), and monitoring of the county's WebEOC local and regional awareness boards. When an incident is imminent, personnel are notified over the air, via the website, by SMS, e-mails. and phone trees.

***CQ:** "When an incident occurs, BaCo ACS RACES personnel are assigned to one or more facilities located throughout the county. . ." How many facilities and what types of facilities are designated communications sites? What kind of gear is at each facility? And who decides which volunteers go where?*

AJ3X: BaCo ACS provides backup and supplemental and emergency communication services for five hospitals, three universities, four county agencies, three state agencies, and two evacuation centers. MOUs are in process to provide support to other agencies.

Facilities have fixed operating positions in their EOCs consisting of a 2-meter dual-band transceiver, 1.25-meter transceiver, a D-STAR dual-band transceiver, a laptop PC, and a data modem for MT63. The PC is tied into the facility's intranet and has access to

SUCH A HAM

Try not to forget the linear amp this year.

the internet. The D-STAR transceivers, recently installed, will be used for voice, e-mail, and transfer of small data files.

The radio room at the county EOC is equipped with two dual-band D-STAR transceivers, two 2-meter/70-cm dual-band transceivers, a 6-meter FM transceiver, two high-frequency transceivers and a 23-cm ID-1 transceiver for high-speed data transfer.

When necessary, teams deploy to shelters or field sites with "go kits" consisting of a dual-band 2-meter/70-cm transceiver, D-STAR ID-1 transceiver, laptop PC, portable antenna system, data modem and a high-capacity battery backup.

BaCo ACS works in teams consisting of a team leader and two to three additional personnel. The Radio Officer calls out the team leaders assigning teams to facilities. Team leaders then call up their teams. Rarely will all facilities need to be manned. Therefore, not all teams will deploy at the same time. The first team deployed to a facility is the primary team assigned to the facility. Teams whose facilities are not opened during the incident provide relief service to another facility's primary team.

BaCo ACS has cooperative working arrangements with the ACS groups in Harford and Cecil counties. When necessary, we can draw upon their personnel for support and they can draw upon our personnel during their deployments.

Over the last several months we have purchased D-STAR-capable equipment to take advantage of the Harford County ACS group's D-STAR repeater system, which is the first D-STAR repeater system to become operational in Maryland. BaCo ACS is also in the process of installing a D-STAR system.

Both BaCo and Harford ACS are extremely excited over the new D-STAR repeater systems. When they become fully operational during the fourth quarter, we will have plugged a significant "hole" in the D-STAR repeater network that exists between New York and Washington, DC. By plugging this "hole" it will be possible to transfer data from the New York City metropolitan area to the Washington, DC metropolitan area using RF. The BaCo and Harford D-STAR repeater systems will be connected to the D-STAR Gateway during the first quarter of 2010.

CQ: *How do the radio and computer nets operate/coordinate during events?*

AJ3X: There is a limit to the amount of traffic that can be handled by an NCS using one frequency. The amount of traffic passed will vary with the length of the message, the skill of the operators, the type of transmission, and operating conditions. On average, 40 ICS-213 messages can be passed per hour using one frequency. To overcome this limit, BaCo ACS uses multiple tactical frequencies for voice messages and D-STAR, MT63, and other digital modes for data and file transfers.

Depending on the incident, BaCo ACS will run an emergency net, a tactical net, and a resource net. Each net maintains a liaison with Command and Control. In addition to amateur frequencies, the EOC monitors traffic on designated FRS and GMRS frequencies. FRS is used by unlicensed personnel; GMRS by personnel so licensed.

CQ: *Does Baltimore County's proximity to the nation's capital, given the post 9-11 era, play a role in the urgency for the need of such a communications plan and infrastructure?*

AJ3X: Baltimore County and surrounding counties are evacuation areas for sites south and the importance of having a supplemental communications group at the ready cannot be overstressed.

North Carolina Radio Amateurs Tackle "Hurricane" in SET

"This is only a drill." This became the on-air mantra on Oct. 3, as hundreds of amateur radio operators took to the air for the annual North Carolina statewide simulated emergency test exercise, or "SET."

For 75 years, amateur radio has had formal emergency response organizations that work with state and municipal governments and agencies to supply supplemental emergency communications.

The SET is held the first weekend in October, and many of North Carolina's 1800 members of ARES (Amateur Radio Emergency Service) were on the air checking out their equipment and honing their operating skills.

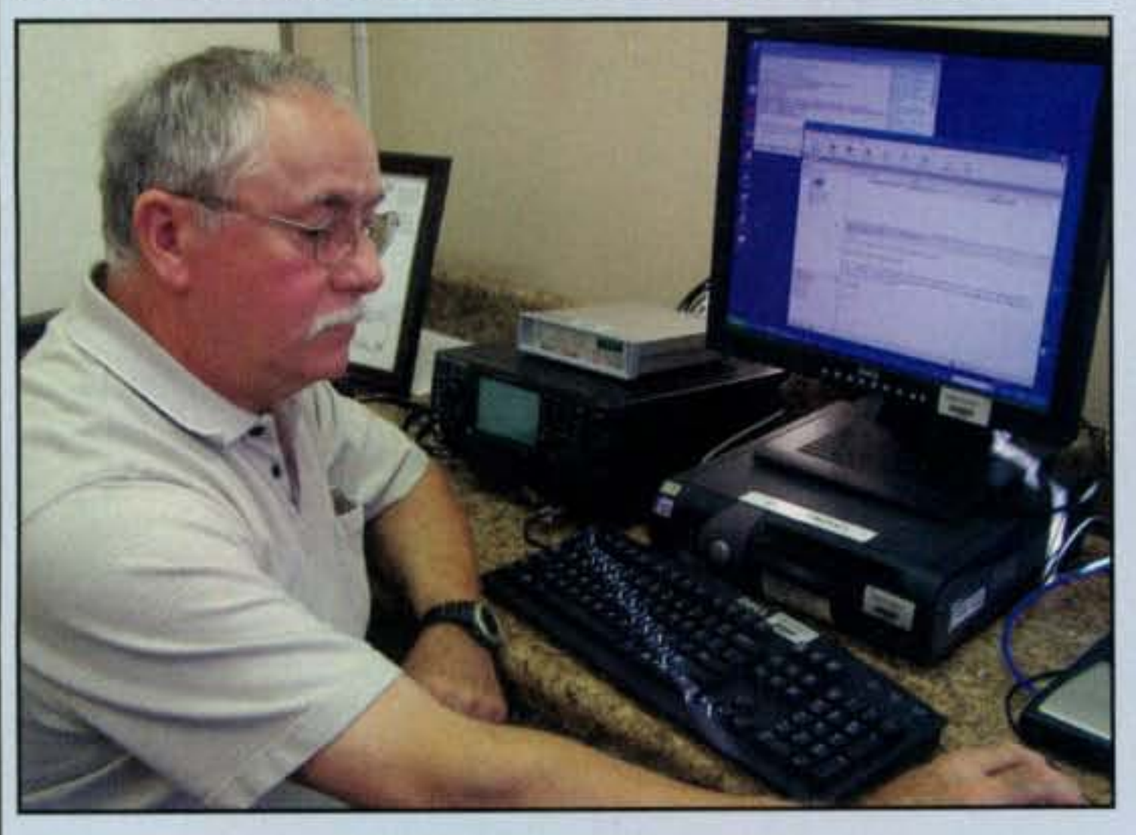
"We've been lucky not to have any large-scale disasters this past year", said Winterville's Bernie Nobles, WA4MOK, a retired UNC-TV broadcast engineer and head of ARES in North Carolina." The purpose of the SET is to keep our skills sharp and our response capability high."

The Saturday exercise pretended that a Category 1 hurricane enveloped the coast, but compromised electrical transmission throughout the state, plunging all of North Carolina into darkness.

"The most effective way to respond is to practice frequently through training," said Ron Knapp, W9EF, of Kinston, who is Assistant Section Emergency Coordinator (ASEC) for Eastern North Carolina, overseeing ARES in the eastern third of the state. ARES mirrors the organizational structure of North Carolina Emergency Management (NCEM). October's SET drill was held inside the eastern branch of NCEM in Kinston.

The SET exercise permitted teams to experiment with new digital technologies which mimic e-mail without the need for an internet, cell, or landline phone connection.

—Bill Morine, N2COP



During the recent North Carolina SET, Dave Roy, W4DNA, North Carolina Section Traffic Manager (STM), operates via WinLink.

Bernie Nobles, WA4MOK, North Carolina Section Emergency Coordinator (SEC), works HF during the state's Simulated Emergency Test in early October. (SET photographs courtesy of Bill Morine, N2COP)

***CQ:** What are some of the most important "lessons learned" from which BaCo ACS has benefitted since its formation in 2006?*

AJ3X: There are several:

• Emergency communications volunteers cannot operate in a vacuum.

• Partnering with Emergency Management is critical to the group's success.

• It's truly one for all, and all for one.

• Preparedness is not an option, it is a requirement.

Wanted: Info About Your Area's Disaster Preparedness

The work of the BaCo ACS provides another snapshot of what dedicated radio amateurs in one region can do to make its EmComm plan highly effective, well maintained, and extremely reliable.

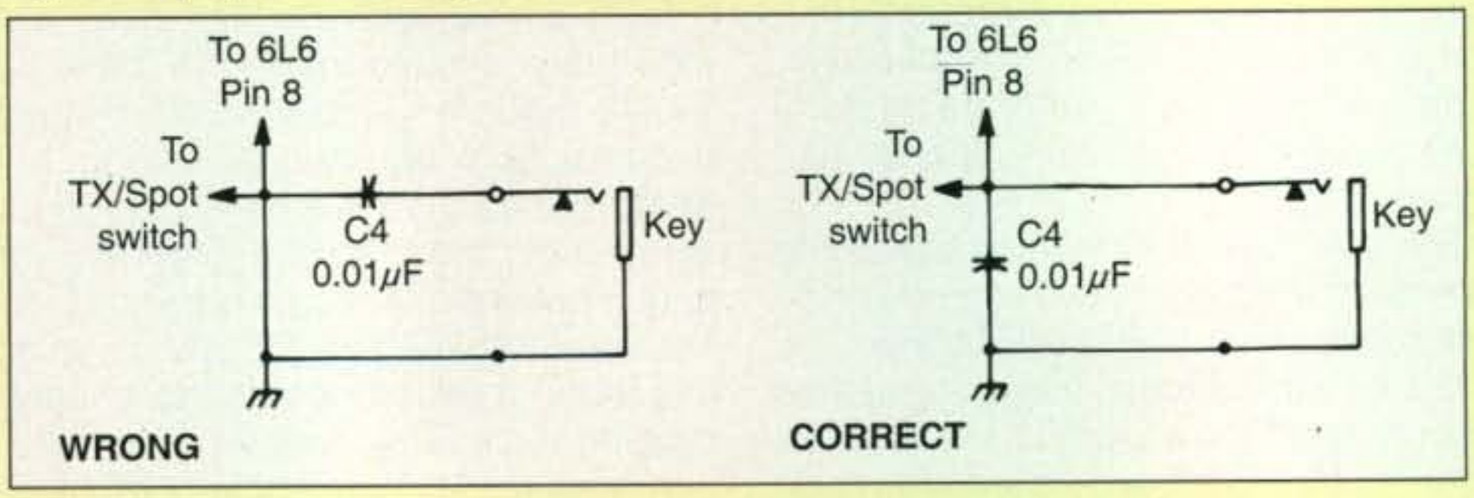
Are there operator/volunteers in your state, county, city, or town involved in innovative disaster preparedness initiatives? We'd like to hear about them. Please drop me at line at: <ki6sn@cq-amateur-radio.com>.

73, Richard, KI6SN

Oops...

The schematic in figure 3 of October's "World of Ideas" column has a misplaced capacitor. C4 should be in parallel with the key, not in series with it. A corrected diagram (of that portion only) is shown.

Also in the October issue, it seems that the "28" key was stuck when we were doing the Table of Contents. In case you haven't figured this out by yourself already, the short feature about KØDQ was actually on page 30 and the CQWW All-Time Records began on page 32. We regret the errors.



Clarification

One of the photos in our October 2009 review of the Ameritron ALS-600 amplifier showed both the radio and the amplifier tuned to the 30-meter band. We should have reminded everyone that operation on the 30-meter band is limited to 200 watts. If you are going to use the ALS-600 (or any other amplifier) on 10 MHz, please keep this power limit in mind.

Finally an eagle-eyed reader pointed out to us that AD5X's promised sidebar about building an Operate/Standby switch for the ARI-500 interface did not appear in this issue. We will have that for you next month.

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Only the Ameritron AL-811H gives you four *fully neutralized* 811A transmitting tubes. You get absolute stability and superb performance on higher bands that can't be matched by un-neutralized tubes.

You get a quiet desktop linear that's so compact it'll slide right into your operating position -- you'll hardly know it's there . . . until QRM sets in. And you can conveniently plug it into your nearest 120 VAC outlet -- no special wiring needed.

You get all HF band coverage (with license) -- including WARC and most MARS bands at 100% rated output. Ameritron's *Adapt-A-Volt*™ hi-silicon core power transformer has a special buck-boost winding that lets you compensate for high/low power line voltages.

You also get efficient full size heavy duty tank coils, slug tuned input coils, operate/standby switch, transmit LED, ALC, dual illuminated meters, QSK with optional QSK-5, pressurized cooling that you can hardly hear, full height computer grade filter capacitors and more. 13¾Wx8Hx16D inches.

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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. 13.8 VDC. 9Wx3½Hx15D in., 7 lbs. **ALS-500RC, $49,** Remote Head.

ALS-600 Station 600 Watt FET Amp

ALS-600
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***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, SWR/Wattmeter, ALC control. 120/220 VAC. Inrush protected. 9½Wx6Hx12D in. **ALS-600S, $1599,** ALS-600 with 10 lb. switching power supply.

AL-80B . . . *Desktop Kilowatt* 3-500G Amp

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Suggested Retail

AL-80B kilowatt output *desktop* linear amplifier doubles your average SSB power output with high level RF processing using our exclusive *Dynamic ALC*™!

You get cooler operation because the AL-80B's exclusive *Instantaneous RF Bias*™ completely turns off the 3-500G tube between words and dots and dashes. Saves hundreds of watts wasted as heat for cooler operation and longer component life.

You get a full kilowatt PEP output from a whisper quiet desktop linear. Compact 15½Wx8½Hx14D inches. Plugs into your nearest 120 VAC outlet. Covers 160 to 15 Meters, including WARC and MARS (user modified for 10/12 Meters w/license).

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New class of *Near Legal Limit*™ amplifier gives you 1300 Watt PEP SSB power output for *60%* of price of a full legal limit amp! 4 rugged 572B tubes. Instant 3-second warm-up, plugs into 120 VAC. Compact 14½Wx 8½Hx15½D inches fits on desktop. 160-15 Meters. 1000 Watt CW output. Tuned input, instantaneous RF Bias, dynamic ALC, parasitic killer, inrush protection, two lighted cross-needle meters, multi-voltage transformer.

HF Amps with Eimac *3CX800A7*

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1 *Eimac*® tube, 1250 W

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$3045
2 *Eimac*® tubes, 1.5 kW *Plus*
With Imported Tube
AL-800F, $1875
AL-800HF, $2745

These *compact* desktop amplifiers with 3CX800A7 tubes cover 160-15 Meters including WARC bands. Adjustable slug tuned input circuit, grid protection, front panel ALC control, vernier reduction drives, heavy duty 32 lb. silicone steel core transformer, high capacitance computer grade filter capacitors. Multi-voltage operation, dual lighted cross-needle meters. 14¼Wx8½Hx16½D in.

AMERITRON *full legal limit* amplifiers

AMERITRON legal limit amps use a super heavy duty Peter Dahl Hypersil® power transformer capable of 2.5 kW!

Most powerful -- *3CX1500/8877*

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Eimac® Tube

AL-1500F
$3095
Imported tube

Suggested Retail

Ameritron's *most powerful* amplifier uses the herculean 3CX1500/8877 ceramic tube. 65 watts drive gives you full legal output -- it's just loafing with a 2500 Watts power supply.

Toughest -- *3CX1200A7*

AL-1200
$3459
Suggested Retail

Get ham radio's *toughest* tube with the Ameritron AL-1200 -- the *Eimac*® 3CX1200A7. It has a 50 Watt control grid dissipation. What makes the Ameritron AL-1200 stand out from other legal limit amplifiers? The answer: A super heavy duty power supply that loafs at full legal power -- it can deliver the power of more than 2500 Watts PEP two tone output for a half hour.

Classic -- *Dual 3-500Gs*

AL-82
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This linear gives you full legal output using a *pair* of *genuine* 3-500Gs. Competing linears using 3-500Gs *can't* give you 1500 Watts because their lightweight power supplies *can't* use these tubes to their full potential.

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Oil-cooled. 50 Ohms. 1500 Watts/5 minutes. SWR< 1.2 to 30 MHz. Low SWR to 400 MHz.

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Whisper quiet fan, 2.5kW/1 minute on, ten off. 300W continuous. SWR< 1.25 to 30 MHz.<1.4 to 60 MHz.

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digital connection

BY DON ROTOLO,* N2IRZ

D-RATS

Finally, there is a great way to put the D-STAR low-rate data channel to use. I've written about the JARL's (Japan Amateur Radio League) D-STAR before, discussing digital voice and the high-speed data channel. Until recently the low-speed (950 bps) data channel that piggybacks on the digital voice signal hasn't been well-utilized. For example, I only used it to announce who I was ("Don in NNJ"), a typical use.

I met Dan Smith, KK7DS, at the Dayton Hamvention® this past spring, and we had a chat at his D-RATS booth (conveniently located right across the aisle from the CQ booth). He wrote some software called D-RATS that makes use of the D-STAR data capabilities in a way that is nothing short of outstanding. This month, we'll take a close look at D-RATS and how it might be used.

The first step is to have a D-STAR radio. It needn't be the top-of-the-line ID-1, as any D-STAR capable radio can make use of the low-speed data channel that piggybacks on the digital voice signal, such as the IC-2200H (with the optional UT118 digital board), which sells at Ham Radio Outlet, Universal Radio, and elsewhere for under $370.

Interestingly, you don't need to have a D-STAR repeater in the area. Radios can exchange data in simplex mode without trouble, and a communication path can be extended to the range of the radio. In fact, D-RATS was originally targeted for simplex communications.

Next is to download the software available at <http://www.d-rats.com> in versions for Windows®, Linux, and Mac OS®. The software is completely free of charge, but voluntary donations are always welcome, of course. Having only experience with the Windows® version, I can only say that the almost 10-MB download was smooth, the installer worked seamlessly, and in just a few moments D-RATS was installed on my desktop.

I won't go into the details of configuration here. The user documentation covers the various settings very well, nothing is particularly challenging, and the software will work as long as the most basic settings (specifically, name and callsign, COM port, and radio baud rate) are correct. One small tip: If you want to just do some testing, you can use the Ratflector, an internet server that lets you connect to other D-RATS users via internet (no radio required!). Just note that it's a data-only reflector (no voice). Simply configure the D-RATS serial port for "net:ref.d-rats.com:9000."

The goal of D-RATS is to create an all-in-one tool for D-STAR data operations, with a focus on the EmComm (emergency communications) community. As I mentioned, it was designed for simplex, and thus has no dependence upon infrastructure such as repeaters or internet connections. While you do create a network of sorts, it's not a network like you'd see on AX.25 packet, for example. Instead, the endpoints are where all the interaction occurs.

Messaging is what D-RATS is used for. In EmComm, it can be noisy in the operations center, causing a few problems. For one, voice communications make it hard to hear and be heard. You also don't want to wear out your welcome by making background noise, annoying the official agencies you're assisting. On voice things can be misunderstood, or slow down significantly if you have to spell everything with the phonetic alphabet. Also, it's terribly inefficient to read words froma page, only to have the other end write them down on another page.

*P.O. Box 114, Park Ridge, NJ 07656
e-mail: <n2irz@cq-amateur-radio.com>

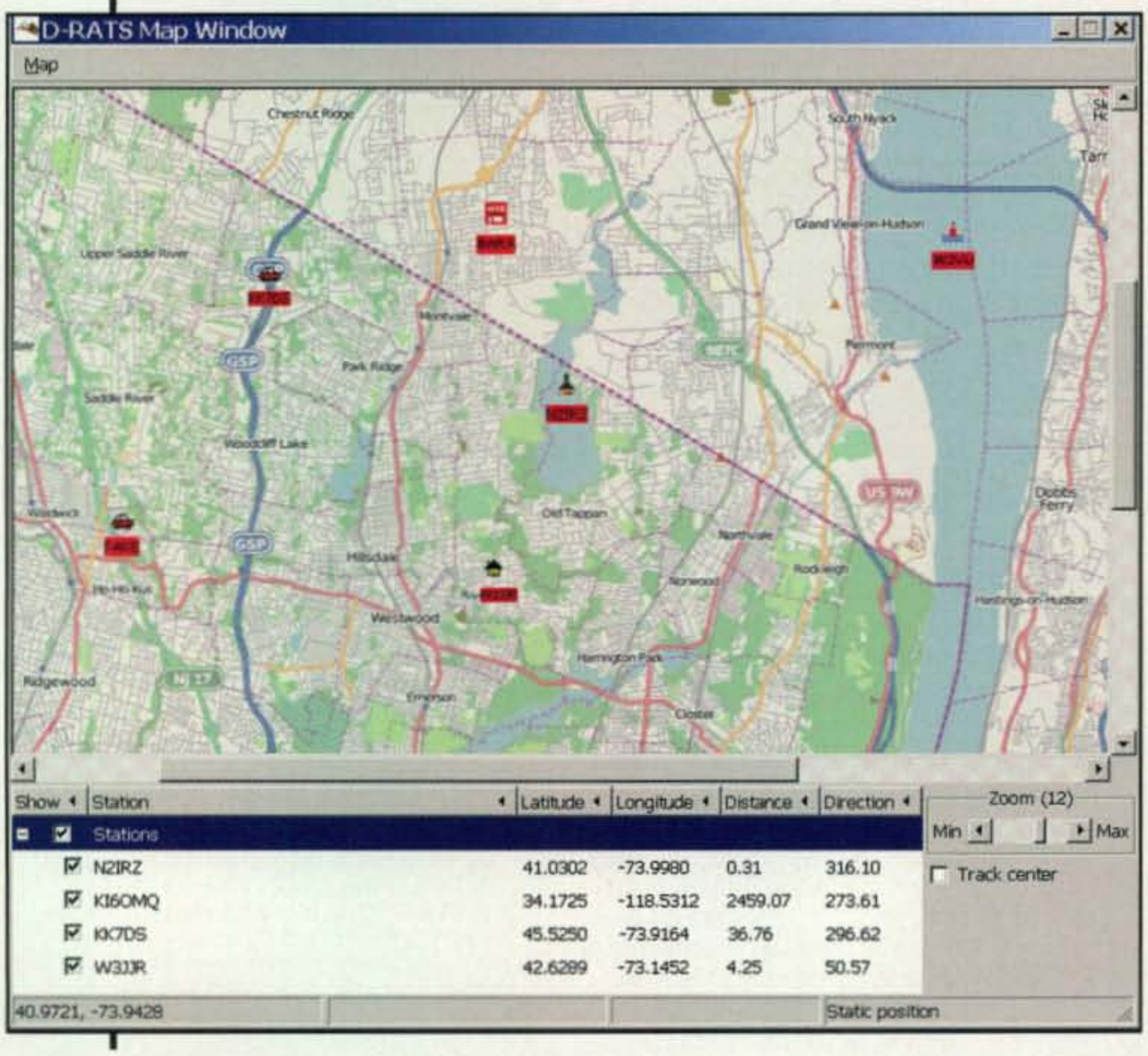


Fig. 1– A D-RATS Map Display page showing some (faked) activity around my location. A station can select one of several dozen icons, much like APRS, and hovering over a station brings up an info window. Maps are updated automatically for free.

A keyboard is far quieter. Electronic text can be cut and pasted (a godsend for two-finger typist guys like me), and data can be printed out in the format your agency prefers. For example, it's a simple task to fill in a simple form and have it come out at the other end in a printable Radiogram format, or perhaps a HICS-260 Patient Evaluation & Tracking form. For chatting among operators, there's even an integrated IM (Instant Messaging) system that uses a multicast protocol, allowing everyone to see what's going on.

Data integrity is assured for files and forms through a checksum, which detects errors and resends the required parts, and an e-mail gateway simplifies interaction with areas outside the EmComm zone. Files are transferred just as easily as text, but at 950 bps that 2.4-MB JPEG file might take a bit of time, so D-RATS has an integrated image file resize/resample utility. Data compression is also automatic for non-image files: Files are compressed where possible to make best use of the channel capacity. Larger files can be transferred cleanly even with interruptions, which are not an unusual occurrence. Just send it and forget it; if can be gotten there, it will get there.

So far, it seems to be a nice, utilitarian program for data and text transfer, great for EmComm but otherwise not particularly exciting. Ah, but things are seldom what they seem!

Using data, we can also handle the issue of positional awareness. We know this trick from our APRS exploits (D-RATS and APRS are not compatible), but D-RATS takes this to the next level. Of course, a GPS receiver is used to feed position data into the system (when you're on the move; fixed stations can enter their position manually). D-RATS then plots your location on the integrated map display and to your icon and display tag additional data (both static and dynamic) can be added.

Two nifty features should be mentioned: One is the ability to set up "Quick Messages"—lines of text that you can send with a double-click. The other is the QST feature, which is a beacon system that allows data to be sent at regular intervals. The nifty part is that the data can be dynamic and automated—for example, weather data, GPS, RSS feeds, text of course, and much more.

Remember, all this is done with only a computer (not necessarily running Windows®, either!) and a D-STAR radio. Plus, you still have the digital voice capabilities, which can be used at the same time as the data channel. Also, excellent tactical maps show the position and status of all the deployed assets. This is not to mention e-mail capability to the rest of the world once your signal reaches an internet gateway.

I have an ID-1 D-STAR radio, primarily because of my interest in using the digital data (DD) mode, which offers a raw throughput of about 128 kbps. This mode is only possible on 1.2 GHz, though. If I were to get a small HT—say, an IC-91AD ($370 at Ham Radio Outlet)—I could take my Intel Classmate notebook and my ancient GPS system and be ready for 2m/440 action with less than 6 pounds of equipment, including batteries.

I've written about data security and encryption before, when I made the case for encryption being legal on the ham bands under certain circumstances (and I proudly note that nothing from the FCC has ever contradicted that). However, D-RATS doesn't have to take on that can of worms, instead using what they call Data Obscurity, implemented in two levels. The first level is the digital mode itself: Without a D-STAR receiver, it's unlikely you'd be able to decode any of the data being transmitted. The second layer is the data compression used by D-RATS to help utilize the data channel more efficiently: Even if you did receive and decode the digital data, it's not in clear text; you need to decompress it through D-RATS to see it. While far short of encryption, which if necessary can be handled by an endpoint program lsuch as CryptoUP, it will certainly prevent the casual listener from seeing what's being sent.

That's D-RATS in a nutshell. Written to take advantage of the extraordinary power of the D-STAR system, this is a giant leap forward for EmComm and digital radio. Even if you don't have a D-STAR radio, download and play with it through the Ratflector. If you are serious about EmComm, it might just convince you to invest in a new rig. Hmm, just in time for the holidays, too…

This is a kind of short column this month. Pressures at work, along with a bad case of the flu, have knocked me down a little bit. However, now that the cold weather is really here, I'm just waiting for that first ice storm so I can go out and put up some antennas.

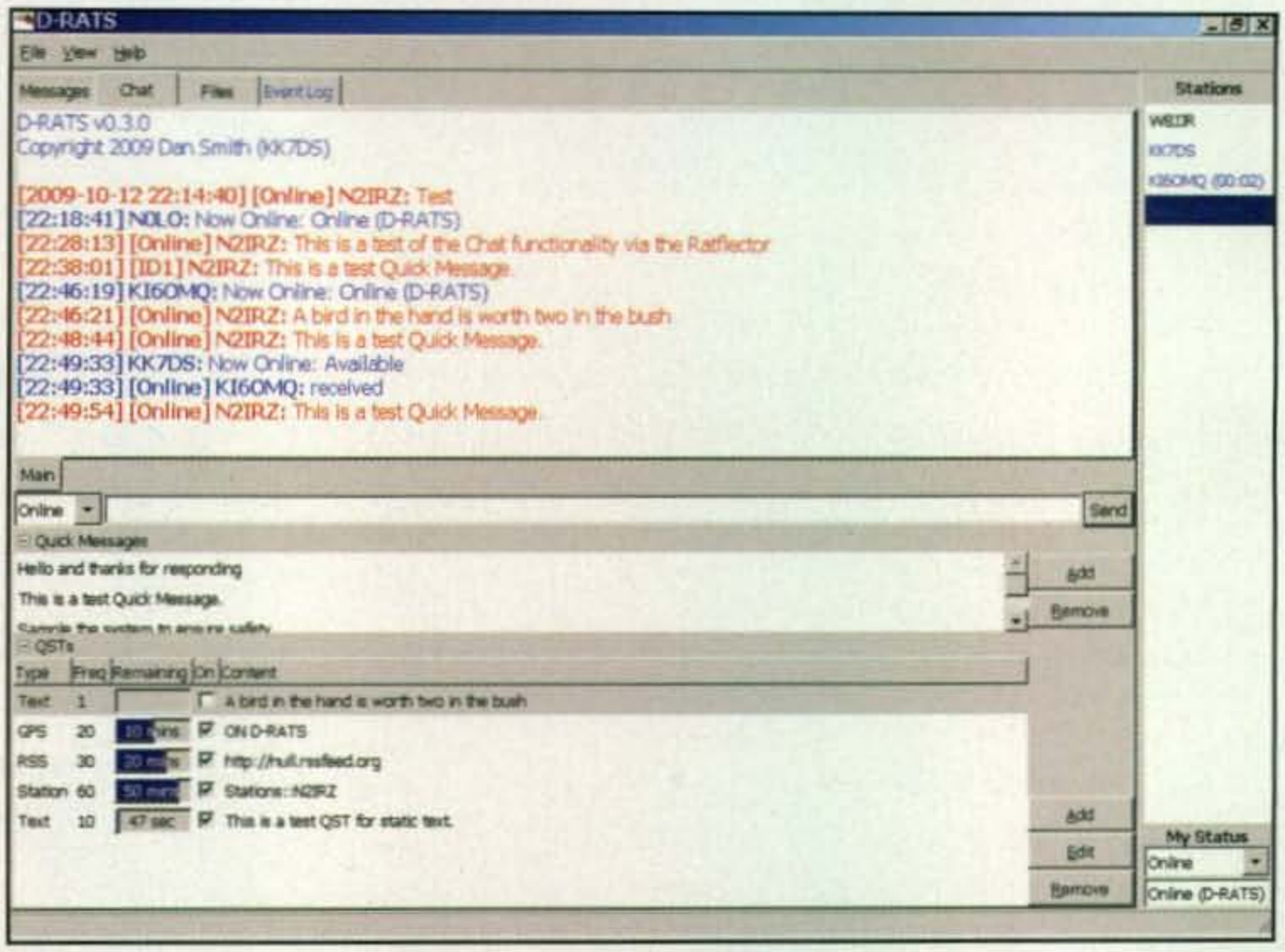


Fig. 2– On the main D-RATS screen you can see chat activity, along with some Quick Messages and QST beacons I've configured. Not seen are the e-mail message client, file transfer screen, and log screen which keeps track of everything that happens—useful for debrief.

As is my custom this time of year, I wish you and your family and friends the very best for the holiday season, and hope you enjoy a happy, healthy, and prosperous New Year. This time of year seems to cause the world to think more about peace, and regardless of your personal, political, and religious beliefs, I think most of us can agree that living in peace and freedom is one of the best ways to live.

73, Don, N2IRZ

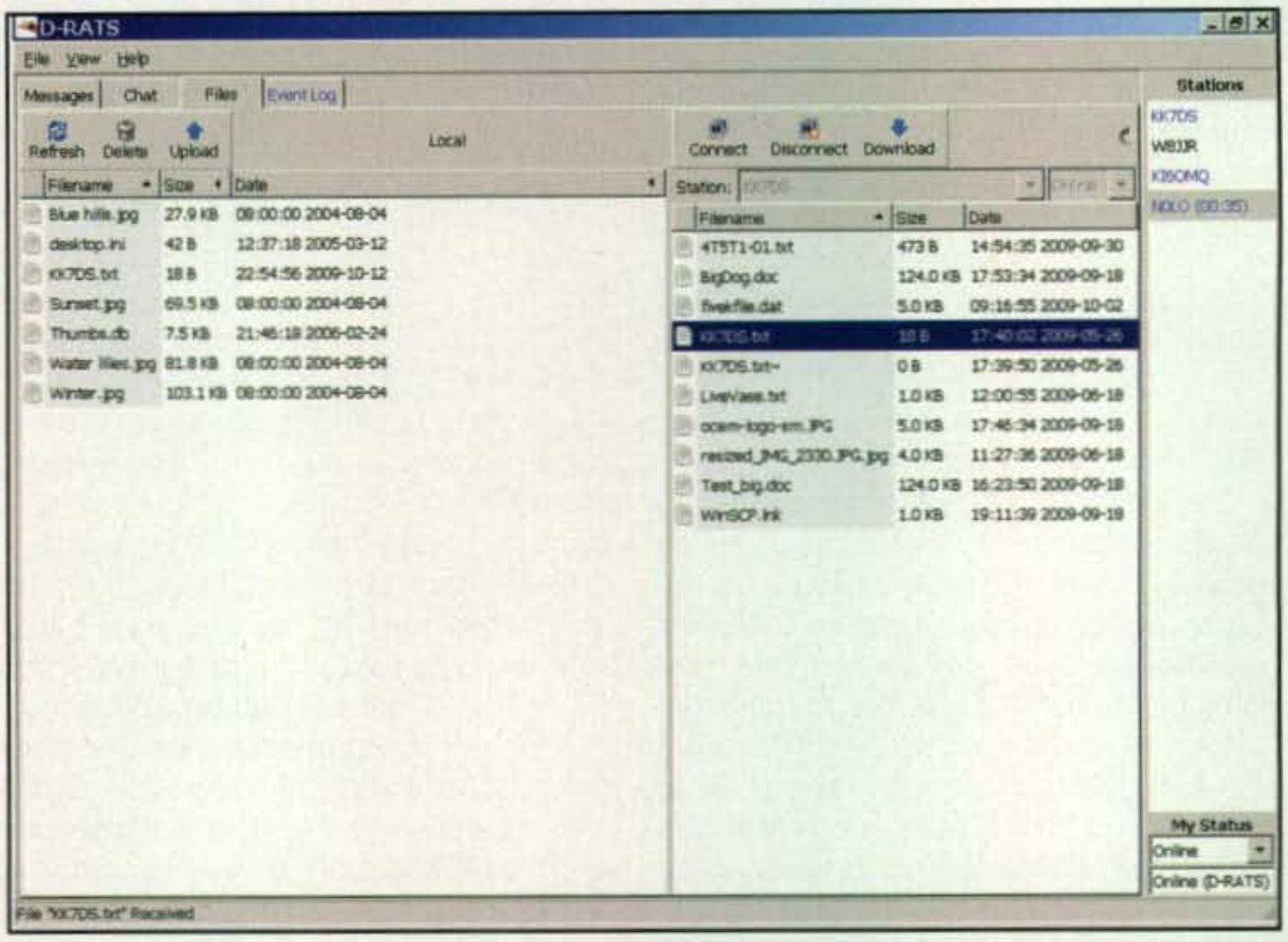


Fig. 3– The D-RATS main screen again, this time showing the file transfer screen. Look closely and you can see that I downloaded the file KK7DS.TXT (18 bytes) to my own file folder. This was done on the Ratflector, an internet-based test site. File transfers have error detection, use data compression when possible, and will continue where they left off if interrupted.

Building Kits as a Group

BY JOE EISENBERG,* KØNEB

The fun of building a kit is made even better when it is done as a group activity. Let's look at the advantages of building together and why it is a great idea for clubs, especially in the winter. Building kits as a group allows newcomers to get help right away and start them on their way to being successful builders. The group size does not have to be very big. Often clubs get about 10 to 20 people together and build the same project at the same time. The trick is to not have too many builders for the instructors to be able to easily handle. The biggest problems are finding a suitable venue and finding the right kit that will allow the builders to complete and test their kits in the available time.

Choosing the Room

When looking for a place to hold the "group build," you might be limited by other events taking place. At a hamfest or convention, for example, the hotel might have a regular conference room available, but might have limited space for builders. Try to find a room with plenty of space so that the builders are not crowded together. I prefer a square or rectangular table formation with the instructors at a table in the middle so they can see in all directions and can help easily without walking behind the builders.

The issue of protecting the table surfaces also comes up no matter where the group build is held. Using a heavy-duty, disposable table covering helps. A thick paper one is best, as melting plastic can stick to the surface. Having the builders bring cookie sheets for work surfaces helps a lot as well by preventing damage from heat and for catching clippings.

Make sure the room is not too hot or too cold. Keeping everyone comfortable makes for less chance of errors. The outside noise level should also be at a minimum so the instructors can be clearly heard.

Choosing a Kit

Selecting the kit to be built requires consideration of several factors. Functionality is most important to consider, as the finished kit should be able to perform its function easily and serve as a teaching tool to learn some aspect of radio or electronics. The cost of the kit is often the next consideration, as it is a good idea to keep it affordable. Kits can often be bought at a discount in quantity. Check with the particular kit supplier to see if a quantity discount is available.

Construction time is also an issue, as there may be limited time if your session is held at a hamfest and coordinated with seminar schedules. There are actually many kits that even a first-time builder can put together in less than an hour, and often much less time than that. It is best to avoid kits that take more time than is available, as the builders might have problems that could be more easily addressed by the instructors in the group setting.

It is very important that the instructors all be familiar with the kit and with any possible issues, both those documented in the instructions and those undocumented, so as to be able to quickly assist those struggling with problems. Quick and accurate help avoids frustration, which can turn off people to building.

Keep a spare kit or a set of the common parts in the kit on hand in case a part is missing or damaged. Make sure that any external parts needed are available so as to make the experience complete. Often plugs, jacks, wire, batteries, etc., are needed and may be purchased in quantity as well to save money. If an external item such as a CW key or headset is needed, try to make available a low-cost solution and/or inform your group in advance to bring these items.

Lights, Camera, Solder!

The next issue is having enough soldering irons and portable lights on hand, as well as enough power to run them all. Today, fortunately, soldering irons and lights do not draw a lot of AC power, so con-

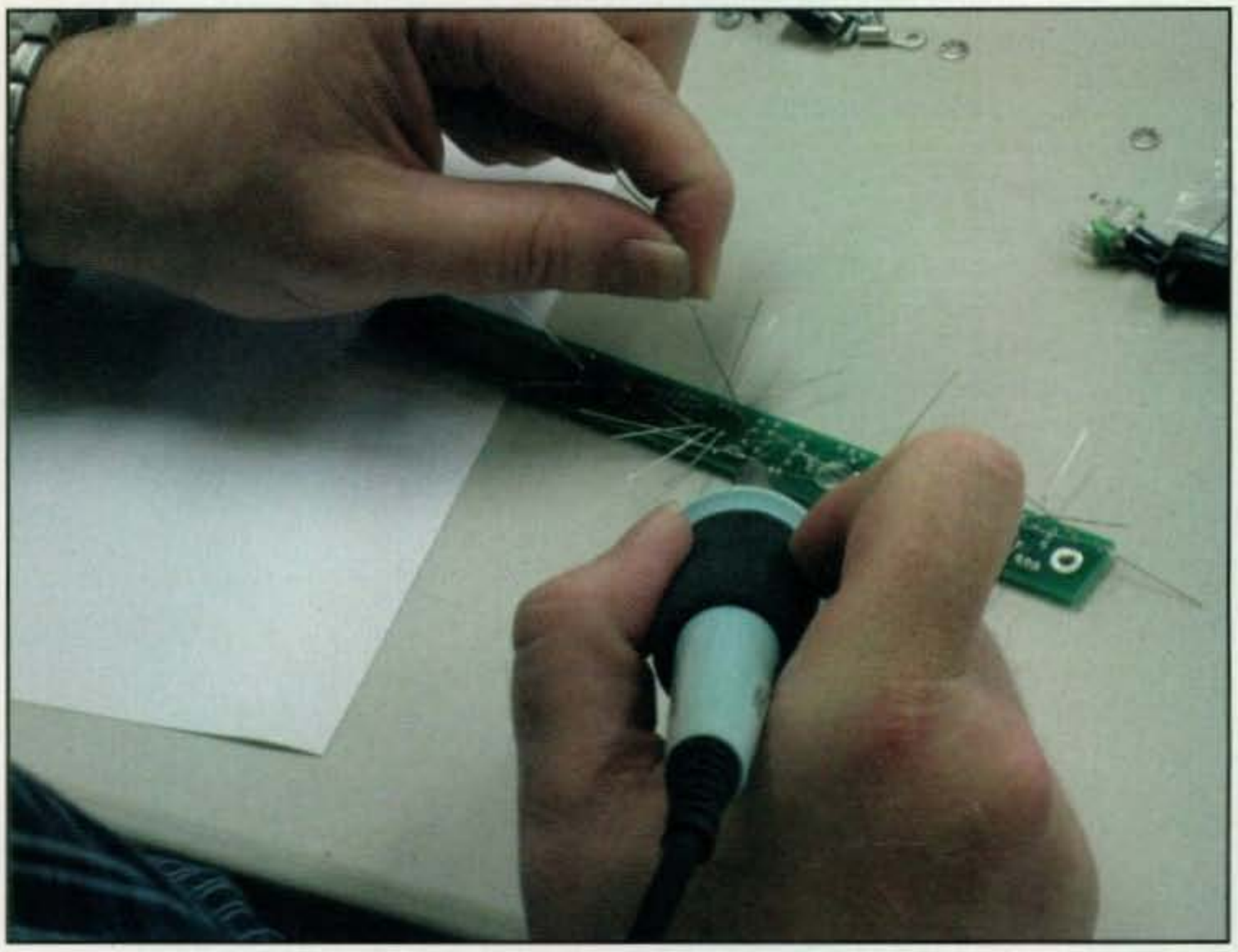
Kelly, K4UPG, introduces his grandson, Killian, to kit building at Ozarkcon 2009.

*7133 Yosemite Drive, Lincoln, NE 68507
e-mail: <k0neb@cq-amateur-radio.com>

A typical group kit-building session can look like this one at Ozarkcon 2009. Notice the instructors' table in the middle.

necting several power strips is usually not a safety issue. Be sure to spread the load over many wall outlets so as not to overload one and trip out a circuit breaker. That could be very embarrassing! Try to keep the cords under the tables to avoid tripping on the power lines. Each builder should have at least two or three outlets available to power the iron and lights.

If there are a lot of beginners, you might want to use a computer with a projector to show a large image of the circuit or the finished board or possibly a difficult step in the process to give them an idea of how it should look. Taking a good-quality photo and putting it on a screen can be a valuable asset to new as well as experienced builders. If there is a step that is particularly tricky—for



The signal tracer/injector kit built at Ozarkcon assembles easily and makes an inexpensive and valuable test instrument.

Tips for a Successful Group Kit-Build

Here is a quick summary of the major points we've covered this month:

1. Choose a room that has plenty of space for the builders and good ventilation. Arrange the tables and power strips for easy access by the instructors. Cover the tables to prevent damage.
2. Select a kit that fits the time available, cost, and functionality desired.
3. Have as much of the financial details as possible taken care of in advance so that the kits can be distributed with a minimal waste of time.
4. Keep spare parts or kits on hand in case of unforeseen problems/missing parts.
5. Before the session, give your builders a list of required tools as well as additional items they might want to bring.
6. Have any external parts needed available, or better yet, make them a part of your kits if possible.
7. Have any needed test equipment available and any special tools needed for tuning, etc.
8. Make plenty of copies of the written documentation to hand out as well as prepare any photos and information needed for display if a projector is used.

example, winding a toroid—you might try using a camera connected to the computer to show in real time the correct way to do it. Make sure the camera is capable of good-quality, close-up focus, and have sufficient light so that the projected image is easy to see.

The instructors should have various desoldering tools handy to help with correcting mistakes or other problems. This can be a valuable "teaching moment" to show new builders how to correctly solder and desolder components. If there are any special tools needed for certain steps—such as a meter or test equipment, tuning tool, heat gun for heat shrink, etc.—be sure that the instructors have those available to assist with completing those steps. If a simple volt/ohm meter is needed, be sure to let your builders know to bring one, or make a low-cost meter available to order when they order their kits. Often they can be had for $6 or less.

With proper planning, advance preparations, and enough tools and instructors on hand, your group build will be both fun and educational, and your builders will go home with a useful piece of gear that they've built themselves! In future columns, I will present specific kits that are ideal for beginners, groups, and experienced builders.

Until next issue . . .73 de Joe, KØNEB

LDG ELECTRONICS

The #1 Line of Autotuners

NEW! Z-100Plus

LDG's popular Z-100 economy tuner is now the Z-100Plus. Still small and simple to use, the Z-100Plus sports 2000 memories that store both frequency and tuning parameters. It will run on any voltage source from 7 to 18 volts; six AA batteries will run it for a year of normal use. Current draw while tuning is less than 100ma. The Z-100Plus now includes an internal frequency counter so the operating frequency is stored with tuning parameters to make memory tunes a blazingly fast 0.1 seconds; full tunes take an average of only 6 seconds.

Suggested Price $159.99

NEW! Z-817

The ultimate autotuner for QRP radios including the Yaesu FT-817(D). Tuning is simple; one button push on the tuner is all that is needed - the Z-817 takes care of the rest. It will switch to PKT mode, transmit a carrier, tune the tuner, then restore the radio to the previous mode! 2000 memories cover 160 through 6 meters. The Z-817 will also function as a general purpose antenna tuner with other QRP radios. Just transmit a carrier and press the tune button on the tuner. Powered by four AA internal Alkaline batteries (not included), so there are no additional cables required. A coax jumper cable is also induced for fast hook up. ***Suggested Price $129.99.***

NEW! KT-100

LDG's first dedicated autotuner for Kenwood Amateur transceivers. Easy to use - just right for an AT-300 compatible Kenwood transceiver. The KT-100 actually allows you to use the Tune button on the radio. The LEDs on the front panel indicate tuning status, and will show a match in seconds, or even less of you've tuned on or near that frequency before. Has 2,000 memories for instant recall of the tuning parameters for your favorite bands and frequencies. If you have an AT-300 compatible Kenwood radio, you can simply plug the KT-100 into your transceiver with the provided cable; the interface powers the tuner, and the Tune button on the radio begins a tuning cycle. The supplied interface cable makes the KT-100 a dedicated tuner for most modern Kenwood transceivers. ***Suggested Price $199.99***

AT-200Pro

The AT-200 features LDG's new "3-D memory system" allowing up to eight antenna settings to be stored for each frequency. Handles up to 250 watts SSB or CW on 1.8 – 30 MHz, and 100 watts on 54 MHz (including 6 meters). Rugged and easy-to-read LED bar graphs show power and SWR, and a function key on the front panel allows you to access data such as mode and status. All cables included. ***Suggested Price $249***

NEW! Z-11Proll

Meet the Z-11Pro, everything you always wanted in a small, portable tuner. Designed from the ground up for battery operation. Only 5" x 7.7" x 1.5", and weighing only 1.5 pounds, it handles 0.1 to 125 watts, making it ideal for both QRP and standard 100 watt transceivers from 160 - 6 meters. The Z-11Pro uses LDG's state-of-the-art processor-controlled Switched-L tuning network. It will match dipoles, verticals, inverted-Vs or virtually any coax-fed antenna. With an optional LDG balun, it will also match longwires or antennas fed with ladder-line. All cables included. ***Suggested Price $179***

FREE Balun with purchase any new LDG tuner with a suggested retail value of over $150!

*Purchase any new LDG tuner with a suggested retail value of over $150 between Oct 15, 2009 and March 15, 2010 and receive a Free balun from LDG Electronics. Simply fill out form (available at www.ldgelectronics.com or via mail - write to 1445 Parran Rd., St. Leonard, MD 20685) and send to LDG along with a copy of your dated sales receipt and LDG will send you a Free RBA-1:1 or RBA-4:1. All forms must be received before March 31, 2010. Limit one free balun per household. Not Transferable.

Free Balun with Autotuner Purchase!*

AT-100Pro

This desktop tuner covers all frequencies from 1.8 – 54 MHz (including 6 meters), and will automatically match your antenna in no time. It features a two-position antenna switch, allowing you to switch instantly between two antennas. The AT-100Pro requires just 1 watt for operation, but will handle up to 125 watts. All cables included. ***Suggested Price $219***

radio not included

NEW! AT-897Plus for the Yaesu FT-897

If you own a Yaesu FT-897 and want a broad range automatic antenna tuner, look no further! The AT-897 Autotuner mounts on the side of your FT-897 just like the original equipment and takes power directly from the CAT port of the FT-897 and provides a second CAT port on the back of the tuner so hooking up another CAT device couldn't be easier.
Suggested Price$199

radio not included

FTL Meter 2.5" face with calibrated scales for signal strength, discriminator reading on receive, and power output, SWR, modulation, ALC action and supply voltage on transmit, all selectable from the radio's menu.
Still Only $49

NEW FTL Meter For Yaesu FT-857(D) and FT-897(D). 4.5" face with calibrated scales for signal strength, discriminator reading on receive, and power output, SWR, modulation, ALC action and supply voltage on transmit, all selectable from the radio's menu.
Suggested Price $79.99

NEW! M-7700 For IC-7700. It will display S-meter on receive, or power out, SWR, ALC level or supply voltages, all selectable from the radio's menu. What's more, the M-7700 and the virtual meter on your radio can work together.
Suggested Price $79.99

See AT-1000Pro Review in Nov. '08 CQ

AT-1000Pro

Building on the success of the AT-1000, LDG Electronics has refined and expanded its 1KW tuner. The AT-1000Pro has an Automode that automatically starts a tuning cycle when the SWR exceeds a limit you set. Operates at any power level between 5 and 1,000 watts peak. RF Relay protection software prevents tuning at greater than 125 watts. Tunes from 1.8 to 54.0 MHz (inc. 6 meters), with tuning time usually under 4 seconds, transmitting near a frequency with stored tuning parameters, under 0.2 seconds. 2000 memories. 2 Antenna connections. All cables included. ***Suggested Price $599***

NEW! YT-100

An autotuner for several popular Yaesu Radios. An included cable interfaces with your FT-857, FT-897 and FT-100 (and all D models) making it an integrated tuner, powered by the interface. Just press the tune button on the tuner, and everything else happens automatically: mode and power are set, a tune cycle runs, and the radio is returned to its original settings. It's the perfect complement to your Yaesu radio.
Suggested Price $199.99

NEW! IT-100

Matched in size to the IC-7000 and IC-706, the new IT-100 sports a front panel push-button for either manual or automatic tunes, and status LEDs so you'll know what's going on inside. You can control the IT-100 and its 2000 memories from either its own button or the Tune button on your IC-7000 or other Icom rigs. It's the perfect complement to your Icom radio that is AH3 or AH-4 compatible.
Suggested Price $179.99

Call or visit your favorite dealer today!
Visit www.ldgelectronics.com for a complete dealer list.

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LDG

qrp

BY DAVE INGRAM,* K4TWJ

Reggie and the Fairchild 50

Season's greetings, friends and fans of low-power hamming! Are you ready for some big-time holiday fun and another year of blowout QRP action? It all starts right here, and interest in minimalist radio is a hot topic of the day. Simply explained, this "doing more with less" pursuit involves building gear with a minimum number of parts and relatively low output, and then using it to communicate over a formidable distance.

The little Reggie one-transistor transceiver and Fairchild 50 transmitter designed and built by Mike Rainey, AA1TJ, and highlighted in this month's column, are prime examples of minimalist gear. The Reggie pumps out a clean 100-milliwatt signal on 80 meters, and as of this column's writing in late September, Mike had made over 150 contacts with 18 states and three Canadian provinces, plus worked the Bahamas. Now that's what I call rompin' with QRP! Furthermore, it is only one of several unique projects from AA1TJ. Mike's other endeavors include a tunnel diode transmitter, a direct-conversion receiver, and mating 1.5-watt transmitter, each made from defunct fluorescent light-bulb parts, and more. These projects will be highlighted in future columns, but this time we are focusing on the Reggie (which has just become available as a kit from Rex Harper, W1REX, of <www.QRPme.com>). We are also highlighting a special treat called the Fairchild 50, which is a 50-year celebration of the classic 2N697.

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e-mail: <k4twj@cq-amateur-radio.com>

AA1TJ's Reggie

If you have studied the general design concept of most one-tube or one-transistor transceivers, you know they typically have a multi-contact switch that connects the main device between two almost separate circuits. Quite often, using two active devices (tubes or transistors) would be easier and less expensive than using that monster switch. The Reggie by Mike, AA1TJ, takes a different approach. It uses a couple of steering diodes in lieu of a big switch, and it sidesteps producing any keying chirp often associated with single-transistor transmitters. That requires explaining, and a quick tour of Reggie's circuit is helpful here (see fig. 1).

First, Q1 and all its associated circuitry up to T1 function as a (continuously running) 100-milliwatt transmitter on key-down and as a BFO injection signal on key-up. Base bias is set by R1, R2, and D1. R3 raises the emitter from ground for feedback to the Colpitts capacitive divider of C3 and C4. X1

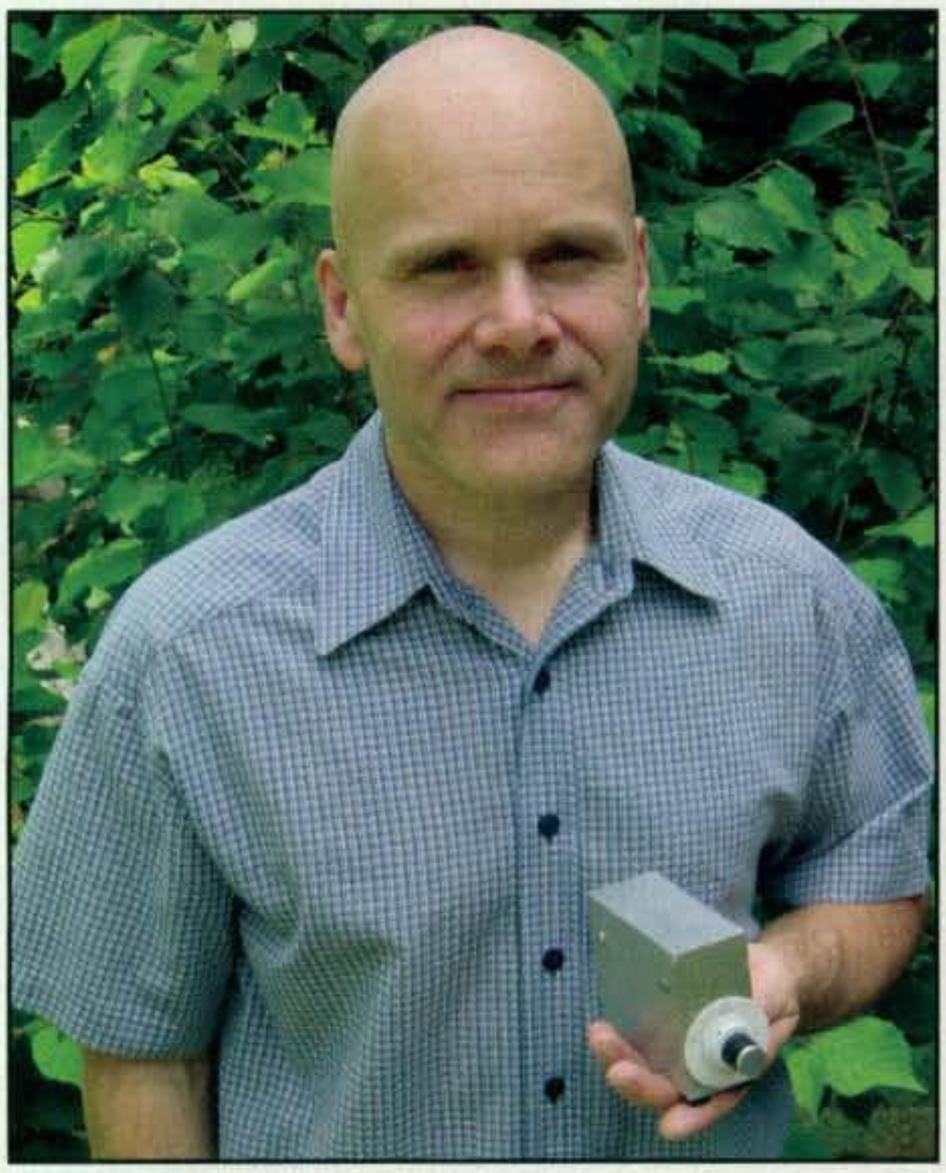

Photo A– Mike Rainey, AA1TJ, holding his 100-milliwatt 80-meter "Reggie" transceiver at Lobstercon 2009. The little rig is loaded with clever circuit designs, and Mike has made contacts across the U.S. and Canada, plus worked the Bahamas with it. (Photo courtesy of AA1TJ)

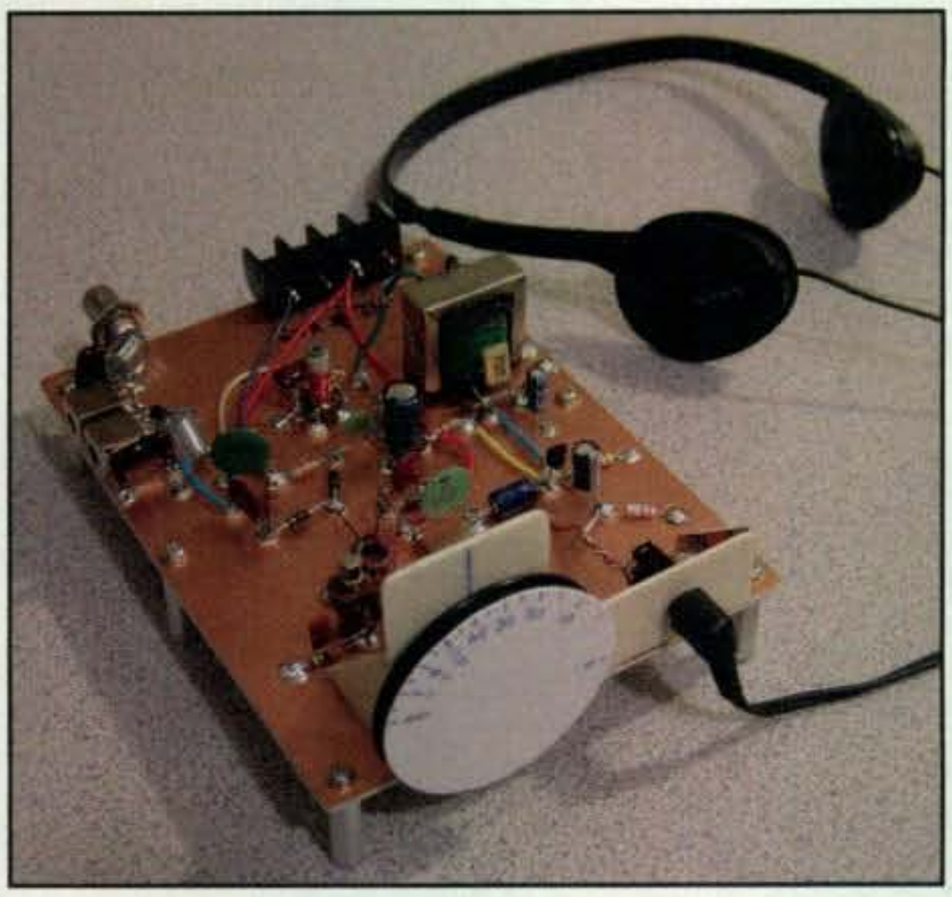

Photo B– Close-up view of Mike's prototype Reggie transceiver built Manhattan style on a large piece of unetched copper-clad board. This version has tiny IF cans, which were changed to regular toroids for production as a kit by QRPme.com. (Photo courtesy of AA1TJ)

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CT17 Level Converter 139.95
ICPW1 Modular 1kW Linear Amp ..... Call
ICSP23 Ext Speaker 179.95
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IC7200

IF DSP, AGC Loop Management, Digital IF filter, Manual notch filter, Digital Twin PBT, Digital noise reduction, Digital noise blanker, High stability transmitter, USB port for PC control, RF speech compressor, CW mode operation, Tough construction against water intrusion, Rugged design for outdoor use. Rear bumper

AH4 Auto Tuner 249.95
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ICSP23 Ext Speaker 179.95
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IC718

The HF bands allow you to communicate over long distances covering many km even to the other side of the world. With the superior performance found in the IC-718 such as wide dvnamic range, high C/N ratio, and full duty operation you will find making these contacts easy. Experience the combination of the latest RF and digital technology, along with the size and simplified operation. You will see the IC-718 will be the most practical rig you will ever own.

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MB23 Carrying Handle 14.95
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IC7000

IF DSP, AGC Loop Management, Digital IF filter, 2 point manual notch filter, Digital noise reduction, Digital noise blanker, 35W output on 70cm band, High stability crystal unit, Direct digital synthesizer circuit, Compact, all in one package, User friendly key allocation, Digital voice recorder, Built-in RTTY demodulator, 2.5 inch color TFT display.

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Rugged submersible protection, Optional GPS speaker microphone, Wideband receiver with dualwatch capability, 5 watt output, Simple bandscope, Built in voice recorder, Large dot matix display, One touch reply button, Keypad navigation, Optional PC remote control capability,

BC177 Rapid Charger 64.95
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BP257 AA Battery Case 34.95
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HM174 Waterproof Speaker Mic 109.95
HM175GPS Wtrprf spkr mc w/GPS 239.95
HM75A Speaker Mic w/Remote 57.95
HS85 Headset w/VOX, PTT 73.95
LC168 Carrying Case 23.95
RS92 Remote control software 77.95

IC2820H

Wideband receiver with simultaneous receive capability, Diversity receive capability, 50W on VHF and UHF, Separate controller from main unit, 522 memory channels, Band scope function, Optional D-Star operation.

CS2820 Programming Software 34.95
MB65 Mounting Base 35.95
OPC478U USB Cloning Cable 49.95
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UT123 Digital/GPS Unit...269.95–25 coupon= 244.95

ICID880H

Switchable VHF/UHF dual band, Wideband receiver, Free download cloning software, 1052 memory channels, Multiple scan function, Built in CTCSS/DTCS enc/dec, Keypad navigation.

MB120 Mounting Bracket 49.95
JTPS14M Power Supply 49.95
OPC478 Cloning Cable 39.95
OPC478U Cloning Cable 49.95
OPC589 Mic adapter 32.95

ICV8000

Switchable VHF/UHF dual band, Wideband receiver, Free download cloning software, 1052 memory channels, Multiple scan function, Built in CTCSS/DTCS enc/dec, Keypad navigation.

CSV8000 Cloning Software 32.95
JTPS14M Power Supply 49.95
OPC478 Cloning Cable 39.95
UT108 DTMF Decoder Unit 31.95

Customer Appreciation Day

Saturday December 12, 2009 10AM – 4PM

Events:

Prizes, Talk to Manufacturers Representatives, Presentations, Special Pricing on most items, Refreshments, Extended Hours

Manufactures scheduled to attend this year:

Ameritron, Comet, Cushcraft, Daiwa, Gordon West, Heil, Hustler, Hygain, Icom, Jetstream, Kenwood, Maldol, MFJ, Mirage, Vectronics and Yaesu.

Presentations:

11 am – Noon:
It All Starts At The Microphone
By Bob Heil

Noon – 1 pm:
PASS THE HAM , *a fun look at ham antics over the airwaves. By Gordon West*

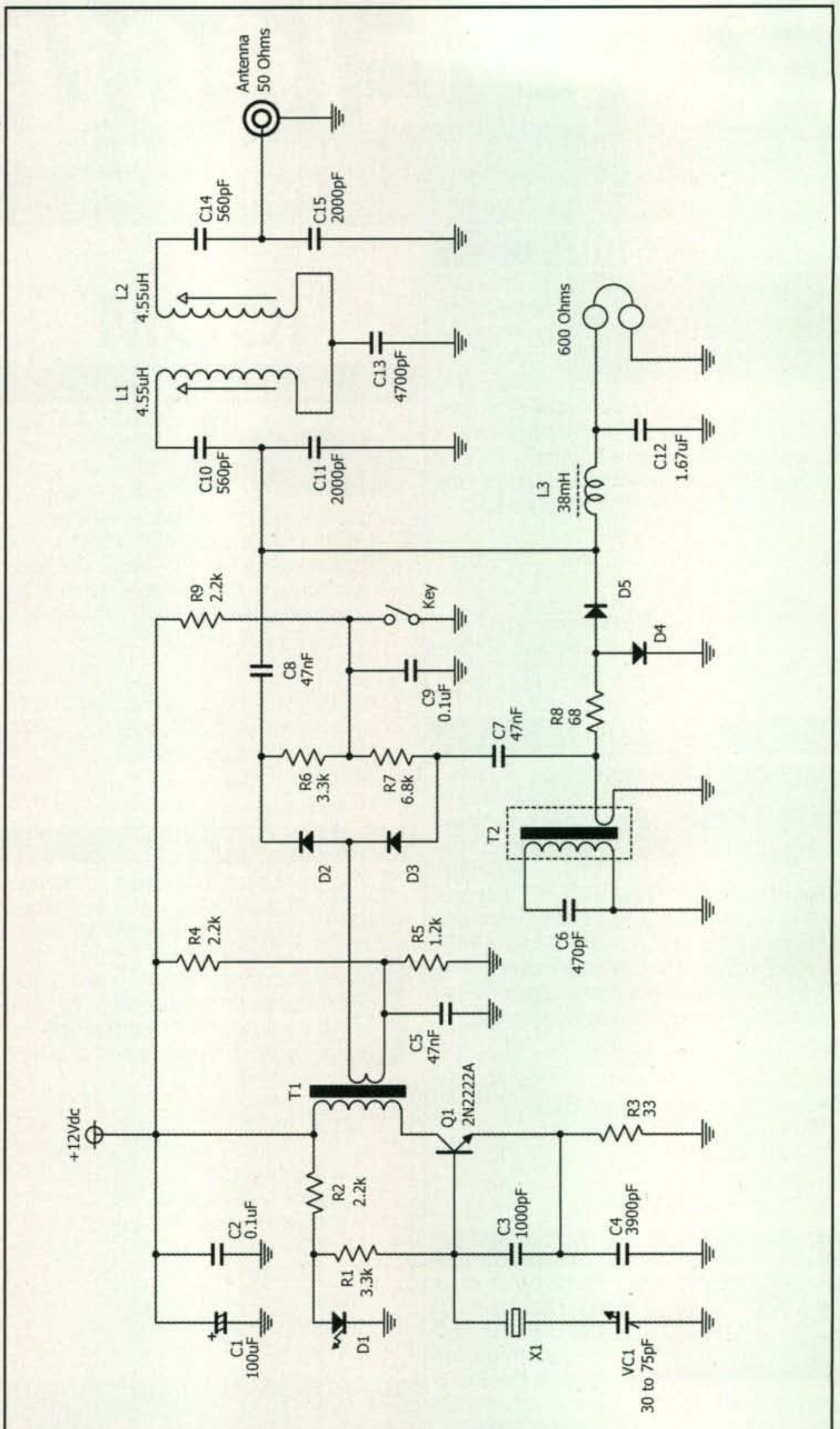
1 pm – 2 pm:
5J0BV San Andres Island 2009 6M DXpedition By K7BV.

Fig. 1– Circuit diagram of the Reggie, the 80-meter minimalist transceiver designed by Mike Rainey, AA1TJ. (Explanation in text.) →

is a ceramic resonator—a device with lower Q than a quartz crystal so its frequency can be pulled or warped up to . . . are you ready for this . . . 60 kHz (at 80 meters, no less!).

Next, notice diodes D2 and D3, the key, the bandpass filter consisting of L1, L2, etc., and the mini receiver (T2, R8, D4, D5, L3, and C12). When the key is open, D3 is forward biased and D2 is reverse biased, so Reggie's signal is routed through L-C resonator T2 and C6 to load/isolation resistor R8. This provides BFO injection for the receiver's shunt-type diode mixer or product detector of D4, D5, etc. Simultaneously, signals coming in through the bandpass filter of L1, L2, etc., proceed to the cathode of D5. Resultant difference/audio output is then matched to the 600-ohm earphones by L3 and C12.

Closing the key reverse biases D3 and forward biases D2. Reggie's signal then passes through C8 to the bandpass filter (L1, L2, etc.) for transmitting,



X1: 3.58 MHz ceramic resonator; VXO tunes 3508 to 3576 kHz
T1: FT50-43, 10-turn (50 µH) primary, 4-turn secondary
T2: 10 mm, shielded "IF can," 3.5 to 6 µH, 2-turn coupling
L1, L2: 10 mm, shielded "IF can," 3.5 to 6 µH
D1: Red LED, voltage at anode measures ~1.9 VDC
D2, D3: 1N4007
D4, D5: 1N4148
Transmitter output: ~100 mW

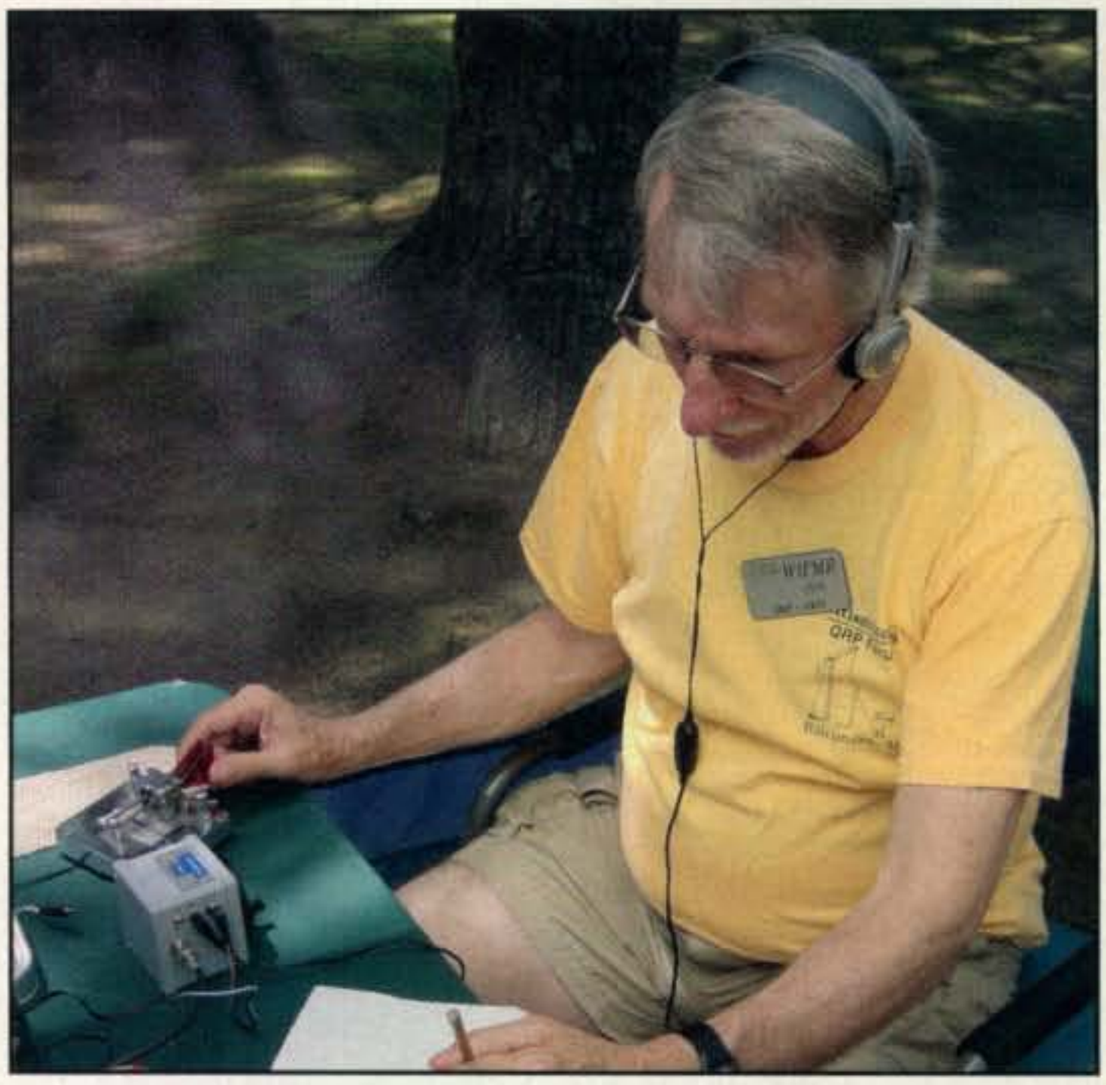


Photo C– Jim Fitton, W1FMR, operating his built-from-scratch Reggie transceiver at Lobstercon 2009. Could this tiny rig become the next big homebrew project among QRPers? (Photo courtesy of W1REX)

while D3 blocks BFO injection to the receiver. The receiver section is "gainless," but that does not seem like a major problem because signal levels are usually high on 80 meters. What else might we say but, "Well done, Mike!" If you have questions or compliments for Mike, incidentally, e-mail him at <mjrainey@gmail.com>.

The Reggie II

As mentioned earlier in this column, Rex Harper, W1REX, of QRPme recently began producing a kit version of the Reggie by AA1TJ. He also worked with Mike to include some neat mods and changes in it for easy assembly and kitability.

First he substituted toroidal-wound coils for Mike's junk-box used IF cans (T1 and T2) and he changed the large, air-variable tuning capacitor (VC1) to a small polyvaricon equivalent. He also had Mike add a one-transistor audio amplifier stage to increase receive volume and permit using conventional Walkman-type 8-ohm earphones in lieu

Photo D– Yet another homebrewed Reggie in action. It is in the aluminum box with red "spot" switch, and is flanked by battery and keyer (left) and another AA1TJ project, the "Bell Ringer" transceiver plus Kent paddle on the right. (Photo taken in Mike's underground lab/shack)

Photo E– The new Reggie II mini transceiver kit as received from W1REX of www.QRPme.com. You start by snapping the four boards apart and placing components in bags or boxes with their respective boards. Full instructions are on the QRPme website or on the CD that comes with the kit.

of Mike's 600-ohm 'phones. The audio amplifier has minimal gain and was designed to present an audio signal level in the Walkman 'phones comparable to the signal you would notice when using the ampless Reggie and 600-ohm 'phones.

Mike's original Reggies were built Manhattan-style, which means you first plan component layout and then glue solder pads, or "islands," of copper-clad circuit-board material to a solid, unetched circuit board. You then solder components and interconnecting wires between the pads. The process is both time-consuming and tricky, so Rex devised what he calls "Limerick" construction. What's that? Limerick looks like a regular PC board complete with all wiring etched in the board and installation points for all components marked and silk-screened on the board. Rather

Photo F– Here is the Reggie II approximately midway through assembly. I purposely left some wires untrimmed on one board to show my "install components, then trim their leads" process.

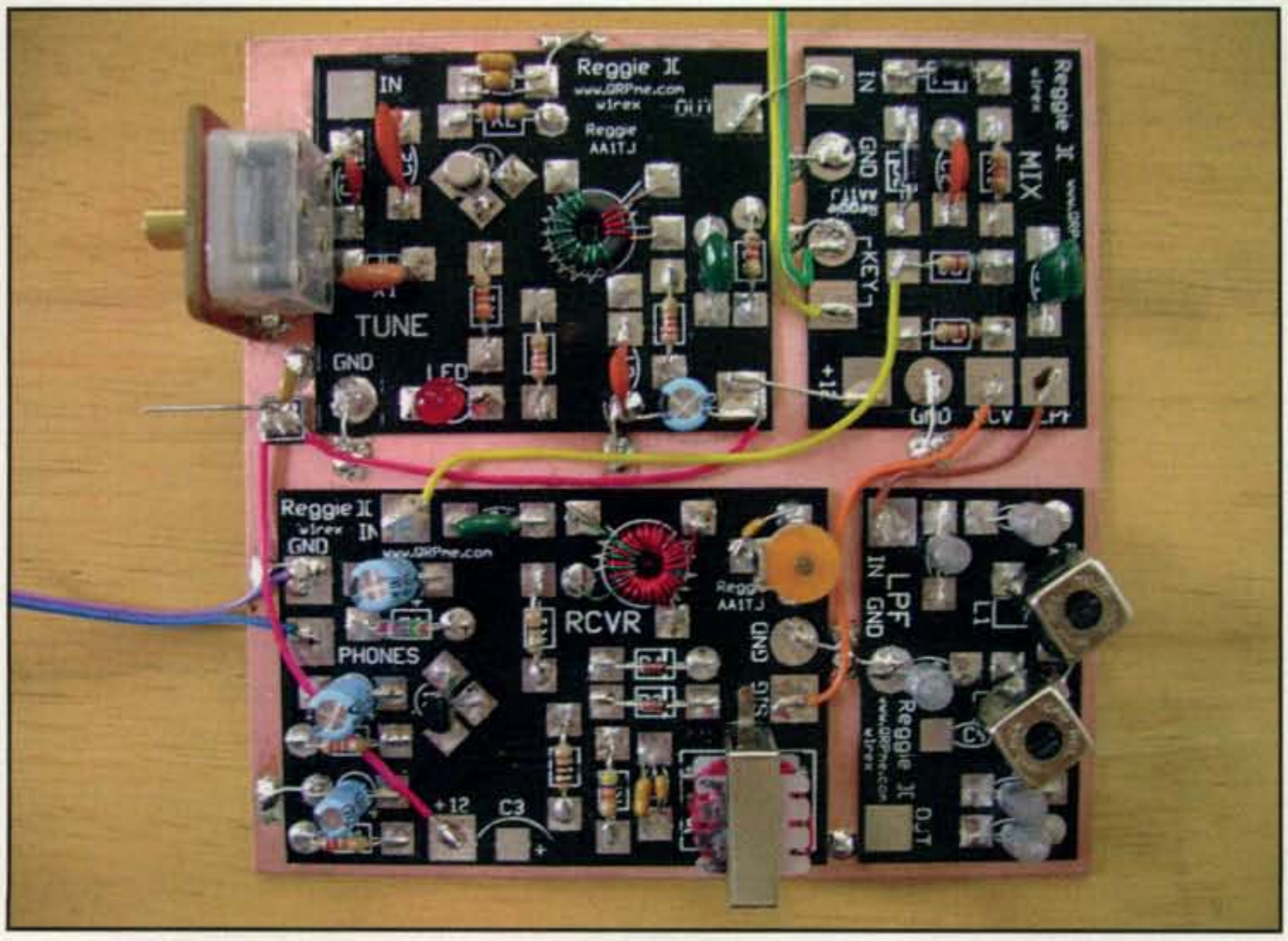


Photo G– Take a look at this magnificent Reggie II built by solder artist Chuck Carpenter, W5USJ. Notice how all four boards are interconnected and glued to a main board for a neat project. The ittle transceiver works well and looks good, too!

than installing component leads through holes and soldering them on the back side, however, you solder them to (premarked) solder pads on the board's top side. It reminds you of building a project surface-mount style, except the solder pads are much larger, and regular-size components (rather than tiny fly-speck components) are used.

Rex also separated his Reggie II into four boards or modules, so you build it like four small projects rather than one large project. The circuit and layout of each module is exactly what you would have if you used Manhattan-style construction techniques. After building all four boards, you simply glue them down on a master bottom board (or stack them if desired), add a few board-interconnecting parts plus I/O connectors, and the Reggie II is complete.

QRPers can never resist experimenting and modifying home-assembled projects, and Limerick construction really shines in this area. Rather than trying to melt solder while pulling component leads from PC-board holes (which you must then solder-wick clean before reusing), you just heat a pad and remove a wire. Also, there is only one wire to a pad—not three or four wires (that inadvertently fall off the pad) like Manhattan-style construction. This is big, friends, especially when combined with "Me Squares" and "Me Pads" (glue down as needed solder pads from QRPme).

I gave that idea a good old college try by modifying my Reggie II for 30 meters. I changed C3 to 330 pFd, C4 to 680 pFd, replaced X1 with a 10.108 crystal, and added a 10-µHy inductor in series with X1 and VC1. I wanted to increase power output, too, but had to stop and finish this column for *CQ*. Hopefully, some of our readers will "pick up the ball" by building and modifying their own Reggie II transceiver in the meantime, however. Ordering a kit is easy: Just go to <www.QRPme.com> and follow the menu prompts.

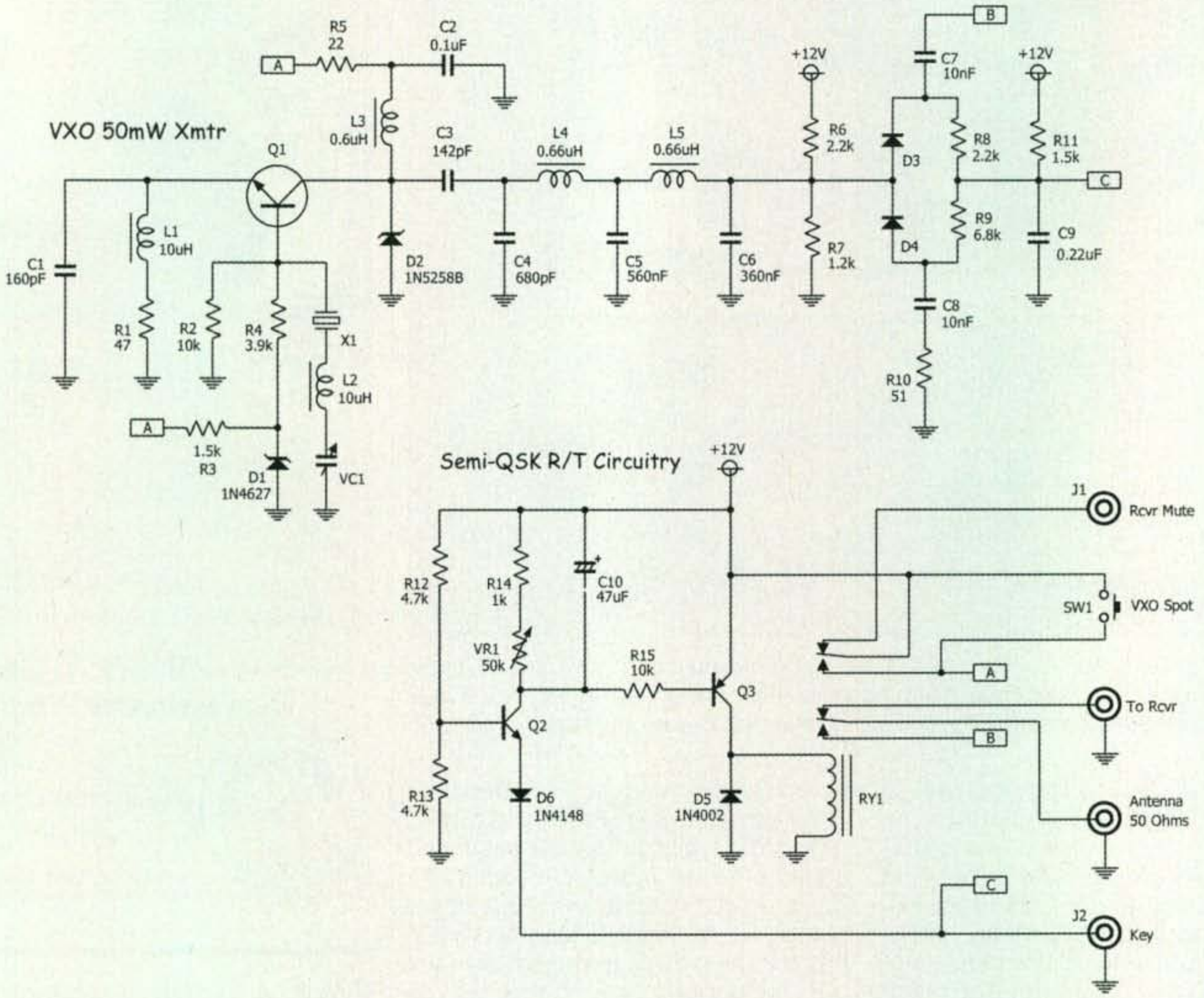
The Fairchild 50

Slightly over 50 years ago when many of us were starting to dink with those blue-cased CK722s, five young scientists and three engineers walked away from promising careers with Schottky Semiconductors and founded a new company known as Fairchild Semiconductor. Their goal was to produce a new and totally beyond state-of-the-art transistor that would serve as a high-speed, high-current driver for new magnetic-core memories in computers.

The "traitorous eight" started absolutely from scratch—learning how to cut semiconductor crystals, build diffusion furnaces, package, install leads, test their new transistors, and more. The process was a major challenge, but the first Mesa-type transistors bearing the new designation of 2N697 hit the market in late 1958. By that time, Fairchild Semiconductor had 60 employees. A year later, the company had grown to over 600 employees, and the price of a single 2N697 had dropped from $75 to $45. This is where the "Fairchild 50" 20-meter transmitter recently built by Mike Rainey, AA1TJ, enters the picture.

In looking through a group of transistors purchased at a hamfest, Mike noticed some 2N697s with a manufacturer's code date of 1959. He began investigating their (previously quickly summarized) history and consequently built a simple 20-meter transmitter running 50 milliwatts output with a 50-year-old Fairchild 2N697 (as evidenced by its date code of 915, corresponding to the 15th week of 1959). I am sure you will appreciate studying the results of Mike's efforts, and, assuming you can find a similar-vintage 2N697, will enjoy making your own copy of the Fairchild 50. Its circuit diagram is shown in fig. 2.

This historically significant gem is a single-stage, continuously running transmitter with VXO control. Notice how a pair of diodes (D3 and D4) is keyed (Point C) so they switch transmitter output between the antenna (Point B) and the dummy load (R10). Yes, you saw this switch in the Reggie,



X1: 14 MHz quartz crystal, FT243, HC49, etc.
D1, D2: 6.2V and 36V zener diodes, respectively
L3: slug-tuned inductor, 0.6 µH nominal
Q1: 2N697 (mine is original "mesa" device, date-coded the 15th week of 1959)
Q2: 2N3904 or similar
Q3: 2NN4403 or similar
VC1: 20 to 360 pF variable capacitor (approx. 13 kHz tuning range)
D3, D4: 1N4007
VR1: Adjust for desired semi-QSK time delay
RY1: Miniature DIP-type DPDT relay with 12V coil

Fig. 2– Circuit diagram of the Fairchild 50, a 50-milliwatt VXO-controlled transmitter using a 50-year-old transistor of historical significance—an original mesa-type Fairchild 2N697. (Circuit design by Mike, AA1TJ)

and it can also be integrated into other ultra-low-power (50- or 100-mw) rigs. Combine that with the fact that you can "hear through" an unswitched IRF510 to MOSFET RF amplifier on receive, and visualize the possibilities. Wow!

Another Fairchild 50 frill that may be adapted to other rigs is the semi-QSK circuit comprised of Q2 driver and Q3 relay control. If omitted, apply 12 volts to Q1's two "A" points and connect a key between point "C" (junction of R8, R9, R11, and C9) and ground. If you are pondering why D2—the 36-volt zener, incidentally—it protects Mike's prized 2N697 from high-voltage spikes if accidentally operated with an antenna connected, which is another handy idea worth remembering.

When I wrote this column, Mike was busy preparing his Fairchild 50 for debut at Lobstercon 2009, a QRP event held in northern New England, but he had already contacted over a half-dozen states plus Nova Scotia with the little rig. That's what we call putting 50 milliwatts to maximum use!

Conclusion

Once again we have overflowed column space and must bow out quickly. Watch for more easy-brew minimalist projects, QRSS mode news, and antenna ideas coming in future columns. Happy Holidays QRO style to all!

73, Dave, K4TWJ

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MFJ-1777 is a 102 foot *all band* doublet antenna that covers 160 through 6 Meters with a balanced line tuner. Super strong custom fiberglass center insulator provides stress relief for ladder line (100 ft. included). Authentic *glazed ceramic* end insulators. Handles full 1500 Watts.

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MFJ-17758 is a short 85 foot long *dual band* 80/40 Meter dipole antenna. It's *full-size* on 40 Meters and has ultra-efficient end-loading on 80 Meters. Handles full 1500 Watts. Super-strong injection-molded center insulator with built-in SO-239 connector and hang hole. Solderless, crimped construction. 7-strand, #14 gauge hard copper wire. Connect your coax feedline directly, no tuner needed.

MFJ-17754, $59.95. Short coax fed 42 foot long *dual band* 40/20 Meter dipole antenna. *Full-size* on 20 Meters, ultra-efficient end-loading on 40 Meters. Same construction as MFJ-17758.

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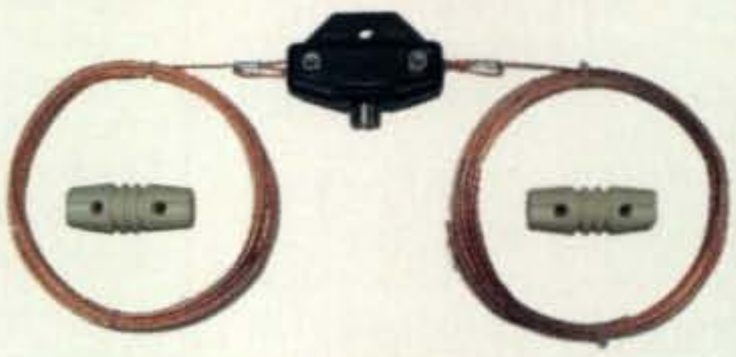

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160M, 265 ft.

MFJ-1779B
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80-40M, 135 ft.

MFJ-1779C
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20-6M, 35 ft.

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True *1:1 Current Balun/ Center Insulator* forces equal antenna currents in dipoles for superior performance. Reduces coax feedline radiation and field pattern distortion -- your signal goes where *you* want it. Reduces TVI, RFI and RF hot spots in your shack. *Don't build a dipole without one!* 50 hi-permeability ferrite beads on high quality RG-303 *Teflon*® coax and *Teflon*® coax connector. Handles full 1.5kW 1.8-30 MHz. Stainless steel hardware with *direct* 14 gauge stranded copper wire connection to antenna. 5x2 inches. Heavy duty weather housing.

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MFJ-915 *RF Isolator* prevents unwanted RF from traveling on the outside of your coax shield into your transceiver. This unwanted stray RF can cause painful RF "bites" when you touch your microphone or volume control, cause your display or settings to go crazy, lock up your transceiver or turn off your power supply. In mobile installations, stray RF could cause your car to do funny things even blow your car computer. Clear up these problems, plug an MFJ-915 between your antenna and transceiver. 5x2 in. Handles full 1500 Watts. Covers 1.8-30 MHz.

MFJ-919, $59.95. 4:1 current balun,1.5 kW.
MFJ-913, $29.95. 4:1 balun, 300 Watts.

Antenna Switches

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$79.95
4-Positions

MFJ-1704 heavy duty *antenna switch* lets you select 4 antennas or ground them for static and lightning protection. Unused antennas automatically grounded. Replaceable lightning surge protection. Good to 500 MHz. 60 dB isolation at 30 MHz. 2.5 kW PEP. Less than .2 dB insertion loss, SWR below 1.2:1. SO-239 connectors. Handy mounting holes. 6¼Wx4¼Hx1¼D in.

MFJ-1702C
$39.95
2-Positions

MFJ-1702C Like MFJ-1704, but for 2 antennas. 3Wx2Hx2D"

MFJ-1700C
$99.95

MFJ-1700C *Antenna/ Transceiver Switch* lets you select one of six antennas and one of six transceivers in any combination. Plug in an antenna tuner or SWR wattmeter and it's always in-line for any antenna/transceiver combination. Has lightning surge protection. Handles 2 kW PEP SSB, 1 kW CW, 50-75 Ohm loads. Unused terminals are automatically grounded. 1.8 to 30 MHz. SO-239 connectors. 4¾W6½Hx3D inches.

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MFJ-1701 *Antenna Switch* like MFJ-1700C but lets you select one of six antennas only. 10Wx3Hx1½D inches.

33 ft. Telescoping fiberglass Mast

3.8 feet collapsed, 3.3 lbs.

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MFJ-16B01, $19.95. Custom injection-molded UV-resistant center insulator has built-in coax connector and hanging hole.
MFJ-18G100, $24.95. 100 ft. of flexible, 7-strand, 14-gauge solid copper antenna wire.
MFJ-58100X, $49.95. 100 ft. 50-Ohm RG-8X with PL-259s on each end.
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Lightning Surge Protectors

Ultra-fast gas discharge tube shunts 5000 amps peak. Less than 0.1 dB loss. Up to 1000 MHz. SO-239s. **MFJ-270, $29.95.** 400W PEP. **MFJ-272, $39.95.** 1500W PEP.

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what's new

BY JOHN WOOD,* WV5J

New Ham Products for Very Happy Holidays

Season's Greetings from John Wood, WV5J, as I happily assume the helm of *CQ*'s "What's New" column and bring to you a stocking full of holiday gift ideas that include a new antenna, a couple of new books, and a very special Christmas Key from Morse Express that will be the first product we visit.

Christmas Key

If you're looking for a last-minute gift idea for your ham buddy or favorite CW operator, Morse Express has released its ninth annual Christmas Key, a precision miniature key made by GHD Telegraph Key, incorporating traditional Japanese craftsmanship along with GHD's impeccable engineering.

In keeping with GHD's larger keys, the Morse Express 2009 Christmas Key (photo A) uses miniature ball bearings at the trunnion, miniature binding posts, a comfortable knob, and perfect balance. The contacts are hard-silver and the mechanical parts have a deep-polished chrome finish. The rectangular wood base is made of heavy mahogany selected for warmth and grain while the knob is hand-turned.

GHD Key's Toshihiko Ujiie combines modern and traditional techniques to produce a miniature key that will be equally at home in the radio shack, in the field, or decorating a Christmas tree. The Morse Express Christmas Keys have always been miniatures, and the 2009 key is the smallest yet.

*1870 Alder Branch Lane, Germantown, TN 38139
e-mail: <wv5j@cq-amateur-radio.com>

Photo A– Morse Express is offering a very special ninth annual miniature Christmas Key to commemorate Christmas 2009, and each key comes with a label that bears its production number.

Introducing WV5J

This month we welcome John Wood, WV5J, as our new "What's New" column editor. John is a longtime journalist and a longtime ham as well ... although he waited longer than most of us to actually get his license. John says he passed his license exam at the peak of the CB boom in 1975 and had to wait *six months* for his license to arrive in the mail! He's had his Extra Class license since the 1980s and is the patriarch of a ham family. John's wife, son ,and daughter all are licensed as well.

John is taking over from Anthony Luscre, K8ZT, who edited this column for a little over two years, following the retirement of Karl Thurber, W8FX. Like many of us, Anthony has been facing increasing demands on his time at his full-time job and was unable to continue with the column. We thank Anthony for his contributions over the past two years and thank John for stepping up to the plate to fill the vacancy on short notice. — *W2VU*

According to Marshall Emm, N1FN, "The laws of physics and ergonomic design principles dictate that the 2009 key is about as small as you can make a key and still have good functionality."

This unique code key measures a tiny $1\frac{3}{4}$ inches by $1\frac{1}{4}$ inches at the base and weighs all of 1.6 ounces, "(a)nd yet the geometry is such that keying force is applied down through the base of the key, and it is surprisingly stable," Emm added.

Each key has a label stating "Christmas 2009" as well as the key's unique serial number. The 2009 Christmas Key will add something special to straight-key operations through the holiday season and for the upcoming ARRL Straight Key Night in January.

The 2009 Christmas Key is a limited edition of 150 keys priced at $89.95 each, plus shipping and handling. Pictures and more information are available on the Morse Express website at <www.MorseX.com>, where you will also find secure ordering facilities. Call (800) 238-8205 toll free to order by phone, or (303) 752-3382 for more information on this year's key.

Spiderbeam Telescoping Fiberglass Pole for 160

There's good news out for portable operators. Spiderbeam-US has announced the newest and

Photo B– Spiderbeam-Europe founder and owner Cornelius Paul, DF4SA, takes on the role of product model to show off his company's new 26-meter (85-foot) telescopic antenna which retracts to a convenient 6-foot, 6-inch package, along with his previous 12-meter and 18-meter models.

tallest addition to its family of fiberglass masts, a new 26-meter (85-foot) pole for operating 160 meters from a field location (photo B).

Built similarly to its 12-meter and 18-meter portable fiberglass poles, Spiderbeam says this pole was designed to have low weight and perfect balance. With a weight of 40 lbs. and a collapsed length of just 6 feet, 6 inches, the 26-meter pole should be easy to transport to remote locations.

Spiderbeam-US tells us that the prototype for this 26-meter antenna pole was extensively tested for several months on the coast of the Baltic Sea, where it successfully weathered all storms without a hitch.

A Spiderbeam representative explains that this pole puts 160-meter activities into a new perspective. By running a resonant piece of wire the full height of the extended 26-meter pole and adding a few top-hat wires and radials, the company states that the new longer pole can enable amateurs to operate a full-size 160-meter vertical without having to use a matching coil. Spiderbeam claims the entire antenna can be erected by two people in less than one hour. It adds that the new collapsible pole also opens the door (photo C) to building portable 160-meter, 4-square arrays and other serious low-band vertical dipole arrays on 40 meters, or even a 20/15/10-meter, one-element quad at 20-meter height above ground, etc. With well over 1,000 poles in the field, and hundreds of DXpedition-tested installations, Spiderbeam claims its poles have proven their reliability.

The introductory price for the 26-meter pole is $899. For more information on this and other fiberglass poles, beginning at just $119, visit <www.spiderbeam.us>.

New *ARRL Handbook* Now Available

The ARRL has announced the release of the 87th edition of its *ARRL Handbook for Radio Communications*, the biggest *Handbook* ever at 1250+ pages (photo D). Since it was first published in

Photo C– Here's how VP6DX uses his Spiderbeam poles—to build a 4-square vertical antenna using four 18-meter Spiderbeam poles to support four vertical radiators.

1926, the *Handbook* has been a mainstay for the radio electronic experimenter. A standard resource for radio amateurs, hobbyists, engineers, and scientists, the *Handbook* is the single most authoritative reference on practical communications topics. According to the League, it is both reference book and tutorial, woven together with practical applications and solutions.

For 2010, *The ARRL Handbook for Radio Communications* has been reorganized into five major sections, making it easier than ever to find exactly what you may be searching for: Fundamental Theory; Practical Design and Principles; Antenna Systems and Radio Propagation; Equipment Construction and Maintenance; and Station Assembly and Management. Each chapter includes introductory material for newcomers as well as in-depth discussions for experienced hams.

Nearly every chapter has been rewritten or reworked, with many projects making their first appearance in the *Handbook*. Some of the new book's features include:

- Several new or revised chapters address the burgeoning digital modes
- The chapter on RF power amplifiers includes new software, expanded design examples, and a new 250-watt solid-state amplifier project
- The power supplies chapter now includes a detailed introduction to switch-mode power conversion
- Expanded chapters on basic electronics and analog design, including analog-digital conversion and microprocessor interfacing
- A chapter on computer-aided circuit design and
- Updated and expanded chapters on space communications and image communications.

The book's accompanying CD-ROM once again includes a searchable PDF version of the entire book, including graphics. Construction information and PC board templates for all projects are included, as are the original *QST* articles, if that was the project's source. In addition, a web page has been created to provide links and supplemental information that may change with time.

The *Handbook* is available in hardcover ($59.95) and softcover ($49.95) versions from the ARRL at <www.arrl.org> or from many ham dealers.

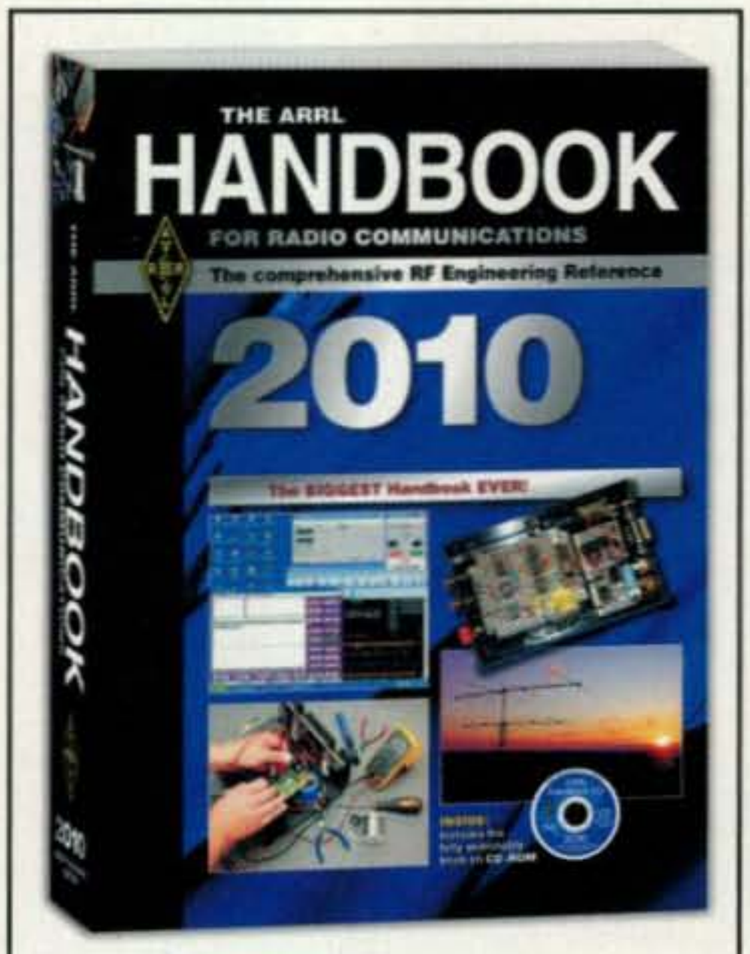


Photo D– The ARRL's new 2010 Handbook for Radio Communications is available now and bigger than ever.

New *GROL + RADAR* Study Manual

Are you ready to GROL? I mean, are you ready to get your General Radiotelephone Operator License? If so, here's how.

On June 26 of this year, the FCC announced the adoption of three new question pools for commercial radio license examination: Elements 1, 3, and 8. These three question pools cover basic radio law and operating practice, electronic fundamentals, and techniques required to adjust, repair, and maintain radio transmitters and ship radar equipment.

To help aspiring GROL applicants, Master Publishing Co. has released its new license preparation study manual which covers all three of the new question pools (photo E).

Written by Gordon West, WB6NOA, the new *GROL + RADAR* license preparation study manual is the most comprehensive way to prepare for the FCC commercial radio operators/maintainer license examinations. The 320-page, large-format book is fully illustrated. Author West provides an explanation for every question, describing why the correct answer is indeed correct, along with the concept behind solving for the correct answer. West's extensive background in marine electronics allows him to provide explanations that will make sense to service technicians.

The manual begins with a brief history of commercial radio license regulations, and a chapter clearly spells out when a commercial radio license is required and which one should be obtained. It also includes a CD-ROM containing the complete FCC Telecommunications Rules for Parts 2, 13, 23, 73, 80, and 87 as a reference for those studying for their Commercial Radio License.

All commercial radio examination managers (COLEMs) are required to switch examinations from the old pools to the new pools on Dec. 26, 2009.

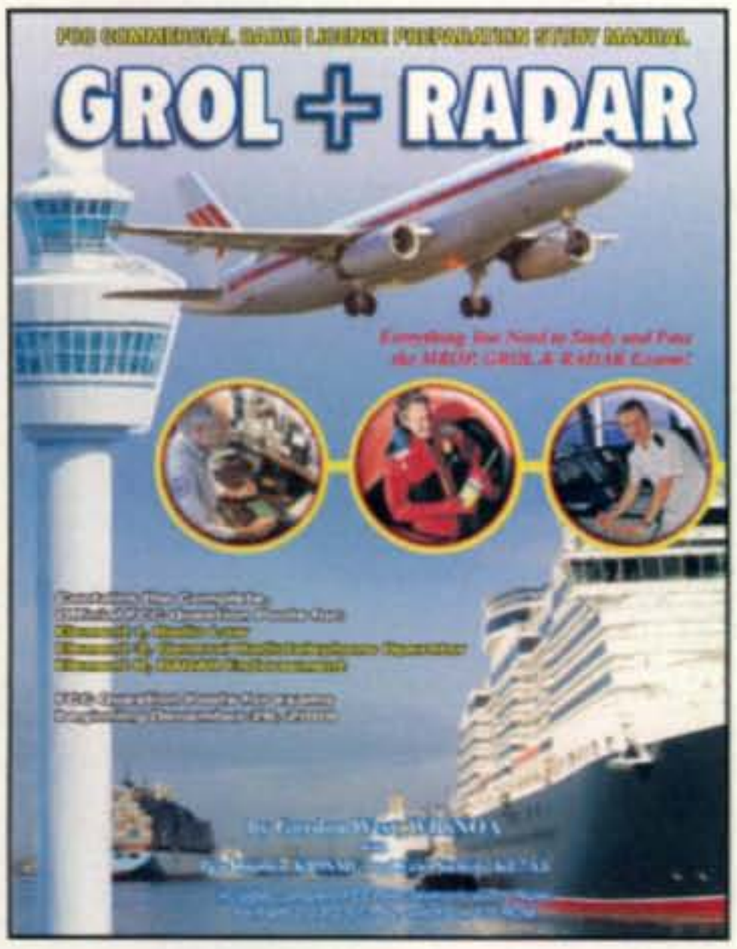


Photo E– If you're looking to prepare for the General Radiotelephone Operators' License exam then you might want to consider investing in this book, which contains all three question pools.

"The new test question pools streamline the study process," comments Julian Frost, N3JF, an Extra Class operator preparing to take his exams soon for the commercial GROL license.

For the rules and regulations, the total number of questions to study dropped from 170 to 144. On the Element 3 technical examination, they went from 916 total questions down to 600 questions —plus they organized the exam by subdividing it into 17 sub-elements and 100 key topics, with one question coming from each key topic. "This way, we won't get hammered with a lopsided number of heavy math formula test questions," adds Frost.

The Element 8 Radar Endorsement question pool also shrank in size, down to 300 questions from 321, with questions subdivided into six sub-elements with 50 key topics, one question on the exam from each key topic.

"This updating of the commercial question pools was long overdue," comments Larry Pollock, head of the National Radio Examiners COLEM. "The commercial exams have not changed since 1995. These new pools reflect all the current changes to commercial radio operation, technology, and radio maintenance." He adds that the reorganization of the new commercial radio examination questions grouped by topics makes test preparation study much more logical.

GROL + RADAR contains three FCC commercial radio question pools:

Element 1—Marine Radio Operator Permit, the basic FCC commercial radio operator license

Element 3—General Radiotelephone Operator License, required for those who maintain marine and aviation radio equipment

Element 8 – RADAR Endorsement, for those who maintain RADAR systems.

Published by Master Publishing, the *GROL + RADAR* manual has a suggested retail price of $49.95. The manual is also available with practice exam study software at a suggested retail price of $79.95. Both products are available from The W5YI Group at1-800-669-9594 or online at <www.w5yi.org>, on Amazon.com, and from radio electronics dealers.

For more information, contact Master Publishing's Pete Trotter at <trottr@msn.com> or call (847) 763-0916.

Wrap-up

That's going to do it for my first "What's New" column, but before I go, let me wish each and every amateur radio operator and his or her families a very Happy Holiday season. Remember, I check my e-mail mailbox constantly, so please feel free to send me your comments, questions, and feedback. If you have a new product you would like to tell me about, send that along also to WV5J@cq-amateur-radio.com.

Happy Holidays! 73, John, WV5J

***Note:** Listings in "What's New" are not product reviews and do not constitute a product endorsement by CQ or the column editor. Information in this column is primarily provided by manufacturers/vendors and has not necessarily been independently verified. The purpose of this column is to inform readers about new products in the marketplace. We encourage you to do additional research on products of interest to you.*

Holiday Gift Ideas from Pop'Comm

ONLY $10.95

2010/11 calendar from CQ

15-Month Calendar (January 2010 through March 2011)

This fifteen month calendar includes dates of importance to Ham Radio operators, such as major contests and other operating events, meteor showers, phases of the moon and other astronomical information, plus important and popular holidays. These calendars are not only great to look at, they're truly useful and make great gifts!

CQ Amateur Radio Operators Calendar —brings you 15 spectacular images of some of the biggest, most photogenic shacks, antennas, scenics and personalities. These are the people you work, shacks you admire, and the antenna systems you dream about!

Order No. HRCAL $10.95

The NEW Shortwave Propagation Handbook

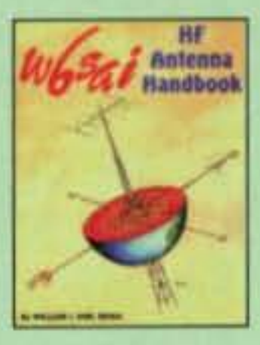
by W3ASK, N4XX & K6GKU

This authoritative book on shortwave propagation is your source for easy-to-understand information on sunspot activity, propagation predictions, unusual propagation effects and do-it-yourself forecasting tips.

Order No. SWP $19.95

W6SAI HF Antenna Handbook

by Bill Orr, W6SAI



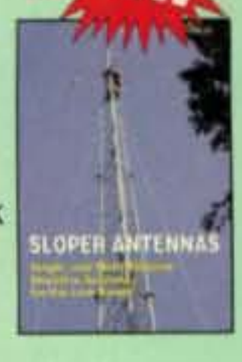
One of ham radio's most respected authors, W6SAI was known for his easy-to-understand, down-to-earth, writing style. In keeping with this tradition, this book is a thoroughly readable text for any antenna enthusiast, jam-packed with dozens of inexpensive, practical antenna projects that work!

Order No. HFANT $19.95

Sloper Antennas

By Juergen A. Weigl, OE5CWL

NEW



Single- and Multi-Element Directive Antennas for the Low Bands

With calculations and practical experience, this book shows which basic concepts have to be considered for sloper antennas for the low bands. These fundamentals are supplemented by construction guidelines for directive antennas using a single element or several elements. You'll find all the information needed for successful home building of the antennas.

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$129.95 **(Reg. $149.95)**

The Short Vertical Antenna and Ground Radial

by Sevick, W2FMI

This small but solid guide walks you through the design and installation of inexpensive, yet effective short HF vertical antennas. With antenna restrictions becoming a problem, it could keep you on the air!

Order No. SVERT $10.00

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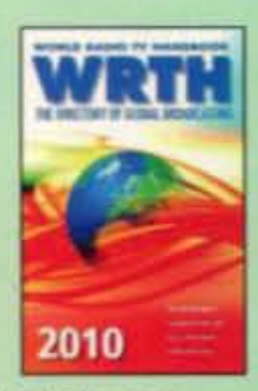

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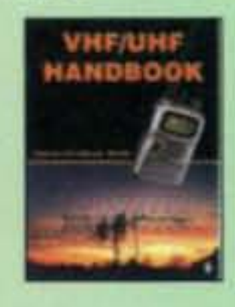

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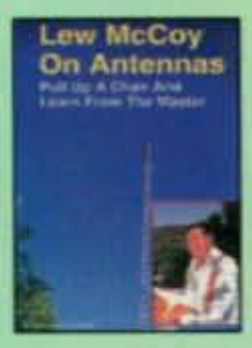

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SRM-30	25	30	3½ x 19 x 9⅜	7.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
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*ICS – Intermittent Communication Service

beginner's corner

BY WAYNE YOSHIDA,* KH6WZ

A Ham's Conundrum of Moving to a New QTH

As I packed and moved items from my old house to a new house, I tried to think of ways to minimize the "downtime" of my ham radio and other activities, including being able to continue my construction projects during the packing and moving process. Although I was not as successful as I planned, I did manage to create a few useful ideas along the way.

One of the things I threw together is the unit shown in photo 1. It is actually three stations in a single, handy carrying case. The box is a $20 "briefcase"-style tool box from the local hardware store. It is a little on the flimsy side, but I felt it should be adequate for temporary station housing.

With a station like this, an equally portable antenna system was needed, and I had this part already done for my work with a local emergency communications group. I call these homemade antennas "squishy ground planes," because they are made with 12-gauge insulated solid-copper wire and they can be folded or squashed for storage and transport. These ground planes are easy to make. A fellow named Malcolm White, WØMAL (ex-KCØYNR), published a good description of a 2-meter ground plane on his website: <http://www.hamuniverse.com/kc0ynr2metergppvc.html>.

I also used the battery box shown in photos 2 and 3. These battery packs are a great accessory for any VHF/UHF station. The gel-cells can provide lots of power for extended operating time on a handie-talkie and can supply power for mobile radios on the low-power transmit setting. I also have a few solar panels and a charge controller, normally used for Field Day. However, maybe it's time to integrate them into the portable home station.

*28181 Rubicon Court, Laguna Niguel, CA 92677
e-mail: <kh6wz@cq-amateur-radio.com>

Photo 1– A three-band VHF/UHF radio station can be made with mobile radios mounted in a briefcase-style toolbox available from a local hardware store for about $20. A compact 23-amp switching power supply powers the rigs if AC is available. The portable station can also be powered using a large 12-volt battery box. (Photos by the author)

These hints are great for the VHF and UHF bands, but I also need to get on the lower HF bands. As soon as I am fully moved into the new home, I will be examining ways to sneak some kind of antenna useful for DX work on the lower bands.

In the workshop, I packed my tools and the parts for future projects in small "stages," so the little-used or very heavy and large tools were moved first, and the common, everyday tools such as pliers, wire cutters, soldering iron, and nut drivers were packed and moved at the last minute.

I packed "inventory" parts first—the items I either bought or traded for some project in the future but will certainly be used. Next came the parts slated for projects in the next few weeks.

For my new ham radio lab, I will store parts and assem-

Photo 2– The portable station can be powered with a large gel-cell. I housed my battery box in a sportsman's "dry box" available from a local camping equipment store. I added a small Rig-Runner unit and voltage and current meters to the box.

Photo 3– A small battery charger, with its cabinet removed to save space, is included inside the battery box.

Photo 4– Traditional parts storage bins like this are handy, but can take up a lot of wall space. A better solution is needed.

Photo 5– A circuit-breaker box can be a scary and dangerous thing. Don't poke fingers or tools inside unless you know what you are doing. If there is any doubt, call an expert.

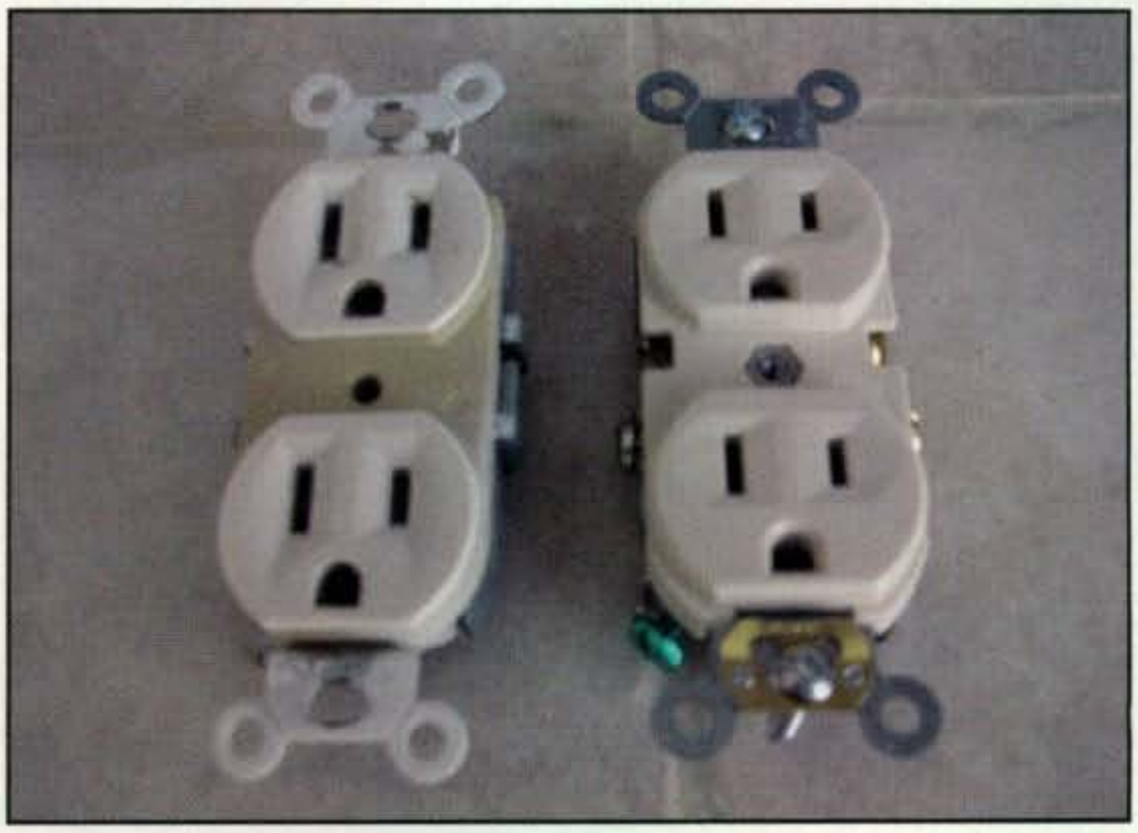

Photo 6– Inexpensive AC outlets should be replaced with better-quality units. Many of these in my new house were either very loose or too tight.

Photo 7– The outlet on the left has push-in connectors and is imported. How secure can a push-on connector be after 20 or 30 years? The unit on the right is an upgrade, with screw-down terminals, more robust contacts, and made in the USA. Both are from the same manufacturer.

blies in larger tubs with some way to separate small items in the tubs. Anti-static (ESD-safe) bags may be one solution. This method uses space more effectively than the traditional bin systems such as those shown in photo 4.

Electricity: More than Sockets in the Walls

Sometime during the moving process, I noticed a problem with a string of outlets in the downstairs dining room and living room. A quick visual check of the circuit breakers did not show any tripped. I used a multimeter to check for voltage, and sure enough, the outlets along two walls were dead. Zero volts coming out of the outlets. I went back to the breaker box, manually setting all of the breakers to the full-off position and then reset them to on. One breaker immediately sparked and tripped, indicating a problem. Remember, the earlier visual check did not seem to show any tripped breakers.

I called an electrician for help, and I followed him around the house as he diagnosed the problem. He explained to me

Photo 8– The FCC home page has a good search function. Use it to locate information on important items such as license information updates, including a change of address.

what the problem is when these things happen. Dan is examining the circuit breaker box in photo 5.

Most homes in North America are wired for 110 VAC, with a few 220 VAC lines for heavy-duty electrical appliances such as air conditioners, electric water heaters, or similar items. Three wires from the electric company enter a box on your home. Between two hot wires, 220 volts appear. The third wire, generally bare, is the "neutral" and is attached to a grounding bar. The neutral wire is connected to the silver-colored contacts in outlets and other connections in the house. Between the neutral wire and one of the hot wires 110 volts appear. The two hot wires (usually insulated with red and black insulation) are distributed evenly throughout the house, balancing the load from the electric supply.

Generally, AC outlets in a house are in parallel and the currents add. A single outlet "string" is usually rated at 15 amps, but sometimes 20 amps is used. When a whole string of outlets does not provide any electricity, only one thing is possible—a tripped circuit breaker or fuse, or an open or broken wire from the supply line. Going back to the circuit-breaker box and manually flipping the circuit breakers, there seemed to be an intermittent condition somewhere, since the circuit breaker did reset to the "on" position in an earlier test. However, at other times the breaker immediately tripped.

Removing the wall plates for each outlet along the wall finally revealed the problem—a shorted wire inside the outlet box. The short circuit was caused by pinched and missing insulation from the hot wire, which touched the metal outlet box and possibly the neutral wire. The repair was easy. The wire was insulated with two layers of heat-shrink tubing and the outlet was replaced.

Speaking of AC outlets, take a look at photos 6 and 7. The electrician noticed the poor-quality outlets used in the house and recommended that they be replaced as needed. I decided it would be best to change all the outlets, since the power was off and not much was installed in the home. When browsing the electrical section in the hardware store, I did notice the pricing of AC outlets ranged from about 59 cents to over a dollar, and the differences had to be much more than color and style.

Government Paperwork

I almost forgot an important detail in my move: Notifying the FCC of my new location. This is important, because if the FCC sends any kind of notice to your address and the mail gets returned, the FCC can revoke your station license or suspend your operator license.

Years ago, you would send an FCC Form 610 to the FCC's Gettysburg address, and after several weeks your new ham license would appear in your mailbox. These days, however, these administrative tasks can be done online with your computer. The FCC's home page (<http://www.fcc.gov>) has a search function that will direct you to the instructions and forms so that you can update your amateur radio license. The search box is on the upper left of the screen (see photo 8).

However, if you still desire to use old-fashioned paper forms to update your ham radio license information, the Form 610 has pretty much been replaced with the new FCC Form 605. You can obtain this Form 605 from the FCC's website, print out a copy of the form, and mail it to the FCC's Gettysburg address.

Conclusion

It is truly amazing to me how much stuff one can accumulate over a course of 25-plus years. Even more amazing is the amount of radio-related electronics items I have acquired, but have never used. I will have to do something about this quickly. If nothing else, I need to get rid of some of the non-used items to make room for some new items I think I may use later. . .

73 and Happy Holidays,
Wayne, KH6WZ

vhf plus

BY JOE LYNCH,* N6CL

First Mongolian EME Operation

Responding to a request from Dave Blaschke, W5UN, to aid him in his quest to complete contacts in all 40 CQ Zones on 2 meters, Jeremy Alexander, W7EME, headed to Mongolia last October. Operating from two different locations in Ulaanbaatar, Mongolia's capital, Jeremy logged several stations during his all too short visit to the country.

Plagued by 5- to 6-hour long power outages, originally a poor EME location, and security issues, Jeremy was able to eventually work both the North America and Europe windows. With plans to return next year, he left his equipment behind so that his gracious hosts will be able to operate EME in the future.

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Dec. 6	Excellent EME conditions.
Dec. 9	Moon last quarter.
Dec. 13	*Geminids* meteor shower. Poor EME conditions.
Dec. 16	New Moon.
Dec. 20	Moon apogee. Poor EME conditions.
Dec. 21	Winter Solstice.
Dec. 22	*Ursids* meteor shower.
Dec. 24	Moon first quarter.
Dec. 27	Moderate EME conditions.
Dec. 31	Full Moon.
Dec. 31	Lunar eclipse.

—EME conditions courtesy W5LUU

Dave Blaschke, W5UN
All 40 CQ Zones on 2 Meters

Dave Blaschke, W5UN, has completed a task that a few years ago seem impossible, working all 40 CQ zones on 2 meters. He is the first to do so. Here is his story:

On October 10, 2009, while monitoring the 2-meter digital band for EME signals, I detected JT1UN calling CQ on 144.150 MHz. After a couple of calls, reports were exchanged, giving me my last zone on 2 meter EME. The operator behind JT1UN was Jeremy Alexander, W7EME, who had flown to Ulanbaatar a couple of days earlier with the goal of making the first-ever contacts on EME from Mongolia.

I suppose my quest for WAZ on 2 meters really began in 1981, when I first started pursuing DX via EME, but I never thought such a thing was possible back then. An unexpected goal was reached in 1991 when I was awarded the first DXCC on 2 meters, which was something I never dreamed would happen when I first began EMEing. I really did not think too much about WAZ until a few months ago, when I realized that I might have worked most of the zones already. I dug out the QSL box, and sure enough, there were QSL cards from 38 zones. I found that I only needed zones 2 and 23 to have them all worked. But there had never been any 2-meter EME operation from either of those zones, to my knowledge, so how was my quest for WAZ going to happen?

By chance I mentioned all of this to W7EME, who promptly took up the idea and said, "I'll go for you." Jeremy has gone to several foreign countries to operate EME in the past, so I knew his experience and ability would afford a great opportunity for zone 2 contacts, not only for me, but for others as well. It turned out that Newfoundland was a tough place to make 2-meter EME contacts from, but several were made, including mine.

After Jeremy returned from VO2-land, I thought I might be pressing my luck by asking him if he would be interested in putting Mongolia on 2-meter EME for my last zone. To my surprise, he jumped at the chance with great enthusiasm. That's when the planning and arrangements began. The rest is history now, but the good news for those who did not make it into the JT1UN log is that Jeremy left his entire station, including antenna, at the JT1KAA club station. So, hopefully, the locals will put JT back on 2 meters EME from time to time. In addition, W7EME tells that me he has already booked a flight for return to JT next fall.

Dave leads a growing interest in working all CQ zones on 2 meters. Very close behind is Joop Mutter, PAØJMV, who has worked stations in 39 zones, lacking only zone 10. Joop also advised me that he is fairly certain that Gary Crabtree, KB8RQ, has also worked stations in all 40 zones.

Morehead State University
Space Science Center

Among the presenters at the presenters at the AMSAT symposium in Baltimore this past October were Clay Graves, KJ4HVL, Tyler Burba, KJ4HVF, and Jonathan Fitzpatrick, KJ4PBH, all students at Morehead State University in Morehead, Kentucky. They presented a report on the newly built Space Science Center, which houses the new space-related programs and future control center for the campus's 2-meter dish. Presently, classes are

e-mail: <n6cl@sbcglobal.net>

A photo of Dave Blaschke, W5UN's Mighty Big Antenna, which was recently used to complete contacts in CQ Zones 2 and 23, thereby completeing Blashke's goal of working stations in each of CQ's 40 Zones on 2 meters. (W5UN photo)

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being taught remotely by Bob Twiggs, KE6QMD, who lives in Sunnyvale, California. About one third of the students in the science degree program have become licensed amateur radio operators—partly as a result of a built-in extra-credit incentive in Twiggs' class. Also planned for the new building are a two-story tall clean room and an anechoic chamber.

The 21-meter dish, which is located on a mountain ridge a couple of miles from the center, will be controlled via a fiber-optics link and will be used for radio astronomy research. Also, due to its azimuth speed of greater than 3 degrees per second and elevation speed of 1.5 degrees per second, it will be capable of tracking most low-Earth-orbit (LEO) satellites.

While Twiggs currently resides in California, he is seriously considering moving to the Morehead area in a couple of years. He will join Jeff Kruth, WA3ZKR, who is an antenna engineer working at the Center.

Plans are under way to support the Kentucky Space Consortium in its efforts to be a major player in space research and development.

Plans are also under way to host the 2010 Southeast VHF Society Conference on campus in the new Space Science Center. More information on the conference will be forthcoming.

Clay Graves, KJ4HVL, operating the AZ-EL controls of the 21-meter Space Science Center dish at Morehead State University, Morehead, Kentucky. (N6CL photo)

Side view of the 21-meter Space Center dish. Notice the top of the cherry picker truck in the lower right corner. (N6CL photo)

Excellent EME Conditions Predicted

Excellent EME conditions are predicted for early this month. Additionally, excellent EME conditions are predicted for early and late January.

Errata

In my October column I reported that John Kjos, W9RPM, worked Sean Kutzko, KX9X, in CM92. Actually, John worked Alan McGuiness, W1NDY, on JT6M in CN72.

Current Meteor Showers

Two showers occur this month. The first, the *Geminids*, is predicted to peak around 0510 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 120 meteors per hour at its peak.

The second, the *Ursids*, is predicted to peak at around 1330 UTC on 22 December. It is an east-west shower, producing an average of no more than 10 meteors per hour, with the very rare possibility of upwards of 90 meteors at its peak.

Calls for Papers

Calls for papers are issued in advance of forthcoming conferences either for presenters to be speakers, or for papers to be published in the conferences' *Proceedings*, or both. For more information, questions about format, media, hardcopy, e-mail, etc., please contact the person listed with the announcement. The following conference organizer has announced a call for papers for its forthcoming conference:

Central States VHF Society Conference: Technical papers are solicited for the 44th annual Central States VHF Society Conference to be held in St. Louis, Missouri on July 22–24, 2010. Papers, presentations, and posters on all aspects of weak-signal VHF and above amateur radio are requested. You do not need to attend the conference, nor present your paper, to have it published in the *Proceedings.* Posters will be displayed during the two days of the conference. Non-weak-signal topics such as FM, repeaters, packet radio, etc., generally are not considered acceptable. However, there are always exceptions. Please contact the folks below if you have any questions about the suitability of a topic. Strong editorial preference will be given to those papers that are written and formatted specifically for publication, rather than as visual presentation aids. Submissions may be made via the following: electronic formats (preferred); via e-mail; uploaded to a website for subsequent downloading; on media (3.5-inch floppy, CD, USB stick/thumb drive). Deadline for submissions: May 1, 2010. For more information, please contact CSVHFS President Ron Ocho, KØØZ, at <ko0z@arrl.net>.

And Finally . . .

What amazes me about the Morehead State University Space Science Center is the strong encouragement of student-led learning. The future of our hobby is in the hands of our youth. We need to encourage their involvement in any way that we can. What is happening at Morehead State concerning licensing of new hams is most encouraging.

If you have a report on student involvement in amateur radio, please let me know about it via my e-mail address: <n6cl@sbcglobal.net>. Perhaps there is an article to be written or at least a report to be published here.

Until next month... 73 de Joe, N6CL

BY TED MELINOSKY,* K1BV

More County Awards

USA-CA Special Honor Roll

H. Mark Pinsky, W8MP
USA-CA All Counties #1187
August 31, 2009

USA-CA Honor Roll

500

9A4KW.....3480
W8MP 3481

1000

W8MP 1782

1500

W8MP 1498

2000

W8MP 1385

2500

W8MP 1303

3000

W8MP 1213

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.

September saw the welcomed addition of Illinois to the list of states that have clubs or groups that sponsor all counties awards. The rules for the Illinois are shown below. Another county award has also been created for Arizona. As you progress in your efforts to work all U.S. counties, you can reward your efforts by applying for these awards as you complete individual states. A complete set of all these known rules is found on my website: <http://www.dxawards.com/>. A direct link to this information is on the left-hand column of the main page.

There are still ten states that do not offer an all counties award: AK, HI, ID, IA, KS, NE, NM, NV, and TN. This poses an opportunity for any club, group, or interested individual to step right in and fill the gap for their own state. I would be happy to provide help to any would-be sponsoring group.

Arizona Worked All Counties Award

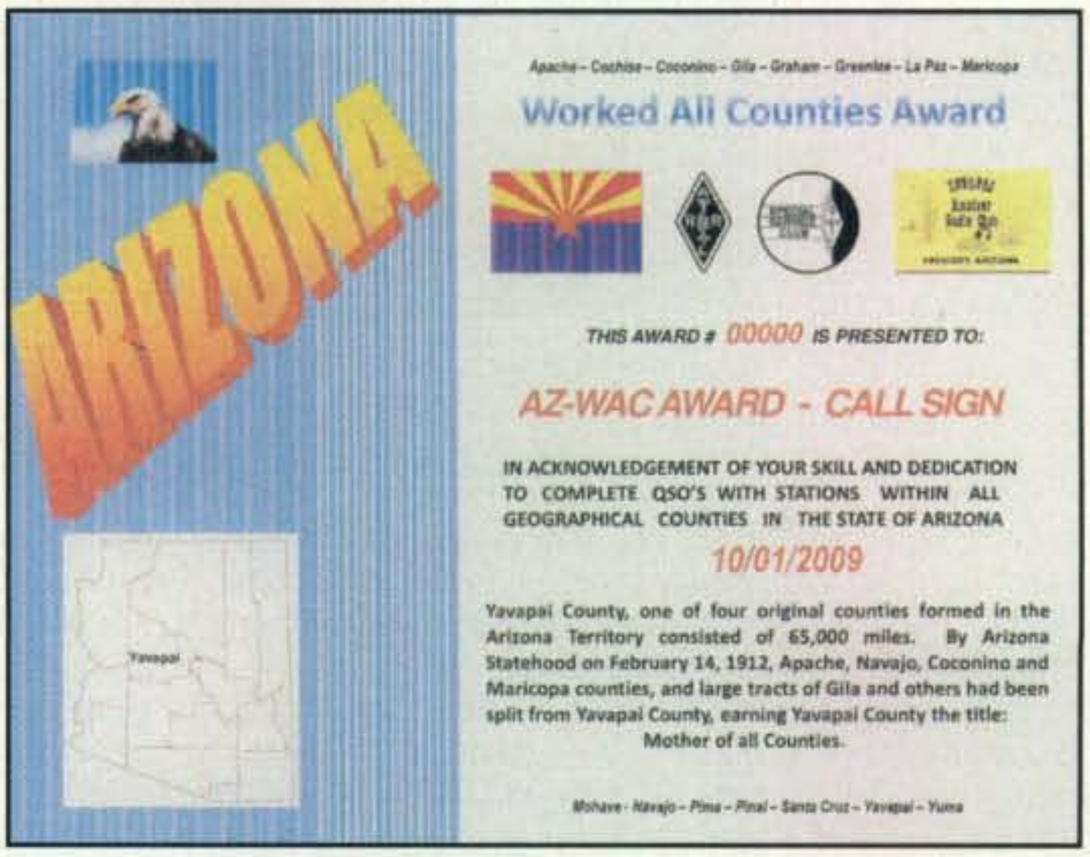
Contact each of the 15 counties of the state of Arizona. All bands and CW, SSB, FM, RTTY, and Satellite accepted. No endorsements are available at this time. Contacts made via cross mode, cross band (except satellite QSOs), repeaters, EchoLink, CQ100, and IRLP do *not* count. Fixed or mobile QSOs are okay. Send an e-mail to the address shown below for a special application. The subject line of your message should read: "AZ-WAC Application."

GCR list is accepted. There is no charge for the award when you accept an electronic image of the certificate, which you can print. If you wish a preprinted award mailed to you, the fee is $US5. In that case, mail application and fee to: Yavapai Amateur Radio Club, Attn: AZ-WAC, P.O. Box 11994, Prescott, AZ 86304-1994. E-mail: AZ-WAZ@w7yrc.org>; Internet: <http://www.w7yrc.org/az-wac.htm>.

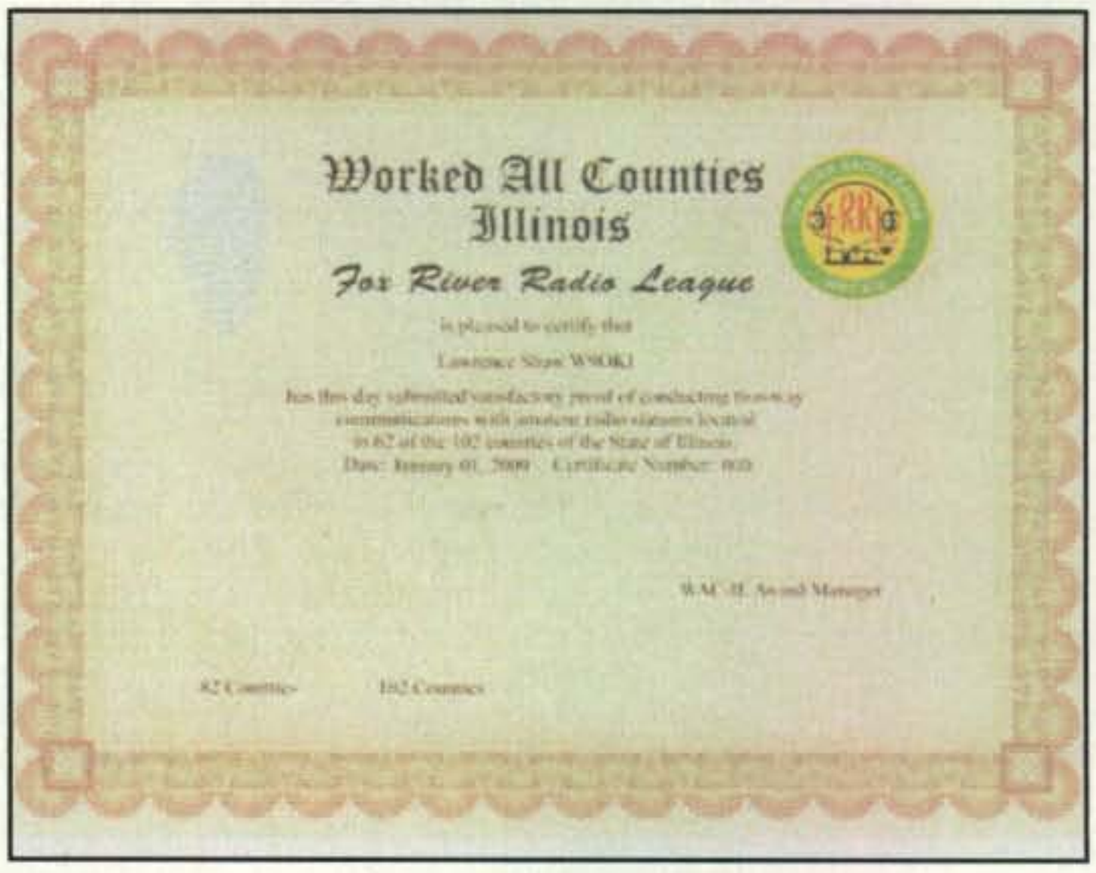
(*Note:* A special Centennial Award will be issued if all contacts are made in 2012.)

Worked All Illinois Counties Award

This award is sponsored by the Fox River Radio League for contacting 62 or more Illinois counties on any band or mode. Endorsements for 82 counties and a grand certificate for all 102 counties are available. Endorsements for specific bands or modes are also available at each level. Use of cross modes, repeaters, or digipeaters not allowed.



To earn the Arizona Worked All Counties Award contact each of the 15 counties of the state.



The Worked All Illinois Counties Award is sponsored by the Fox River Radio League for contacting at least 62 Illinois counties on any band or mode.

*12 Wells Woods Rd., Columbia, CT 06237
e-mail: <k1bv@cq-amateur-radio.com>

Satellite contacts are okay. Portable and mobile contacts are okay, but confirmation must indicate the county. The applicant must possess the confirmations, such as physical QSL card or LoTW for each county that provides the following information: station worked, date, time, frequency, mode, and county.

Send a completed application (found on the website listed below), record sheet, and fee of $US5 for each certificate. Fee for endorsements is $US1. Apply to: Fox River Radio League, Lawrence O. Shaw, W9OKI, 147 N. Buckingham Drive, Sugar Grove, IL. 60554. E-mail: <datecaviation@msn.com>; Internet: <http://frrl.org/>.

DX Awards

Worked All Moldova Trophy. Moldova is a small landlocked country located between its larger neighbors, Romania and Ukraine. Ham radio speaking, it is not a rare entity, but its ER prefix could be considered "scarce," making this award somewhat of a challenge. The award, sponsored by the national society, Radioamatorilor din Moldova (ARM), is in the form of a handsome plaque featuring an image of the statue of famed medieval King Stefan cel Mare (aka Stephen the Great) and a map of the country.

The plaque is issued for contacts with Moldova amateurs on or after June 1, 1993. SWL okay. Europeans need 60 confirmations and all others need at least 30 confirmations from all five radio call areas of Moldova: ER1 through ER5. Any missing area may be replaced with Moldovan special event prefixes of ER6 to ERØ. The same station may be contacted up to three times: once each for CW, SSB, and digital modes. The same station may be contacted on different bands for credit.

Contact the award manager before applying, as the cost of the plaque may vary in the future. The application should be in the form of a GCR list and sent to: Valery Metaxa, P.O. Box 3000, Chisinau, MD-2071, Moldova. E-mail: <er1da@mail.ru>; Internet: <http://www.qrz.ru/awards/country/10.html>.

Norway's Morokulien Award. The entity of Morokulien is a memorial to peace, straddling the Swedish-Nor-

The Worked All Moldova Trophy is issued for contacts with Moldova amateurs. Europeans need 60 confirmations and all others need at least 30 confirmations from all five radio call areas of Moldova.

H. Mark Pinsky, W8MP
USA-CA All Counties #1187, August 31, 2009

3077 counties. Worked. Confirmed. Yes, it's crazy, as 1186 other hams will attest to. I started this project shortly after I was licensed in 1974. I knew that I would never have the gazillion-watt station on a remote mountaintop, surrounded by ocean, with 43 sets of parallel towers. As a 15-year-old from Toledo, Ohio, I knew there was one trump card that money couldn't buy—persistence.

As a new ham, I was taken in by Tom Rauch, W8JI. What an Elmer! He is one of the world's true electrical geniuses. Tom can actually see electrons moving at any point, in any electrical system, something I could never do in a million years. But simply being in his presence, having his friendship, has made me strive to do the best I possibly can in the areas where I could excel. If there is anyone who meets my definition of the quintessential ham, it is Tom, hands down.

I went to Ohio State for college and dental school. To make a long story short, I had learned to fly while in high school. One thing led to another and took a turn that led me to also be a major airline A320 Captain. A bit of a change…

One dental school professor stands out: Dr Harold Crosthwaite, K8HC, is among the finest teachers one could ever have. He mentioned he was learning ham radio while teaching me the finer points of prosthodontic dentistry. We formed a friendship that has lasted to this day. He chased DX. With all the respect he can muster, he thinks I am crazy chasing counties. A better inspiration you could not find.

I became less active in ham radio while starting a family. I set up my TS-50 with an indoor dipole. This is the same antenna I am still using, due to deed restrictions. One evening, I worked Luis Chartarifsky, XE1L. I mentioned that I would be in Mexico City on a layover the next day, and he gave me his number. Luis has one of those stations that I will never have. He has awards galore, and has been on some serious DXpeditions. Luis welcomed me into his home like "family." He has told me, as nicely as possible, that this county hunting thing is crazy. There is nothing like "family" to keep you motivated.

About four years ago, I decided that it was time to try to complete this county hunting project in earnest. I looked through my QSL card collection, and found approximately 500 counties. A few days on the county hunter frequencies had me hooked. Along the way, I found a great group of people in pursuit of the same dream. To a person, each wants the other to succeed. What a terrific group. While traveling with the airline, I would call one of my new friends for an eyeball QSO. They would always insist on taking me out to eat 200 miles and 10 counties away, with the excuse that the best restaurant was there. W0QE took me around Colorado. K8ZZ in Michigan. KB6UF in Louisiana. AB7RW in Portland. KE7RTL in Idaho.

Space simply doesn't allow me to list the true extent of the help and camaraderie that the county hunters have been. With apologies to those I might miss, I need to mention KM1C, KD1EJ, N1LHW, K1SO, KO1U, KL1V,WB2ABD, K2HVN, NM2L, AB2LS, N2OCW, KZ2P, W3DYA, K3IMC, KA3QLF, AE3Z, N4CD, N4AAT, WB4KZW, KA4TYG, N4UJK, WA4UNS, NX4W, AB4YZ, KS5A, K5GE, N5KGY, WA5OPO, AI5P, K5TVC, N5UZW, AJ5ZX, K6JN, KB6TAL, W6TMD, WG6X, WY7LL, KS7S, WQ7A, N7ID, W7FEN, KI7WO, W8FNW, W8JJ, N8KIE, AA8R, K8YJ, WD9EJK, KA9JAC, N9JF, AA9JJ, NN9K, W9MSE, N9QPQ, N9QS, N9STL, KM9X, KØARS, ACØB, KBØBA, NØDXE, KØGEN, WØGXQ, NØKV, NØLXJ, NFØN, WØNAC, KØRCJ, NØXYL, NØZA.

The most important people, who truly deserve my utmost thanks, include my parents Ted, WB8TLY, and Sonja, as well as my children: Brian, KB8EEH, Roxanne, KD8GWT, and Gary. And the most helpful of all, never minding me getting "just one more county" is my wife Rose, KD8EGG. She has heard that excuse, literally, around 2000 times. Thank you again!

For those skeptical about county hunting, please consider taking on the challenge. It can be managed with a very modest radio/antenna. County hunters go out of their way to help you get the county they're in. Most will stay in a county as long as it takes, with others helping on relays, to make sure that you get it. It is a fantastic aspect of our ham radio hobby.

What is next? For me that is easy. It may take another 30 years, but now I want to *transmit* from them all. I hope my wife will not be reading this . . . *73, Mark, W8MP*

To earn Norway's Morokulien Award contact stations LG5LG and SJ9WL/SK9WL in this unique "state" on the Norwegian/Swedish border.

wegian border, located east of Stockholm. It is jointly administered by the two countries, although the border between them passes right through the middle of Morokulien. A monument was erected to commemorate the 100 years of peace between the two countries. With terrible irony, the dedication of the memorial took place in mid-August of 1914, just as the slaughters of WW I gripped central Europe and would continue for another four years.

Today, close to the border, on the Norwegian side, is a cottage containing an amateur radio station licensed by the two countries as LG5LG/SJ9WL. It is devoted to the ideals of peace and justice. Contacts with these callsigns will earn you the Morokulien Award. (The two countries take turns in administering and issuing the award. Currently, Norway is responsible.)

Contact stations LG5LG and SJ9WL/SK9WL in this unique "state" on the Norwegian/Swedish border. Award fees largely go to aid the handicapped. The award is available to amateurs and SWLs. Contacts after July 1, 1968 count. Europeans must contact these stations on two bands and on different days for a total of four days of operation. All others need to work these two stations on a different day, but the contacts may be made on the same band.

Send GCR list and fee of 50 NOK, $US5, or 10 IRCs to Sven Erik Spigseth LA4EKA, Ullern, N-2100 Skarnes, Norway. Internet: <www.sj9wl-lg5lg.com>.

The Polish Radio Amateur Association has recently begun to offer Poland's PZK Award Hunter Award for earning certain numbers of their certificates.

Poland's PZK Award Hunter Award. The Polish Radio Amateur Association, PZK, has been featured in prior columns for its a very nice selection of awards which are fairly easy to obtain, are not terribly expensive, and are a handsome addition to any award hunter's collection. The society has recently begun to offer an award for earning certain numbers of their certificates.

This award is issued to licensed radio amateurs and SWLs. It can be obtained, in an applicable class, for having collected a specific number of awards issued by the PZK.

Class 1: for having collected 8 awards (VHF/UHF, 4 awards)

Class 2: for having collected 6 awards (VHF/UHF, 3 awards)

Class 3: for having collected 4 awards (VHF/UHF, 2 awards)

Various versions of "Polska" award, issued under different administrative divisions, are considered separate awards. The "SPPA" award, and all endorsements (stickers), is counted as one award. Each version of the "HQ Award" is counted as a separate award. Higher classes of other PZK awards are counted as separate awards.

Send a list of earned awards, along with fee of 5 IRCs, to: Award Manager PZK, Andrzej Buras, SQ7B, P.O. Box 12, 27-200 Starachowice, Poland.

We're always looking for new and interesting awards to feature in this column. If your club or special-interest group has such an award, please contact me at the e-mail address shown on the first page of this column.

Wishing you all a joyous holiday season . . . 73, Ted, K1BV

BY JOHN DORR,* K1AR

Guest Operating: Challenges and Rewards

November's Contest Tip

Placing clearly written labels on your antenna switches and amplifier settings (and elsewhere) is a basic requirement for contest stations, yet many folks don't do it. In the excitement of Friday afternoon, it may be more tempting to work guys than take that final step toward efficiency. Paying attention to the details of preparation in the long run is what separates successful contest efforts from mediocre ones. Also, you may avoid a catastrophic failure from using the wrong antenna or setting. Help yourself this time; with only 15 minutes invested, you'll have another competitive advantage under your belt!

Many contesters place a high value on building and ultimately operating from their own stations, stations that have been designed, implemented, and maintained by one person. My personal experience allows me to see the issue from both sides of the coin. In the mid-1980s, I used to operate all the time from my own station in Billerica, Massachusetts. It was a simple station by today's standards—one tower with monobanders and a few wires hanging off the top. However, I put up the tower myself and many of the antennas. Fortunately, it was also a magical location (in a valley, believe it or not), and I was able to win a few contests from there.

In recent years, and especially since my move back to New Hampshire over a decade ago, I've lost the motivation to construct a large contest station. My current scenario is not unlike many other contesters' circumstances. Let's face it: Not all hams have the time and drive to build the next contest superstation. Frankly, I am amazed at the number of new stations that continue to emerge, and maybe even more impressed with the likes of KC1XX (and team) along with others who suffer massive antenna damage and manage to put it all back up in time for the fall contest season.

Thus, if your goal is to operate competitively, what are you to do? Herein lies the topic for this month's discussion. In talking to many people over the years, I've found there are wide-ranging opinions on this topic. The hardliners feel that you should always operate from your own station and that the use of someone else's sweat and toil is inappropriate. There may be some truth to that. You, at the very least, have to ask whether or not it's completely fair for someone to enjoy the same accolades from winning simply by driving to a "turnkey" ham station on Friday afternoon, versus someone who has been climbing towers for five straight summers in a concerted effort toward personal achievement.

*2 Mitchell Pond Road, Windham, NH 03087
e-mail: <K1AR@contesting.com>

Calendar of Events

All year	**CQ DX Marathon**
Nov. 21–22	LZ DX Contest
Nov. 21–23	ARRL SSB Sweepstakes
Nov. 28–29	**CQ WW DX CW Contest**
Dec. 4–6	ARRL 160M Contest
Dec. 5–6	TOPS Activity Contest
Dec. 12–13	ARRL 10M Contest
Dec. 19	OK DX RTTY Contest
Dec. 19–20	Croatian CW Contest
Dec. 26	RAC Winter Contest
Dec. 26–27	Stew Perry Topband Challenge
Jan. 2–3	ARRL RTTY Roundup
Jan. 9–10	North American CW QSO Party
Jan. 29–31	**CQ 160M DX CW Contest**
Feb. 26–28	**CQ 160M DX SSB Contest**

There are other considerations. One of the most obvious gray areas is when the station malfunctions during a single-operator contest effort. Is it fair to make the guest operator figure out the design and intricacies of the host's station on little or no sleep? Conversely, is it equitable for the host to be busy repairing a problem while the guest continues to operate? When operating from your own station and a problem develops, there is no one, short of a very cooperative wife, who is going to help. At the very least, too, you stand to lose unrecoverable operating time. I think the answer is obvious: It's not really fair.

Fortunately, over the years I've been very lucky not to have any catastrophic situations occur as described above while I've been guest operating. However, this scenario makes you think. What if you lose a contest by 15 QSOs to a "guest operating competitor" and those contacts were lost because you were at 90 feet on a tower Sunday afternoon fixing a sticky relay on your 20 meter stacks?

Even if contest adjudicators (I always enjoy using that word) included language in the rules that prevented host operator intervention for station malfunctions, it would be very difficult to enforce. An even more unfair approach would be a rule preventing someone from operating at another contester's station. This is a complicated subject indeed. The contest world certainly does not need another operating category. Imagine the burden of figuring out the winner of the Single Operator, CW, QRP, Assisted, 20-meter Single Band guest operator category?

We all can agree that it's not a perfect world, and the scenarios that can come from this topic should be something to discussed and considered. I personally feel that the fairest solution resides with the operators themselves. It actually begins well before the contest. If practical (and as a host operator, I would expect it), the guest should be involved in the development and maintenance of the station. In other words, the guest should have a vested inter-

est in the performance of the hardware, too! However, it becomes more complicated during the heat of battle. I suggest, as a guideline, that guest operators at the very least should have responsibility for fixing problems that are understood and practical. A little common sense applies here. For example, it should be the job of the guest operator to retrieve and install a replacement amplifier from the trunk of his car rather than the host giving him the luxury of continuous operating time by doing the dirty work. I believe the same applies to outside work—especially if you have been involved in the construction of the station. The sticky relay problem should be solved by the guest, not the host. Put in general terms, host operators are not there to maintain continuous operating time for the guest. They are there to provide an operating venue and a little alternating current for the equipment.

Now I know you're thinking about the many other advantages that come from operating at someone else's station. Who should cook the food? Is it fair for the host to make sure you are awake at 0900Z on Sunday morning? Does the very presence of a "cheerleader" in the shack give you a motivational advantage? The bottom line of this topic is that as a guest operator you should be extremely cognizant of any advantage given to you by the presence of your host. The solution, although not perfect, is to try and operate under the same circumstances that you would encounter at home. Wake up calls by either your wife or a host is probably the same thing in my book. A good hot meal cooked by your wife or host is also similar. In contrast, asking your host to climb his tower to manually move the Tailtwister™ rotator off the south limit switch or drive around the neighborhood looking for line noise is another matter.

Do you have opinions on this complex topic? I'd like to hear from you!

Final Comments

There is one final thought on guest operating and that is be a good guest. Always remember you are experiencing a unique privilege by "invading" someone else's home and using his station. It's something that a guest should never take for granted, and an sincere thank you can go a long way toward maintaining a great relationship, not just with the hosting ham, but with the family as well. Be on your best behavior, fellow guests!

See you in the next contest!

73, John, K1AR

dx

BY CARL SMITH,* N4AA

2009 Operations and DXpedition Frequencies

December? Yes, the year is coming to an end. Ten years ago we all were wondering what would happen when the clock turned over at midnight, December 31, 1999. Would all the computers shut down? If that happened, what would happen to all of the "things" controlled by those computers? Would our lights go out? The list just went on and on. Well, now we know that "nothing" happened as the clocks moved into a new century . . . at least nothing drastic happened. The world continues to turn and the sun continues to rise in the east and set in the west, although we sure haven't seen much in the way of sunspots. As DXers, we have continued to listen for new ones, or at least new for our individual "race for the gold." It certainly hasn't been easy, especially in the last four or five years as that pesky solar flux index (SFI) dropped into the upper '60s and seemed to be stuck there, and still is for the most part. The solar "experts" can't seem to agree on what the heck is going on or when we might be in for a significant improvement. Therefore, we DXers just keep on doing what we do … listen, listen, and listen some more.

The French team from Glorioso after making some 50,000 QSOs. (Photo courtesy of Didier, F5OGL)

*P.O. Box DX, Leicester, NC 28748-0249
e-mail: <n4aa@cq-amateur-radio.com>*

The K4M, Midway team as they prepare to board the plane in Hawaii for the island. (Photo courtesy of Tom, N4XP)

Notable Operations of 2009

Over the past year we have seen some pretty good operations, and some that just didn't quite live up to "our" expectations. The latter should be examined in more detail and not just looked at from the Cluster commentary. The Cluster commentary gets pretty ugly, and frankly just downright pathetic, when some individuals don't think they are getting "their" share of the action.

Glorioso. Such was the case for the Glorioso DXpedition. Repeatedly, I tried to explain that the team who operated FT5GA was first French Military personnel and second (or less) on a radio DXpedition. If they had not been *French* military, they would not have been allowed on the island. These people had been working on permission to go to Glorioso for *years*. Finally after all that time they were ready to go and *bang!* A civilian airliner went down in the ocean off the east coast of Africa. Being in an area served by the French Military, the aircraft, which would have taken the team to Glorioso, was pressed into search/rescue service, thus delaying the operation even more. Was this the fault of the team? Absolutely not! Such a humanitarian effort will always take priority over any non-emergency ham radio operation.

CQ DX Awards Program

SSB

2535 .....WA2BEV

CW

1095 .....PP7LL

RTTY

44 .....JA7XBG

SSB Endorsements

330.....N5FG/3399 320.....W1DF/326
330.....PY2YP/338

CW Endorsements

330.....N5FG/338 320.....W1DF/329
330.....PY2YP/337

RTTY Endorsements

330.....N5FG/332

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 339 active countries. Please make all checks payable to the award manager.

The WPX Program

CW

3236 .....HB9DAX 3238.....W5ZR
3237 .....S55SL

SSB

3057 .....VR2PW 3059.....CE1UGE
3058.....PT7ZT

Mixed

2074.....S55SL 2076 .....AB1J
2075 .....DG0KS

Digital

38.....AB1J

CW: 550 JH6JMM. 650 S55SL. 750 W4UCZ. 800 HB9DAX. 1000 W5ZR. 2750 W8IQ.
SSB: 950 PT7ZT. 1100 AA1VX.
Mixed: 550 DG0KS. 1600 S55SL. 1650 DF7ZS. 2050 AB1J.

80 Meters: OK1MP
40 Meters: HB9DAX
20 Meters: PT7ZT, OK1MP, HB9DAX
15 Meters: PT7ZT, OK1MP

Asia: OK1MP
Africa: OK1MP
Europe: PT7ZT, OK1MP, HB9DAX
Oceania: OK1MP
North America: PT7ZT, OK1MP, HB9DAX

Award of Excellence Holders: N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MDD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GO, W4BQY, I0JX, WA1JMP, K0JN, W4VQ, KF2O, WB8CNL, W1JR, F9RM, W5UR, CT1FL, WA4QMQ, W8ILC, VE7DP, K9BG, W1CU, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SM0DJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, I8YRK, SM0AJU, N5TV, W6OUL, WB8ZRL, WA8YTM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DE0DXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8UB, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, N3XX, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YB0TK, K9QFR, 9A2NA, W4UW, NX0I, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MS, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DE0DAQ, I1WXY, LU1DOW, N1IR, IK4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBF, W5ODD, I0RIZ, I2MQP, F6HMJ, HB9DDZ, W0ULU, K9XR, JA0SU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW, K0IFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, I7PXV, S53EO, DF7GK, S57J, EA5BM, DL1EY, DJ1YH, KU0A, VE2UW, 9A9R, UA0FZ, DJ3JSW, OE6CLE, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RA0FU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A, IZ5BAM, K4LQ, K0KG, DL6ATM, VE9FX, DL2CHN, W2OO, AI6Z, RU3DX, WB9IHH, CT1EEN, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, KT2C, UA9CGL, AE5B, K0DEQ, DK0PM, SV1EOS, UA0FAI, N4GG, UA4RZ, 7K3QPL, EW1CQ., UA4LY, RZ3DX, UA3AIO, UA4RC, N8BJQ, UA3BS, UA9FGR, UT3UY, WA5VGI, UT9FJ, UT4EK, K9UQN, UR5FEO, LY2MM, N3RC, OH3MKH, RA3CQ, UT3IZ.

160 Meter Endorsements: N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8ILC, K9BG, W1CU, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF, N4NX, SM0DJZ, DK5AD, W3ARK, LA7JO, SM0AJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DE0DXM, UR2QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N6JV, ONL-4003, W5AWT, NN3XX, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YB0TK, K9QFR, W4UW, NX0I, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, W5ODD, I0RIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JA0SU, I5ZJK, I2EOW, KS4S, KA1CLV, K0IFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, DJ1YH, KU0A, VR2UW, UA0FZ, DJ3JSW, OE6CLD, HB9BIN, N1KC, SM5DAC, S51U, RA0FU, CT4NH, EA7TV, LY3BA, K1NU, W1TE, UA3AP, OK1DWC, KX1A, IZ5BAM, DL6ATM, W2OO, RU3DX, WB9IHH, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, UA9CGL, SM6DHU, K0DEQ, DK0PM, SV1EOS, N4GG, UA4RZ, 7K3QPL, EW1CQ, UA4LY, RZ3DX, UA3AIO, UA4RC, N8BJQ, UA3BS, UA9FGR, UT3UY, WA5VGI, UR5FEO, N3RC, UT3IZ.

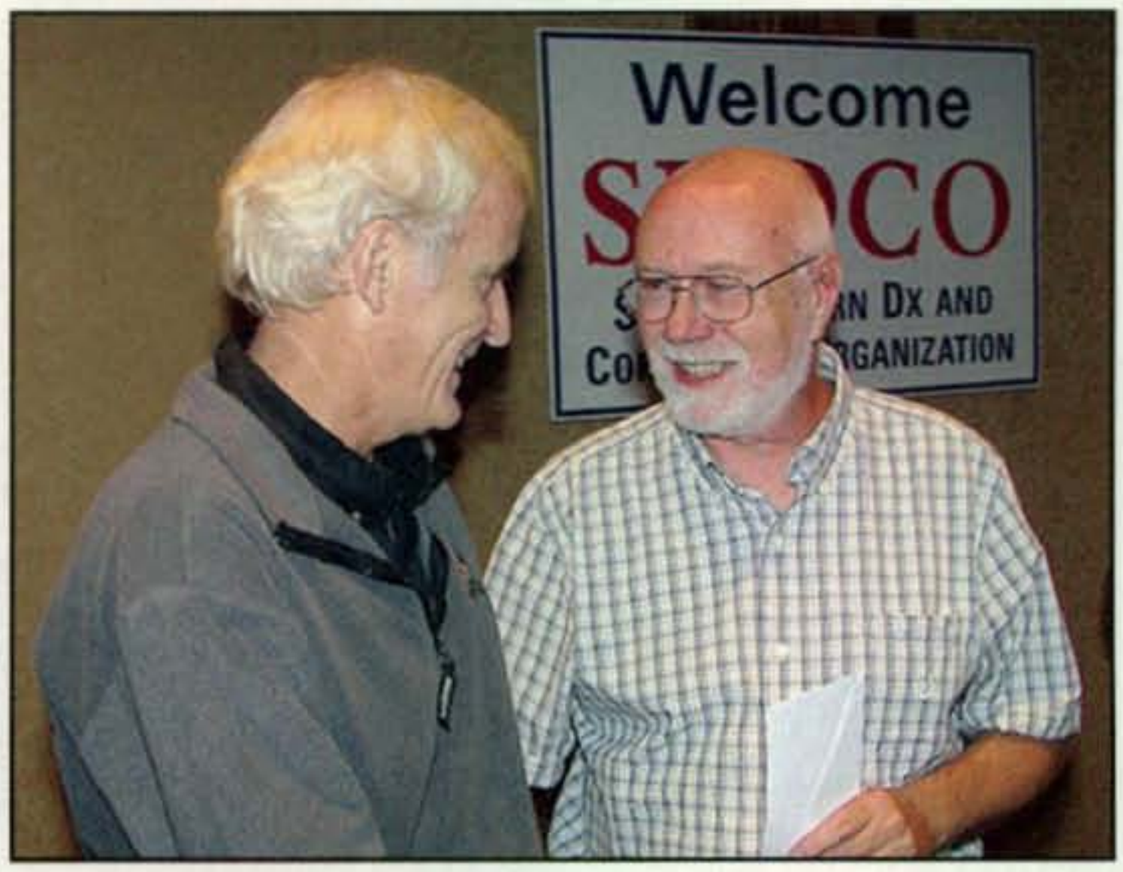
Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage for airmail) to "CQ WPX Awards," P.O. Box 355, New Carlisle, OH 45344 USA. Note: WPX will now accept prefixes/calls which have been confirmed by eQSL.cc. Other electronic QSL confirmation means are not accepted.

*Please Note: The price of the 160, 30, 17, 12, 6, and Digital bars for the Award of Excellence are $6.50 each.

Log-periodic antennas are becoming very popular. Here is a monster going up at N5WV. It has 19 elements covering 5 to 30 MHz and will be installed at 200 feet. (Photo courtesy of Randy, N5WV)

Another raffle prize from the SEDCO V convention, an IC-7600, is presented to David, NJ4F, by Pat Marcy, W7PZ, of ICOM America. (Photo courtesy of David, K4PZT)

At the SEDCO V convention the end of September, Dennis, K7BV, of Yaesu presents one of the raffle prizes, an FT-2000, to Mike, N4MIK. The young man on the right is Cameron, a General Class licensee who drew the winning tickets. (Photo courtesy of David, K4PZT)



Last, but not the least, a $1,000 discount certificate for Alpha/RF Concepts products is presented to Wayne, K8LEE, by Gordon, W0RUN, of Alpha/RF Concepts at the SEDCO V convention. (Photo courtesy of David, K4PZT)

Remember what I said above about that SFI? Well, the team on Glorioso didn't have any special power to generate sunspots. They had to take what they were dealt, and it was not a huge bonus. Their military duties took precedence over their radio operation. Anyone who has been in the military should understand this point: You are *not* your own boss and you don't just walk off and do what you want to do, whenever you want to do it.

The five ops who were on the island logged something over 50,000 contacts. Was that a record? No. Was it the best they could do under the circumstances they faced? You were not there. I was not there. We cannot say they did, or didn't. What were they hearing, or not hearing, on a particular band or mode at a given time? We don't know. We were not there. That famous old saying "You can't work 'em if you can't hear 'em!" seems to be appropriate here. If they were not hearing signals on 20 meters, why spend time there? Again, we were not there, and we don't know what the situation was at a particular time—only they do. You can bet they wanted to do the best they could possibly do for everyone. How will history record their operation? Only time will tell.

Conway Reef. There was a 20th Anniversary DXpedition to Conway Reef in October. Hans, DK9XK, led a team of eight for the celebration of his operation from Conway 20 years ago. In their eight-day operation they reportedly logged something over 35,000 contacts.

Midway. Most of us will never understand the complicated matters relative to conducting a major DXpedition. Even the most experienced among us can get "blind-sided." It happened to the team that finally put Peter I on the air for us. Then it happened to another major DXpedition—Midway, K4M. The entire team assembled in Hawaii ready to fly off to the island in early October. It didn't happen … not as planned anyway. The aircraft was "broken" and could not fly. The sit-

CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries. With few exceptions, the ARRL DXCC Countries List is used as the country standard. The CQ DX Award currently recognizes 339 countries. Honor Roll listing is automatic when an application is received and approved for 275 or more active countries. Deleted countries do not count and all totals are adjusted as deletions occur. To remain on the CQ DX Honor Roll, annual updates are required. All updates must be accompanied by an SASE if confirmation of total is required. The fee for endorsement stickers is $1.00 each plus SASE. Please make checks payable to the awards manager, Billy F. Williams. All updates should be mailed to P.O. Box 9673, Jacksonville, FL 32208.

CW

NØFW 338	K2FL 338	N4MM 337	PY2YP 337	K3JGJ 336	G3KMQ 334	KA3S 328	EA3ALV 319	N2VW 283
WB4UBD 338	K4MQG 338	W7OM 337	K2OWE 336	HB9DDZ 335	K6LEB 333	K1FK 328	RA1AOB 317	XE1MD 280
K3UA 338	W8XD 338	W7CNL 337	K9OW 336	K2JLA 334	K5RT 332	IKØADY 328	W6YQ 316	4Z5SG 279
K9MM 338	K2TQC 338	WØJLC 337	K8LJG 336	F3AT 334	K8SIX 331	F6HMJ 328	WA4DOU 316	W2JLK 277
W4OEL 338	N7RO 338	K4CN 337	K9IW 336	PA5PQ 334	W4UW 331	W1DF 328	ON4CAS 314	
EA2IA 338	F3TH 338	VE3XN 337	W4MPY 336	NC9T 334	W7IIT 331	IKØTUG 321	KØKG 306	
OK1MP 338	DL3DXX 338	K4JLD 337	K5UO 336	G4BWP 334	N7WO 330	W3II 320	WD9DZV 304	
N7FU 338	WK3N 338	N5ZM 337	K7LAY 336	W1JR 334	W6OUL 329	OZ5UR 320	KT2C 304	
N4JF 338	N5FG 338	N4AH 337	N6AW 336	I4LCK 334	KE3A 329	CT1YH 320	N2LM 297	
K4IQJ 338	K9BWQ 337	N4CH 337	KA7T 336	YU1AB 334	K6CU 329	W9IL 319	HA5LQ 287	

SSB

K4JLD 339	K5OVC 339	K4IQJ 339	VE2GHZ 338	W7BJN 337	JA7XBG 335	K4DXA 328	N8SHZ 316	K7ZM 300
EA2IA 339	K4MQG 339	WK3N 339	AA4S 338	AB4IQ 337	WØYDB 334	SV3AQR 328	W6NW 314	XE1MEX 300
XE1AE 339	N4MM 339	N5FG 339	py2yp 338	W4UNP 337	K5RT 334	VE7EDZ 328	KA1LMR 312	W4EJG 295
IN3DEI 339	K9MM 339	K5TVC 338	VE3MR 338	W4UW 337	WA4WTG 334	XE1MD 327	RA1AOB 312	W9ACE 294
NØFW 339	OZ5EV 339	KZ2P 338	VE3MRS 338	K8SIX 336	ZL1BOQ 334	YV4VN 326	N2LM 312	WD9DZV 292
DU9RG 339	VE2PJ 339	W6BCQ 338	XE1L 337	KE3A 336	K3LC 334	KD5ZD 326	G3KMQ 312	W6MAC 292
K3UA 339	K3JGJ 339	W6EUF 338	OE3WWB 337	K9IW 336	HB9DDZ 334	W1DF 326	KD2GC 311	AD7J 291
K6YRA 339	N5ZM 339	W7OM 338	K9OW 337	N2VW 336	VE4ACY 333	PY2DBU 325	RW9SG 310	AE9DX 289
IK1GPG 339	N7RO 339	K9BWQ 338	N6AW 337	W2CC 336	K9PP 333	KE4SCY 325	IØYKN 310	W5PVE 288
DJ9ZB 339	KE5K 339	W8AXI 338	IK8CNT 337	N7WR 336	YV1KZ 333	W4MPY 325	KU4BP 310	HB9DQD 286
N7BK 339	IØZV 339	W9SS 338	EA4DO 337	PA5PQ 335	W9IL 333	K6GFJ 324	XE1MW 309	VE7HAM 285
4Z4DX 339	OE2EGL 339	VK4LC 338	CT3BM 337	XE1VIC 335	F6HMJ 333	TI8II 324	AA1VX 308	N8LIQ 284
WB4UBD 339	W4ABW 339	K7LAY 338	YU1AB 337	NC9T 335	YV1AJ 332	W6OUL 322	4Z5FL/M 306	N3RC 280
OZ3SK 339	DL3DXX 339	WS9V 338	K8LJG 337	K1UO 335	KSØZ 332	XE1RBV 321	K7SAM 305	HSØ/EA4BKA 276
OK1MP 339	I8KCI 339	W6DPD 338	W3AZD 337	CT1EEB 335	VE4ROY 332	XE2NLD 321	I3ZSX 304	K9DXR 275
K2TQC 339	VE1YX 339	K4CN 338	KØKG 337	W1JR 335	YV1JV 331	VE7SMP 320	JR4NUN 303	
K4MZU 339	N4CH 339	VE3XN 338	W2FKF 337	I4LCK 335	K7HG 331	WØROB 320	W4PGC 302	
N4JF 339	EA3BMT 339	K9HQM 338	W7FP 337	ZL1HY 335	N5YY 331	ON4CAS 319	EA8AYV 302	
W4WX 339	IKØAZG 339	K2FL 338	YU3AA 337	K5UO 335	N1ALR 330	LU3HBO 317	4X6DK 301	

RTTY

WB4UBD 337	N5ZM 333	N5FG 332	G4BWP 320	K4CN 303
NI4H 336	K3UA 332	OK1MP 329	PA5PQ 311	K8SIX 300

uation was complicated by the fact that there was no other aircraft that was "certified" to land on Midway. After days of waiting, the aircraft mechanics were finally able to make repairs, and the team was able to make the trip to Midway late on Sunday, October 11th. The operation, which was to have begun around October 9th or 10th, finally began on Tuesday, October 13th. The news from the island was—*very hot,* can only do so much work outside. As of this writing the team must leave the island October 19th. No extension was possible due to the migratory bird situation there. We will know "the rest of the story" by the next issue of *CQ* magazine and I'll share it with you at that time.

DXpedition Frequencies

For many years now there have been semi-official DXpedition frequencies. I'm not sure how or where this began, but it was a pretty good idea at the time. We came to know what frequencies to listen on for a DXpedition, such as 3.895, 14.195, 21.295, etc. Over the years DXpedition frequencies became a source of complaint by non-DXers and even some DXers. Usually, the complaints have concerned the pile-ups

calling the DXpedition, and most often concern the SSB frequencies, and in many cases the WIDE spread listening range being used (sometimes as much as 25–30 kHz). One of my readers recently sent his comments, and I offer them to you for your consideration and comment… *not* to me, but among you and your fellow DXers at club meetings, on the air, with your DX Advisory council members, etc. I can put the word out there, but I cannot "change" the operating frequencies. Only your peer pressure can do that. Here's what the reader had to say:

"I am writing to you, as you are a person of influence in the DXing community. I would like to share a suggestion about the frequencies which DXpeditions choose to operate on. Many years ago (in the 1970s era), DX stations would transmit on the bottom of the band, and listen up from there. The general net activities and rag chew activities would take place toward the top of the band, and interference between the two groups was kept to a minimum. In recent times, there have been DX pile-ups in the upper part of the band, especially on 20 meters phone. In my view, this practice only tarnishes the image of us, the DXers. Collectively, I think we need to get back to past practice of using the lower part of the bands (i.e., now 14150 kHz), or else face the increasing wrath of our non-DX brothers and sisters. I ask you to consider floating this concept among the DXing community, in an effort to help keep the peace."

All-Time New Ones!

Wow, that's something we like to hear. A great many DXers now have achieved that # 1 Honor Roll status and are looking for new challenges. In recent years we have been "blessed" with a couple of all-time new ones and that gave us the opportunity to dig for that one to maintain our "place in line" on the Honor Roll list. Well, it appears that sometime late in 2010 there will be at least two, and perhaps as many as four, all-time new ones for us. All of this comes from the Netherlands Antilles in the Caribbean. This is still subject to the end results of the restructuring of the Antilles. As things progress I'll try to keep you informed of what is happening on this subject.

With the holidays just ahead, I wish you peace and good will to all. Remember, too, until next time, enjoy the chase, and Have Fun!

73, Carl, N4AA

5 Band WAZ

As of October 1, 2009, 7993 stations have attained the 200 zone level and 1659 stations have attained the 150 zone level.

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

UW7CN G3VMW SP3EPK

The top contenders for 5 Band WAZ (zones needed, 80 or 40 meters):

S51U, 199 (27)
N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40m)
IK1AOD, 199 (1)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W3NO, 199 (26)
RU3FM, 199 (1)
N3UN, 199 (18)
W1JZ, 199 (24)
W1FZ, 199 (26)
SM7BIP, 199 (31)
N4NX, 199 (26)
N4MM, 199 (26)
EA7GF, 199 (1)
N6HR/7, 199 (37)
JA5IU, 199 (2)
RU3DX, 199 (6)
N4XR, 199 (27)
HA5AGS, 199 (1)
VE3XN, 199 (26)
YU7GMN, 199 (10)
K7LJ, 199 (37)
RA6AX, 199 (6 on 10m)
RX4HZ, 199 (13)
KØGM, 199 (17)
S58Q, 199 (31)
KQØB, 199 (2 on 10)
K9OW, 199 (34 on 10)
N5AW, 199 (17)
JH7CFX, 199 (2)
IN3ZNR, 199 (1)
G3VKW, 199 (31)
EA5BCX, 198 (27, 39)
G3KDB, 198 (1, 12)
JA1DM, 198 (2, 40)
9A5I, 198 (1, 16)
K4CN, 198 (23, 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)
F5NBU, 198 (19, 31)
OE2LCM, 198 (1, 31)
WK3N, 198 (23, 24)
W9XY, 198 (22, 26)
KZ2I, 198 (24, 26)
W7VJ, 198 (34, 37)
K9MIE, 198 (18, 21)
W9RN, 198 (26, 19 on 40)
W5CWQ,198 (17, 18)
I5KKW, 198 (31&23 on 20)
IV3MUC, 198 (1&31 on 40)
UA4LY, 198 (6&2 on 10)
UT9FJ (27, 29)
JA7XBG, 198 (2 on 80&10)

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

JE1GWO (187 zones)
K7VC (176 zones)
JH7CFX (199 zones)
W5OZI (196 zones)

5 Band WAZ updates:

UT9FJ (200 zones)
K2EP (194 zones)

***Please note: Cost of the 5 Band WAZ Plaque is $100 shipped within the U.S.; $120 all foreign (sent airmail).**

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, Floyd Gerald, N5FG, 17 Green Hollow Rd., Wiggins, MS 39577. 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 Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

The WAZ Program

6 Meters

87 .....MUØFAL (25 zones) 88.....PY2BW (26 zones)

12 Meter SSB

41 .....N4PQX

20 Meter SSB

1182 .....RX3MX 1183 .....EA3ATM

15 Meter CW

335 .....JE1GWO

20 Meter CW

590 .....JE1GWO

80 Meter CW

78.....WA5VGI

160 Meters

318 .....UW7CN (30 zones) 321.....US4EX (40 zones)
319.....JA7NI (39 zones) 322....PY2BW (31 zones)
320 .....W5OZI (35 zones)

All Band WAZ

Mixed

8622.....UT1CC 8625.....K6LY
8623.....W6GAK 8626.....W7/DL1UF
8624.....RV3BD

SSB

5119 .....JA1CKE 5120 .....IK1SOW

CW

577.....JT1DA 579 .....W5ZR
578 .....E74SD

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, Floyd Gerald, N5FG, 17 Green Hollow Rd., Wiggins, MS 39577. 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 Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

QSL Information

4O/DJ8QP via DJ8QP
4S7AAG via DL1LH
4S7SAG via DH7SA
5X1THA via MØWTF
6W/OK1FZM via OK1FZM
7Q7CE via IN3VZE
BY3MM via BD3NHK
DR2ØDLY via DL1AB
EF7URS via EA7URS
EG1FST via EA1EG
EG7PL via EA7URP
ER65ØMD via ER4DX
ER8C via ER1DA
FY/LAØBY via LAØBY
HBØ/OE9SDV via OE9SDV
HF35PEA via SP1NQF
HSØZJF via ON4AFU
IU2FV via IQ2MI
JF1FGX/DU9 via JF1LZQ
L73D via LW4EF
OHØ/G3LP via G3LP
OO5G via ON4GI
SN1ØØDP via SQ2RH
SN7ØW via SP2LNW
SV9/G3ROO via G3ROO
T6YA via F5OGL
UR4CWQ/P via UT7UW
V31MD via NM2D
VU3DJQ via EA7FTR

(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>; <http://golist.net/>.)

The Sun is Not Asleep!

BY TOMAS HOOD,* NW7US

propagation

A Quick Look at Current Solar Cycle Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, September 2009: 4
Twelve-month smoothed, March 2009: 3

10.7 cm Flux
Observed Monthly, September 2009: 70
Twelve-month smoothed, March 2009: 69

***Ap* Index**
Observed Monthly, September 2009: 3
Twelve-month smoothed, March 2009: 5

One Year Ago: A Quick Look at Cycle 24 Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, September 2008: 1
Twelve-month smoothed, March 2008: 3

10.7 cm Flux
Observed Monthly, September 2008: 67
Twelve-month smoothed, March 2008: 70

***Ap* Index**
Observed Monthly, September 2008: 5
Twelve-month smoothed, March 2008: 7

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for December 2009

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 1-2, 4, 6-8, 10, 14-16, 20, 22-24, 26-29, 32	A	A	B	C
High Normal: 3, 9, 11, 13, 17, 21, 25, 308	A	B	C	C-D
Low Normal: 5, 12, 18-19	B	C-B	C-D	D-E
Below Normal: N/A	C	C-D	D-E	E
Disturbed: N/A	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 in *The New Shortwave Propagation Handbook* by George Jacobs, W3ASK; Theodore J. Cohen, N4XX; and Robert B. Rose, K6GKU.

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 1 will be fair (C) on December 1st and 2nd, poor (D) to fair (C) on the 3rd, etc.

3. As an alternative, the Last-Minute Forecast may be used as a general guide to space weather and geomagnetic conditions through the month. When conditions are Above Normal, for example, the geomagnetic field should be quiet and space weather should be mild. On the other hand, days marked as Disturbed will be riddled with geomagnetic storms. Propagation of radio signals in the HF spectrum will be affected by these conditions. In general, when conditions are High Normal to Above Normal, signals will be more reliable on a given path, when the path is ionospherically supported.

The progress of the new solar Cycle 24 continues to be a topic of speculation. During August 2009 no sunspots were observed. This gave the appearance that the sunspot cycle was still asleep. With the monthly smoothed sunspot count of zero, August looks like the worst month on record since the start of the new cycle. However, looks are deceiving. We've witnessed longer quiet periods prior to August. Those quiet periods, however, did not begin right at the start of any month and end after the end of the same month. Those long quiet periods were timed just right so that the monthly counts did not show zero for a whole month. Nevertheless, we've had quiet periods exceeding one month in duration.

The month of August, when taken in the context of surrounding months, though, is not a sign of a still-sleeping Sun. The proof is in September's smoothed sunspot count, 4.2—the highest monthly count since the start of the new cycle. We are already seeing a slow, yet steady climb in monthly sunspot counts, as well as in the 10.7-cm solar flux readings. The result? Propagation is improving on the high frequencies.

September saw some very strong sunspot activity, with two sunspot regions emerging at the nearly the same time (figs. 1 and 2). This pushed the 10.7-cm flux into the mid-70s, breathing life into HF

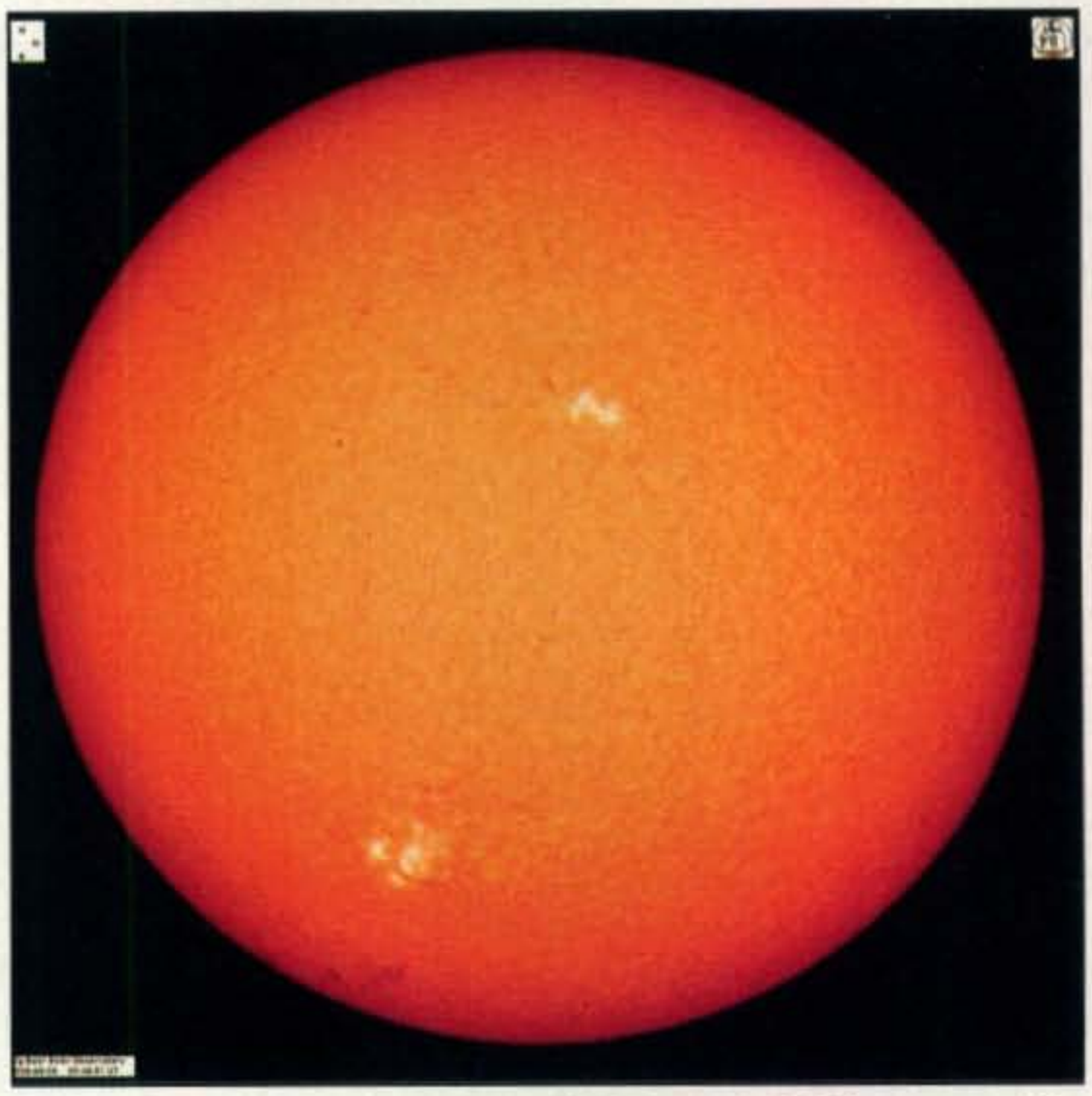


Fig. 1– Two sunspot regions (1026 and 1027) emerged in September 2009, resulting in improved HF propagation. (Source: SOHO)

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e-mail: <nw7us@arrl.net>

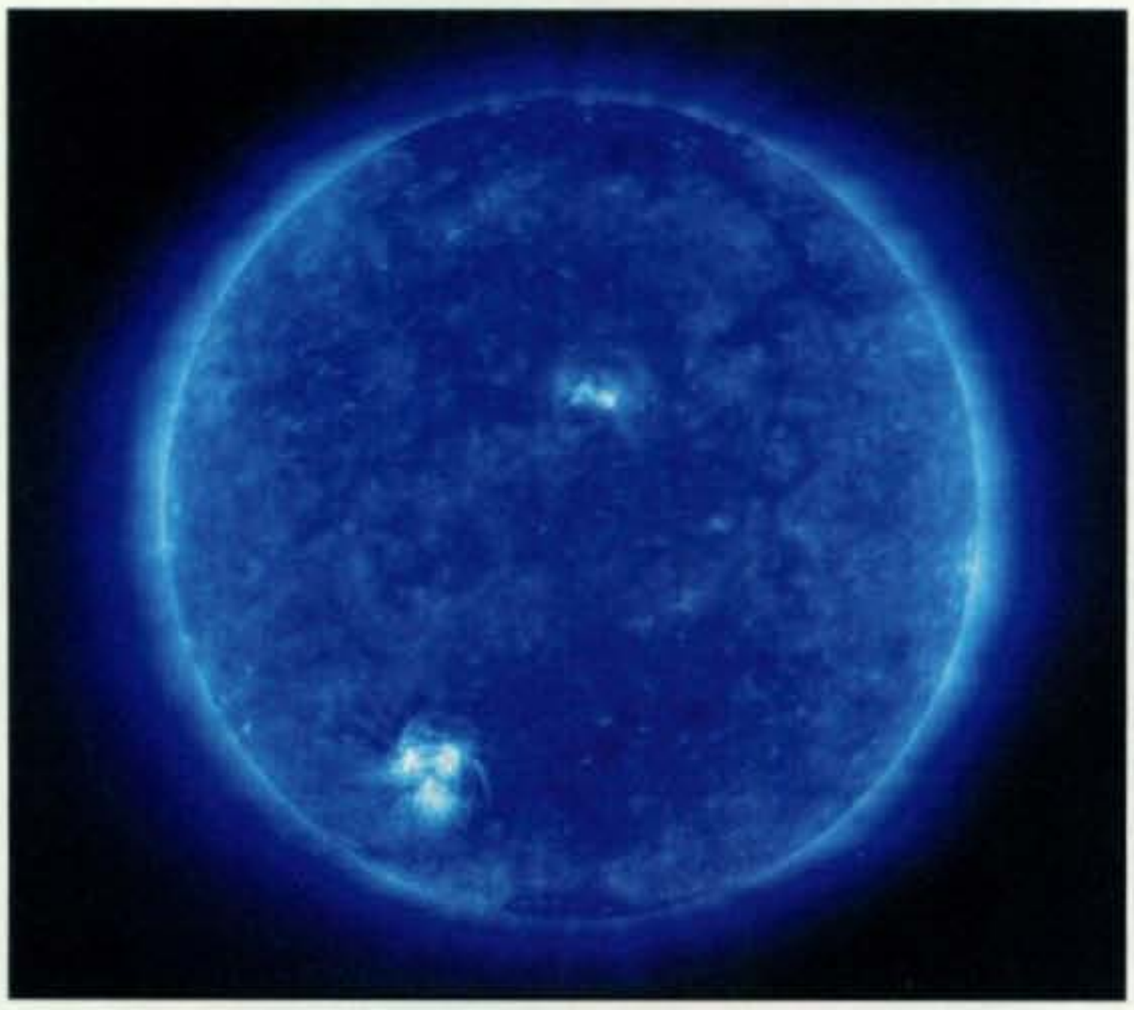

Fig 2– Another view of the two sunspot regions from September 2009. One region produced a C-class solar flare. (Source: SOHO)

propagation. After these two sunspot regions rotated out of view, the Sun remained quiet until mid-October, when the sunspot regions rotated back into view. The leading region no longer had well-defined sunspots, yet still contributed to a rise in 10.7-cm activity. October ended with signs that the Sun is continuing a slow, yet steady increase in sunspot activity.

Will Sunspots Disappear by 2015?

The sunspots we are now seeing clearly belong to the new solar Cycle 24. However, many of the new-cycle spots appear weaker than the new spots seen at the start of recent past solar cycles (figs. 3[A] and 3[B]).

Could it be that sunspots are different now than during the last sunspot cycle? If so, is another cycle of some sort at work, independent of the solar 22-year magnetic cycles?

Remember, the 11-year average sunspot cycle is half of the Sun's 22-year magnetic cycle. During the first 11 years of this 22-year cycle, the Sun's magnetic poles are opposite in polarity from those during the next 11 years. The Sun actually flips its magnetic poles from cycle to cycle; that is one of the indicators solar scientists use to track the transition from cycle to cycle.

In 1990, a time of maximum sunspot activity in Cycle 22, solar researchers led by S. K. Solanki from Zurich took advantage of the new infrared capability at the McMath-Pierce Solar Telescope on Kitt Peak in Arizona. They made observations of sunspots, mapping magnetic fields, along with other spectral data. These observations continued through the minimum of Cycle 22. In 1998 the observing runs were made more systematic by measuring all sunspots visible on the disk during the run. The research work has continued through Cycle 23 up to the present (2009).

A startling trend has emerged from the data gathered in this research. In 2005, scientists led by Matthew Penn from the U.S. National Solar Observatory (NSO) closely examined these solar measurements made over the previous 13 years. The analysis indicates that the magnetic field strength in sunspots is decreasing with time, independent of the sunspot cycle. A simple linear extrapolation of the data suggests that sunspots might completely vanish by 2015! This sensational prospect was published by Penn and William Livingston (also of the NSO) in a paper published in *The Astrophysical Journal,* 649: L45–L48, 2006 September 20, entitled, "Temporal Changes in Sunspot Umbral Magnetic Fields and Temperatures" (see <http://tinyurl.com/ hfradio-spotpaper>).

About Those Spots

Sunspots are magnetic regions on the Sun with magnetic field strengths thousands of times stronger than the Earth's magnetic field. Plasma flows in these magnetic field lines of the sun (fig. 4). Sunspots appear as dark spots on the surface of the Sun. Temperatures in the dark centers of sunspots (the *umbra*) drop to about 3700K, compared to 5700K for the surrounding photosphere. This difference in temperatures makes the spots appear darker than elsewhere.

Sunspots usually form in groups containing two sets of spots. One set will have a positive, or north, magnetic field while the other set will have a negative, or south, magnetic field. The magnetic field is strongest in the darker parts of the sunspot. The field is weaker and more horizontal in the lighter part (the *penumbra*). (See fig. 5.)

Since the time of Galileo Galilei, who made the first European observations of sunspots in 1610, observers and scientists have discovered a great deal about the Sun and its influence on the Earth and our atmosphere. The Chinese and many other early civilizations were the first to discover sunspots. Daily sunspot observations were started at the Zurich Observatory in 1749. By 1849, continuous sunspot observations were recorded.

Over time, cycles in solar activity were revealed. The Sun's sunspot activity has a cycle that lasts for an approximate 11-year period. The cycle starts with very quiet solar activity with very few sunspots, then peas about three to five years later with a very high number of daily sunspots, and then sunspot activity decreases until the end of the solar cycle.

In 1848, the Swiss astronomer Johann Rudolph Wolf introduced a daily measurement of sunspot number. His method, which is still used today, counts the total number of spots visible on the face of the Sun and the number of groups into

Flash:

CQ WW DX CW Contest Forecast Looks Challenging

Good Conditions Now Expected

Since this issue should reach many subscribers before the CW contest begins, here's a quick update for the 2009 CQ WW DX CW Contest (http://www.cqww.com/) starting at 0000 UTC, Saturday, November 28 and continuing until 2400 UTC, Sunday, November 29. The original forecast, published in this column last month, called for fair to good conditions during the contest period. Based on the 27-day rotation of the Sun and the recent solar activity, the forecast now is for good conditions on both contest days. Perhaps better than good; there are signs and we will see.

Daily 10.7-cm solar flux levels are expected to be 70 for both days. The geomagnetic planetary *A*-index is expected to be about 5 during the CW contest. As predicted last month, this translates to a contest period of quiet geomagnetic conditions. While the low solar activity leaves the ionosphere weak, the quiet conditions provide an edge when working weak signals. When paths are open, you should be able to rack up significant points. For an up-to-the day Last-Minute Forecast, visit my propagation resource center, at <http://prop.hfradio.org/>.

which they cluster, because neither quantity alone satisfactorily measures sunspot activity.

To compensate for the many limitations of observing the Sun at various places, each daily international number is computed as a weighted average of measurements made from a network of cooperating observatories.

The Trend Continues

Three years after the first paper, the predicted cycle-independent dearth in sunspot numbers has proven accurate. An updated paper, "Are Sunspots Different During This Solar Minimum?" (published in EOS, Transactions, American Geophysical Union, Vol. 90, No. 30, 28 July 2009; see <http://tinyurl.com/hfradio-eospaper>) reports that the vigor of sunspots, in terms of magnetic strength and area, has continued to diminish. Fig. 6 shows the decrease in field strength now found with respect to time (1992–2009), which still shows a linear trend independent of the solar cycle. The mean infrared intensity of sunspot umbrae is also increasing with time.

In simple terms, the sunspots observed since the 1990s have been increasing in brightness, while decreasing in magnetic field strength. When the brightness becomes the same in the sunspot as the brightness of the rest of the solar disc, we will no longer be able to see these weak sunspots. They simply will vanish, perhaps by 2015 (figs. 7[A] and 7[B])!

After interviewing Dr. Penn in the "NW7US Space Weather and Radio Propagation Podcast,, Episode 4, quite a few people questioned this startling research. For example:

In the 2006 journal article, I found the last sentence of the first paragraph of Observations troubling: (1) If no effort is made to prevent counting the same sunspot twice, one could, even subconsciously, favor sunspots that might favor one's hypothesis, and (2) If multiple counting is allowed and long-lived sunspots have different characteristics than shorter-lived sunspots, the data is skewed toward sunspots with longer lives because there are more opportunities to count these sunspots, more times. If I were a reviewer of this paper, I would be very uncomfortable with this sentence.

Dr. M. Penn responds:

As you know the Sun is highly dynamic! The following movie from MDI on SOHO of the 2001 sunspots dramatically shows this: <http://soi.stanford.edu/press/ssu11-01/ MPG/lc.2001.mpg.>

Bill's observations occur only 60 days per year, so with clouds, he might have 50 snapshots of the sunspot activity during this movie. Small pores evolve from hour to hour, and even large umbrae change from day-to-day and week-to-week. His observation plan minimized bias by measuring every sunspot on the visible disk each day he observed. Without continuous observations, it's impossible to tell if a particular pore has been observed already; and worse, without seeing the far-hemisphere of the Sun, it's impossible to tell even if large umbrae appearing on the eastern limb have been observed on their previous rotation. Equally important is the fact that not all sunspots could be observed.

Selection bias was extensively tested in this and following work. Larger sunspots tend to live longer and thus have a higher probability of being observed multiple times. The data sets were examined to measure the behavior of different-sized spots, and each size bin showed the same time variation; large spots by themselves showed the same trends that small spots by themselves showed.

We know the sample is incomplete, but with the testing we've done we think that multiple measurements do not introduce a bias which would cause the time variation.

As far as an observer-introduced bias. ... Bill is internationally known as a very patient and excellent observer. It's hard to imagine that during the course of 13 years he (consciously or not) sub-

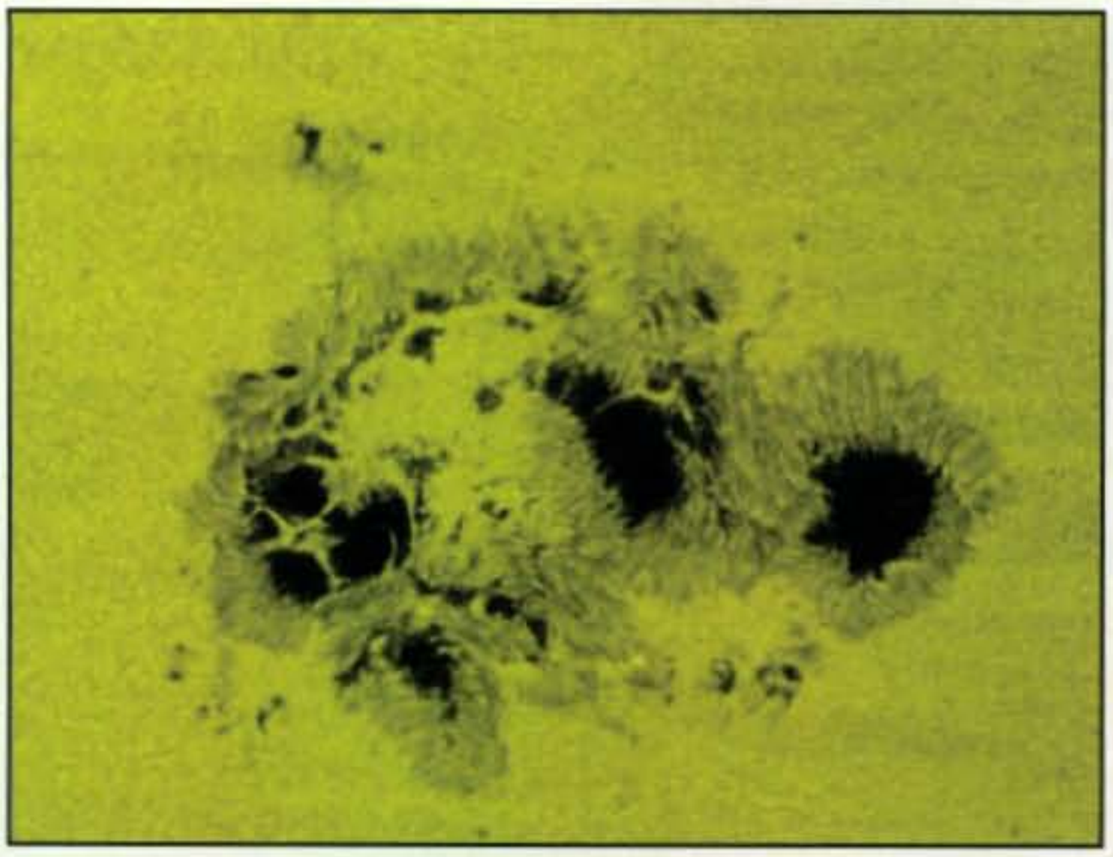

Fig. 3(A)– An image of a sunspot from near the maximum of the last solar cycle, Cycle 23, taken at the McMath-Pierce telescope, Kitt Peak, Arizona, on 24 October 2003. The sunspots clearly show a dark central umbra surrounded by a brighter, filamentary penumbra. The magnetic fields seen here range from 1797 to 3422 Gauss. (Source: M. Penn, U.S. NSO; National Solar Observatory)

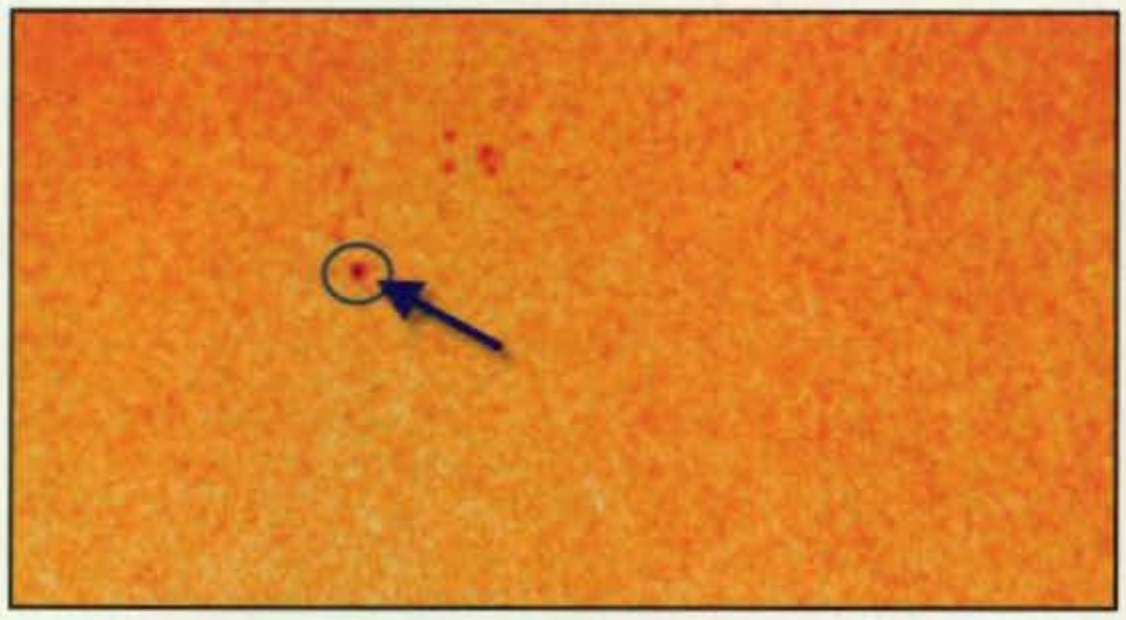

Fig. 3(B) – An image of a pore, a tiny sunspot with no penumbral structure, taken from the MDI instrument on the SOHO spacecraft, 11 January 2009. This is an example of what we observe today at solar minimum. The larger pore had a magnetic field of 1969 Gauss. Presently, the solar surface is mostly devoid of spots. Both images (figs. 3[A] and fig. 3[B]) have the same spatial scale and are roughly 250,000 kilometers across. (Source: M. Penn, U.S. NSO)

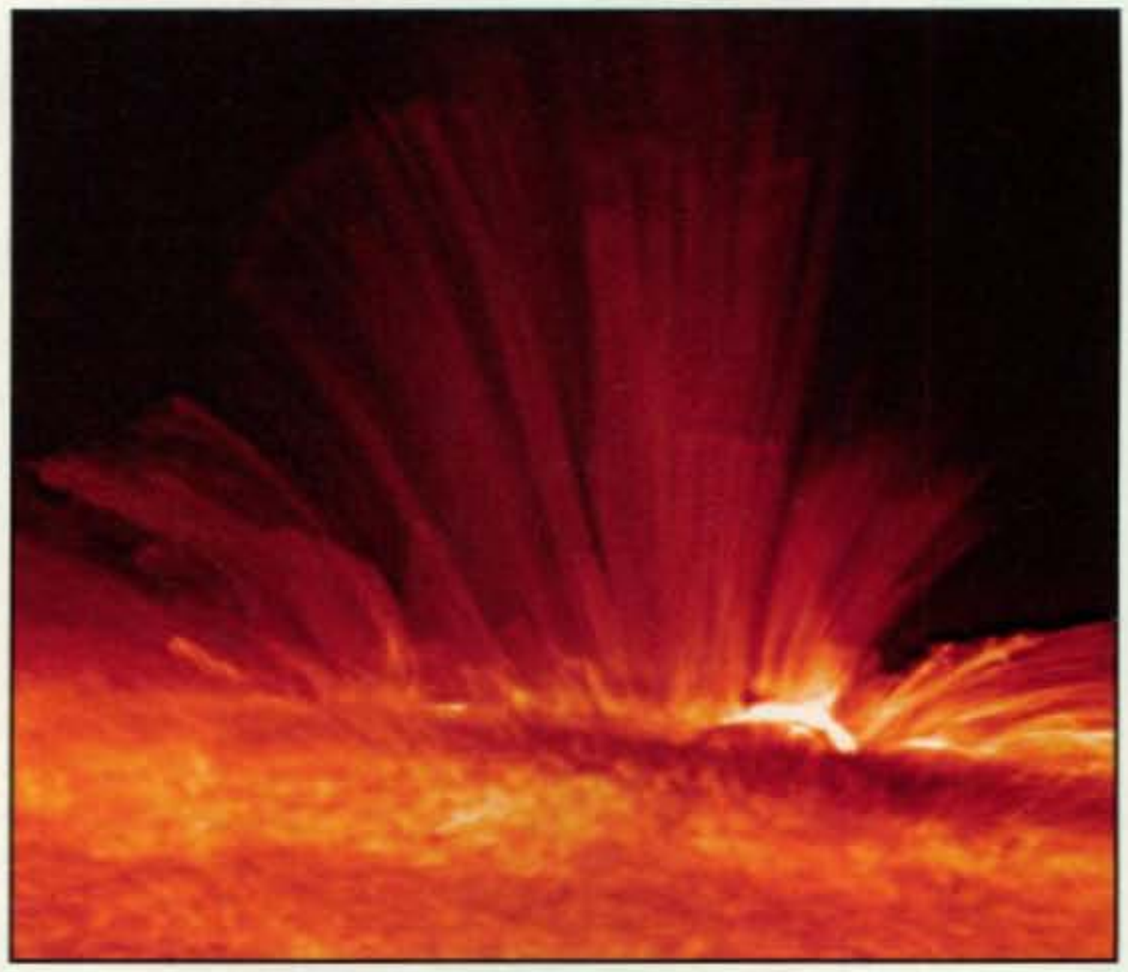

Fig. 4– Solar magnetic field lines, punching through sunspots, seen in this dramatic photo of solar plasma riding these intense magnetic structures. (Source: NASA)

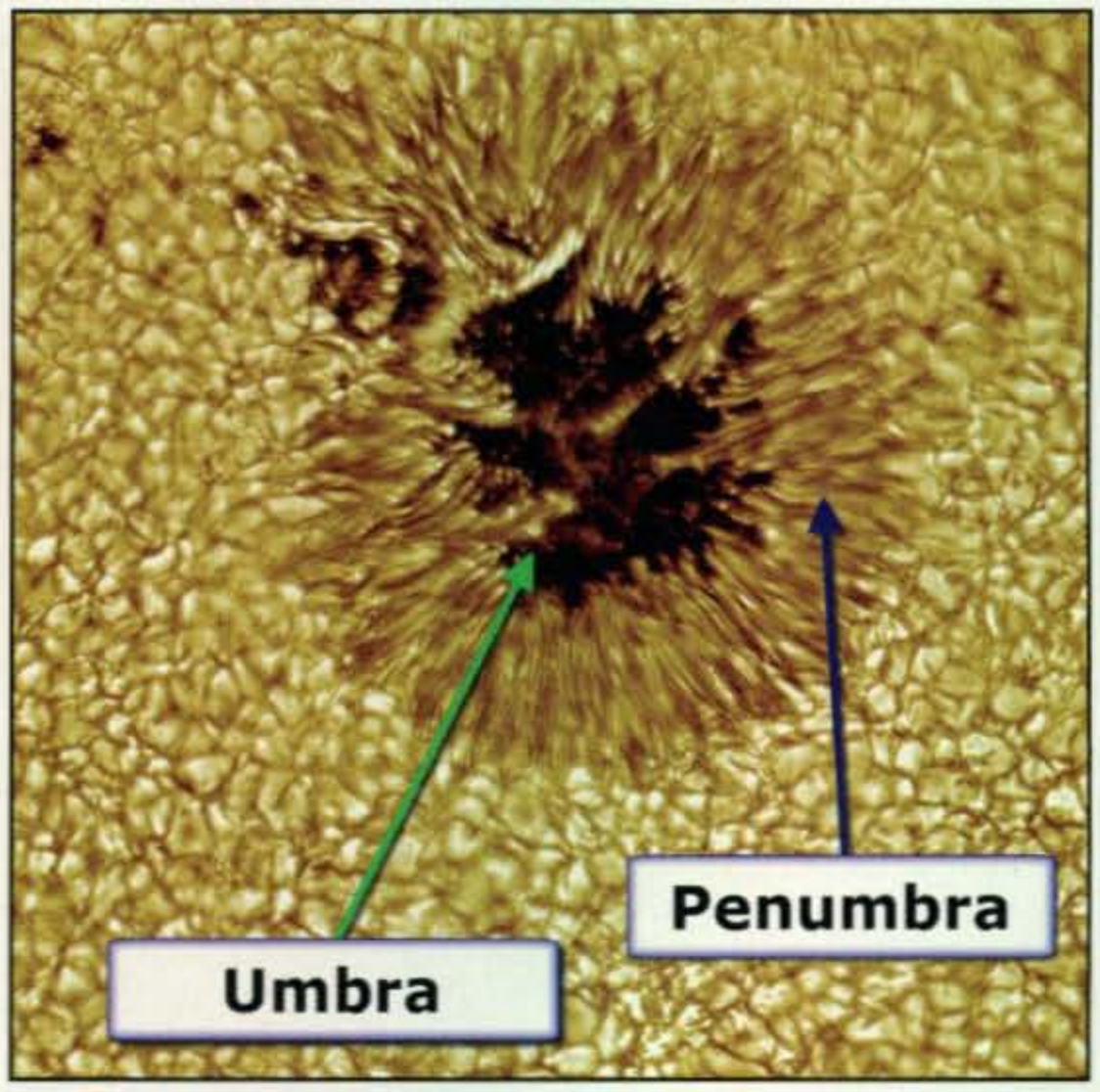

Fig. 5– A sunspot showing the darker (cooler) center, the umbra, and the outer penumbra. Will these clearly defined sunspot characteristics visually disappear by 2015? (Source: NASA)

tly changed his sunspot selection to introduce a linear trend, and further that his personal bias would eventually agree with the fact that the next solar minimum would be longer than usual! Furthermore, current work on automatically selected sunspots from archival data bases supports these IR observations.

In one year's time, will we see the most recent sunspots exhibit the same decline in strength? This column will continue to report on the solar cycle progress, as well as whether or not this trend is continuing.

Winter Opportunities on the Bands

A moderate to low level of solar activity is expected during December, with 10.7-cm flux levels peaking (if predictions hold true) around 75, dipping down to the upper 60s. Since August, we've seen less spotless days, and the bands are starting to show signs of change. During October, for instance, with the flux at or slightly above 70, I was copying and even initiated European and Pacific/Asian QSOs on 20 meters, using PSK-31, with the highlight having a QSO with Felix, DP1POL, in Antarctica (see fig. 8). It is possible to work the world on the high frequencies even during solar minimum.

The great thing about the winter season is that the density of ionization in the Northern Hemisphere is expected to increase more rapidly after sunrise than during other seasons. Additionally, static and atmospheric noise levels will be at seasonally low values during the month of December. Reasonably strong signal levels are expected on most of the

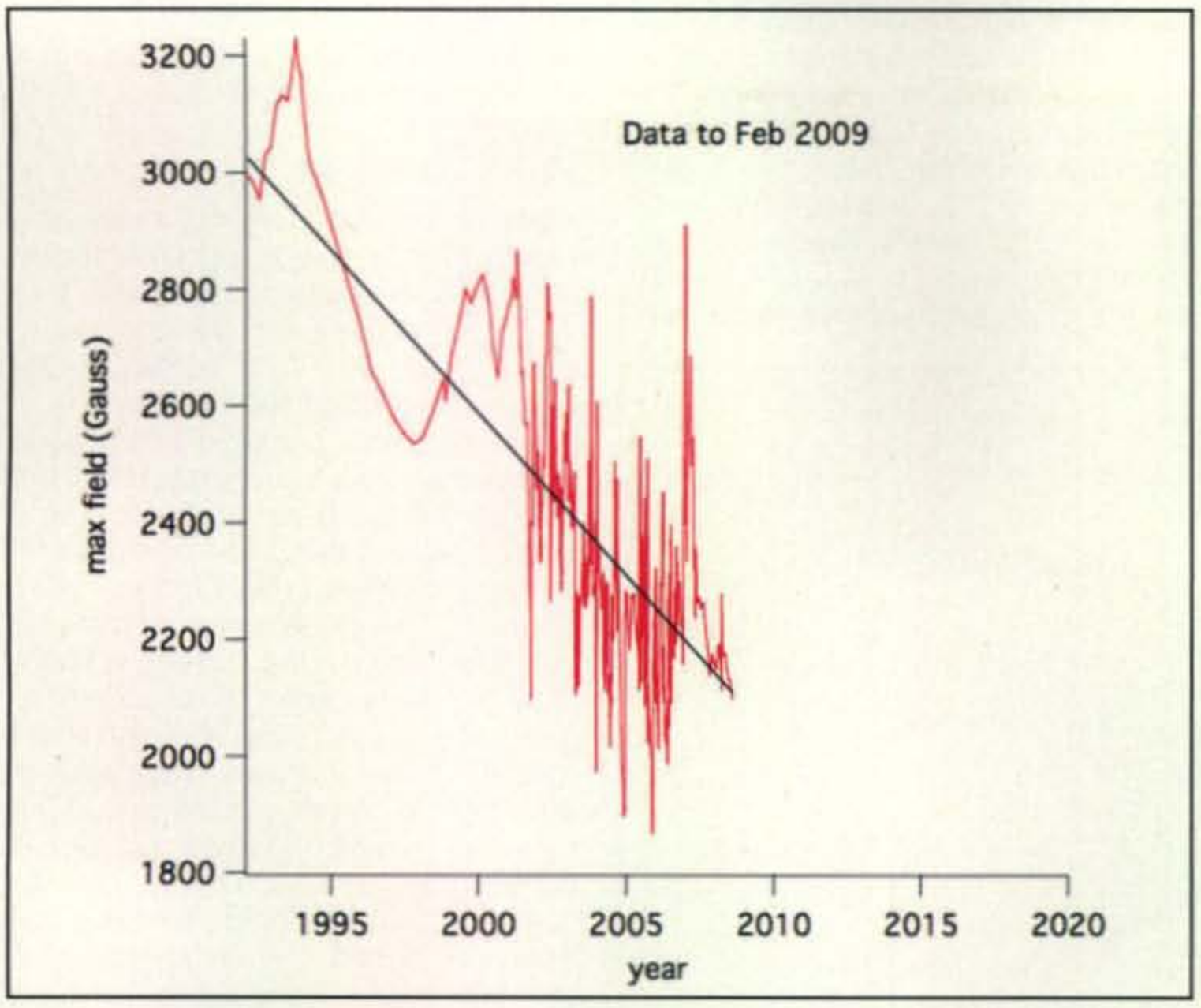

Fig. 6– The maximum sunspot field strength is plotted versus time, during the period from 1992 to February 2009; a 12- point running mean is shown, and a linear fit to the data is plotted. Apart from a few measurements, the linear trend has been seen to continue throughout this solar minimum. (Source: M. Penn, U.S. NSO)

open bands, while the higher bands will not be as hot as during the peak years.

Continue to expect fair daytime openings on 15 meters primarily on north/south paths. Openings may be slightly longer and more stable than at the same time last year due to the slight increase in solar activity. There is an increase in reports of 10-meter activity, so don't rule out working that great band.

Fairly good DX openings are also expected on 17 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 DX, following the pattern of 20 meters. When conditions are "Above Normal," 30, 20, and 17 meters are likely to remain open toward the south and west from early evening until about midnight, mostly for DXers in the lower latitudes nearer the equator.

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 meters 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 more in a 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 should peak toward Europe and in a generally easterly direction around midnight, and then open in a generally western direction with a peak just after sunrise. The band should remain open towards the south throughout most of the night.

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 during the daylight hours on 20, 17, and to some lesser degree on 15 meters. During 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.

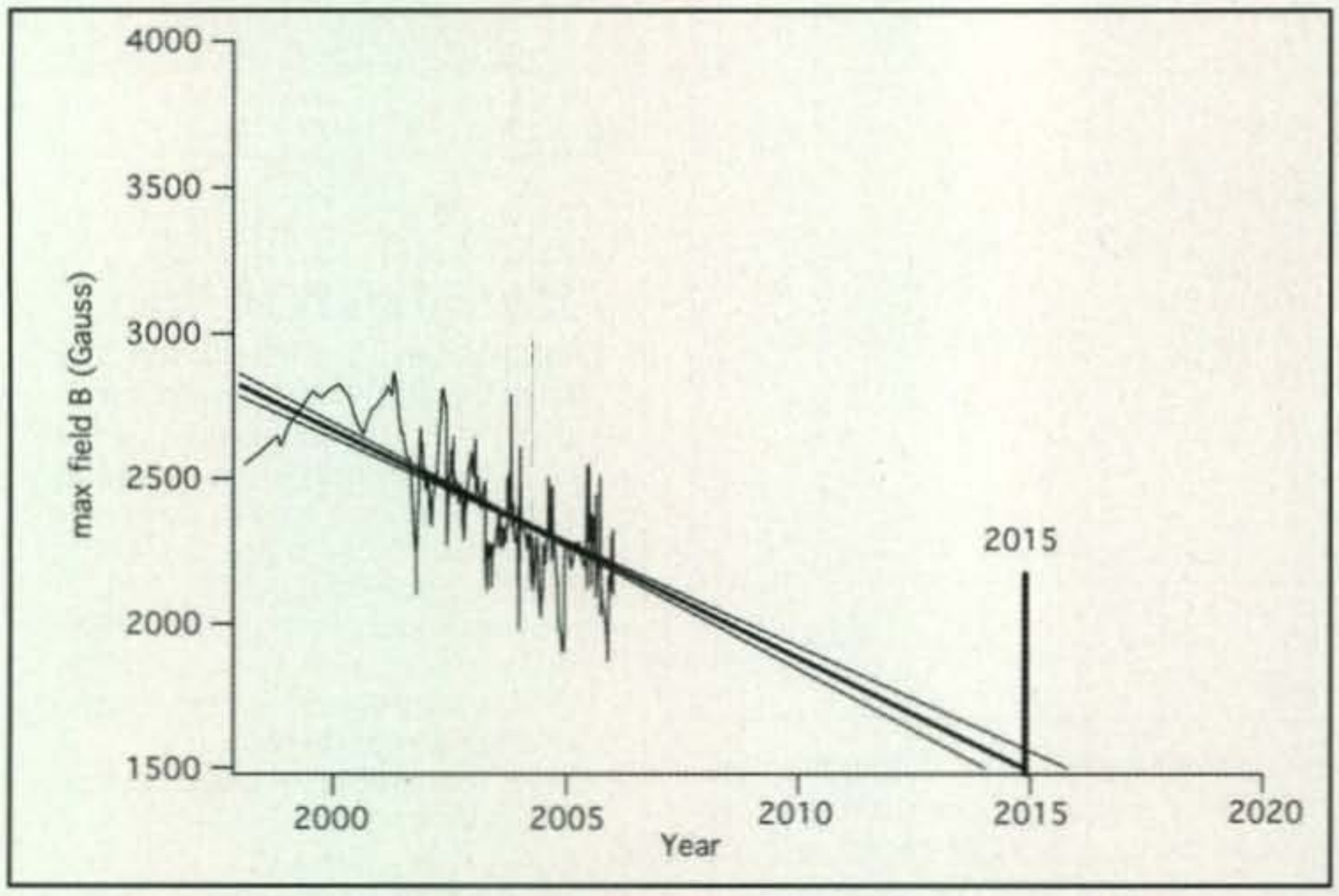

Fig. 7(A) – A linear fit to observed magnetic fields extrapolated to the minimum value observed for umbral magnetic fields; below a field strength of 1500G as measured with the iron (Fe I 1564.8nm) line, no photospheric darkening is observed. (Source: M. Penn, U.S. NSO)

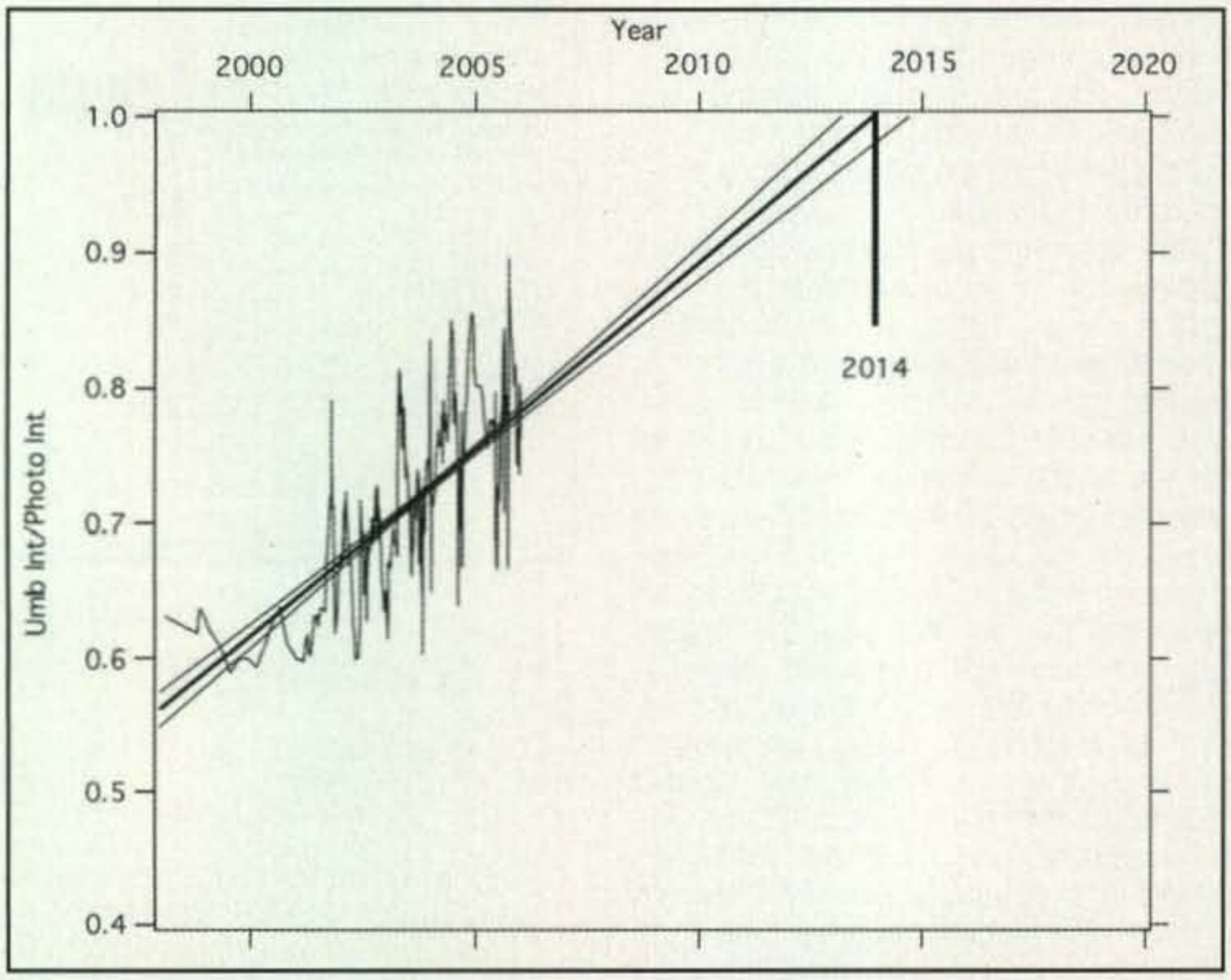

Fig. 7(B) – A linear fit to the observed umbral contrast values, extrapolated to show that by 2014 the average umbrae would have the same brightness as the quiet Sun. (Source: M. Penn, U.S. NSO)

VHF Conditions

Aurora most likely will not occur this month. However, look for some decent meteor shower activity this month, providing conditions for meteor-scatter openings on the VHF bands for distances up to about 1000 miles.

Meteor-scatter propagation is a mode where 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. A meteor 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, like 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 60-second refractions on 6 meters might only support 1-second refractions 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 by Shelby Ennis, W8WN, on working high-speed CW meteor scatter 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>.

Meteor Showers

The annual *Geminids* meteor shower from December 7 to December 17 will peak on December 14. This is one of the better showers, since as many as 120 visual meteors per hour (zenith hourly rate, ZHR) may occur. This 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

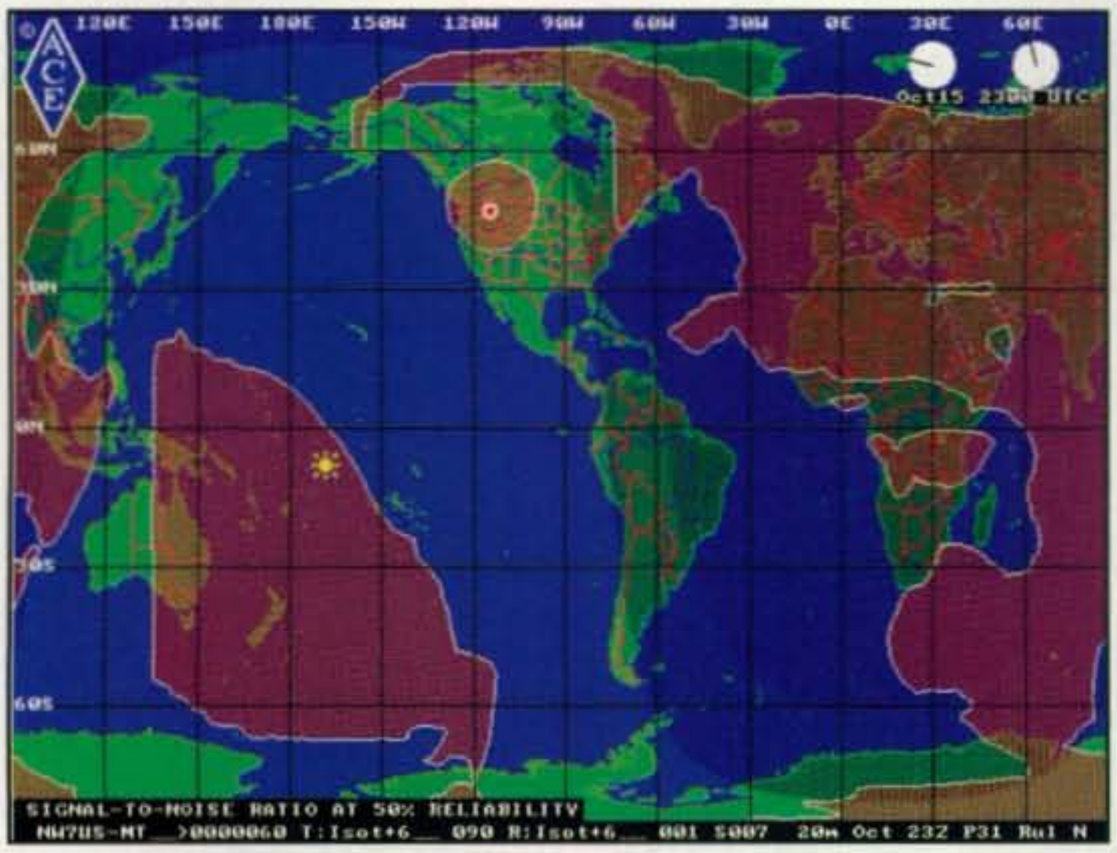

Fig. 8– An ACE-HF Pro coverage map for 2300 UTC, October 2009, of a 100-watt PSK31 signal originating at NW7US (Montana). The map predicts where the signal can be received during at least half of the month, using a dipole antenna at the NW7US station. Notice that reception of the PSK31 signal is possible in Antarctica. This was proven true with a PSK31 QSO between NW7US and DP1POL (Antarctica) in October. This map illustrates that it is possible to work the world on HF, even during the lowest period in a solar cycle. (Source: NW7US, using ACE-HF Pro <http://hfradio.org/ace-hf>)

broad maximum, lasting nearly one whole day, so no matter where you live, you stand a decent chance of catching sight of some *Geminids*.

There is considerably less likelihood for 6-meter transequatorial (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.

A secondary seasonal peak in sporadic-*E* ionization should also result in some short-skip openings on the low VHF bands between distances of about 800 and 1300 miles. A rare occurrence of aurora during days of stormy geomagnetic activity is possible, providing some unusual short-skip openings on low VHF. Be sure to check out *CQ*'s sister publication, *CQ VHF*, for a look at the 2009 sporadic-*E* season in the Fall 2009 issue.

Check out <http://www.imo.net/calendar/2009> for a complete calendar of meteor showers in 2008. If you are not yet a subscriber to *CQ VHF*, grab the fall issue and start your subscription today. You'll find a wealth of information regarding working meteors, and other VHF activity, in each issue.

Current Solar Cycle Progress

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for September 2009 is 4.2, much higher than the zero (0) of August, and the highest monthly recorded so far in 2009 and since the start of Cycle 24. The lowest daily sunspot value of zero was recorded for September 2 through September 20. The highest daily sunspot count was 20 on September 23 and 24. The 12-month running smoothed sunspot number centered on March 2009 is 3.4. A smoothed sunspot count of 7, give or take about 5 points lower to 5 points higher, is expected for December 2009.

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 70.4 for September 2009. The 12-month smoothed 10.7-cm flux centered on March 2009 is 69.0. The predicted smoothed 10.7-cm solar flux for December 2009 is 75, give or take about 6 points.

The observed monthly mean planetary *A*-index (*Ap*) for September 2009 is 3. The 12-month smoothed *Ap* index centered on March 2009 is 4.5. Expect the overall geomagnetic activity to vary greatly between quiet to active during most days in December. Refer to the Last-Minute Forecast for the outlook on conditions during December.

Would you like to hear a weekly podcast about space weather and radio propagation? Check out <http://podcast.hfradio.org> for the "NW7US Space Weather and Radio Propagation Podcast" produced by this author. Additionally, if you are on Facebook, check out the Radio Propagation and Space Weather Group at <http://tinyurlcom/fb-spacewx>. As usual, I invite you to visit my online propagation resource at <http://propagation.hfradio.org/>, where you can get the latest space data, forecasts, and more, all in an organized manner. If you have a cell phone with internet capabilities, try <http://wap.hfradio.org/>.

Drop me an e-mail or send me a letter if you have questions or topics you would like to see me explore in this column. Also, I'd love to hear any feedback you might have on what I have written. Until next month . . .

73, de Tomas, NW7US

CQ Index 2009

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.

2009 CW RESULTS
SINGLE OPERATOR
NORTH AMERICA
UNITED STATES

CONNECTICUT

K1VW	**309,054**	**756**	**56**	**58**
N4XR	**256,877**	**666**	**55**	**56**
K1IM	173,272	686	53	35
W1QK	131,181	670	51	22
NN1N	103,174	360	49	30
***K1DM**	**54,579**	**290**	**48**	**21**
*K1BV	49,280	371	48	7
W1WEF	36,465	273	46	9
W1AW	11,920	133	37	3
*K1PU	10,440	157	29	0
*NX1Q	9,780	145	30	0
KG1D	9,282	77	34	8
*KB1NRB	435	17	15	0

MAINE

K1DG	**1,263,414**	**1817**	**58**	**79**
K8PO	**889,127**	**1609**	**59**	**68**
N1CGP	9,087	93	35	4

MASSACHUSETTS

K6ND	**847,014**	**1369**	**58**	**71**
K5ZD	**515,648**	**799**	**55**	**57**
***K1EP**	**346,896**	**981**	**56**	**52**
W1BYH	115,544	430	53	35
***W1CCE**	**101,920**	**433**	**52**	**28**
*N1DM	78,660	355	51	25
*N1DC	23,760	182	38	10
*W1TO	12,383	179	28	1
W1KQ	10,106	132	29	2
*N1QY	9,999	39	9	24
*AA1O	7,840	115	31	1
*KB1CJ	3,496	65	23	0

NEW HAMPSHIRE

***WA1Z**	**426,532**	**1008**	**57**	**59**
N1IX	**342,990**	**867**	**54**	**57**
K1AR	**330,550**	**753**	**56**	**54**
*KA1API	17,160	125	28	16
*K1PDY	5,160	86	24	0
*K1QO	4,402	64	30	1
*W1END	3,906	93	18	0
*N1IMW	868	31	14	0
*KB1OSI	615	22	15	0

RHODE ISLAND

W1XX	**222,264**	**632**	**56**	**42**
K1DFT	**200,688**	**492**	**55**	**56**
***K3IU**	**35,700**	**287**	**44**	**7**
W1YRC	28,028	222	44	8

VERMONT

K1LI	**204,352**	**565**	**54**	**49**
W1SJ	**170,648**	**792**	**57**	**26**
***K1IB**	**108,150**	**494**	**52**	**23**
*K1HTJ	31,217	252	48	5

NEW JERSEY

N2ED	**353,535**	**816**	**58**	**53**
K2MK	82,668	347	56	27
W2LE	81,396	376	46	30
***K1JT**	**72,534**	**456**	**49**	**17**
*N1IBM	52,487	241	46	27
N2NC	46,680	272	42	18
*N2MH	16,320	208	34	0
*WA2RY	14,824	196	33	1
*K2SQS	13,974	176	31	3
K2PS	13,906	167	30	4
*W2FB	13,674	124	36	7
W2CVW	9,960	93	34	6
WR2G	5,704	63	23	8
*K1TN	4,966	76	24	2
W2OX	1,254	37	19	0
*KR2D	290	13	10	0

NEW YORK

N2BA	**636,778**	**1323**	**58**	**69**
WB2ABD	**320,160**	**736**	**56**	**60**
K2FU	303,296	883	57	55
W2RR	219,596	637	55	48
N2GC	168,468	416	53	48
KW2J	138,334	636	54	28
AB3CX	122,760	407	50	38
***K2UF**	**121,212**	**424**	**52**	**39**
***W2TZ**	**111,600**	**499**	**55**	**25**
*WA2ETU	96,922	408	55	31
NA2M	66,297	303	52	25
*WA2MCR	60,800	264	48	28
WS9M	57,050	256	45	25
*N2RI	42,877	347	45	8
*WA2JQK	37,827	185	53	28
*AI2N	37,365	348	45	2
*W2LC	29,463	148	42	19
*K2TV	16,380	191	32	3
*WA2YSJ	11,426	169	29	0
*N2LL	10,906	118	34	4
*W2/NP3D	10,800	125	32	4
*KB8O	7,854	99	32	2
*KV2X	6,328	103	28	0
*W2GDJ	6,090	72	35	0
*KC2FOL	5,800	99	25	0
N2EIK	5,340	83	30	0
*KD2HE	2,960	71	20	0

DELAWARE

AA1K	**903,258**	**1461**	**58**	**71**

DISTRICT OF COLUMBIA

W3A	**81,396**	**365**	**52**	**24**

MARYLAND

KD4D	**679,052**	**1416**	**59**	**63**
K3ZO	**446,368**	**988**	**57**	**59**
***W3EF**	**290,398**	**858**	**57**	**50**
K3TC	256,200	771	54	51
N3UM	234,208	707	56	48
W6AAN	214,452	518	55	56
K3WI	161,568	665	53	35
***NS3T**	**125,496**	**508**	**53**	**30**
*K3CB	55,409	344	50	17
W3DAD	26,367	230	39	8
*NG3K	18,582	208	36	2
*K3DI	18,120	193	37	3
*N3II	6,775	114	24	1
*K3KU	5,700	100	25	0

PENNSYLVANIA

W3BGN	**846,846**	**1474**	**58**	**68**
W3GH	**483,637**	**1092**	**58**	**63**
W3TS	440,248	1099	57	56
W3TDF	303,016	948	56	42
***N3GJ**	**276,780**	**759**	**55**	**50**
W3SO	179,300	553	57	43
W3PN	102,147	488	52	27
N3RJ	94,365	388	52	29
*AA3LX	72,652	269	54	28
K3ATO	65,772	421	50	13
*NA3F	62,848	382	47	17
K3MJW	52,988	455	48	4
*KN3A	40,105	220	50	15
W3FVT	27,825	217	42	11
*AD8J	27,720	275	43	2
W3WC	17,589	185	40	1
K4JLD	11,684	93	36	10
*W3CG	7,808	108	30	2
*N3XZ	3,339	68	20	1
*WA3AAN	915	26	15	0

ALABAMA

K4TD	**614,308**	**1360**	**56**	**62**
K4SAV	**358,192**	**799**	**58**	**64**
***K4WI**	**179,832**	**749**	**55**	**37**
***K4CWW**	**104,130**	**540**	**55**	**23**
N4BCB	63,570	414	51	14
K4ZGB	63,060	460	52	8
W4RYW	55,575	360	52	13
*K4HAL	50,050	296	48	17
*N4JH	38,918	296	48	10
*NV4B	26,568	216	51	3
*NE4M	22,470	246	42	0
*WB5NMZ	18,972	151	41	10
*K8AJX	14,985	153	43	2
*N4AU	7,590	119	29	1
WX4TM	1,392	30	24	0

FLORIDA

K1TO	**638,163**	**1234**	**57**	**72**
K9OM	**370,402**	**753**	**55**	**63**
N6AR	289,800	614	56	59
***W4AA**	**198,598**	**552**	**54**	**55**
***W2TX**	**155,570**	**557**	**53**	**41**
N4BP	148,148	594	54	37
*K4GKD	146,400	437	54	46
WØJLC	122,301	382	56	51
N4PSE	81,450	279	51	39
*K4MF	61,908	263	50	27
*NS9I	51,545	324	50	15
*KN4Y	18,241	226	34	3
WD4IXD	10,914	62	35	16
*N4EK	9,900	124	33	3
*N4DXI	7,344	103	32	2
*W4SUL	1,848	47	20	1

GEORGIA

W8JI	**1,249,032**	**1892**	**59**	**83**
K1ZZI	**391,964**	**1090**	**58**	**58**
K4BAI	239,500	793	56	44
KU8E	220,382	743	55	46
AA4CF	85,512	335	51	33
***K4LW**	**10,725**	**149**	**31**	**2**
*N4WD	8,736	77	31	11
*AE4O	1,224	34	18	0

KENTUCKY

W5MX	**839,762**	**1628**	**59**	**74**
***K4SAC**	**36,680**	**295**	**51**	**5**
*K4IE	29,754	239	48	6
AB4IQ	27,666	186	47	11

NORTH CAROLINA

W4ZV	**929,920**	**1621**	**59**	**69**
***N4YDU**	**245,544**	**786**	**55**	**49**
WX4G	145,350	606	53	37
KY4P	43,483	229	48	19
K4YKZ	40,380	246	44	16
*W4KAZ	25,792	189	38	14
*N4FP	13,244	97	31	13
*K4BSK	10,840	126	39	1
*WB4ROA	7,752	75	29	9
*KJ4WD	5,580	83	31	0
*AJ4CU	1,638	36	21	0

SOUTH CAROLINA

AF4OX	**569,008**	**1265**	**58**	**64**
***W4IX**	**288,530**	**850**	**57**	**53**
*K4QO	94,656	307	49	38
*K4CNW	83,520	232	49	38
*WS4C	52,425	270	55	20
*W4IT	52,404	315	49	17
N2FY	27,944	188	42	14
*WA8OJR	17,138	196	36	2
W4MEL	9,273	133	32	1

TENNESSEE

***N2WN**	**350,436**	**978**	**58**	**56**
K1GU	**243,009**	**934**	**55**	**38**
W4NZ	**235,095**	**743**	**58**	**47**
AD4EB	194,910	832	56	33
AA4NU	169,560	681	52	38
***N4ARO**	**112,540**	**460**	**55**	**30**
NA4K	106,708	600	54	20
N4AAI	101,184	750	56	6
N4ZI	80,799	501	54	15
N4IR	64,410	487	47	10
W2OO	58,320	267	48	24
WD4LUR	50,025	101	45	42
*K4DZR	49,358	379	51	7
*W4DAN	41,552	396	46	3
K4RO	34,496	189	41	15
*AB4GG	28,420	248	43	6
*NB4M	23,667	213	45	4
*NA4C	20,776	190	44	5
W4EEH	17,531	159	42	5
*WO4O	16,800	54	1	34
*K4BX	15,566	164	42	1
*W4HZD	14,742	156	34	5
WA4GLH	9,676	105	38	3
*WA4OSD	6,300	105	30	0
KA4OTB	6,240	90	31	1
*WF7T	4,088	73	28	0
*W4OGG	1,743	35	21	0

VIRGINIA

K3ZM	**1,211,763**	**1718**	**56**	**77**
NR4M	**862,960**	**1504**	**59**	**75**
KT3Y	825,110	1474	59	71
N4UA	253,440	696	56	54
N3JB	140,400	502	51	39
N4RA	119,462	325	51	47
***W4YE**	**107,888**	**403**	**54**	**34**
W7HJ	73,920	243	50	34
*N4MM	55,380	279	50	21
*K7CS	54,622	358	46	16
WA4JUK	53,444	375	50	12
*WA4PGM	49,536	312	48	16
W3BP	46,920	372	39	12
W4VIC	36,624	263	41	15
K4RDU	27,840	230	41	7
*AI4MI	22,876	245	40	3
K4EU	22,512	236	41	1
*K4FTO	19,885	218	39	2
*N3TG	14,858	176	37	1
N3BM	10,500	132	35	0
*WG4M	9,536	132	31	1
*KI3O	7,425	104	32	1
*K2VX	6,562	86	33	1
*W4AU	5,967	101	27	0
*N4JED	5,472	103	24	0
*K3MZ	4,950	63	32	1
*N3UA	4,602	77	24	2
*K4JJQ	4,510	87	22	0

ARKANSAS

***K5LG**	**152,614**	**862**	**57**	**20**
W5JAY	**12,236**	**107**	**40**	**6**
*KD5J	1,533	32	20	1

MISSISSIPPI

***W5UE**	**38,607**	**351**	**45**	**6**
*WO5L	37,700	279	47	11
*N5CW	32,400	308	47	3
NI5F	**31,049**	**196**	**49**	**12**
*N5GH	19,061	181	45	4
*WD5BJT	11,233	100	41	6
*NA5DX	1,827	45	20	1

NEW MEXICO

W6PU	**182,880**	**785**	**57**	**39**
N5UL	**111,056**	**388**	**54**	**34**
K7IA	45,695	281	51	14
WØZW	16,512	154	45	3

OKLAHOMA

N5OT	**86,328**	**480**	**54**	**18**
K5QEA	54,846	348	53	13
K5KA	48,195	315	50	13
***AB5I**	**15,936**	**144**	**41**	**7**
*AA5JG	5,845	76	35	0

TEXAS

K5RX	**629,244**	**1314**	**58**	**68**
K5WA	**431,115**	**1039**	**56**	**67**
***WØUO**	**208,704**	**840**	**56**	**40**
***N5AW**	**154,008**	**367**	**55**	**53**
*W5RYA	78,400	534	54	10
*N5OE	63,420	462	50	10
K5BG	62,980	340	50	17
*AC5K	49,203	325	49	14
*WA8ZBT	41,949	297	50	9
*W5JAW	35,926	162	52	19
*N5WLA	23,556	197	48	4
*K5EWJ	19,150	157	44	6
*AD5VJ	16,006	119	44	9
KZ5J	15,480	161	40	5
AA5VU	5,655	70	37	2
*KN8KAZ	3,597	46	31	2
*N5KF	3,024	52	26	1
*AF5Z	2,808	43	24	2
*AA5TB	1,200	28	19	1
*KE5LYW	374	14	10	1

CALIFORNIA

AC6DD	**382,336**	**823**	**58**	**58**
K6NR	**197,088**	**613**	**56**	**40**
AJ6T	161,594	594	53	33
***W6JTI**	**105,080**	**547**	**56**	**18**
K6NA	102,116	210	51	47
N6TV	94,032	508	56	16
N6JV	91,177	434	55	18
KF6T	90,301	493	52	21
N6RZ	81,697	381	52	25
N6AA	76,240	306	51	29
N6KI	65,928	404	51	16
N6RK	57,645	232	43	20
W7CB	50,163	282	53	16
N6XI	35,672	241	44	8
K9JM	35,033	268	46	7
W6FA	32,860	189	47	15
*KM6Z	26,316	216	45	6
W6RKC	21,050	164	43	7
W6SJ	17,350	157	47	3
K6ANP	15,876	116	42	7
*AA6EE	15,582	129	43	6
NT6X	15,500	128	43	7
N6NF	13,708	134	43	3
*N6PC	9,560	105	38	2
*ND6S	9,440	135	31	1
*K6WSC	7,854	98	31	3
*KQ6ES	7,479	125	24	3
WA6BOB	7,047	105	28	1
**K6EI	6,006	77	32	1
*K6UIZ	4,890	71	29	1
*K6DGW	4,577	88	22	1
K2RDX	3,850	50	33	2
*KM6I	3,850	76	21	1
*N6AJR	2,944	52	22	1
KI6T	2,880	37	17	7
*W6RFF	2,640	54	21	1
WW6D	2,352	51	20	1
W6VNR	2,147	52	19	0
*K6CSL	1,963	68	12	1
KG6ZHC	1,962	53	18	0
W6HG	1,808	61	16	0
K6III	1,802	50	17	0
*KA6UMQ	1,020	32	17	0
*K6GEP	570	27	10	0
*K6CTW	330	15	11	0

ARIZONA

K8IA	**375,273**	**1094**	**56**	**57**
KC7V	**352,506**	**1024**	**56**	**53**
***W7RH**	**177,888**	**638**	**56**	**40**
***N7IR**	**131,410**	**569**	**55**	**30**
*AC7A	49,044	271	53	14
W7YS	47,061	295	52	11
W7ZR	40,863	348	47	6
W7SW	17,043	196	35	4
*K7JE	14,790	98	41	10
*KN5H	14,476	138	44	3
KR7RK	8,200	95	39	2
*K7SP	3,444	52	26	2
*W4LSC	688	22	14	2

IDAHO

KBTO	**92,888**	**570**	**56**	**12**
KA7T	39,006	207	48	18
***K7ARJ**	**13,201**	**132**	**41**	**2**
*N7LB	12,222	123	37	5
*W7QDM	3,100	53	25	0

MONTANA

K7BG	**364,191**	**1013**	**57**	**54**
KS7T	21,296	222	42	2
***K7ABV**	**6,784**	**88**	**38**	**2**
*NW7O	420	11	15	0

NEVADA

***W6NF**	**41,644**	**299**	**50**	**8**
*K1NV	14,100	120	42	5

OREGON

K7RAT	**695,394**	**1351**	**58**	**68**
W2VJN	**481,850**	**1013**	**58**	**57**
W7EW	406,593	1069	57	42
KI7Y	137,199	579	55	28
K4XU	74,324	400	51	17
N6TW	60,166	323	51	16
***NE7D**	**46,816**	**348**	**50**	**6**
K7ZS	22,638	194	44	5
*W7WHY	14,749	129	36	7
*W7YAQ	13,462	75	42	11
*N3CJD	12,986	131	41	2
*N7VS	12,384	142	32	4
*KA7U	8,220	128	30	0
W7JY	6,390	77	25	5
*W3CP	4,805	67	29	2
*N7WR	1,580	38	20	0

UTAH

WX7G	**131,920**	**587**	**56**	**29**

NN7ZZ	**126,984**	**624**	**54**	**24**
WA7LNW	112,500	447	54	36
WASHINGTON				
N9ADG	**230,769**	**697**	**57**	**42**
WA7LT	**149,726**	**630**	**55**	**31**
W7GKF	127,280	616	58	16
W7QC	71,492	463	53	8
W9PL	42,517	239	50	11
W7RG	37,583	238	41	8
KB7N	35,406	198	44	19
***N7LOX**	**33,550**	**269**	**50**	**5**
K7AMS	32,812	264	47	5
W3AS	26,129	214	48	5
*NG7Z	20,280	207	36	4
*K7AWB	18,564	144	46	6
*N7QS	15,240	150	36	4
*W7LKG	9,657	108	34	3
*W7TMT	8,740	100	35	3
*W7QN	8,520	141	21	3
*WAØWWW	7,448	112	26	2
N6KW	3,432	58	22	2
*WA7NCL	3,000	55	24	0
*K7WA	2,916	72	17	1
*W6AEA	1,296	45	12	0
N6MZ	136	5	1	3
WYOMING				
***WB7S**	**5,364**	**68**	**35**	**1**
MICHIGAN				
N8EA	**254,835**	**627**	**57**	**48**
N8LJ	**213,956**	**937**	**56**	**33**
K8DD	129,370	558	53	32
***WA1UJU**	**91,938**	**603**	**58**	**8**
N8XI	90,783	443	55	22
W8DCQ	76,504	376	52	21
W8RU	61,632	310	51	21
*K8JA	33,096	232	47	9
*WB8B	30,316	235	45	7
K8MJZ	24,432	225	45	3
N8SS	20,328	126	43	13
*K7DR	19,350	155	43	7
NO8R	19,152	204	42	0
*K8OT	12,800	143	38	2
*NF8M	8,995	112	35	0
*KD8GBK	8,500	115	34	0
*KB8M	36	2	4	0
OHIO				
***K8FH**	**269,892**	**927**	**55**	**47**
***W1NN**	**248,160**	**973**	**56**	**38**
*WB8JUI	240,380	847	57	44
WN8R	**161,676**	**632**	**57**	**36**
N8AA	**141,723**	**564**	**54**	**33**
*N9AUG	140,060	535	55	39
*K8MP	126,480	583	52	28
K8MR	113,240	588	55	21
K8WDN	111,412	399	55	37
N8PW	64,350	289	52	23
*K8AB	53,495	344	55	10
*W8OHG	52,910	331	49	16
*W8EH	52,302	303	52	17
*W8IDM	49,242	364	52	6
*K8VUS	46,662	286	50	16
*N8HP	35,511	254	49	8
*KE8PX	28,908	293	42	2
*N8OH	28,779	216	44	9
*W8PEN	23,856	256	42	0
*KE8E	15,224	154	43	1
*W8PN	13,767	153	39	0
*N2OPW	13,376	133	44	0
KD8CGH	11,803	145	37	0
*AF8C	8,897	115	30	1
*KV8Q	5,562	94	27	0
KG9Z	3,926	60	25	1
W3USA	3,480	65	24	0
*N8QE	25	6	5	0
*KC8UR	2	1	1	0
WEST VIRGINIA				
N8II	**291,060**	**949**	**57**	**51**
K8JQ	**200,925**	**772**	**57**	**38**
***K3XO**	**125,671**	**431**	**54**	**37**
*WA8KAN	17,316	210	35	2
WA8WV	360	6	0	6
ILLINOIS				
K9DX	**1,107,744**	**1901**	**59**	**73**
WB9Z	**862,635**	**1724**	**59**	**72**
***K9QVB**	**154,560**	**725**	**56**	**28**
K9CT	151,600	710	54	26
***K9MMS**	**148,757**	**787**	**56**	**23**
*WO9S	105,360	505	56	24
K9ZO	62,055	396	49	14
*K9IJ	39,627	265	51	12
*N9TF	31,720	269	49	3
*K9OZ	31,008	291	48	0
W9SE	30,324	205	49	8
*KA9O	28,620	234	50	4
*K9OR	23,716	213	47	2
*K9JU	20,790	199	44	1
*AK9I	20,020	164	46	6
*NJ9Z	19,170	177	44	1
*N9GH	11,868	120	41	2
*KY9KYO	5,610	83	30	0
ND9E	5,565	72	35	0
*W9OA	4,914	85	27	0
*KD9MS	867	21	17	0
*K9MDO	825	27	15	0
*W9ILY	112	8	7	0
INDIANA				
W9RE	**587,384**	**1448**	**59**	**60**
K9NW	**391,590**	**1178**	**58**	**56**
***N4TZ**	**221,062**	**675**	**55**	**52**
***K9WJU**	**128,576**	**634**	**55**	**27**
K9WWT	108,352	753	55	9
N9FC	42,398	310	49	9
*NA9U	27,872	236	46	6
K9JWI	15,540	164	40	2
*WB2L	360	19	15	0
*KK9V	160	9	10	0
WISCONSIN				
W9OP	**214,705**	**550**	**59**	**56**
***N9CK**	**181,790**	**624**	**58**	**40**
WI9WI	**156,816**	**643**	**55**	**33**
K9MA	82,575	396	51	24
*WE9V	52,038	377	50	9
K9OT	48,422	164	44	27
*KB9S	15,351	154	43	0
NØIJ	14,534	89	27	16
*WA9VEE	7,344	103	34	0
*KB9Q	1,463	32	19	0
COLORADO				
NØKE	**202,051**	**719**	**57**	**40**
K6XT	**120,530**	**518**	**54**	**31**
KØUK	90,300	456	52	23
NCØB	87,760	397	53	27
***ACØDS**	**87,444**	**623**	**54**	**9**
WØETT	81,150	431	54	21
NØRN	68,112	216	49	37
*NN7A	53,816	377	54	8
*KIØJ	24,492	196	48	4
IOWA				
WØEWD	**211,553**	**984**	**58**	**31**
***NØDQS**	**46,104**	**254**	**55**	**13**
*ADØH	10,537	115	40	1
*KBØL	6,264	68	34	2
KØSRL	4,096	57	32	0
KANSAS				
WØBH	**100,130**	**721**	**55**	**7**
***AAØMZ**	**30,160**	**210**	**50**	**8**
NØXM	6,408	80	34	2
WVØT	1,701	38	21	0
MINNESOTA				
***ACØW**	**184,319**	**846**	**58**	**31**
***WØOR**	**133,742**	**648**	**57**	**25**
*KØTT	131,064	510	53	33
WBØCFF	**93,177**	**328**	**52**	**35**
*KØKP	63,840	315	56	20
*NØUY	49,312	284	52	15
K4IU	43,355	266	52	13
KØJJR	31,853	257	52	1
*WØAD	30,240	243	53	3
*NNØQ	28,272	210	51	6
WØDD	27,192	115	49	17
WØHW	25,326	185	48	6
*KØPC	23,088	217	48	0
*KØMPH	18,377	165	44	3
*W9LHG	17,955	171	45	0
*NØHJZ	17,114	182	42	1
KIØZ	17,110	116	44	15
*AAØAW	11,840	117	38	2
*KØYR	10,374	107	41	1
**NØUR	9,196	107	38	0
*WBØN	1,805	43	19	0
*KEØL	630	18	15	0
MISSOURI				
KØDEQ	**51,118**	**342**	**51**	**10**
***AEØRX**	**39,000**	**229**	**51**	**14**
*WØPC	37,422	300	50	4
NØTT	21,168	174	44	5
WØTY	20,884	197	45	1
KØOU	12,341	108	37	6
NORTH DAKOTA				
***WØCZ**	**11,544**	**127**	**38**	**1**
*NØUD	8,692	96	41	0
SOUTH DAKOTA				
WØSD	**919,170**	**1813**	**58**	**58**
KØPIR	17,155	162	45	2
***KKØSD**	**784**	**21**	**16**	**8**
CANADA				
NEWFOUNDLAND				
VO1TA	**185,088**	**320**	**49**	**47**
VO1MP	64,681	146	37	34
NOVA SCOTIA				
VA1MM	**195,048**	**442**	**54**	**30**
***VE1ZA**	**35,984**	**110**	**29**	**23**
VE1AI	4,522	52	18	1
PRINCE EDWARD ISLAND				
***VY2SS**	**21,924**	**98**	**29**	**13**
*VY2LI	1,725	23	14	1
QUEBEC				
VE2TZT	**1,089,533**	**1396**	**57**	**70**
VE2DWA	**330,400**	**496**	**52**	**60**
VE2DC	52,602	148	40	26
***VE2FK**	**14,144**	**95**	**27**	**5**
*CG2AWR	13,266	89	31	2
*VE2GK	12,584	108	26	0
*VE2HLS	12,042	103	26	1
ONTARIO				
VE3EY	**1,366,774**	**1704**	**59**	**68**
VE3EJ	**1,094,300**	**1475**	**59**	**65**
CG3AT	997,542	1361	58	68
VE3JM	970,266	1373	58	64
***VE3DO**	**783,972**	**1203**	**58**	**61**
VE3TA	694,484	1087	59	60
VE3CX	562,876	1000	57	52
***VE3DZ**	**554,830**	**949**	**57**	**56**
VE3CR	299,009	557	56	47
VE3PN	274,456	472	51	40
*VE3KF	263,245	561	55	40
*VE3NE	220,704	496	54	34
VE3CUI	209,760	578	55	21
VA3CCO	184,535	602	55	10
VE3UTT	114,308	262	49	33
VE3RER	103,872	344	52	12
*VE3OX	95,370	307	53	13
*VE3OSZ	92,736	130	54	42
*VE3FH	91,391	319	45	14
*VE3RCN	55,935	269	38	7
VA3EC	55,212	277	43	0
VE3EBN	50,697	251	38	5
*VE3FJ	48,852	226	44	2
*VE3UZ	46,697	203	47	2
*VE3OBU	31,413	186	35	2
*VA3KAI	29,526	153	39	3
*VE3JI	27,640	153	39	1
*VE3TW	25,840	139	38	2
*VE3PA	22,191	121	35	4
*VE3XAT	10,741	103	23	0
*VE3BK	5,083	52	23	0
*VE3BNO	2,400	31	20	0
*VE3FU	1,540	25	14	0
*VA3HUN	344	11	8	0
SASKATCHEWAN				
VE5UF	**382,200**	**842**	**58**	**33**
ALBERTA				
VE6WQ	**589,077**	**1006**	**59**	**52**
VE6BBP	**296,974**	**721**	**56**	**27**
VA6ZZZ	138,818	472	53	9
VE6SF	113,646	298	54	24
BRITISH COLUMBIA				
VE7SV	**661,862**	**946**	**58**	**60**
VE7CC	**565,110**	**903**	**58**	**57**
VA7DX	106,420	323	52	16
VE7UF	95,589	345	52	5
***VA7ST**	**58,350**	**242**	**44**	**6**
*VE7CA	47,760	209	42	6
*VA7MM	40,700	176	44	6
*VE7WU	39,042	141	46	8
*VA7ND	32,076	158	41	3
VA7RN	28,100	117	46	4
NORTH AMERICA				
Alaska				
KL7RA	**947,505**	**1319**	**57**	**56**
KL1JP	448	12	4	3
Belize				
V31YN	**410,345**	**681**	**54**	**53**
Cuba				
***CM6RCR**	**339,058**	**662**	**54**	**40**
*CO8LY	43,855	194	42	7
*CO8TW	26,606	99	40	13
Grenada				
***J39BS**	**158,355**	**353**	**49**	**32**
Martinique				
FM5BH	**774,903**	**995**	**57**	**72**
Mexico				
XE2S	**151,924**	**384**	**51**	**25**
***XE2FGC**	**21,690**	**98**	**39**	**6**
*XE2YWH	13,055	78	32	3
U.S. Virgin Islands				
***KP2BH**	**18,901**	**89**	**27**	**14**
AFRICA				
Canary Islands				
EA8AH	**2,078,352**	**1547**	**55**	**81**
***EA8CN**	**252**	**5**	**0**	**6**
Chagos Island				
VQ9LA	**62,130**	**168**	**2**	**36**
Senegal				
6W1SE	**16,560**	**49**	**14**	**22**
ASIA				
Asiatic Russia				
UA9CDV	**634,788**	**840**	**13**	**71**
RT9S	**356,664**	**524**	**7**	**70**
RN9MA	278,768	426	7	69
UA9CMQ	263,848	499	8	51
RZ9HT	223,360	394	5	59
***UA9CBM**	**180,480**	**426**	**0**	**48**
***UA9BX**	**131,472**	**317**	**0**	**48**
UA9CDC	122,784	288	1	47
UA9TF	120,230	251	0	55
UA9PC	118,440	266	1	55
*RL9AA	89,392	280	0	37
*UA9AB	87,009	261	0	39
*RW9CD	73,220	235	0	35
RA9AE	44,172	142	0	36
*UA9AX	39,997	124	0	37
*UA9QM	38,425	193	0	25
*RAØLV	38,178	75	23	31
*RA9AP	37,408	156	0	28
*UA9FEX	33,488	152	0	26
UAØYAY	33,336	117	3	33
*RW9QA	28,896	161	0	24
*UAØZAM	21,980	133	16	4
*RU9WZ	18,612	133	0	18
RWØBG	12,684	84	0	21
*RK9AD	11,988	49	0	27
UAØACG	10,992	70	0	24
RA9AC	10,754	73	0	19
*UAØLCZ	9,648	55	8	16
*UA9XBJ	7,582	53	0	17
RAØQA	7,074	45	0	18
*RA9MC	5,203	65	0	11
*RAØQC	4,800	60	4	11
RUØLL	3,052	36	5	9
*RU9AZ	2,216	47	0	8
*UA9ADW	2,144	35	0	8
RØ/UT5IA	1,536	25	0	8
*UA9QA	1,368	16	0	9
RZØAF	800	9	5	5
*UAØDC	792	15	3	6
*UA9SAW	294	6	0	7
*UAØSBQ	275	6	0	5
UAØOA	240	9	1	4
Asiatic Turkey				
***TA2RC**	**409,560**	**703**	**3**	**57**
***TA3D**	**168,364**	**364**	**6**	**43**
TA3J	**24**	**2**	**0**	**2**
China				
B4TB	**10,112**	**110**	**6**	**10**
***BD1ISI**	**8,355**	**97**	**6**	**15**
BA4SI	1,232	19	0	11
Cyprus				
C4M	**225,675**	**398**	**13**	**46**
Georgia				
***4L2M**	**246,177**	**508**	**3**	**48**
Hong Kong				
***VR2YYW**	**88**	**5**	**0**	**4**
Israel				
4Z5LA	**201,483**	**350**	**16**	**45**
***4X/SM8A**	**15,990**	**63**	**1**	**29**
Japan				
JH4UYB	**441,639**	**533**	**40**	**59**
JA2XYO	94,248	176	29	37
JR1IJV	83,780	168	27	32
JI3KDH	81,984	163	28	36
JH3AIU	66,249	165	20	31
JA6BZI	58,254	120	17	40
JK1OPL	37,700	90	19	31
***JM1NKT**	**29,367**	**104**	**16**	**23**
JA7BME	18,560	64	20	12
JF2QNM	17,714	65	15	19
JH4CES	16,416	63	8	24
JA7COI	14,170	72	14	12
JA7KY	13,572	57	17	12
*JI1LET	12,325	54	15	14
*JE1SPY	11,986	79	13	13
JR3NZC	11,368	49	20	8
JA1HGY	8,280	37	16	8
JA7ADM	6,195	33	9	12
JA7IC	5,250	27	11	10
JA7NX	4,500	21	14	11
JR7MAZ	2,880	18	2	16
*JP1SRG	2,660	24	4	10
JA2FSM	1,540	17	7	4
*JA1FRQ	1,500	15	6	6
JA7ZP	1,067	13	6	5
*7L1ETP	904	21	3	5
JA4DHN	880	11	10	12
*JS1NDM	720	8	7	2
*JF2WXS	400	9	0	5
JR6CF	140	4	0	4
*JK2VOC	58	14	0	2
Kazakhstan				
UPØL	**349,286**	**621**	**5**	**56**
UN9L	79,170	234	0	39
***UN7CH**	**31,860**	**146**	**0**	**27**
UN6P	13,959	57	0	27
*UN5J	9,135	80	0	15
UN7PV	6,080	37	0	20
Laos				
XW1B	**5,985**	**41**	**0**	**19**
Saudi Arabia				
***7Z1SJ**	**71,500**	**160**	**4**	**46**
Tajikistan				
EY8MM	**891,220**	**893**	**29**	**81**
Thailand				
HSØZEE	**34,840**	**136**	**3**	**37**
UK Bases on Cyprus				
ZC4LI	**374,990**	**561**	**16**	**54**
Uzbekistan				
***UK8AKK**	**6,930**	**57**	**0**	**15**
West Malaysia				
***9M2DRL**	**28**	**3**	**0**	**4**
EUROPE				
Aland Islands				
OHØE	**1,709,907**	**1874**	**57**	**84**
Austria				
***OE6IMD**	**50,576**	**163**	**9**	**49**
*OE3CHC	18,681	97	1	38
*OE1H	6,314	59	0	22
Azores				
CU2X	**1,358,532**	**1467**	**56**	**70**
Belarus				
***EU1AZ**	**266,875**	**837**	**11**	**50**
***EW8DX**	**244,404**	**753**	**12**	**50**
*EV6M	159,999	534	8	49
EW8KY	**127,679**	**605**	**1**	**40**
EW7BR	**107,070**	**485**	**0**	**43**
*EW8CY	92,040	453	0	40
EW2AA	71,500	247	6	49
*EW6MM	66,486	314	1	41
*EU4CQ	53,048	283	0	38
*EU1DZ	46,332	256	0	36
EW3LN	45,018	214	0	41
*EW1IP	35,646	179	2	37
*EU2EU	19,404	103	4	32
EW7DK	**13,026**	**105**	**0**	**26**
*EW6GF	2,064	38	0	12
EU7SA	845	12	2	11
Belgium				
OP5T	**331,256**	**641**	**26**	**68**
OO6C	44,308	190	5	39
***ON3ND**	**20,880**	**142**	**0**	**30**
Bulgaria				
LZ9W	**392,401**	**828**	**24**	**65**
***LZ9R**	**279,350**	**701**	**14**	**60**
LZ1GL	**231,021**	**714**	**13**	**50**
LZ3FN	149,796	504	3	54
LZ1AQ	115,180	327	12	53
LZ5A	31,500	205	0	30
*LZ2SC	20,310	130	0	30
*LZ2FM	7,536	57	0	24
*LZ2UZ	1,092	17	0	13
Croatia				
9A4W	**951,600**	**1290**	**46**	**76**
***9A2AJ**	**515,790**	**945**	**33**	**66**
***9A3VM**	**220,052**	**734**	**3**	**55**
*9A5MT	203,184	525	18	54
9A2DQ	**153,525**	**274**	**28**	**61**
*9A3KS	45,120	130	14	46
*9A6Z	22,240	139	0	32
9A6C	1,080	27	0	9
*9A2GA	406	16	0	7
Czech Republic				
OLØA	**897,720**	**1267**	**50**	**70**
OLØW	**574,465**	**1118**	**37**	**58**
OK1CW	555,880	989	34	70
OK1T	457,478	1026	30	52
OK1NI	329,152	861	22	52
***OK1FPS**	**277,426**	**740**	**23**	**51**
***OK6Y**	**257,520**	**683**	**16**	**58**
*OK1MNW	224,455	565	23	54
*OL6P	222,208	710	8	56
*OL4W	219,115	680	14	51
*OK1JOC	214,240	667	14	51
*OK1AY	184,174	516	19	52
*OK2VWB	176,880	502	16	51
*OK2PWJ	170,968	455	18	53
*OK2YT	165,952	517	11	53
*OK1HFP	156,058	418	20	51
OK1AYY	144,720	405	21	46
OK1CRM	143,550	557	0	58
*OK5XX	132,986	474	8	51
OK1AOV	127,950	323	21	54
*OK2PTS	109,344	477	1	47
*OK1MCW	105,551	360	13	46
*OK1GS	105,203	458	7	42
*OK1HX	97,706	425	2	47
*OK2PBG	89,350	375	6	44
*OK1FHI	85,974	401	1	45
*OK2PQS	82,400	335	12	38
*OK5TFC	77,900	433	1	37
OK2SG	72,600	231	8	52
*OK2EC	70,605	326	5	40
*OL2U	65,395	336	0	41
*OK1DM	64,240	352	0	40
OK1DEC	61,320	316	4	38
*OK2TRN	50,000	266	3	37
OK1DWJ	45,006	82	19	59
*OK2BWC	43,132	210	4	37
*OK1MNV	39,786	231	0	38
*OK2BFN	37,777	222	0	37
*OL3X	37,250	135	8	42
*OK2SGY	35,665	228	0	35
*OL4M	35,490	224	1	34
*OK1MKU	30,422	116	6	47
*OK2ABU	24,544	169	0	32
*OK2KFK	3,600	38	0	20
OK1FRO	3,196	43	0	17
OK2NA	1,845	28	0	15
*OK1JN	250	7	0	10
Denmark				
OZ7YY	**1,397,451**	**1526**	**56**	**85**
***OZ7BQ**	**139,004**	**414**	**15**	**47**
OZ4O	**133,008**	**348**	**16**	**52**
OZ7EA	49,590	217	1	44
*OZ3SM	45,738	221	0	42
*OV5A	32,742	195	0	34
*OZ1AAR	24,220	143	0	35
*OZ4RT	13,431	80	1	32
*OV3X	6,240	62	0	20
England				
M6T	**1,723,275**	**1933**	**54**	**81**
G3BJ	**1,177,671**	**1429**	**53**	**74**
G3LET	728,000	1135	42	70
G3XTT	538,692	853	45	61
***MØBJL**	**220,241**	**563**	**24**	**49**
***G3MZV**	**115,375**	**300**	**19**	**52**
G4BUO	99,698	188	32	47
G7VJR	89,798	300	6	53
G4BJM	68,582	242	13	40
*G3YBY	54,213	206	8	43
G3GLL	47,320	153	8	48
*GØORH	42,483	179	8	43
G4MKP	37,850	143	7	43
*G4DDL	22,760	111	7	33
G4OBK	20,944	57	12	44
*G3KMQ	20,131	97	6	35
M4T	18,468	144	0	27
*MØPCB	9,296	70	0	28
*G3SNU	869	17	0	11
Estonia				
***ES3RF**	**39,908**	**172**	**8**	**44**
European Russia				
UA6LCN	**412,356**	**943**	**21**	**63**
RN3GM	**400,707**	**738**	**23**	**74**
UA1ANA	368,823	759	26	65
UA3LID	285,822	694	19	60
RK3ER	270,028	775	15	53
***UA4YA**	**229,179**	**541**	**15**	**64**
UA1OMS	209,790	652	3	60
RW3XZ	204,900	526	15	60
RV1CC	204,680	593	16	52
RD4WA	190,092	593	2	60
***RV3LO**	**184,512**	**579**	**10**	**54**
*RZ3AUL	177,684	523	13	55
*RU3EJ	174,850	537	12	53
RV3FI	174,540	582	7	53
UA3MIF	164,640	545	6	54
*RU3VD	159,575	479	10	55
UA3TCJ	153,192	322	33	45
RX3AJ	140,492	459	9	53
RV3MI	132,447	522	2	49
RK3ZZ	132,300	409	12	48
UA4WI	127,092	512	1	50
RN3TT	120,963	391	6	55
*RN1NW	117,236	454	7	46
*UA6AX	111,671	464	1	48
*RA3ZC	110,982	423	5	48
*RZ1OK	110,187	339	7	56
*RA3UAG	107,590	363	5	53
*RW4FE	106,056	387	4	50
RD3DT	105,256	357	8	51
*UA1CUR	100,278	378	4	50
*RW6AHO	95,520	415	0	48
RG3K	93,080	358	2	50
*RV4LC	91,955	340	2	51
*RL3FO	81,456	347	2	46
*RV3ZN	78,918	400	0	42
UA4SAW	76,095	322	1	44
*RA3YC	74,734	369	4	39
RW6HX	71,760	301	0	48
*RA3MB	69,316	213	9	53
*RA4HT	68,761	296	0	47
RA4ST	67,404	326	1	40
*UA3DGG	59,397	328	0	39
RA6MQ	52,670	238	2	44
*RW3DA	52,026	280	0	39
RU4WD	50,274	269	0	38
UA3RAG	47,736	259	0	39
RX3AEX	46,865	284	0	35
*RN4SN	44,976	194	1	47
*RU6HJ	44,655	239	0	39
RW3LL	43,605	145	9	42
*RA6FV	37,111	209	1	36
RU4CO	36,760	181	0	40
*RN4AK	35,904	216	0	34
*UA1OAM	35,496	195	2	34
*RU3UR	34,524	161	0	42
*UA4HJ	33,400	164	0	40
UA3RN	32,274	220	0	33
*UA4HIP	30,473	209	0	31
*RN4SS	29,727	238	0	27
*RA6XB	28,444	102	3	49
*RD3DS	28,149	177	0	33
*RU3PU	26,554	170	0	34
RW4PY	26,443	173	0	31
UA3DPM	25,560	126	3	37
*RA3QUA	24,790	137	0	37

*UA6YW	22,240	141	0	32
UA4AAC	21,812	157	0	28
*RU4HU	20,097	149	0	29
*UA3QGT	19,965	123	0	33
*RA6LW	19,600	121	1	34
*RK4PB	19,370	153	0	26
*UA6HFI	18,549	146	0	27
*RU6YJ	16,625	105	2	33
*RU4CS	15,288	60	0	42
*RW3ZA	13,978	107	0	29
*RK6AQM	13,946	65	1	37
*RU3DM	12,996	58	2	36
UA3QIX	12,708	57	3	33
*RX6AH	12,190	117	0	23
RN3ZC	10,950	90	0	25
RW3SY	10,860	72	0	30
*RD4HM	10,450	45	2	36
*RU3UW	10,311	113	0	21
*RA3BQ	8,778	81	0	22
RN3AHL	3,042	33	1	17
RA3XO	2,327	39	0	13
*UA1ORL	2,043	57	0	9
*RN4HA	1,386	16	1	17
RZ3DX	770	10	2	9
*UA4SN	670	14	0	10
*RW6AMZ	100	1	0	1
Finland				
OG2P	**1,058,445**	**1340**	**49**	**80**
OH8X	**1,048,875**	**1353**	**49**	**76**
***OH5TS**	**182,400**	**538**	**11**	**53**
OH1RX	173,558	403	23	54
OH5NE	125,358	478	4	47
*OH5YU	75,164	326	0	46
OH5NZ	46,552	194	5	41
OH2K	33,330	228	0	30
*OH2LNH	21,779	155	0	29
*OH7KD	12,220	95	0	26
*OH6MKL	3,816	46	0	18
*OH2BEC	329	10	0	7
France				
F8BPN	**245,996**	**438**	**39**	**50**
F5BBD	**154,632**	**417**	**19**	**49**
***F6DZD**	**5,544**	**51**	**0**	**22**
*F4FDA	30	3	0	2
Germany				
DL1AUZ	**1,021,853**	**1433**	**49**	**70**
DJØMDR	**1,016,064**	**1380**	**54**	**72**
DL3YM	912,730	1337	49	70
DK6WL	649,313	1133	37	72
DKØXB	472,410	1040	34	56
DL5YYM	456,110	1091	29	56
DK3WW	423,700	792	31	69
DJ6QT	330,546	732	29	60
***DJ6BQ**	**278,296**	**648**	**28**	**58**
DK8FS	257,580	538	27	63
DL4ME	248,127	719	18	55
DL7UVO	219,392	739	11	53
DK5AD	210,605	580	24	49
***DK5DQ**	**192,372**	**604**	**18**	**51**
DL5JS	181,369	571	16	51
*DD5M	168,840	587	13	50
DL1VDL	162,870	574	9	52
*DL7UMK	155,186	519	12	50
*DJ8EW	143,577	598	3	50
*DL3KUM	134,040	458	11	49
*DJ3WE	126,080	404	12	52
*DL7DZ	125,696	382	14	50
*DJ6OZ	124,434	361	15	47
DJ5HD	122,140	419	13	49
*DL2RUG	120,708	384	15	48
*DL4WA	116,556	369	12	54
*DL3ARM	116,058	425	11	47
*DR4T	113,811	419	10	49
*DJ9CN	112,580	353	13	52
DL2HRE	107,835	332	11	54
*DJ8UV	106,656	339	16	50
*DL7VMM	105,079	361	9	50
DP3D	105,000	285	19	51
*DF7TT	100,224	377	9	49
*DK3DUA	99,275	380	7	48
*DL3FF	94,181	391	8	45
DL1ELY	86,240	386	12	37
*DL1RTL	86,130	291	13	45
*DK1AX	85,360	324	9	46
*DK2BJ	79,228	288	10	48
DL3XM	74,403	211	11	52
*DK8NT	71,808	322	7	41
DL2OM	70,394	215	20	41
*DL1DXA	68,343	238	10	47
*DK6CQ	68,202	260	8	46
DL3BQA	67,710	221	8	53
*DL1NKS	66,120	212	14	46
DJØIF	64,113	155	17	54
*DL3DRN	63,744	295	5	43
*DL4ZA	63,384	385	0	38
*DJ2BC	62,475	277	1	48
*DL9CW	62,230	265	4	45
DK8EY	62,192	244	7	45
*DJ2IA	59,748	234	8	44
DL5ST	59,394	200	11	46
DL5SE	55,575	328	0	39
*DL3VZL	54,524	279	2	41
*DK6AS	53,820	110	21	48
*DJ5QV	53,214	277	0	42
*DL2LRT	52,668	259	0	44
DL6EZ	52,320	298	0	40
DL2MDU	51,793	215	2	47
*DL1TPY	49,440	224	4	44
*DL9NDS	48,576	223	7	39
DK9BW	48,128	218	3	44
*DL1DWR	47,268	269	2	37
*DJ1YF	47,027	264	2	39
*DF4XF	46,665	218	9	36
DL7JRD	46,410	103	12	53
*DL6UAA	45,375	325	0	33
*DL3BRA	45,201	258	1	38
*DK3YD	45,135	184	8	43
*DF8XC	44,655	254	0	39
*DK1MA	42,206	189	6	41
DL1BUG	41,106	235	0	39
DL3MCO	40,866	212	3	39
*DL8ZAJ	38,920	211	2	38
*DM2BPG	36,777	198	5	36
*DL8NBJ	36,582	195	0	42
*DL4SL	35,948	163	0	43
*DL2ASB	35,392	127	11	45
*DL3ZAI	33,845	225	0	35
*DL5ARM	33,670	198	0	37
*DJ2YE	33,228	214	0	36
*DL6MTA	32,349	167	0	41
*DK3GI	32,214	195	0	39
DK1KH	31,840	174	2	38
DJ4SO	31,800	104	6	47
*DL2ZA	30,134	181	2	36
*DK7FP	28,938	158	0	39
*DG9MDM	28,652	166	0	38
DK7MD	27,040	70	14	38
*DL6RBH	25,865	166	0	35
*DL3EBX	20,536	140	0	34
*DJ5MY	20,048	162	0	28
*DK8RE	19,798	117	1	37
DA3X	19,722	103	10	28
*DJ5IR	19,648	140	0	32
*DL7UPN	19,278	121	0	34
*DK8FD	19,044	123	1	35
*DB7MA	17,504	129	0	32
DL8EAQ	16,380	121	0	30
*DL1BUT	15,878	97	0	34
*DK4VY	15,488	109	0	32
*DK8NX	15,416	71	4	43
*DL8YR	15,330	99	0	35
*DK4WF	14,784	102	1	31
*DL1HUH	14,256	80	1	35
*DL2A	13,832	80	3	35
*DL1DTL	12,122	99	0	29
DJ5CL	11,718	100	0	27
*DL9NCR	11,592	62	3	33
DJ6TB	11,475	103	0	27
*DF6WE	11,424	92	0	28
DF2IAX	10,432	73	2	30
*DH9SB	9,821	103	0	23
*DL4EAX	9,625	93	0	25
DJ1AA	9,531	86	0	27
*DL2AWB	9,240	50	1	34
*DKØMN	9,207	78	0	27
*DF6RI	8,778	101	0	21
*DJ5TT	8,712	81	0	24
*DK5WO	8,382	89	0	22
DL2SWN	8,148	58	0	28
*DL7UIO	6,838	63	0	26
*DO1UZ	6,182	67	0	22
*DG7RO	5,220	64	0	20
*DL5CK	4,680	51	0	20
*DL2YED	4,200	46	0	21
*DL6DCD	3,700	39	1	19
*DL5WB	3,200	39	0	20
*DJ3JD	2,484	30	0	18
DL2LAR	1,881	25	0	19
*DL7ULM	1,846	39	0	13
DL7BA	1,008	17	0	12
*DH6DAO	990	26	0	10
DLØXM	924	15	1	11
DL8USA	750	11	1	9
*DO5ALX	376	10	0	8
*DL1SBF	330	17	0	6
Greece				
SV3RF	**716,540**	**1098**	**41**	**69**
Hungary				
HG3A	**1,354,782**	**1483**	**57**	**86**
***HA8BE**	**490,723**	**929**	**28**	**69**
HG7T	**331,422**	**797**	**20**	**58**
***HA6NL**	**328,779**	**757**	**19**	**62**
*HG6V	187,736	602	8	54
*HA1BC	154,952	554	5	51
*HA6NW	129,400	514	5	45
HA6FQ	127,673	396	7	54
HA1YI	80,094	378	1	41
*HA5UY	79,086	382	0	42
*HA3OD	70,785	243	7	48
*HA4YF	27,324	167	0	33
*HA3UU	16,688	119	0	28
*HA3OU	16,566	102	0	33
*HA2MN	6,552	64	0	21
Iceland				
TF3CW	**500,256**	**662**	**51**	**57**
Ireland				
***EI/W5GN**	**405,108**	**736**	**38**	**55**
EI6DX	**162,644**	**416**	**18**	**55**
EI7GY	3,255	26	5	16
Italy				
***IK2HDF**	**315,588**	**768**	**23**	**55**
***IK4XCL**	**243,000**	**638**	**19**	**53**
*IZ3ALF	178,485	450	24	49
*IK2AHB	111,104	343	12	50
IKØYUT	**94,116**	**403**	**5**	**41**
IZ8GCB	86,296	384	1	45
*I2WIJ	78,336	308	1	50
IZ8EDL	62,478	228	5	49
I1EIS	53,436	161	14	47
*IV3JCC	37,271	161	2	45
*I2AZ	35,052	145	6	40
*IK3ORD	21,920	137	0	32
*IØMWI	19,764	106	0	36
*IK8UND	10,550	83	0	25
*IK5AFJ	7,800	68	0	26
*IZ2FOB	5,786	55	0	22
*IK2IKW	2,086	31	0	14
*IZ5GRS	603	14	0	9
*IKØTUM	370	20	0	5
*IZ2CSX	259	8	0	7
Kaliningrad				
***UA2FL**	**191,754**	**688**	**6**	**48**
*RA2FB	8,316	79	0	22
*UA2FGY	4,284	53	0	18
Latvia				
YL2SM	**879,942**	**1201**	**46**	**77**
YL2PJ	**538,174**	**1060**	**23**	**68**
YL9T	516,084	1058	31	56
YL3FT	436,192	922	25	61
YL2BJ	344,964	681	27	62
YL2PP	265,520	587	20	60
***YL5W**	**194,805**	**562**	**13**	**52**
*YL2CR	60,754	324	1	36
*YL2II	23,467	155	0	31
Lithuania				
LY9Y	**931,492**	**1359**	**42**	**76**
LY3BY	**661,247**	**1143**	**35**	**66**
LY5R	510,600	998	28	64
***LY9A**	**383,152**	**926**	**20**	**57**
LY2X	292,388	834	13	54
LY2VA	256,340	694	16	54
***LY4T**	**250,784**	**712**	**14**	**54**
LY3ID	239,175	578	21	54
LY2NK	193,858	620	11	50
LY1CT	178,500	579	12	48
*LY2MM	152,500	480	9	52
LY2OU	134,688	434	15	46
*LY4CW	82,110	361	3	43
*LY2OO	75,950	297	6	44
LY6A	59,050	226	3	47
*LY2TS	46,605	251	3	36
*LY2OM	30,414	172	0	37
*LY4L	4,680	53	0	20
*LY3W	4,617	52	0	19
LY3M	3,180	35	0	20
Luxembourg				
LX7I	**1,138,878**	**1622**	**45**	**72**
***LX1ER**	**42,294**	**133**	**13**	**44**
Moldova				
ERØWW	**1,115,979**	**1462**	**49**	**74**
ER5WU	**295,526**	**690**	**17**	**60**
***ERØFEO**	**205,632**	**636**	**11**	**53**
***ERØ/UTØFT**	**201,971**	**643**	**5**	**56**
Monaco				
***3A/K3OX**	**640**	**16**	**0**	**8**
Montenegro				
***4O3Z**	**1,260**	**24**	**0**	**12**
*4O4A	376	10	0	8
Netherlands				
PA5KT	**462,460**	**807**	**47**	**48**
PAØLOU	**350,740**	**640**	**29**	**66**
PAØJNH	141,436	330	23	53
PA7FA	130,800	299	23	57
PA5TT	91,336	316	2	54
PAØINA	64,610	149	16	54
***PG7V**	**38,571**	**204**	**2**	**37**
*PAØMIR	35,475	162	5	38
*PA3GWN	34,086	179	1	38
PE5T	33,271	97	24	25
*PAØTCA	28,977	145	4	35
*PA3GVI	28,659	135	6	35
*PA1TX	25,312	162	1	31
*PA3EMN	22,088	87	9	35
*PC7T	20,230	121	1	33
*PE2JMR	20,010	136	1	29
*PG4I	18,054	104	0	34
*PA3GQF	8,112	74	0	24
*PA3HGF	8,027	72	0	23
*PAØFAW	7,613	71	1	22
*PAØFEI	7,128	56	1	26
*PG2AA	2,940	30	0	20
PA9CW	1,430	25	0	13
*PAØB	940	21	0	10
Norway				
LA7THA	**184,465**	**386**	**37**	**42**
LA9TJA	**172,160**	**504**	**17**	**47**
***LA3BO**	**124,236**	**402**	**13**	**45**
LA1PHA	81,380	224	15	50
*LA8WG	36,740	162	1	43
Poland				
SP2LNW	**393,880**	**829**	**26**	**60**
SQ1K	**306,106**	**701**	**24**	**58**
SP2FAP	298,740	686	27	51
SQ5M	293,928	755	20	54
***SP8NR**	**283,346**	**722**	**18**	**56**
***SN1I**	**230,664**	**501**	**28**	**56**
*SN8F	216,514	742	7	51
*SP3GTS	208,488	601	13	55
*SP7DCS	187,328	564	16	48
*SN5J	165,360	539	13	47
*SP1GZF	144,066	344	23	55
*SP2QG	114,800	457	1	49
*SP3LPG	108,576	461	1	47
*SP8AJK	103,068	303	10	53
*SP9FZC	101,400	316	8	52
*SP9JZT	87,568	355	9	43
*SP9RQJ	85,680	366	4	44
*SN5G	83,880	382	2	43
*SQ9IDE	82,485	382	0	45
*SP7JQQ	77,448	374	0	42
*SP9BNM	71,225	406	0	37
*SP6GNJ	68,700	270	1	49
**SP2DNI	66,195	298	5	40
*SP6BEN	55,484	198	7	45
SP5GH	53,071	98	16	57
SP4JCP	50,626	304	0	34
*SP9GFI	50,078	194	7	42
*SP3CYY	43,450	154	16	34
*SQ9DXN	38,040	190	1	39
**SP4GL	34,475	206	0	35
*SP3OL	31,894	187	0	37
*SP5CQI	27,588	177	0	33
*SP2HPD	26,753	187	0	31
*SP7EXJ	25,802	138	0	38
*SP5ELW	24,672	98	2	46
*SP6LMQ	11,186	68	0	34
*SP7JLH	5,488	42	1	27
SP6T	2,603	19	1	18
*SP7FBQ	2,304	30	0	16
SP6AEG	366	9	3	3
Portugal				
CT1FJK	**656,352**	**753**	**54**	**75**
CT1ILT	59,536	156	21	40
***CT1AGF**	**245**	**5**	**0**	**7**
Romania				
YR5N	**293,888**	**879**	**6**	**58**
***YO2IS**	**219,618**	**670**	**11**	**52**
***YO3APJ**	**215,208**	**562**	**12**	**60**
YO7LCB	**202,809**	**576**	**15**	**52**
YO5AJR	166,286	520	5	56
*YO8AXP	142,128	500	6	50
YO4KCC	105,030	461	0	45
*YO2CJX	56,532	263	2	40
*YR8D	51,393	272	0	37
*YO8RFS	47,680	244	0	40
*YO9AGI	33,077	226	0	31
*YO8DOH	26,136	142	0	36
*YO2BB	23,976	141	0	37
*YO2GL	21,245	118	0	35
*YO5DAS	20,851	148	0	29
Sardinia				
***ISØOMH**	**21,120**	**128**	**1**	**32**
Scotland				
GM3POI	**2,058,632**	**2171**	**57**	**79**
***GM3NHQ**	**7,425**	**63**	**0**	**25**
Serbia				
YU1WS	**498,088**	**1013**	**26**	**66**
***YT8A**	**411,445**	**805**	**29**	**66**
YT2T	**368,135**	**808**	**23**	**62**
***YT2U**	**106,608**	**441**	**8**	**48**
*YT1HA	79,148	328	2	45
YU1DW	75,809	357	1	42
*YU9DX	33,425	194	0	35
*YU1KT	29,007	180	2	31
*YU1ED	12,090	98	0	26
*YT7IM	4,833	39	0	27
Shetland & Faire Islands				
MMØXAU	**107,415**	**308**	**22**	**41**
Slovakia				
OM4EX	**716,533**	**1057**	**37**	**76**
OMØWR	**492,420**	**1051**	**24**	**63**
***OMØTT**	**247,932**	**666**	**14**	**57**
OM8DD	179,745	472	16	53
OM7CA	161,936	550	12	46
***OM7AG**	**109,188**	**387**	**6**	**48**
*OM4DN	85,403	420	1	40
*OM4DA	63,495	278	6	39
*OM4J	53,130	234	0	46
*OM5UM	44,336	266	0	34
OM3BA	30,101	198	0	31
*OM1AW	24,880	121	1	39
*OM4DU	21,132	125	1	35
*OM5FA	18,513	113	1	32
*OM4AY	14,499	115	0	27
Slovenia				
S5ØA	**987,239**	**1326**	**51**	**70**
S57AL	**486,577**	**1014**	**24**	**67**
S5D	430,008	999	25	57
S59AA	401,657	849	25	64
S57C	399,642	888	23	63
***S52W**	**312,417**	**750**	**20**	**61**
***S53F**	**311,142**	**768**	**18**	**60**
S58Q	308,792	627	27	61
S51NZ	242,794	637	18	56
S53M	216,960	707	10	50
*S51F	151,970	459	12	53
S56X	146,010	456	12	50
*S57NAW	70,650	275	5	45
*S58MU	65,925	296	7	38
*S51MF	56,355	220	6	45
*S53FO	49,680	237	3	42
S58P	38,448	135	16	32
*S53DIJ	576	14	0	9
*S59EIJ	413	13	0	7
*S59T	350	10	1	6
Spain				
EA2LU	**738,070**	**1018**	**49**	**66**
EA7TL	**305,388**	**478**	**39**	**63**
EA7AJR	178,036	284	32	62
***EA5HT**	**112,392**	**341**	**10**	**53**
EA2SS	97,900	355	6	49
*EA7NW	21,168	86	14	28
*EA4NP	19,229	86	6	35
*EA7MT	13,532	75	3	31
*EA3LA	8,448	74	0	24
*EA1ND	6,125	43	3	22
*EA2SW	5,643	37	6	21
*EA3EP	2,040	30	0	15
EA1YO	1,584	19	0	16
*EA3ALV	561	15	0	11
*EC1AIJ	530	13	1	9
*EA1AST	222	7	0	6
Sweden				
SM5CEU	**598,860**	**937**	**41**	**67**
SEØX	**389,844**	**845**	**29**	**55**
SM6CPY	362,421	689	35	58
***SM5MX**	**151,368**	**420**	**18**	**50**
*SMØBSO	35,760	177	3	37
*SM5ARL	26,316	118	5	38
*SF6DX	20,130	124	0	33
*SM5DXR	8,096	78	0	22
*SM5Z	60	3	2	1
*SESE	5	1	0	1
Switzerland				
HB9CVQ	**333,099**	**884**	**17**	**56**
***HB9ARF**	**106,250**	**420**	**0**	**50**
HB9CPS	39,018	188	2	40
*HB9LL	9,982	66	0	31
Ukraine				
UX2X	**591,456**	**1083**	**30**	**71**
UV5U	**463,702**	**914**	**26**	**68**
UY5ZZ	458,880	930	28	68
UYØZG	357,420	803	21	63
UU4JC	250,559	684	12	59
UT2UB	244,584	586	22	57
UW5U	223,650	761	0	63
***UV2L**	**211,616**	**614**	**12**	**56**
***UX5NQ**	**203,670**	**663**	**11**	**51**
UT2PX	191,580	628	9	53
UW8SM	191,136	581	14	52
UW2ZM	164,557	394	19	60
UX3HA	149,778	572	2	51
UT1DX	141,020	526	9	46
UR8RF	139,438	451	9	53
UT3N	136,488	600	4	43
*USØZZ	132,804	388	4	64
*US9PA	131,880	492	8	48
UT5ECZ	124,921	478	9	44
*UR7VA	110,432	376	6	50
*UT5UQN	108,000	415	7	47
UW2Q	106,076	478	1	45
US3IZ	101,136	439	2	46
UT4ZG	99,481	386	3	50
*US8ICM	97,846	351	6	52
UT8IO	96,720	378	0	48
*UX7U	95,744	461	5	39
UX1IL	89,892	420	0	44
*UT5VX	87,722	397	4	42
URØIQ	86,886	324	5	49
UT5EO	85,330	401	4	42
*UU6JJ	79,968	347	1	47
UT5UGR	79,860	385	0	44
*UY2UQ	78,356	435	0	38
UR5MW	71,785	289	5	44
*UY5VA	71,160	370	1	39
*UT2QQ	65,088	283	2	46
UR5E	64,328	302	0	44
*US7IA	64,083	317	0	41
*UT1QL	63,339	304	0	43
*UXØUW	63,304	340	2	39
*UR3LPM	62,651	297	0	43
UT5CB	60,865	251	5	42
*UT4EK	59,709	328	0	39
*US8UA	55,200	242	0	48
*UR7EQ	52,104	281	0	39
UV5QQ	49,440	209	2	46
*UX8IR	49,434	233	0	42
*US6EX	45,496	209	0	47
UR5AKU	44,591	197	0	43
UR8LV	43,851	180	2	45
*UT4PZ	37,706	232	0	34
*UT5CY	35,136	199	0	36
*UT4VW	29,960	172	0	35
*US1IV	29,498	131	0	43
UR3IQO	27,183	131	0	39
*UR5MBA	22,126	119	0	37
UT5UY	20,492	69	10	37
*UX6VA	20,230	115	0	35
*UT7MW	16,268	122	0	28
*UT3FM	15,903	100	0	31
*UT4XU	13,949	73	0	37
*UR8IDX	13,370	76	0	35
*UX8IW	11,425	101	0	25
*UR5ZVJ	11,175	100	0	25
*UY1HY	11,024	78	0	26
*UT5ZA	10,375	92	0	25
*UU2JG	9,588	44	5	29
*UY5QZ	9,296	75	0	28
*UX3IO	8,908	44	1	33
*UR8GM	8,820	65	0	28
*UR5LJD	8,448	89	0	22
USØQG	6,216	67	0	21
*UT4ZX	6,104	42	0	28
*UY5TE	4,046	64	0	17
*UT7HM	2,730	43	0	15
*UTØU	1,830	28	0	15
Wales				
GW3JXN	**463,023**	**798**	**42**	**57**
GW3SQX	**429,516**	**664**	**46**	**51**
OCEANIA				
Australia				
VK6DXI	**5,600**	**51**	**0**	**14**
***VK3IO**	**3,731**	**37**	**2**	**11**
Guam				
KG6DX	**2,370**	**41**	**1**	**5**
Hawaii				
***NH6AH**	**100**	**10**	**5**	**0**
Indonesia				
***YC2EUZ**	**2,072**	**24**	**0**	**14**
*YB2UTX	840	19	0	8
*YB3BOA	483	13	0	7
*YCØLOW	265	13	0	5
*YC1COZ	195	10	0	5
*YB3XM	175	9	0	7
South America				
Argentina				
LU6QI	**125**	**4**	**1**	**4**
Aruba				
P43JB	**145,550**	**189**	**40**	**42**
Brazil				
ZY7C	**147,491**	**185**	**32**	**51**
PY2DO	6,408	30	14	10
PV8DX	5,817	29	10	11
PY2NY	1,651	15	6	7
PR7AR	72	4	1	5
Chile				
CE1/K7CA	**579,645**	**603**	**55**	**44**
Colombia				
***HK3O**	**16,005**	**56**	**22**	**11**
Ecuador				
HD2A	**354,051**	**420**	**51**	**42**

QRP

NORTH AMERICA

UNITED STATES

CONNECTICUT

W1AMF	**12,320**	**167**	**30**	**2**

NEW HAMPSHIRE

KN1H	**8,547**	**104**	**31**	**2**

RHODE ISLAND

KD1H	**4,725**	**82**	**24**	**1**

NEW JERSEY

K2JT	**6,656**	**112**	**26**	**0**
W2JEK	2,163	45	20	1

NEW YORK

W2GB	**94,544**	**437**	**48**	**28**
K2QO	23,490	220	41	4
WO2N	15,762	171	33	4

DELAWARE

AE3J	**4,995**	**83**	**27**	**0**

MARYLAND

K3TW	**25,830**	**262**	**35**	**6**

PENNSYLVANIA

NK8Q	**93,632**	**466**	**51**	**25**

ALABAMA

N4AX	**4,530**	**73**	**30**	**0**

FLORIDA

WS4Y	**1,600**	**35**	**18**	**2**

NORTH CAROLINA

W4TMR	**87,296**	**321**	**54**	**34**
WB4MSG	47,502	345	47	11

VIRGINIA

K4ORD	**46,400**	**333**	**48**	**10**

NEW MEXICO

W5GZ	**12,936**	**142**	**41**	**1**

TEXAS

NF5P	**6,766**	**97**	**33**	**1**
WB5BKL	320	16	10	0

CALIFORNIA

N6WG	**17,960**	**199**	**36**	**4**
NE6M	1,120	57	10	0
N6FD	828	31	12	0

ARIZONA

N7MAL	**897**	**30**	**12**	**1**

NEVADA

NU7T	**1,722**	**58**	**13**	**1**

WASHINGTON

WF4U	**22,099**	**184**	**45**	**4**
KX7L	**7,595**	**106**	**30**	**1**

MICHIGAN

WBGP	**42,761**	**310**	**52**	**9**
KT8K	2,300	41	23	0

OHIO

N8VW	**198,048**	**760**	**56**	**40**
WB8RTJ	33,337	288	50	3
K8ZT	28,132	216	42	10
W8VE	12,051	135	39	0
AA8IV	330	18	10	0

WEST VIRGINIA

K8OWL	**5,370**	**82**	**30**	**0**

ILLINOIS

K9FO	**96,152**	**605**	**54**	**14**
K9CS	16,146	150	46	0
NE9H	4,368	68	28	0

INDIANA

KB9ZUV	**8,128**	**111**	**32**	**0**
KA8SGT	7,502	106	31	0

WISCONSIN

K9AY	**205,202**	**801**	**57**	**37**
K9TY	8,816	98	38	0
KØCD	1,440	30	20	0

COLORADO

NO2D	**352**	**16**	**11**	**0**

KANSAS

W7JI	**27,538**	**253**	**48**	**1**
WØEB	855	21	19	0

MINNESOTA

KØPK	**78,936**	**492**	**53**	**13**
KEØG	21,840	201	48	0

CANADA

ONTARIO

VE3MGY	**138,915**	**475**	**50**	**13**
VE3FRX	**101,931**	**356**	**53**	**8**
VA3RKM	10,416	97	23	1

SASKATCHEWAN

VE5MX	**600**	**12**	**10**	**0**

ASIA

Asiatic Russia

RN9AUF	**5,814**	**42**	**0**	**17**

Japan

7K1CPT	**164**	**12**	**0**	**4**
JAØGBO	100	13	0	4
JA1BVA	16	9	0	1
JE2LPC	6	3	0	1

Kazakhstan

UN7CN	**8,715**	**75**	**0**	**15**

EUROPE

Bosnia-Herzegovina

E71DX	**45**	**3**	**0**	**3**

Czech Republic

OK7U	**174,120**	**601**	**14**	**46**
OK2BYW	**118,030**	**449**	**6**	**49**
OK1XR	17,100	136	0	30

England

****G3YMC**	**22,724**	**125**	**4**	**34**

European Russia

RW3AI	**53,259**	**270**	**0**	**41**
RA3DTH	8,190	52	0	30
UA1CEC	7,568	79	0	22
RX3ALL	6,408	56	0	24
RW1AI	5,842	50	0	23
RV3BQ	4,301	58	0	17

Germany

DJ3GE	**11,648**	**104**	**0**	**26**
DF2OK	5,502	62	0	21

Hungary

HA6IAM	**79,968**	**327**	**3**	**46**
HA5BA	3,710	58	0	14
HA5OB	312	9	0	8

Italy

IKØEIE	**10,234**	**40**	**1**	**42**
IK1RAC	1,824	31	0	12
I7PXV	1,560	24	0	12
IK3JBP	30	3	0	3

Latvia

YL2CV	**55,965**	**288**	**1**	**38**

Lithuania

LY2BNL	**5,148**	**51**	**0**	**22**

Luxembourg

LX1NO	**820**	**17**	**0**	**10**

Macedonia

Z35X	**2,720**	**34**	**0**	**17**

Netherlands

PAØRBO	**2,772**	**33**	**0**	**18**
PE2KP	756	21	0	9
PA1B	100	5	0	4

Norway

LA8UL	**3,040**	**28**	**0**	**19**
LA1ENA	1,376	23	0	13

Poland

SP5ELA	**93,330**	**377**	**3**	**48**
SP5DDJ	7,728	70	0	23
SP4JFR	4,392	50	0	18
SP8MI	4,180	44	0	20
SP6IHE	750	11	6	4

Romania

YO4AAC	**3,696**	**48**	**0**	**16**

Serbia

YU2DX	**16,728**	**148**	**0**	**24**

Slovakia

OM3CUG	**100,602**	**440**	**0**	**46**
OM7PY	22,050	103	0	42

Slovenia

S59D	**73,034**	**277**	**11**	**42**

Spain

EA5GDW	**4,544**	**25**	**3**	**29**

Sweden

SM7RPU	150	6	0	5

Ukraine

UU7JF	**40,120**	**250**	**0**	**34**
UX8IX	**39,273**	**221**	**0**	**39**
UX7UN	25,509	167	0	33
UT5DJ	2,822	39	0	17
UT5UN	2,565	39	0	15

OCEANIA

Australia

VK2CCC	**34**	**7**	**0**	**2**

Hawaii

KH7Y	**860**	**12**	**9**	**1**

ASSISTED

NORTH AMERICA

UNITED STATES

CONNECTICUT

K1VC	**234,828**	**804**	**57**	**42**

MASSACHUSETTS

W1UJ	**217,645**	**629**	**55**	**40**
N1DG	**161,676**	**399**	**53**	**55**
N1SV	108,400	230	47	53
W1EBI	18,044	125	44	8
KV1J	6,222	85	33	1

NEW HAMPSHIRE

N9NC	**214,620**	**574**	**59**	**46**
WB1EDI	33,920	259	44	9
K1GQ	5,425	97	25	8

NEW JERSEY

N2NT	**936,526**	**1414**	**58**	**76**
N2MM	**505,386**	**945**	**57**	**69**
W2YC	174,359	436	56	57
N2WM	123,600	321	50	50
K2AX	116,900	237	46	54
N2VW	109,416	338	54	43
K2TTT	84,064	479	52	19
K2GN	76,648	253	51	37
WA2VUN	4,750	76	24	1
N2AET	3,381	69	23	0

NEW YORK

N2CU	**561,279**	**1246**	**59**	**70**
W2LK	**348,572**	**835**	**57**	**61**
N1EU	291,814	739	56	62
N2WLG	266,002	639	56	57
N2WK	207,807	465	54	59
N2NI	162,925	369	50	45
WA3AFS	99,586	255	52	49
N2LQ	56,088	203	51	31
NJ1F	44,694	145	48	30
K2QMF	42,478	135	29	38
KD2A	33,001	215	52	9
WB2TPS	4,293	68	26	1

DISTRICT OF COLUMBIA

4U1WB	**3,128**	**62**	**23**	**0**

MARYLAND

N3KS	**633,906**	**1098**	**57**	**72**
K3MM	**568,278**	**1023**	**58**	**73**
W3XB	318,015	548	51	60
N3AM	218,000	686	55	45
W3KL	167,214	476	48	39
K2PLF	146,924	507	53	39
W3UL	49,640	263	46	22
W3BW	4,650	43	22	8

PENNSYLVANIA

W8FJ	**443,992**	**738**	**57**	**70**
AA3B	**220,500**	**610**	**48**	**50**
N3ZA	74,448	210	49	39
W3MF	73,632	346	53	25
KQ3F	62,906	351	52	19
N3NR	51,250	181	45	37
K3ND	45,609	199	42	27
WI2E	36,288	272	45	9
W3AG	21,800	231	38	2
N3XLS	12,036	160	33	1
N3SD	11,514	134	36	2

ALABAMA

N4KG	**272,552**	**511**	**56**	**68**
KR4F	**272,368**	**797**	**56**	**60**

FLORIDA

N4WW	**244,366**	**522**	**57**	**65**
N2NL	**213,875**	**337**	**52**	**73**
K4UTE	143,635	300	54	61
K4PB	141,510	353	53	53
KD5M	102,111	282	53	48
NU4Y	21,879	189	44	7

GEORGIA

N4PN	**530,271**	**1210**	**59**	**74**
WF4W	**118,170**	**605**	**55**	**23**
WB4MAK	80,311	400	52	25
NE4S	62,243	405	52	15
W4ATL	26,840	202	47	8
NN4RR	10,682	55	28	21
ND4V	5,180	89	28	0

KENTUCKY

K4WW	**95,353**	**532**	**56**	**15**
KO4OL	6,784	99	32	0

NORTH CAROLINA

K4SV	**236,057**	**592**	**52**	**61**
K4CZ	**232,246**	**715**	**56**	**50**
K8AC	166,314	430	53	53
K3KO	162,216	487	58	50
NT4D	110,182	429	54	35
W4MY	81,541	439	54	19
AA4S	69,006	210	54	39
N4TL	49,166	213	33	29
KS4S	20,412	220	39	3
W4TMO	11,088	99	38	6

SOUTH CAROLINA

K2SX	**245,592**	**715**	**55**	**53**

TENNESSEE

N4VV	**363,342**	**905**	**58**	**65**
N4DW	**355,866**	**914**	**58**	**53**
W6UB	149,400	483	53	47
W4CK	37,011	143	46	27
K4EDI	12,768	131	36	6

VIRGINIA

W4MYA	**909,696**	**1631**	**58**	**80**
W4NF	**628,804**	**1257**	**57**	**67**
K2WK	484,592	1177	58	66
W4PK	381,612	937	56	62
N4RV	306,663	603	55	64
W4PM	236,538	717	55	47
W2YE	155,257	391	54	53
KG4W	143,616	554	53	43
NN3W	118,103	444	53	36
K5EK	91,494	555	51	18
N4VA	77,400	383	51	24
W3YY	70,875	314	52	29
W4HJ	33,475	164	43	22
N4DWK	25,996	97	42	25
N3AO	20,727	181	44	5
N3KN	20,237	179	45	4
WK4Y	14,689	167	36	1

ARKANSAS

N7FF	**45,818**	**298**	**51**	**11**

LOUISIANA

N5AN	**267,456**	**799**	**56**	**56**
K1DW	23,760	179	46	9

MISSISSIPPI

W5XX	**178,848**	**590**	**57**	**51**
K2FF	13,867	96	36	13

TEXAS

K5NA	**767,181**	**1453**	**59**	**82**
AB5MM	**315,720**	**825**	**58**	**62**
N5TW	96,030	286	51	46
N5NA	73,920	337	54	26
N5XJ	57,152	370	52	12
NX5M	49,217	175	48	31
N5JB	29,634	152	48	18
W5AJ	25,862	152	54	13
K5LH	18,326	175	46	3
N1CC	12,956	152	39	2
W5OV	2,850	47	24	1

CALIFORNIA

K6TA	**147,420**	**491**	**55**	**36**
NI6T	**136,608**	**343**	**53**	**43**
W6YI	85,624	241	47	41
N6IE	64,728	372	55	17
N6RV	59,860	293	52	21
K6MM	32,148	232	50	7
N6PE	23,797	139	34	19
K6NV	21,164	228	42	2
W4EF	14,688	103	37	11
N6QQ	484	16	9	2

ARIZONA

AA7A	**200,342**	**498**	**56**	**53**
N6SS	**173,922**	**520**	**56**	**45**
W6XI	149,376	525	55	41
W9NGA	84,048	375	50	18
NQ7R	53,196	182	43	35

NEVADA

W7RN	**233,300**	**696**	**55**	**45**
N7ON	52,608	345	55	9

UTAH

W7CT	**113,805**	**542**	**55**	**26**

WASHINGTON

K7OX	**347,088**	**933**	**58**	**54**
K7LFY	58,504	331	56	15
N7NM	45,175	265	56	9
K7ZA	29,388	149	47	15
WA1PMA	16,245	113	50	7

MICHIGAN

W8TE	**316,468**	**770**	**58**	**64**
W8LU	**136,904**	**311**	**57**	**52**
K8ZZ	66,795	459	51	10
W8GF	53,270	182	49	41
K8GT	9,731	113	36	1

OHIO

K1LT	**685,952**	**1346**	**59**	**69**
N8TR	**358,272**	**646**	**58**	**70**
N8BJQ	303,856	822	58	54
W8AV	175,489	382	49	64
W7PP	81,755	321	50	33
W8KEN	31,525	138	44	21
AA8LL	10,019	105	42	1

WEST VIRGINIA

AJ1M	**11,634**	**120**	**37**	**5**

ILLINOIS

K9NR	**509,056**	**1324**	**59**	**69**
WX9U	**199,598**	**598**	**57**	**49**
K9IUQ	113,102	354	53	44
KS9W	109,107	494	54	27
N2BJ	107,604	491	54	30
AI9L	72,656	341	52	24
N7US	43,746	253	53	16
KM9M	15,640	184	40	0

INDIANA

W9IU	**378,448**	**1201**	**59**	**50**
NZ9R	71,610	346	54	23

WISCONSIN

WE9R	**96,806**	**304**	**54**	**43**

COLORADO

KVØQ	**561,340**	**1115**	**59**	**71**
K7SCX	78,075	410	56	19
KØCOM	14,560	121	49	3

IOWA

KØKT	**179,352**	**643**	**55**	**39**

KANSAS

KØPY	**85,330**	**527**	**54**	**16**

MINNESOTA

NEØU	**247,950**	**703**	**57**	**57**
KØKX	**195,910**	**468**	**57**	**53**
NØAT	130,572	503	55	38
KØAD	61,380	395	54	12
WAØMHJ	50,840	181	52	30
WØBM	32,240	274	50	2

MISSOURI

KBJPL	**157,780**	**616**	**55**	**37**
WØTT	101,325	551	54	21

NEBRASKA

W7IZL	**53,352**	**194**	**44**	**34**

NORTH DAKOTA

NTØV	**194,350**	**409**	**56**	**59**

CANADA

NOVA SCOTIA

VE1JF	**51,356**	**105**	**31**	**43**

QUEBEC

VA2WDQ	**403,920**	**696**	**56**	**52**
VA2AM	**110,466**	**185**	**52**	**50**

ONTARIO

VE3XB	**564,300**	**906**	**56**	**58**
VA3DX	**457,710**	**751**	**56**	**58**
VE3RZ	382,228	597	58	61
VE3QAA	354,118	548	55	63
VA3KA	73,968	120	4	63
VE3HG	30,452	124	31	15

ALBERTA

VE6SV	**395,584**	**666**	**56**	**56**
VE6LB	16,731	100	25	8

BRITISH COLUMBIA

VE7FO	**10,370**	**64**	**32**	**2**

Alaska

AL9A	**62,205**	**226**	**43**	**12**
AL2F	28,170	124	40	5

Dominican Republic

HI3TEJ	**162,690**	**355**	**49**	**38**

Martinique

FM5CD	**545,160**	**765**	**55**	**65**

U.S. Virgin Islands

KV4FZ	**733,881**	**926**	**58**	**71**

AFRICA

Canary Islands

EA8BQM	**110**	**4**	**0**	**5**

Senegal

6W/DL2RMC	**779,520**	**713**	**50**	**62**

ASIA

Asiatic Russia

RG9A	**831,024**	**1023**	**10**	**77**
UA9MA	**325,350**	**585**	**10**	**65**
RX9AM	235,008	502	0	51
RX9SA	215,760	393	2	58
RUØAW	210,693	313	17	62
RU9TO	151,536	299	1	55
UAØSR	149,184	246	13	59
RVØAR	83,025	123	20	55
UA9TQ	54,612	150	0	41
RN9AA	36,760	104	0	40
RK9UE	35,520	90	12	36
RO9O	22,661	85	0	31
RU9UG	17,314	94	0	22
RV9CX	3,263	28	0	13
UA9QQ	2,840	44	0	10
UAØCW	1,100	12	0	10
UAØCA	675	9	0	9
RWØCF	39	1	0	3

Cyprus

P33W	**1,820,799**	**1532**	**47**	**80**

Georgia

4L6QC	**106,965**	**247**	**0**	**45**

Hong Kong

VR2PX	**5,232**	**55**	**0**	**16**

Israel

4Z5MU	**1,470**	**13**	**3**	**11**

Japan

JH2FXK	**208,527**	**273**	**32**	**57**
JS3CTQ	**130,520**	**267**	**26**	**39**
JH3PRR	118,059	201	22	47
JG7PSJ	33,456	95	21	20
JA1KVT	27,360	97	15	23
JA1BJI	12,320	73	13	15
JA6SRB	2,940	25	6	8
JA1IZZ	2,004	20	6	6

Kazakhstan

UN7TW	**595**	**9**	**0**	**7**

EUROPE

Andorra

C31CT	**600**	**14**	**8**	**10**

Austria

OE3DSA	**611,858**	**1072**	**34**	**67**
OE3ZK	43,470	149	11	43

Belarus

EV1R	**305,797**	**799**	**15**	**58**
EW6CU	43,808	234	1	36

Belgium

ON4UN	**1,242,210**	**1342**	**56**	**85**
OQ5M	45	3	0	3
ON5ZO	5	1	0	1

Bulgaria

LZ4TX	**420,496**	**948**	**16**	**66**

Croatia

9A3ST	**7,680**	**66**	**0**	**24**

Czech Republic

OK2W	**622,114**	**1051**	**33**	**73**
OL8R	**554,795**	**919**	**36**	**71**
OK7Y	490,944	954	32	64
OK1VD	361,845	673	30	69
OK1DO	326,606	780	21	61
OK2BMU	180,908	497	14	57
OK1KT	180,310	476	19	54
OK2HZ	169,242	491	12	55
OK2BPU	126,344	345	16	52
OK5AD	102,900	426	8	42
OK1MZO	55,896	223	7	44
OK1VKC	32,487	109	10	41
OK4MM	17,340	101	1	33
OK1ABB	16,680	56	13	27
OK1FAI	10,385	48	11	20
OK1LO	7,634	77	0	22
OK1UKV	3,026	41	0	17
OK2PAD	1,950	26	0	15
OK1HGM	30	2	0	2

Denmark

OZ1AXG	**93,775**	**332**	**4**	**51**
OZ7TTT	54,390	210	8	41

England

G3TXF	**744,566**	**1013**	**49**	**73**
G3LZQ	**414,999**	**548**	**46**	**71**
G3YYD	255,102	435	35	67
G3WPH	245,088	449	34	58
G4AMT	154,488	210	45	37
G3RWL	100,533	240	22	47
G4BYG	85,425	183	23	52
G3UHU	45,747	177	1	50
G3SVD	41,808	102	16	51

Estonia

ES5QX	**1,052,323**	**1308**	**49**	**82**
ES2DJ	**399,573**	**886**	**21**	**60**
ES5NC	141,777	450	6	53

European Russia

UA6LV	**1,058,205**	**1206**	**49**	**92**
RA3CO	**917,658**	**1210**	**42**	**84**
RX4HZ	633,528	1036	25	83
RW4PL	558,720	797	38	82
RU4LM	395,125	630	37	72
UA3SAQ	308,295	654	18	67
RU4PU	292,528	534	24	70
UA3BS	224,294	576	19	55
RN1ON	200,625	495	13	62
UA4RZ	196,688	476	9	67
UA6GP	179,627	528	6	61
UA3KM	176,800	544	4	61
RU1AO	142,675	449	9	56
RA3ZZ	111,888	396	2	54
RK3DK	98,935	417	3	44
RA1QD	96,773	432	2	45
RU6FA	93,068	348	3	50
RX3AT	89,096	305	5	51
UA3QFU	81,162	290	3	51
RA3QN	74,160	384	0	40
RA6YDX	66,364	288	6	41
RA4HBS	56,880	248	0	45
RA3DNC	53,900	246	1	43
UA4FCO	49,120	239	0	40
UA3XAC	43,381	183	5	42
RA1QFY	23,374	168	0	29
RA3NZ	20,910	149	0	30
UA1ORK	18,400	67	3	43
RN3GA	12,000	76	0	30
UA4HEJ	11,840	51	6	31
RA3VR	5,966	76	0	19
UA3AGW	2,952	21	3	15
UA1OMZ	2,700	21	3	17
RN6FK	924	12	4	7
RU3LA	693	15	0	11
UA6FF	585	8	2	7
UA3FX	416	9	0	8
RA3XDX	400	8	2	6

Finland

OH4A	**992,960**	**1388**	**48**	**68**
OH2BO	**646,354**	**723**	**49**	**82**
OH6MW	269,735	691	16	57
OH2XX	173,246	592	5	53
OH6RE	34,560	131	7	41
OH8US	21,855	76	12	35
OH3FM	10,700	104	0	20
OH8KA	610	16	0	10

France

F6BEE	**522,268**	**626**	**50**	**68**
F5IN	**171,504**	**423**	**24**	**48**
F4EIZ	156,429	270	29	62

Germany

DL7ON	**909,000**	**1300**	**43**	**82**
DFØSAX	**617,436**	**1117**	**37**	**71**
DL8QS	530,991	785	41	82
DAØCA	462,668	947	34	60
DJ9VA	456,610	749	41	69
DK2FG	419,230	646	39	74
DL8SCG	416,800	813	37	63
DL9YAJ	372,096	687	36	66

DL1RG	347,448	696	31	62
DJ5MW	326,928	638	37	61
DK7YY	318,560	819	23	57
DL1NEO	302,847	665	26	61
DK4A	262,800	746	18	57
DM1TT	240,396	610	23	55
DJ9MH	203,040	505	25	55
DL4RCK	195,264	589	15	57
DF3CB	188,161	432	25	58
DL5MX	186,417	479	19	58
DK1KC	180,780	548	17	52
DF5BM	176,441	484	21	52
DL1YD	161,925	350	28	57
DL3OBQ	127,832	476	6	52
DJ2MX	123,024	380	12	54
DK1FW	111,471	289	17	56
DK3UA	110,022	309	13	53
DL3ANK	107,160	251	21	55
DL5MEV	106,400	229	21	59
DHØGHU	105,168	414	3	53
DL6MHW	93,930	322	15	47
DL5MG	89,152	273	15	49
DF8AA	83,412	253	16	47
DL7YS	74,850	328	3	47
DL7BY	66,834	304	2	45
DL6ZXG	58,011	187	8	53
DRØGANT	56,696	354	0	38
DL3BXX	54,366	307	0	39
DL4KUG	46,512	201	5	43
DJ8ES	42,448	143	7	49
DL5CF	40,561	192	0	47
DF2HL	40,071	123	13	44
DL5KUA	38,475	122	15	42
DK5MB	37,400	193	2	42
DJ2QV	34,980	180	2	42
DL4NER	23,736	132	0	43
DF2LH	20,424	76	7	39
DL1TS	17,120	118	2	30
DL2AXM	16,092	149	0	27
DL1DTC	15,469	113	0	31
DL9AWI	12,650	115	0	25
DC4A	9,477	88	0	27
DL5ZB	8,769	38	7	30
DL4NAC	7,028	59	0	28
DL1KWK	5,177	34	0	31
DL3ABL	4,520	50	0	20
DC3RJ	2,816	43	0	16
DR4W	2,652	41	0	17
DK3PM	1,938	27	0	17
DJ3RA	1,000	10	7	3
Greece				
SV1GRD	**63,366**	**191**	**5**	**54**
SV1JG	25,884	140	0	36
SV1DPI	4,368	28	6	18
Guernsey				
GU4YOX	**7,250**	**37**	**14**	**11**
Hungary				
HA3NU	**557,424**	**981**	**40**	**58**
HA1DAE	**230,420**	**512**	**21**	**61**
HA3LI	147,088	499	3	55
HAØLC	106,250	413	1	49
HA1SN	2,919	29	0	21
Italy				
IKØYVV	**276,747**	**585**	**30**	**57**
IC8FBU	**151,478**	**380**	**21**	**53**
IKØXBX	146,965	284	27	58
IK2ANI	88,604	240	15	53
I2SVA	48,020	196	2	47
IØQM	3,133	51	0	13
IZ4DZD	520	13	0	8
IZ8DVD	378	11	0	9
IZØEHL	4	2	0	1
Latvia				
YL7X	**515,755**	**964**	**32**	**63**
YL2KO	**161,460**	**554**	**9**	**45**
YL5T	26,527	126	2	39
Lithuania				
LY2IJ	**1,261,656**	**1533**	**50**	**82**
LY7M	**549,332**	**1090**	**26**	**66**
LY3BN	500,968	864	29	75
LY2FN	333,060	803	18	60
LY5W	216,282	633	13	53
LY3X	62,190	280	1	44
LY2CO	37,269	188	0	41
LY1C	2,430	30	0	18
Netherlands				
PA3C	**191,301**	**358**	**31**	**62**
PAØWRS	**166,650**	**257**	**31**	**70**
PAØO	136,544	373	21	47
PA5A	42,532	137	23	26
PA3EBP	2,160	27	0	16
Norway				
LA8AJA	**636,451**	**1031**	**42**	**67**
LA8HGA	23,220	60	6	48
LA6DW	3,553	37	1	18
LA2GH	230	7	1	9
Poland				
SN3R	**1,467,955**	**1685**	**53**	**84**
SP3BQ	**1,368,840**	**1576**	**53**	**83**
SP4Z	552,024	1017	28	71
SP2EWQ	409,360	886	24	61
SO8A	330,412	710	22	64
SO6I	208,440	701	6	54
SP9LAS	134,871	437	9	52
SP5CJY	76,020	235	11	49
SP8HXN	71,552	262	6	46
SP1S	47,092	134	6	55
SP3IOE	36,210	127	9	42
SQ9FMU	36,108	206	1	35
SP6NIF	18,500	62	6	44
SP8TJU	13,144	98	0	31
SP9HZW	8,400	56	0	30
SP4GHL	7,238	70	0	22
SP8HKT	5,824	45	0	28
SQ6MS	5,136	45	0	24
SP3J	4,896	58	0	18
SP7HOV	4,400	27	5	15
SP7MFR	2,550	24	0	17
SP9CVY	1,330	18	0	14
SP6CZ	884	12	3	14
SP5WA	603	9	1	8
SP6BLI	24	2	1	1
SP5FHF	2	1	0	1

Romania				
YO6BHN	**311,925**	**788**	**16**	**59**
YO7BGA	76,200	292	6	44
YO7LGI	47,085	222	2	41
YR1C	30,330	194	0	30
YO5OHO	15,903	120	0	27
YO3JW	7,332	57	0	26
Scotland				
MMØGPZ	**43,197**	**160**	**4**	**47**
Serbia				
YU1LA	**977,900**	**1335**	**46**	**81**
YT5C	**551,955**	**1060**	**29**	**64**
YT1VP	463,196	999	22	64
YT1TA	195,114	619	11	51
YT2AAA	14,848	102	0	29
YU1PC	10,833	98	0	23
Slovakia				
OM5NU	**311,364**	**719**	**21**	**60**
OM7YC	48,440	244	0	40
Slovenia				
S57DX	**780,965**	**1211**	**42**	**73**
S53O	**765,325**	**1152**	**41**	**74**
S5ØK	751,276	1053	49	73
S55M	672,840	1110	35	73
S57M	594,928	1004	39	64
S5ØR	420,712	924	26	60
S54O	374,255	832	23	62
S56A	254,610	592	23	59
S59W	108,576	265	20	52
S57SU	77,600	312	4	46
S5ØX	69,536	282	10	43
S54X	45,612	229	0	42
S59N	42,108	201	8	36
S51DX	32,760	189	0	36
S59ABC	7,568	75	0	22
Spain				
EA5KY	**115,570**	**297**	**18**	**52**
EA4KD	**109,020**	**215**	**27**	**52**
EC5CR	27,987	84	8	49
EA5BY	18,522	75	11	31
EA2DK	279	11	0	9
EA5GVZ	232	7	0	8
Sweden				
SM2M	**453,128**	**736**	**42**	**62**
8SØW	**143,938**	**316**	**21**	**58**
SM6WET	102,376	274	14	53
SMØIMJ	95,743	262	19	48
SM5FUG	58,550	220	11	39
SE2T	41,625	177	5	40
SA1A	25,632	147	4	32
SM5INC	22,661	144	0	31
Switzerland				
HB9LCW	**106,260**	**235**	**25**	**52**
HB9HFN	3,360	26	1	20
Ukraine				
UW2M	**940,632**	**1176**	**41**	**91**
UZ7U	**474,656**	**836**	**33**	**71**
UXØFF	366,792	792	19	68
UT7DK	363,280	904	22	58
UR5QU	305,357	672	25	58
UR5IOK	297,975	627	20	67
UU2JQ	218,304	599	8	64
UZ5UA	217,854	713	9	54
USØKW	175,236	507	11	57
UT7MA	141,230	476	5	53
UR5QA	111,230	460	4	45
UU2CW	110,396	435	6	46
UT4MF	94,248	380	5	46
UX3MZ	85,146	380	0	46
UT8NT	76,563	340	3	44
UR8MH	34,504	199	0	38
UT3IB	30,369	90	3	50
UY2ZA	27,640	139	1	39
UT3NF	19,981	55	8	45
US5CB	11,782	70	0	43
UT7UW	9,396	63	8	19
UR5IKN	4,324	34	0	23
US3QQ	3,154	31	0	19
UR4CWQ	583	14	0	11
US3LX	280	10	0	8
US3IP	100	4	2	2

OCEANIA

New Zealand				
ZL1AZE	**1,570**	**19**	**4**	**6**

South America

Brazil				
PY5EW	**12,716**	**45**	**14**	**20**
PY2WC	1,133	15	5	6
PY1NB	368	9	4	4

MULTI-OP

NORTH AMERICA

UNITED STATES

CONNECTICUT				
NZ1U	**565,308**	**1083**	**58**	**65**
W1EQ	**502,320**	**1089**	**59**	**56**
MASSACHUSETTS				
K1LZ	**1,077,780**	**1578**	**58**	**80**
W1UE	**1,044,725**	**1557**	**57**	**74**
K1TTT	1,006,236	1767	59	73
W1QA	535,680	1062	57	67
NEW HAMPSHIRE				
KØTV	**532,704**	**1098**	**57**	**67**
K1QX	37,259	250	36	17
RHODE ISLAND				
W1OP	**40,669**	**127**	**26**	**41**
NEW JERSEY				
W2GD	**1,227,944**	**1785**	**58**	**78**
KD2I	**647,040**	**1258**	**59**	**69**
W2VQ	191,572	600	54	40
N2KPB	85,260	248	51	47
WW2NJ	32,352	302	47	1
PENNSYLVANIA				
WE3C	**1,220,632**	**1766**	**58**	**84**
K9RS	**1,187,894**	**1799**	**58**	**81**
KBDI	**368,041**	**1051**	**57**	**56**
W4SEC	13,248	109	37	11
GEORGIA				
NQ4I	**837,822**	**1613**	**59**	**82**
KENTUCKY				
K4FT	**337,900**	**1079**	**57**	**52**
K4AVX	25,284	224	43	6
NORTH CAROLINA				
N1LN	**831,872**	**1703**	**58**	**74**
N4XD	**521,750**	**1148**	**58**	**67**
SOUTH CAROLINA				
AA4V	**623,232**	**1267**	**59**	**69**
VIRGINIA				
W4ML	**460,660**	**1121**	**57**	**67**
KC4D	**392,400**	**1017**	**58**	**62**
ARKANSAS				
K5GO	**780,444**	**1670**	**58**	**75**
NEW MEXICO				
NI5T	**448,704**	**1254**	**58**	**56**
N7KA	**219,285**	**872**	**58**	**41**
CALIFORNIA				
N6RO	**392,940**	**931**	**58**	**60**
W6OAT	**183,356**	**709**	**56**	**36**
K6XV	178,932	700	57	36
N5KO	136,701	579	56	27
W6GMU	82,946	490	55	12
WB6BFG	4,004	93	22	0
ARIZONA				
N7DD	**559,650**	**1074**	**58**	**72**
N7KQ	35,456	202	48	16
K7RST	35,336	282	48	8
MONTANA				
KB7Q	**335,944**	**1203**	**57**	**41**
OREGON				
NK7U	**484,828**	**1137**	**58**	**64**
UTAH				
NS7K	**100,512**	**603**	**57**	**15**
WASHINGTON				
AD7AF	**173,089**	**687**	**57**	**22**
MICHIGAN				
K8CC	**667,059**	**1556**	**59**	**70**
K8GG	**561,537**	**1303**	**59**	**70**
OHIO				
W8FT	**419,400**	**1128**	**58**	**62**
WISCONSIN				
WBAIH	**773,820**	**1613**	**59**	**76**
COLORADO				
KJØG	**92,880**	**545**	**56**	**16**
IOWA				
NØXR	**970,725**	**1836**	**59**	**70**
MINNESOTA				
WØMR	**95,472**	**556**	**54**	**18**
NØBK	1,312	32	16	0
MISSOURI				
KØLIR	**140,784**	**715**	**58**	**26**

CANADA

NEW BRUNSWICK				
VE9ML	**47,023**	**157**	**39**	**20**
PRINCE EDWARD ISLAND				
VY2ZM	**2,423,796**	**2174**	**58**	**90**
QUEBEC				
VE2OJ	**496,100**	**969**	**57**	**43**
ONTARIO				
VE3MIS	**142,777**	**453**	**52**	**15**
Bahamas				
C6ANM	**765,700**	**1036**	**59**	**65**
Mexico				
XE1RCS	**1,061,739**	**1357**	**59**	**74**
San Andres/Providencia				
5KBCW	**10,070**	**62**	**37**	**16**

AFRICA

Madeira Islands				
CT9M	**2,447,836**	**1687**	**58**	**88**
Morocco				
CN3A	**1,908,748**	**1394**	**57**	**82**

ASIA

Asiatic Russia				
RA9A	**545,498**	**693**	**15**	**71**
RWØCWA	**527,772**	**576**	**48**	**55**
RK9CWA	477,004	724	7	67
RK9CZO	427,999	663	7	66
RX9CAZ	378,927	599	7	64
RWØLT	109,505	296	16	39
RK9JWV	62,320	190	0	41
Israel				
4Z5J	**1,400,704**	**1175**	**48**	**76**
Japan				
JA3YBK	**500,106**	**554**	**47**	**55**
JAØZRY	**2,820**	**26**	**4**	**11**
Kazakhstan				
UP2L	**1,064,805**	**1165**	**25**	**80**
Qatar				
A71BX	**372,216**	**522**	**18**	**60**

EUROPE

Austria				
OE2S	**756,448**	**1175**	**48**	**72**
CU8A	**569,644**	**753**	**48**	**58**
Belarus				
EW1WZ	**498,953**	**1008**	**23**	**68**
EW2WW	**141,168**	**540**	**5**	**46**
Belgium				
ON4WW	**1,155,066**	**1496**	**52**	**77**
Bosnia-Herzegovina				
E7DX	**1,351,104**	**1812**	**44**	**80**
E77CFG	**425,200**	**1007**	**21**	**59**
Bulgaria				
LZ7J	**854,680**	**1275**	**43**	**72**
Croatia				
9A7A	**892,995**	**1412**	**34**	**77**
9A3B	**573,949**	**1071**	**31**	**66**
9A7T	316,530	636	25	65
9A1ACD	172,380	508	13	52
Czech Republic				
OK5W	**1,484,304**	**1757**	**54**	**82**
OL7M	**953,190**	**1341**	**42**	**84**
OK4W	865,011	1279	49	70
OL7R	771,175	1248	41	68
OL5K	745,584	1138	42	70
OK6DX	598,752	1124	32	67
OK1MQ	421,972	994	24	58
OL1C	358,785	810	27	58
OL4A	357,633	901	20	59
England				
G3UJE	**760,275**	**1197**	**41**	**68**
G4AQG	**248,611**	**442**	**35**	**62**
Estonia				
ES9C	**2,011,320**	**1999**	**57**	**94**
European Russia				
RK4UWR	**788,396**	**1029**	**28**	**86**
RK3SWS	**595,104**	**1093**	**21**	**75**
RK3AWK	531,726	986	33	69
RK3SWB	300,484	658	21	65
RC3W	229,775	696	9	56
RF3C	192,694	507	12	59
RK4FWX	116,978	490	3	43
RK3DZH	112,420	537	0	44
Finland				
OG9W	**528,750**	**993**	**30**	**64**
OH4AB	**495,420**	**953**	**25**	**67**
France				
TM6M	**1,622,888**	**1706**	**56**	**80**
Germany				
DR1A	**1,238,516**	**1643**	**52**	**81**
DQ4W	**963,356**	**1424**	**50**	**74**
DLØMB	716,910	1202	40	75
DLØAO	704,634	1173	39	75
DL1QQ	666,396	1235	37	70
DF7ZS	629,475	1110	45	64
DKØOG	576,828	1016	38	71
DF1HF	385,500	729	34	66
DJ6TK	377,627	849	26	63
DLØUM	224,373	489	29	58
DL5XAT	105,906	398	13	44
DKØIZ	103,290	315	16	50
DJ7LH	28,466	151	0	43
Greece				
SX1L	**503,240**	**1012**	**26**	**66**
Hungary				
HG8DX	**1,776,600**	**1844**	**55**	**95**
HG1S	**737,124**	**1238**	**35**	**71**
HG5A	682,684	1222	35	68
Isle of Man				
MD4K	**1,849,637**	**2039**	**56**	**81**
Italy				
I4EAT	**1,062,720**	**1319**	**52**	**83**
IQØOS	39,550	230	0	35
IQØRM	23,751	130	1	38
Kaliningrad				
RK2FWA	**1,724,310**	**1832**	**53**	**94**
UA2FW	**1,394,976**	**1725**	**47**	**85**
Lithuania				
LY7A	**452,886**	**1015**	**22**	**60**
LY2XW	**426,105**	**924**	**25**	**60**
LY2J	381,227	939	23	54
Montenegro				
4O3A	**1,115,934**	**1566**	**44**	**78**
Netherlands				
PI4COM	**822,224**	**1197**	**45**	**73**
PI4TUE	**771,435**	**1268**	**42**	**63**
PC5M	598,920	920	44	61
Norway				
LA2AB	**439,290**	**878**	**26**	**64**
Poland				
SO8R	**577,109**	**1031**	**31**	**72**
SN9Z	**510,055**	**1035**	**27**	**64**
SN2K	315,447	732	17	62
SP1KRF	61,614	303	1	41
Romania				
YO3FRI	**181,038**	**516**	**14**	**52**
Serbia				
YU1EXY	**1,017,675**	**1336**	**48**	**77**
YT5Z	**959,880**	**1344**	**47**	**73**
YU1KX	517,750	982	29	66
YT1R	423,798	949	22	61
Slovakia				
OM8A	**1,815,328**	**1967**	**55**	**87**
OM7M	**1,667,886**	**1720**	**54**	**93**
OM6A	188,480	591	10	52
OM3RRC	187,140	611	5	55
Slovenia				
S51TA	**1,479,324**	**1773**	**53**	**79**
S52OP	**842,232**	**1241**	**43**	**71**
S52ZW	596,871	1113	32	67
S53APR	54,249	290	0	39
Spain				
EA5BM	**533,750**	**741**	**46**	**76**
ED5T	84,353	248	17	50
Sweden				
SK7DX	**1,184,375**	**1524**	**51**	**74**
SK3W	**968,422**	**1311**	**48**	**71**
8S5X	496,132	980	31	63
SM6VJA	236,082	685	16	50
Ukraine				
UU7J	**1,254,448**	**1408**	**53**	**95**
UZ1H	**567,270**	**1021**	**27**	**72**
UT5A	308,088	666	23	65
UW4E	280,028	747	15	58
UX4E	246,229	655	14	59
UT7L	201,144	584	11	57
UU4JXI	112,896	549	0	42
UWØL	92,449	409	0	47

OCEANIA

Hawaii				
KH6LC	**452,640**	**582**	**53**	**27**
KH6CC	**156,736**	**263**	**47**	**15**

South America

Netherlands Antilles				
PJ2T	**2,065,700**	**1497**	**57**	**83**
Uruguay				
CX6VM	**183,309**	**221**	**43**	**44**

Check Logs

The following submitted check logs. Thank you: 4Z5MU, 8S6T, C31CT, DFØSAX, DJ3RA, DK3PM, DL1DTC, DL1EKO, DL5ZB, DL6ZKG, DL9AWI, G3RWL, G4AMT, HA1SN, HI3TEJ, IZØEHL, IZ4DZD, K1DW, K3SWZ, LA2GH, LA4NE, LA6DW, LA8HGA, N2NL, OH3BU, OH5PT, OH8KA, OH8US, OK1ABB, OK1FAI, OK1HGM, OK1UKV, OK1VKC, OK4MM, ON5ZO, OQ5M, PA3EBP, RA3XDX, RN3GA, RN6FK, RN9AA, RWØCF, SM3R, SM5INC, SM5QU, SM7ALC, SP3J, SP5BLI, SP5FHF, SP5WA, SP6CZ, SP7HOV, SP7MFR, SP8HKT, SP9CVY, SQ6MS, UAØCA, UAØCW, UA1OMZ, UA1ORK, UA3AGW, UA3BS, UA4HEJ, UA6FF, UA9QQ, UN7TW, UR2VA, UR4CWQ, US5CB, UT3NF, UT7UW, WØYSE, W4EF, YO5OHO, YO6LV, YR1C, YT2AAA, Z35M.

2009 SSB RESULTS

SINGLE-OPERATOR

NORTH AMERICA

UNITED STATES

CONNECTICUT				
N1ZZ	**126,764**	**507**	**54**	**32**
ND1X	37,111	235	48	11
***KB1JDY**	**10,908**	**112**	**30**	**6**
*NX1Q	6,204	74	29	4
*N1ZN	4,600	81	24	1
*W2JU	1,575	48	15	0
MAINE				
K8PO	**370,032**	**1228**	**57**	**47**
K1FTK	32,385	218	37	14
MASSACHUSETTS				
***K1EP**	**116,698**	**631**	**51**	**23**
K5ZD	**76,294**	**344**	**49**	**25**
K1SND	34,684	317	44	2
W1BYH	34,278	221	46	12
W1KQ	21,648	178	41	7
*N1SV	20,700	168	35	10
N1DD	11,025	129	30	5
*AD1DX	8,073	127	24	3
WJ1R	4,872	71	26	3
*K6NDV	1,728	42	16	0
W1UJ	1,445	32	17	0
NEW HAMPSHIRE				
AF1T	**187,878**	**814**	**57**	**32**
K1AR	82,782	399	49	24
K1HAP	58,108	243	49	24
N1IW	45,961	281	44	15
W1MKY	30,444	306	41	2
W1SD	29,016	209	42	10
W3UA	17,550	112	42	12
***KZ1O**	**16,060**	**147**	**40**	**4**
K1BD	1,843	42	19	0
*NJ1H	270	15	9	0
RHODE ISLAND				
W1XX	**124,659**	**529**	**50**	**31**
W1OP	41,940	238	43	17
***N1XQ**	**2,904**	**54**	**24**	**0**
VERMONT				
N1BCL	**55,917**	**432**	**52**	**5**
KB1ODO	10,131	128	31	2
NEW JERSEY				
K2PS	**105,048**	**602**	**54**	**18**
N2NT	76,715	256	39	28
*N2HMM	26,936	190	46	10
***N1IBM**	**4,536**	**63**	**24**	**4**
K2ZB	3,087	66	20	1
*N2MH	3,024	63	21	0
*N2DWS	2,669	65	17	0
*W2JEK	50	6	5	0
NEW YORK				
W2RR	**109,719**	**621**	**54**	**19**
AC2AA	61,815	422	49	16
***W2/E78WW**	**54,221**	**392**	**46**	**13**
*WA2JQK	39,825	276	48	11
WS9M	32,823	185	46	17
*N2MTG	28,616	247	43	6
*K2XA	27,300	210	42	10
*W2LP	25,852	237	41	5
N2EIK	21,794	280	33	1

WB2KLD	19,975	172	39	8
AA2NA	9,622	119	34	0
*KB8O	7,475	135	25	0
W2XL	7,392	157	22	0
W2PA	7,006	90	29	2
K2YR	2,625	31	14	7
*KT2D	1,632	43	17	0
*AI2N	976	26	16	0
*KB2ESY	360	15	15	0
DELAWARE				
AA1K	**36,025**	**261**	**44**	**11**
DISTRICT OF COLUMBIA				
K3VOA	**43,615**	**322**	**44**	**11**
W3DQ	3,072	53	24	0
MARYLAND				
K3ZO	**228,475**	**875**	**57**	**38**
N3HBX	**201,920**	**1072**	**58**	**22**
W6AAN	59,498	309	50	21
K3TC	54,054	338	46	17
***N1WR**	**49,501**	**348**	**47**	**12**
N3UM	46,035	361	49	6
*N3ALN	40,368	377	44	4
K3MM	36,981	208	46	17
*K3TN	21,761	199	40	7
W2GG	16,044	158	35	7
*NS3X	15,768	200	35	1
W3EKT	14,592	164	33	5
*W3MR	11,544	120	32	7
*N3KHK	2,832	53	24	0
PENNSYLVANIA				
W3BGN	**323,442**	**1016**	**58**	**44**
W3TS	**234,987**	**976**	**59**	**28**
W3GH	197,965	970	57	2
***N3GJ**	**64,108**	**434**	**51**	**11**
W3SO	60,711	444	49	10
N3RJ	50,600	394	46	9
WØBR	31,735	225	45	10
*AA3LX	25,284	220	47	2
K4JLD	20,235	115	45	12
*KA3FZN	20,081	197	40	3
W3FVT	16,296	162	38	4
WA3MKB	11,772	149	35	1
*K3VED	10,286	120	34	3
*AD8J	2,750	46	25	0
*WW3S	868	26	13	1
*W3FLH	539	23	11	0
WI2E	315	13	9	0
*NU3Q	245	13	7	0
ALABAMA				
K4AB	**74,106**	**444**	**55**	**14**
N4JDB	24,915	193	47	8
***K4WI**	**15,795**	**169**	**40**	**5**
*WB5NMZ	8,862	98	37	5
*AG4W	6,790	89	32	3
FLORIDA				
AA4MM	**58,578**	**235**	**49**	**29**
K4HV	32,091	235	44	13
AD4ES	15,604	141	40	7
K9FY	10,023	118	36	3
***K4GOP**	**2,943**	**52**	**25**	**2**
*NF4A	2,500	41	21	4
*NS9I	1,300	28	18	2
*AC2N	720	21	16	0
*WN3USA	636	25	11	1
GEORGIA				
N4PN	**508,320**	**1376**	**58**	**62**
WO4DX	**156,384**	**952**	**55**	**17**
NO9E	69,564	485	50	12
KU8E	41,520	273	47	13
***N4WD**	**17,954**	**160**	**40**	**7**
N3FP	12,519	144	35	4
*KG4USN	4,032	64	26	2
W4OJC	893	19	19	0
*KI4YMD	714	18	17	0
K4JPD	700	23	13	1
*KC4YBO	308	14	11	0
K4BAI	182	14	7	0
KENTUCKY				
KR4WI	**35,860**	**287**	**50**	**5**
***W4UDX**	**3,807**	**63**	**27**	**0**
NORTH CAROLINA				
N4XD	**154,629**	**787**	**56**	**27**
NX9T	**150,875**	**836**	**58**	**17**
WJ2D	104,544	593	53	19
AJ4CU	18,232	160	35	8
*KK4RV	12,138	132	38	4
*AI4GR	5,040	80	30	0
NC4MI	2,288	45	25	1
K4SV	2,075	38	24	1
*KJ4WD	1,376	37	16	0
SOUTH CAROLINA				
KI4PKW	**86,460**	**578**	**54**	**12**
***KM4RK**	**4,680**	**75**	**28**	**2**
*KR1ST	3,848	69	25	1
K3IXD	2,808	52	23	1
TENNESSEE				
***N2WN**	**74,220**	**509**	**50**	**10**
K4BP	**70,804**	**513**	**53**	**9**
AA4NU	51,968	387	49	9
W4EEH	42,398	304	50	8
*N4ARO	41,654	301	51	8
W4KW	32,816	249	48	8
*NA4K	21,552	194	45	3
KA4OTB	3,645	57	25	2
W4OGG	2,856	42	27	1
*W4BK	660	22	15	0
VIRGINIA				
***K1HTV**	**113,764**	**732**	**53**	**15**
*KB4OLM	65,632	531	50	6
KA8Q	**29,839**	**204**	**40**	**13**
K4ZW	29,574	225	46	7
N3JT	29,205	208	43	12
N3ZV	24,457	300	35	2
N4MM	20,482	172	41	8
N4BCC	16,450	134	42	8
K4RDU	13,694	147	36	5
*W4YE	8,575	105	31	4
*K4FTO	5,200	94	25	0
W2YE	3,120	50	21	3
*K4ECP	3,059	64	23	0
*KI4RXC	2,530	29	16	7
*KI3O	2,415	42	22	1
*N3KN	1,632	45	17	0
*N3AO	1,173	30	17	0
*WA4PGM	72	6	6	0
ARKANSAS				
W5KI	**4,488**	**60**	**33**	**1**
N7FF	4,230	63	30	0
LOUISIANA				
K5ER	**49,476**	**380**	**51**	**6**
AC5O	37,248	253	51	13
MISSISSIPPI				
KA5VFU	**13,207**	**131**	**40**	**7**
NEW MEXICO				
***K9GAJ/M**	**4,080**	**70**	**30**	**0**
K7IA	**2,997**	**51**	**26**	**1**
OKLAHOMA				
***K5LAD**	**22,313**	**182**	**49**	**4**
N5OT	1,533	32	20	1
TEXAS				
NR5M	**232,116**	**1029**	**57**	**35**
K5NA	**206,486**	**1004**	**57**	**29**
K5RX	56,916	312	51	17
***AD5XD**	**30,348**	**255**	**50**	**4**
*WD5K	27,552	214	49	7
NA4M	4,830	56	30	5
*K3TD	2,862	47	25	2
*KD5ZEZ	2,125	38	23	2
*W5OV	372	14	11	1
*W5JAO	300	15	10	0
*AA5AM	96	8	6	0
*W5QLF	60	6	3	1
CALIFORNIA				
W6YI	**158,688**	**881**	**56**	**20**
W7DR	47,386	345	50	8
KI6CG	21,267	170	42	9
W7CB	10,320	102	36	7
N6NF	8,525	126	30	1
N6AJR	7,857	126	25	2
KG6AO	5,440	71	30	2
***K6YA**	**2,882**	**66**	**22**	**0**
AD6ZJ	2,047	40	22	1
*AA6EE	1,264	40	15	1
*KI6JJW	1,235	43	12	1
*K6WSC	650	25	12	1
KG6ZHC	272	17	8	0
*K6CSL	186	14	6	0
*K6XX	180	10	9	0
ARIZONA				
N7VF	**50,692**	**388**	**52**	**6**
W6XI	30,470	227	46	9
NQ7R	27,965	271	44	3
***K9WZB**	**27,474**	**199**	**50**	**7**
K7AED	23,920	204	47	5
NF7E	12,188	123	41	3
*W7UPF	10,707	113	40	3
W7GNP	2,247	52	20	1
*K7GIM	24	4	3	0
IDAHO				
KØTO	**52,896**	**421**	**52**	**5**
MONTANA				
N87V	**37,230**	**324**	**48**	**3**
KS7T	9,240	115	34	1
KD7DCR	8,640	91	39	1
***AD7MQ**	**5,610**	**81**	**34**	**0**
*NW7O	1,794	34	22	1
NEVADA				
K7SFN	**45,448**	**381**	**46**	**6**
***W6NF**	**20,300**	**168**	**45**	**5**
K7DSL	18,988	183	41	6
N7TR	7,786	105	34	0
*K7ACZ	3,936	57	29	3
*N7TP	2,328	48	24	0
*KE7JIP	473	21	11	0
OREGON				
KI7M	**48,180**	**367**	**48**	**7**
N6TW	13,482	137	39	3
K7ZS	8,424	90	35	4
***W7OR**	**5,434**	**70**	**38**	**0**
*W3CP	2,160	49	19	1
*WA7UR	279	14	9	0
*N7VS	203	13	7	0
UTAH				
N5LZ	**57,000**	**427**	**48**	**9**
***NS7K**	**17,158**	**167**	**42**	**4**
*W7SUR	2,832	56	24	0
WASHINGTON				
WA7LT	**105,927**	**676**	**54**	**13**
N7BT	21,364	178	43	6
***K7AWB**	**21,032**	**208**	**42**	**2**
KB7N	11,739	112	41	2
*N7NKO	7,722	101	32	1
*W7SAW	6,039	82	33	0
W7GKF	4,290	59	33	0
*KI7DG	2,600	44	26	0
*WA@WWW	2,014	51	19	0
*NG7Z	1,890	58	14	0
WYOMING				
AC7NO	**69,192**	**504**	**53**	**9**
MICHIGAN				
W8DCQ	**61,696**	**410**	**52**	**12**
K8MJZ	38,688	357	48	0
***K8JA**	**28,710**	**201**	**51**	**7**
N8WNA	8,350	66	47	3
*NO8R	5,125	84	25	0
*KD8GRG	2,262	41	26	0
*NF8M	644	20	14	0
*K9TRV	147	9	7	0
OHIO				
N8VW	**159,936**	**772**	**57**	**27**
***N8IE**	**43,896**	**316**	**49**	**10**
AC8G	41,923	343	46	7
*W8GG	38,916	196	51	18
*KC8QAE	38,425	322	48	5
*KE8PX	34,503	282	49	4
*WB8JUI	33,956	277	45	7
K8VUS	31,211	200	48	11
NA8W	24,786	199	45	6
*K8AB	21,780	207	41	3
*K8CR	18,865	164	45	4
*N8HP	18,522	155	46	3
*KB8UUZ	17,292	167	41	3
*W8KNO	16,112	184	38	0
W8MET	11,748	117	40	4
*W8IDM	7,920	101	32	1
*WA8LOW	7,334	85	34	4
*K8YN	7,181	73	40	3
*N8XTH	6,600	93	30	0
*WB8TCT	2,944	52	23	0
*KD8HHG	2,047	41	23	0
*N8QE	8	2	2	0
*W8EH	5	1	0	1
WEST VIRGINIA				
K8JQ	**75,096**	**606**	**49**	**7**
K8OQL	57,627	449	51	6
W8OHT	8,244	97	33	3
ILLINOIS				
WB9Z	**512,316**	**1623**	**59**	**55**
***K9MMS**	**50,209**	**374**	**53**	**6**
K9FO	48,792	373	50	7
K9CT	35,090	247	50	8
KG9N	34,164	298	52	0
*N9LYE	33,750	300	50	0
*W9JXN	20,544	184	45	3
N9GH	15,796	155	41	3
*K9RJZ	13,650	157	38	1
K9KMD	10,206	104	42	0
WO9S	8,399	97	37	0
*NJ9Z	5,130	75	30	0
AI9L	4,384	63	31	1
*N9TF	3,775	68	25	0
*KD9MS	825	20	14	1
*W9SE	60	6	5	0
INDIANA				
W9RE	**90,206**	**470**	**54**	**20**
K9NW	43,676	302	52	9
***K9SH**	**30,316**	**252**	**47**	**5**
*N9DD	14,680	155	39	1
*K9SQL	13,680	156	36	2
*WB9NOO	10,220	122	35	0
K9LA	6,048	80	30	2
*WB2L	24	4	3	0
WISCONSIN				
K9UW	**131,998**	**962**	**57**	**5**
***WW9R**	**18,983**	**197**	**41**	**0**
KB9LIE	11,718	119	42	0
*WE9R	3,741	55	28	1
*KC9KIO	3,048	50	24	0
*KB9Q	2,508	48	22	0
*AF9J	1,560	36	20	0
COLORADO				
NCØB	**64,612**	**490**	**50**	**8**
NØKE	26,469	223	46	5
WØMU	14,040	138	43	2
***WØETT**	**11,295**	**111**	**43**	**2**
KØGAS	9,720	124	35	1
*AGØA	3,013	63	22	1
IOWA				
WØEWD	**320,070**	**1331**	**59**	**35**
***NØDQS**	**53,105**	**345**	**54**	**11**
KØSRL	14,040	136	44	1
KBØL	1,260	28	21	0
KANSAS				
***KØRH**	**101,304**	**734**	**55**	**8**
WØBH	**100,928**	**694**	**55**	**9**
*NØAG	13,865	136	45	2
WØCEM	5,587	68	35	2
MINNESOTA				
***KØPK**	**44,899**	**331**	**55**	**4**
*NØODK	31,625	242	49	6
KØYR	**25,728**	**241**	**48**	**0**
*NØHJZ	25,000	216	48	2
KØCN	21,546	160	47	7
K9WN	16,920	151	46	1
*WØAD	8,502	98	38	1
WØOO	8,342	83	41	2
KØJJR	7,449	86	39	0
*KSØT	4,862	62	33	1
*K4IU	4,165	57	35	0
*NØUJJ	2,574	49	22	0
*KJØP	720	22	18	0
MISSOURI				
KØETV	**66,550**	**551**	**50**	**5**
***WØJPL**	**57,540**	**412**	**53**	**7**
KN4JX	10,363	104	40	3
*WBØQLU	1,449	33	21	0
NEBRASKA				
***KBØARZ**	**7,030**	**81**	**38**	**0**
NORTH DAKOTA				
***KD4POJ**	**77,870**	**529**	**54**	**11**
NTØV	**7,733**	**92**	**35**	**2**
CANADA				
NEW BRUNSWICK				
***VE9KAR**	**83,496**	**314**	**39**	**17**
*VE9CEH	74,464	300	40	12
VE9MY	**22,274**	**102**	**27**	**16**
NOVA SCOTIA				
***VE1ZA**	**38,403**	**142**	**29**	**22**
*VE1DHD	13,000	116	25	1
PRINCE EDWARD ISLAND				
VY2SS	**6,100**	**54**	**22**	**3**
QUEBEC				
VA2WDQ	**27,702**	**160**	**34**	**4**
VE2DC	22,427	119	37	4
***VE2HAY**	**10,650**	**77**	**29**	**1**
*VE2DWA	1,177	23	11	0
*CG2AWR	100	14	11	0
ONTARIO				
VE3EY	**786,912**	**1327**	**59**	**53**
VA3KA	**489,365**	**941**	**57**	**48**
VE3AP	425,800	823	54	46
VE3TA	158,508	527	53	10
VE3PN	156,744	411	51	21
VE3CR	151,110	423	55	18
***VA3YP**	**148,080**	**525**	**49**	**11**
*VE3UK	112,277	401	49	10
*VE3MGY	85,250	363	46	4
*VE3DZ	63,666	252	45	9
VE3EJ	60,945	259	47	4
*VE3NB	60,632	252	47	5
*VE3TMG	57,232	250	46	3
VE3CX	55,200	237	45	5
*VE3EDY	48,461	213	42	7
VE3CUI	35,301	184	36	5
*VE3XAT	34,496	172	40	4
*VE3TW	23,793	156	33	0
*VE3RCN	16,832	117	32	0
VE3RER	15,600	115	29	1
*VE3NQM	15,180	100	33	0
*VE3TU	14,817	100	32	1
VA3XH	13,068	86	31	2
VE3UZ	9,734	68	31	0
*VE3JM	8,876	70	28	0
*VE3JI	3,440	39	20	0
MANITOBA				
***VE4TV**	**14,040**	**85**	**39**	**0**
*VE4EAR	8,584	61	29	0
SASKATCHEWAN				
***VE5SF**	**8,712**	**57**	**33**	**0**
ALBERTA				
VE6BBP	**92,974**	**338**	**52**	**6**
VE6JY	68,799	253	50	7
BRITISH COLUMBIA				
VE7TUG	**27,094**	**153**	**37**	**1**
***VE7JKZ**	**8,878**	**81**	**21**	**2**
*VA7ST	666	16	9	0
North America				
Alaska				
KL7RA	**37,835**	**158**	**36**	**11**
Cayman Islands				
ZF2AM	**515,419**	**864**	**54**	**53**
Cuba				
***CM6RCR**	**206,125**	**444**	**52**	**33**
Dominican Republic				
***HI3TEJ**	**192,231**	**360**	**46**	**47**
Mexico				
XE2S	**36,980**	**176**	**40**	**3**
***XE2NS**	**5,125**	**45**	**21**	**4**
Puerto Rico				
***KP4KE**	**306,022**	**483**	**50**	**56**
U.S. Virgin Islands				
KP2M	**34,656**	**112**	**22**	**26**
***KP2BH**	**2,980**	**28**	**10**	**10**
AFRICA				
Canary Islands				
EA8AH	**512,631**	**513**	**43**	**60**
Madeira Islands				
CT3DL	**335,900**	**343**	**42**	**58**
CT3DZ	**161,446**	**185**	**35**	**54**
Morocco				
CN8YE	**380**	**11**	**0**	**4**
ASIA				
Armenia				
EK6TA	**168,658**	**361**	**0**	**49**
Asiatic Russia				
UA9KAA	**64,800**	**178**	**0**	**40**
RT9S	59,856	158	0	43
RA9SC	37,696	108	0	38
UAØCW	27,626	84	14	24
RWØCF	25,740	91	9	24
*UA9ACJ	15,088	77	0	23
*RW9QA	2,043	29	0	9
*UA9QCZ	714	18	0	7
RU9UE	70	4	0	2
China				
BD3BXH	**192**	**12**	**0**	**4**
Cyprus				
C4M	**232,837**	**392**	**3**	**58**
H2T	**172,254**	**314**	**3**	**54**
Hong Kong				
VR2PX	**135**	**5**	**0**	**5**
Kazakhstan				
UP2L	**136,250**	**287**	**0**	**50**
Turkey (Asiatic)				
***TA3D**	**258,506**	**458**	**3**	**55**
*TA2RC	67,602	183	0	38
EUROPE				
Andorra				
***C31CT**	**121,520**	**407**	**12**	**44**
Austria				
***OE5JKL**	**11,908**	**95**	**0**	**26**
*OE5OTO	5,964	58	0	21
*OE1H	828	19	0	9
Azores				
CU2AF	**138,384**	**267**	**28**	**44**
CU8AS	7,536	35	16	8
Belarus				
EV1R	**86,800**	**334**	**1**	**49**
***EW8DX**	**35,315**	**198**	**0**	**35**
EW3LN	22,976	140	0	32
*EW1IP	9,178	72	0	26
EW2AA	8,768	53	0	32
EW2EO	5,439	52	0	21
*EW6MM	3,312	38	0	18
*EV6M	1,988	29	0	14
Belgium				
***OO2T**	**23,569**	**125**	**3**	**34**
Bosnia-Herzegovina				
E74AA	**76,832**	**308**	**0**	**49**
Bulgaria				
LZ1ZF	**26,532**	**154**	**0**	**33**
***LZ3YY**	**1,260**	**16**	**0**	**14**
*LZ2FM	329	9	0	7
Crete				
SV9COL	**13,919**	**90**	**0**	**31**
Croatia				
9A2DQ	**347,340**	**762**	**18**	**66**
***9A6Z**	**12,122**	**83**	**0**	**29**
Czech Republic				
OK1NY	**307,233**	**718**	**20**	**61**
OK1T	**245,490**	**677**	**13**	**57**
OK1DOL	237,116	684	9	59
***OL3X**	**75,019**	**319**	**1**	**48**
*OK2SAR	60,396	297	0	42
*OK1JOC	35,742	208	0	37
*OK6AB	32,376	177	2	36
OK1AY	26,247	145	0	39
*OK1XYZ	24,242	148	0	34
*OK5XX	16,960	111	0	32
*OK1MKU	16,800	83	2	38
*OK2BJC	11,350	97	0	25
*OK2TC	11,200	95	0	25
*OK2WYK	5,522	52	0	22
*OK1MNV	2,790	42	0	15
Denmark				
OZ2PBS	**33,630**	**176**	**1**	**37**
OZ1AXG	8,610	55	0	30
England				
G2F	**48,530**	**216**	**1**	**45**
***MØMCX**	**20,650**	**125**	**1**	**34**
G3TXF	9,827	50	8	23
*GØMLY	2,475	33	0	15
*G4LWB	2,336	32	0	16
*G4NXG/M	975	15	0	13
*G4WGE	512	14	0	8
*G7RTI	300	12	0	5
Estonia				
ES5RW	**248,472**	**757**	**3**	**60**
European Russia				
***RW1CW**	**53,680**	**245**	**0**	**44**
RU1AB	**40,320**	**178**	**0**	**45**
RN3ZC	27,200	160	0	34
RD6LP	26,163	99	2	49
*UA1CUR	20,130	126	0	33
*RA6XB	19,227	92	0	39
RV1CC	18,381	111	0	33
*RU6HJ	16,647	107	0	31
*RW3ZA	16,616	115	0	31
*RA3MB	15,960	92	0	35
*RU6YJ	12,064	74	0	32
*RA6YBW	11,780	82	0	31
RX3AEX	10,968	97	0	24
*RA3XCZ	7,199	62	0	23
*UA3LHL	6,916	53	0	26
RA4UVK	3,780	33	0	21
*RZ3PS	3,549	30	0	21
UA4RZ	3,124	26	0	22
*UA6AIW	2,520	28	0	18
*RA3RGQ	1,575	19	0	15
*RA6DT	1,164	17	0	12
RW4PL	1,128	25	0	8
*UA3RN	632	14	0	8
*RA3NC	156	6	0	4
France				
F6CTT	**620,524**	**1026**	**34**	**72**
F5LJA	57,982	219	5	48
F5BBD	44,650	158	12	38
***F5VLV**	**36,808**	**168**	**5**	**38**
*F5LIW	14,730	99	0	30
F5DRD	14,112	100	5	23
*F4DSK	3,534	41	0	19
*F1MKG	900	19	0	12
Germany				
DK5WL	**249,678**	**722**	**16**	**62**
DL7BC	**121,816**	**514**	**9**	**47**
DL3BQA	115,584	493	5	51
***DJ8UV**	**89,656**	**376**	**8**	**48**
DKØRX	80,083	353	5	48
DL1Z	77,256	304	11	47
DL5JS	68,276	312	5	47
*DL4ZA	62,083	307	5	44
DL6EZ	60,398	326	0	46
*DH2UHF	55,476	294	4	42
DK1KC	53,449	307	0	43
DK6CQ	49,021	240	2	45
DL1SWB	48,915	265	3	42
*DG5NFF	40,194	240	2	40
DG1EA	34,447	240	0	37
DL8SCG	28,842	130	3	43
DM2BPG	28,046	192	2	35
*DL1DWR	25,305	173	0	35
*DO5AWE	19,210	142	0	34
*DH1PS	19,080	121	0	36
*DL6NAL	18,258	132	0	34
*DO1MGN	17,884	124	0	34
*DL3VZL	17,544	126	0	34
*DGØCC	17,344	142	0	32
DJ2ST	16,870	111	6	29
*DO7DU	16,568	100	2	36
*DL7DZ	16,492	100	4	34
DL9YAJ	16,354	99	0	37
*DK5MB	16,124	134	0	29
*DM2AWM	14,935	127	0	29
DK8EY	14,340	117	0	30
*DL9NCR	14,016	105	0	32
*DO7FOX	13,733	116	0	31
*DL8NBJ	13,717	126	2	27
DA3X	13,620	118	0	30
*DL1NKS	12,636	117	0	27
*DG9MDM	12,480	91	0	32
DF1LON	11,610	116	0	27
*DK8NX	11,049	91	0	29

*DL3DRN	10,892	97	0	28
*DH4PSG	10,602	88	2	29
DLØDX	10,584	87	0	27
DG2NMH	10,350	108	0	25
*DJ2YE	10,244	102	0	26
*DL3TD	10,152	108	0	24
DL5ST	8,526	75	0	29
DL1NEO	7,920	85	0	24
*DJ5TX	7,826	77	0	26
*DL8UAA	7,748	73	0	26
*DK7FP	7,632	81	0	24
*DK6BT	7,263	67	0	27
*DL3BRA	6,744	70	0	24
*DJ5CL	6,480	69	0	24
DL7DS	5,975	60	0	25
*DO9ST	5,560	71	0	20
DJ8ES	5,544	42	0	28
*DF6WE	5,160	49	0	24
*DL1TPY	4,712	59	0	19
*DF5BX	4,700	59	0	20
DL/PA1TT	3,980	47	0	20
*DH6DAO	3,969	54	0	21
*DL9FB	3,128	47	0	17
DL8EAQ	3,087	33	0	21
*DJ6QO	2,070	30	0	18
*DL7UAI	2,055	34	0	15
*DO2ML	1,935	40	0	15
*DL1DBR	1,666	31	0	14
*DL4EAX	1,441	40	0	11
*DL2SWN	1,155	16	0	15
*DO1NWA	864	24	0	9
*DO2SBE	671	14	0	11
*DJ3WE	522	14	0	9
*DO7ANW	416	11	0	8
DJ6TB	273	13	0	7
*DO1HGS	120	10	0	4
Greece				
SY2V	**44,070**	**222**	**0**	**39**
SV2KBE	27,144	132	0	39
SV1GRD	25,445	143	0	35
***SV2CUU**	**4,720**	**45**	**0**	**20**
Hungary				
HG3A	**590,526**	**994**	**29**	**77**
***HA8BE**	**161,823**	**559**	**1**	**56**
***HG7T**	**104,419**	**419**	**0**	**49**
*HA1BC	15,630	106	0	30
Iceland				
TF3SG	**19,221**	**76**	**6**	**37**
Italy				
I4FYF	**294,588**	**673**	**21**	**63**
IØSA	**134,912**	**428**	**9**	**55**
***IZ2XXC**	**60,792**	**248**	**5**	**46**
I2SVA	52,400	207	6	44
I1EIS	45,686	157	12	41
IW2LLH	41,123	200	1	40
IK8LXI	31,783	172	0	37
IV3BKH	18,600	80	4	36
*IZ3IBL	6,808	64	0	23
*I2WIJ	5,736	53	0	24
IZ8EDL	4,095	40	0	21
*IZ5IMD	1,605	22	0	15
*IØTIC	748	21	0	11
*IZ1MHY	180	9	0	4
Latvia				
YL2PP	**23,088**	**111**	**0**	**39**
***YL2CR**	**5,208**	**44**	**0**	**24**
Lithuania				
***LY9A**	**127,872**	**529**	**0**	**48**
LY2FN	**103,785**	**365**	**2**	**53**
*LY4T	78,476	344	0	46
LY2OU	31,775	151	0	41
LY2J	23,940	136	0	36
*LY4R	8,556	59	0	31
LY9Y	7,176	55	0	26
Luxembourg				
***LX1ER**	**98,040**	**329**	**8**	**49**
*LX1NO	1,430	22	0	13
Moldova				
***ER2RM**	**39,647**	**183**	**1**	**40**
ERØ/UTØFT	**27,936**	**153**	**0**	**36**
Montenegro				
***4O3Z**	**450**	**10**	**0**	**9**
Netherlands				
***PA1CM**	**50,697**	**238**	**2**	**41**
PA3GCV	**32,214**	**165**	**0**	**39**
PAØLOU	20,131	93	2	39
PA9DD	16,668	97	4	32
PAØJNH	13,134	79	0	33
*PAØMIR	10,672	75	0	29
*PAØFEI	9,396	66	0	29
PAØINA	8,370	48	6	24
*PHØAS	5,764	53	0	22
*PA9CC	4,620	46	0	21
*PE2JMR	3,572	41	0	19
*PA1TX	2,640	37	0	15
*PI4WLD	2,210	26	0	17
*PA4SDV	1,638	24	0	14
Northern Ireland				
GI5K	**283,386**	**732**	**16**	**57**
Norway				
LA1PHA	**20,054**	**107**	**0**	**37**
LA9TJA	16,672	105	0	32
***LA4ANA**	**2,023**	**27**	**0**	**17**
*LB9RE	1,274	20	0	14
Poland				
SP7MTF	**367,852**	**866**	**14**	**68**
***SQ8JX**	**73,824**	**311**	**1**	**47**
SP5WA	58,179	271	0	43
SN9P	52,335	230	0	45
SP3GJH	51,428	243	2	41
*SP5CJY	48,528	190	3	45
*SP9NWN	39,732	192	2	40
*SP9DTE	28,224	166	0	36
*SP4LVK	21,420	128	0	34
*SP6TRX	19,488	78	6	36
*SP9JZT	17,193	105	0	33
SN2M	7,944	67	0	24
*SP9CLO	3,325	35	0	19
*SP6GNJ	2,921	26	0	23
SP1S	2,340	22	0	20
*SQ2EAN	590	13	0	10
Portugal				
***CT1DHM**	**66,177**	**206**	**13**	**44**
CT1ILT	**60,984**	**179**	**16**	**40**
CT1EAT	330	6	3	3
Romania				
YO7LCB	**105,300**	**394**	**0**	**52**
***YO5BJW**	**94,176**	**386**	**0**	**48**
*YO7LFV	59,248	251	3	43
YO4KCC	37,848	191	0	38
*YO3CZW	35,892	194	0	36
YO7BGA	6,425	47	0	25
*YO5QAW	490	13	0	7
*YO2LXW	20	2	0	2
Scotland				
***GM4UBJ**	**2,352**	**30**	**0**	**16**
Serbia				
YT3A	**345,197**	**774**	**20**	**63**
YT8A	**285,524**	**650**	**16**	**56**
***YT2U**	**22,134**	**133**	**0**	**34**
Shetland & Faire Islands				
GZ5Y	**81,461**	**293**	**9**	**44**
Sicily				
***IT9VCE**	**70,104**	**295**	**1**	**45**
Slovakia				
OMØWR	**212,219**	**671**	**6**	**55**
OM3TWM	**153,236**	**505**	**6**	**52**
***OM4DN**	**41,320**	**208**	**1**	**39**
*OM6AL	35,298	191	1	36
*OMØA	25,184	157	0	32
*OM4DA	13,581	102	0	27
*OM4TW	6,780	69	0	20
Slovenia				
S5ØA	**240,084**	**582**	**17**	**59**
S5ØK	**122,244**	**380**	**11**	**50**
S57C	58,680	259	0	45
***S58MU**	**6,346**	**68**	**0**	**19**
*S57EA	5,814	63	0	19
*S57NTR	4,940	53	0	20
*S53DU	310	13	0	5
S59T	248	13	0	4
Spain				
EA5RU	**134,976**	**334**	**14**	**60**
EA1DVY	79,395	222	19	48
EA5FKX	69,312	248	10	47
***EA7TL**	**67,649**	**188**	**18**	**43**
EG5T	54,093	182	14	43
*EA1MR	42,978	141	19	38
EE3R	35,300	137	11	39
*EA3AKA	25,092	129	5	36
*EA3FF	19,620	104	6	30
EA1YO	14,960	89	5	29
*AM3EGB	11,100	78	0	30
*EA3LA	6,739	64	0	23
*EA4XR	6,336	48	6	27
*EA5ASM	2,700	35	0	20
EA2CNU	2,322	27	0	18
EA1AAW	2,176	31	0	16
*EA3HAQ	864	23	0	12
*EA1DFP	410	10	0	10
AO5W	6	3	0	1
Sweden				
SM5U	**72,225**	**320**	**0**	**45**
***SM4WKT**	**20,615**	**118**	**0**	**35**
Switzerland				
***H89ODP**	**17,847**	**133**	**0**	**27**
Turkey (Europe)				
***TA1ED**	**40,782**	**189**	**0**	**42**
Ukraine				
UX2X	**152,644**	**491**	**8**	**54**
URØDXX	**122,252**	**474**	**2**	**50**
***UZ7M**	**85,329**	**301**	**1**	**56**
UY5ZZ	72,012	285	1	50
UX3HA	50,995	215	0	47
UYØZG	46,311	223	0	43
*UR5ETN	36,974	202	0	38
*UT5PY	29,792	160	0	38
UT7QL	25,776	152	0	36
USØSY	25,004	129	1	37
*UT4XU	23,680	131	0	37
UT7XX	23,584	147	0	32
*UR3IJI	22,814	144	0	34
*UX5IO	21,200	102	0	40
UT5ECZ	20,195	121	0	35
*US5ISV	18,975	124	0	33
US1GBH	17,655	113	0	33
*UXØUW	13,122	104	0	27
UR4ISW	11,820	80	0	30
US7IA	11,564	92	0	28
UW2Q	10,125	72	0	27
*UU2JG	8,370	51	0	30
*US4IPQ	8,040	47	0	30
UT5UGR	7,104	62	0	24
*UY8LM	7,100	59	0	25
*UZ5UA	6,072	60	0	22
*UT7VR	5,742	40	0	29
*US6IKV	5,725	53	0	25
*URØIQ	4,290	33	0	22
*UR5AMK	2,016	30	0	16
*UT5ZB	1,339	22	0	13
UT5EO	1,246	17	0	14
*US6IKN	497	19	0	7
Wales				
***MW1LCR**	**59,267**	**248**	**4**	**43**
GW3JXN	**21,590**	**86**	**9**	**36**
*GW4EVX	11,799	89	0	27
GW4BLE	8,289	60	0	27

OCEANIA

Australia

VK3ID	**288**	**17**	**3**	**3**
***VK2KRM**	**70**	**16**	**0**	**2**

South America

Argentina

LU2DKT	**16,492**	**48**	**16**	**22**
LU2DVI	3,268	20	7	12
***LU3HS**	**14**	**2**	**0**	**2**

Aruba

***P4ØA**	**15,640**	**49**	**20**	**14**

Brazil

PT7BZ	**4,680**	**32**	**0**	**24**

Colombia

***HK3O**	**3,496**	**22**	**5**	**14**
*HK6JIL	264	7	0	6
*HK6BRK	145	6	0	5

Ecuador

HC2AQ	**84,456**	**138**	**37**	**31**

Venezuela

YW4V	**8,559**	**35**	**6**	**21**

QRP SINGLE-OP NORTH AMERICA UNITED STATES

CONNECTICUT

N1TM	**6,049**	**118**	**23**	**0**

MARYLAND

K3TW	**2,940**	**64**	**21**	**0**

NORTH CAROLINA

WB4MSG	**53,979**	**423**	**49**	**8**
W4TMR	40,061	278	47	12

SOUTH CAROLINA

KG4IGC	**1,326**	**39**	**17**	**0**

TEXAS

NF5P	**529**	**17**	**12**	**1**

CALIFORNIA

N6WG	**414**	**20**	**9**	**0**
K6MI	60	5	6	0

ARIZONA

N7MAL	**450**	**21**	**9**	**1**

UTAH

WF4U	**5,376**	**76**	**31**	**1**

WASHINGTON

NN7SS	**561**	**21**	**11**	**0**

OHIO
K8ZT 1,848 40 22 0
W8BS 48 6 4 0

KANSAS
KDØR 6,195 87 35 0

CANADA
ONTARIO
VA3WR 2,232 29 18 0
VA3RKM 2 1 1 0

EUROPE
Austria
OE9MON 13,104 96 0 28

Belarus
EU1DZ 120 6 0 4

Czech Republic
OK2BYW 38,920 202 0 40
OK7CM 23,695 141 0 35

England
G6CSY 225 9 0 5

European Russia
RW3AI 5,610 53 0 22
RD4HD 3,003 51 0 13
RV6LGK 156 9 0 6

Germany
DL7UMK 20,288 158 0 32
DJ3GE 630 15 0 10

Hungary
HA6IAM 26,424 148 0 36
HA5BA 265 13 0 5

Italy
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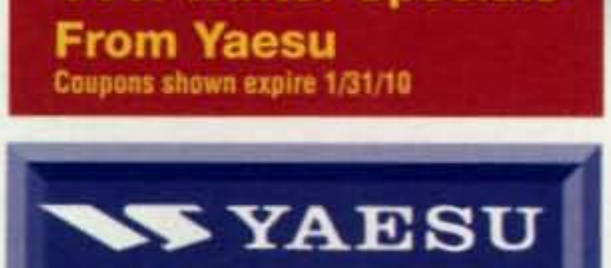

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