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JUNE 2003

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On the Cover: The VHF station of Ivan Pagacik, K1MS, of Littleton, Massachusetts. Details on page 68.

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THE RADIO AMATEUR'S JOURNAL

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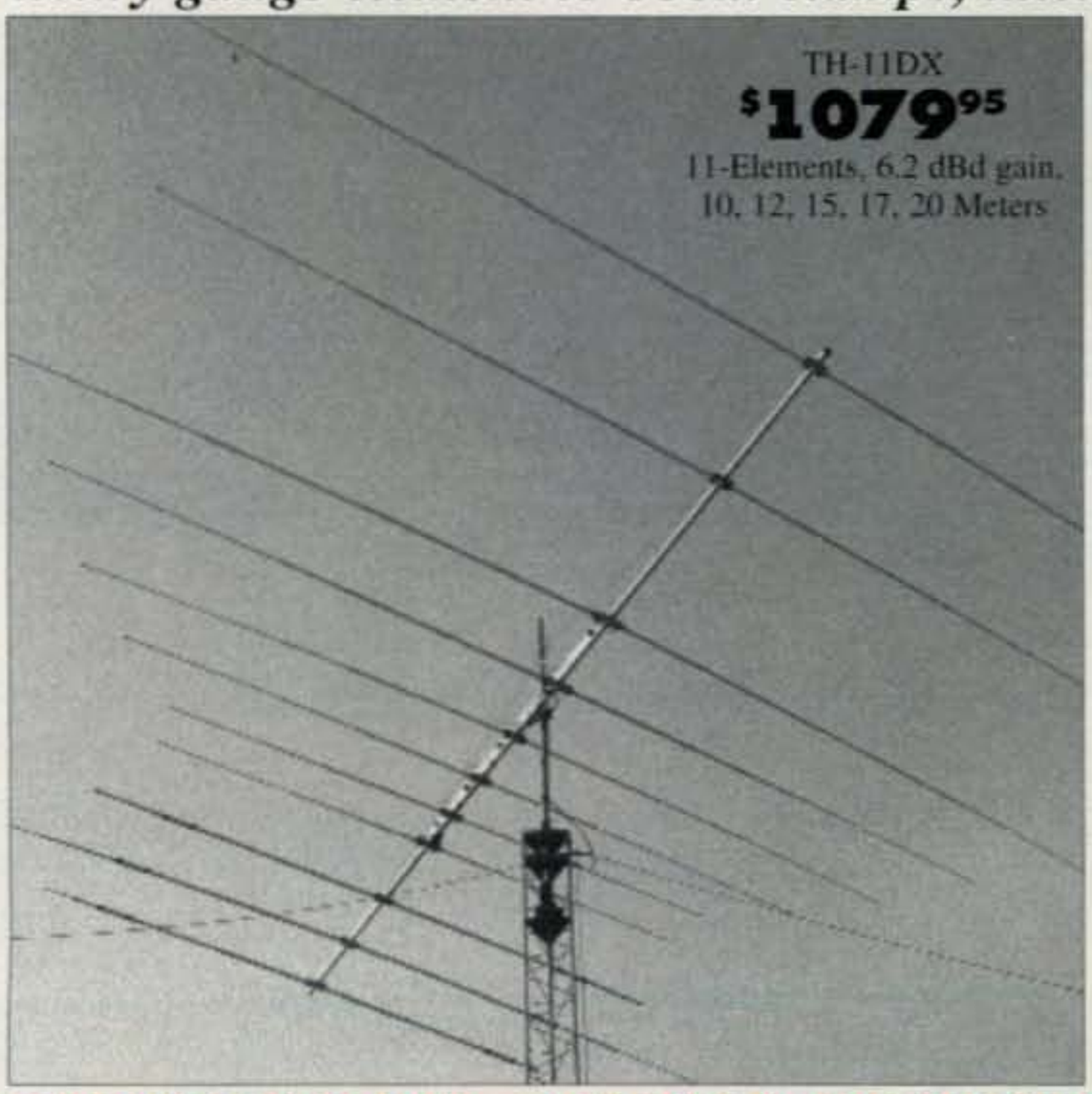

TH-11DX
$1079.95
11-Elements, 6.2 dBd gain.
10, 12, 15, 17, 20 Meters

TH-11DX, $1079.95. 11-element, 6.2 dBd Gain, 10,12,15,17,20M

The choice of top DXers.

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Features *Hy-Gain BetaMatch™* for DC ground, full power *Hy-Q™* traps, rugged boom-to-mast bracket and mounts on standard 2"O.D. mast. Stainless steel hardware. BN-86 balun recommended.

TH-2MK3, $339.95. 2-element, 3.4 dBd Gain, 10,15,20 Meters

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Revolutionary 4-element compact tri-bander *lets you add 40 or 30 Meters!* Has 14 foot boom and tight 17.25 feet turning radius. Fits on roof tri-pod, mast or medium duty tower.

Hy-Gain's *patented* broadbanding *Para Sleeve* gives you less than 2:1 VSWR. 1.5kW PEP.

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Compact 3-element 10, 15, 20 Meter Tri-Bander
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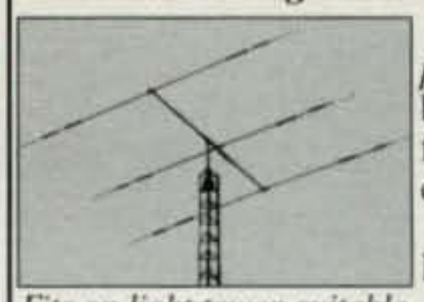

Fits on light tower, suitable guyed TV pole, roof tri-pod

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Model No.	No. of elements	avg Gain dBd	avg F/B dB	MaxPwr watts PEP	Bands Covered	Wind sq.ft. area	Wind (mph) Survival	Boom (feet)	Longest Elem. (ft)	Turning radius(ft)	Weight (lbs.)	Mast dia O.D.(in.)	Recom. Rotator	Retail Price
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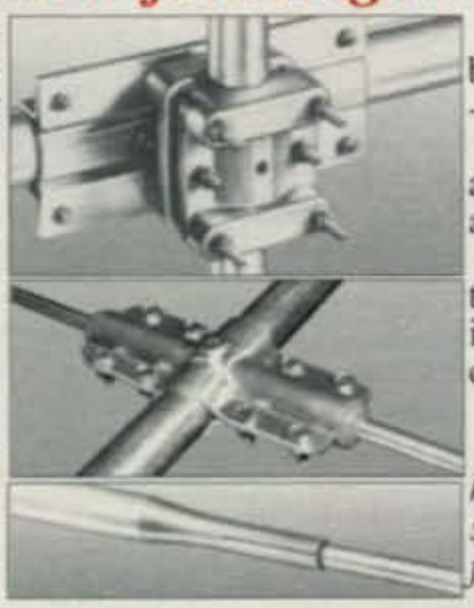
TH-7DX	**7**	**6.57**	**21**	**1500**	**10, 15, 20**	**9.4**	**100**	**24**	**31**	**20**	**75**	**1.5-2.5**	**HAM-IV**	**$819.95**
TH-5MK2	5	6.1	20	1500	10, 15, 20	7.4	100	19	31.5	18.42	57	1.5-2.5	HAM-IV	$699.95
TH-3MK4	**3**	**5.8**	**25**	**1500**	**10, 15, 20**	**4.6**	**95**	**14**	**27.42**	**15.33**	**35**	**1.9-2.5**	**CD-45II**	**$439.95**
TH-3JRS	3	5.8	25	600	10, 15, 20	3.35	80	12	27.25	14.75	21	1.25-2.0	CD-45II	$329.95
TH-2MK3	**2**	**3.4**	**15-20**	**1500**	**10, 15, 20**	**3.25**	**80**	**6**	**27.3**	**14.25**	**20**	**1.9-2.5**	**CD-45II**	**$339.95**
EXP-14	4	5.9	25	1500	10,15,20	7.5	100	14	31.5	17.25	45	1.9-2.5	HAM IV	$549.95

Tooled Manufacturing . . . Highest Quality Materials



1. Hy-Gain's famous super strong *tooled* die cast *Boom-to-Mast Clamp*

2. *Tooled* *Boom-to-Element Clamp*

3. Thick-wall *swaged* aluminum tubing

***Tooled** manufacturing* is the difference between Hy-Gain antennas and the others -- they just don't have it (it's expensive!).

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Hy-Gain antennas feature *tooled* swaged tubing that is easily and securedly clamped in place. All tubing is deburred and cleaned for smooth and easy assembly.

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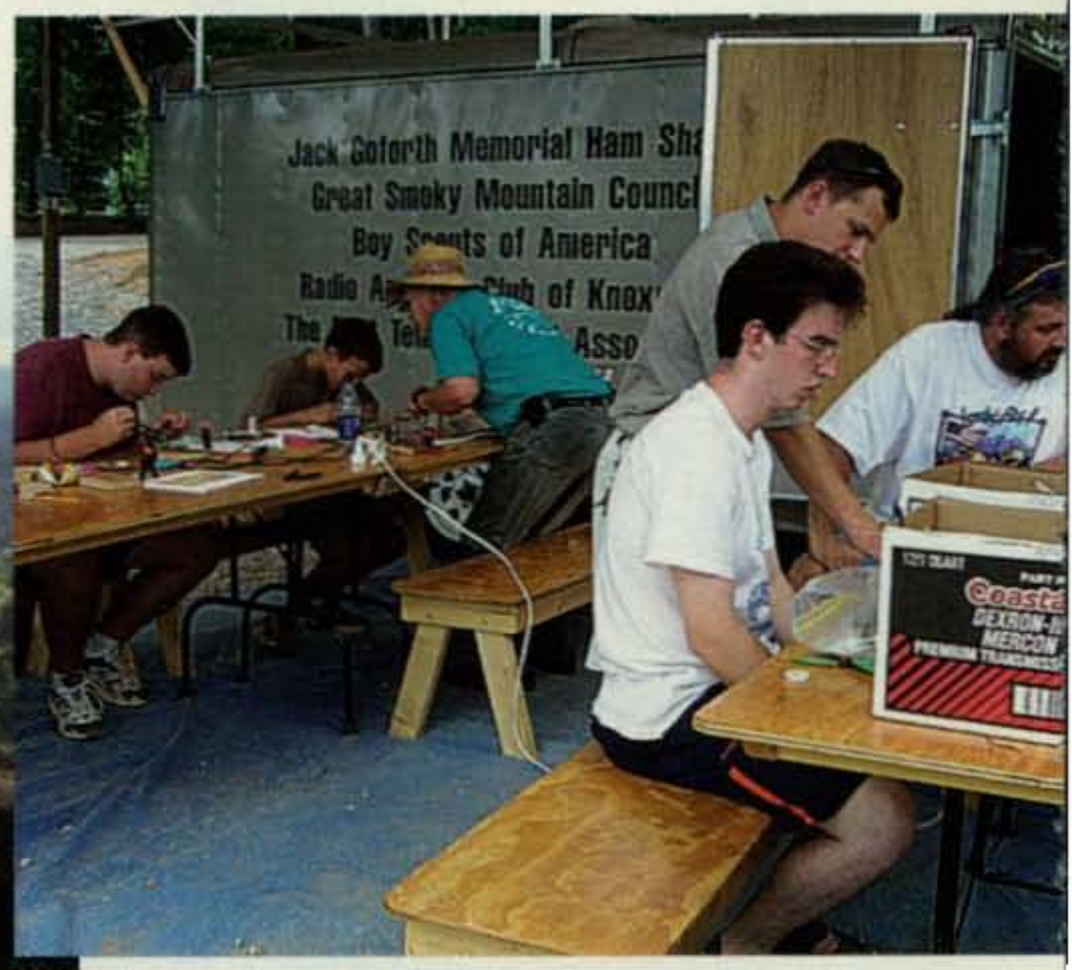

features

Vol. 59 No. 6

VHF Special!

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[1]Note that certain frequencies are unavailable. [2]5W output

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TH-F6A

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ham radio news

Limited Award Credit Okayed for Iraq

Both *CQ* and the ARRL are accepting certain operations from Iraq for their DX award programs, but with some differences. According to CQ DX Award Manager Billy Williams, N4UF, "Contacts with ham stations operated by U.S. and other military personnel are acceptable for CQ DX awards unless evidence surfaces that suggests an operation is bogus or is in conflict with laws enacted by a legitimate Iraqi government. This policy applies also to amateur radio operations by contractors, news personnel, and Iraqi citizens."

The ARRL says that until a new interim government is in place, it will give DXCC credit only to operations in Iraq by U.S. or British military personnel who have received written authorization from their commanding officer. "We are allowing military amateur operation (if it exists) to count for DXCC credit," says ARRL Membership Services Manager Wayne Mills, N7NG, who tells *CQ* the policy "is based in part on what we have done in the past. Military authorization was accepted in 1991 (Iraq) and in 1992/3 in Somalia." Mills says the policy extends only to operations authorized by coalition military commanders and only until an interim government is in place. It is unclear how this policy will be applied to civilians who get operating permission from local military commanders.

Dayton Honors Tyree, Taylor, and Dimse

Larry "Tree" Tyree, N6TR, has been named 2003 Radio Amateur of the Year by the Dayton Amateur Radio Association (DARA). Tree, of Boring, Oregon, was honored primarily for developing the concept of "Kids' Day," a twice-yearly event in which hams are encouraged to get their kids and grandkids on the radio to talk to other kids. Tree is also a well-known contester and member of the CQ Contest Committee and the author of the popular TR-Log contest logging software.

DARA's 2003 Special Achievement Award goes to Jonathan Taylor, K1RFD, of Ridgefield, Connecticut. Taylor developed the "EchoLink" software that spurred the tremendous popularity of internet repeater linking. He previously wrote a program called "EchoStation" which permits a standard Windows®-equipped PC to be used as a repeater controller.

Steve Dimse, K4HG, of Cudjoe Key, Florida, is the recipient of DARA's 2003 Technical Excellence Award. He has used the internet to enhance amateur radio by creating and maintaining the worldwide APRS internet network which connects over 20,000 APRS users around the world. He has also created an internet weather reporting service accessible to non-hams that parallels the amateur-based APRS Weather service. The Citizens Weather Service allows properly equipped non-hams to use the internet to forward reports to the National Weather Service along with APRS reports. According to DARA, many CWS users eventually become hams.

The awards will be presented at a special ceremony at the Dayton Hamvention®, which is not holding a banquet this year for the first time in over 20 years.

Ham Licenses Threatened By Non-Ham Violations

Several hams who have allegedly committed violations outside the ham bands have been warned that these actions may endanger their amateur licenses. Three Idaho hams allegedly transmitting SSB and SSTV on "freeband" (frequencies adjacent to the CB band) were warned that continued operation could result in fines of up to $10,000 and possible revocation of their amateur licenses. In addition, an Ohio ham was warned that his amateur license may be in danger as a result of alleged profanity transmitted on CB channel 13.

Ed Juge, W5EJ, Silent Key

Well-known amateur Ed Juge, W5EJ (but best known by his previous callsign, W5TOO), passed away on March 31, according to longtime friend and colleague Bob Miller, K2RM. Juge was an executive at RadioShack for many years and one of the people who kept ham radio on the company's radar. In addition, he served on the ARRL No-Code committee in the late 1980s and chaired the ARRL Digital Committee in 1992. He was particularly active in QRP. Outside the world of ham radio, Juge was a well-known and well-respected figure in the computer industry. He is survived by his wife, Jo, KA5ABC, and by two children and three grandchildren.

Internet Voice Gateways Break 2000 Mark

Ian Abel, G3ZHI, the Internet Repeater Linking Project (IRLP) mailing list manager, reports that the total number of amateur radio repeater and simplex internet gateways now exceeds 2000. This includes nodes on the three major linking systems, IRLP, EchoLink, and eQSO.

On the topic of internet linking, AMSAT has established an EchoLink conference server called *AMSAT*. According the AMSAT News Service, the server is up continuously and gives satellite users around the world a place "to congregate and chat." More information is available at <http://www.amsat.org/echolink/>.

FCC Questions "Enhanced SSB"

Four amateurs have received letters from the FCC telling them to think long and hard about using something called "enhanced Single Sideband" on HF. These wide-bandwidth SSB signals reportedly produce "great audio." The letters from FCC amateur enforcement chief Riley Hollingsworth, K4ZDH, say the Amateur Service is not a substitute for the broadcast service, nor were its frequencies allocated to permit "broadcast quality" audio. He reminds the hams that FCC rules require that amateur signals may not "occupy more bandwidth than necessary for the information rate and emission type being transmitted..." and that every operator must cooperate in "making the most effective use of the Amateur Service frequencies."

Hollingsworth says signals that occupy more bandwidth than necessary in a heavily used band are extremely inconsiderate of other hams and "shortsighted," noting that continued use of "enhanced SSB" will likely result in petitions for rule making requesting that the FCC establish bandwidth limitations for ham signals.

K5XU Named to FCC Advisory Panel

George M. "Mike" Duke, K5XU, of Jackson, Mississippi has been named to the FCC's Consumer Advisory Committee. According to the *ARRL Letter*, Duke "will represent the interests of blind or visually impaired persons, Amateur Radio operators, and management of audio information services for the blind" on the 35-member panel.

May 30 Deadline for Young Ham Nominations

Nominations for the annual Newsline Young Ham of the Year award must be in by May 30, according to award director Bill Pasternak, WA6ITF. The award recognizes significant accomplishments by amateurs age 18 and younger. Complete information and online nomination forms are available at <http://www.arnewsline.org/> (scroll down to Young Ham of the Year section). *CQ* magazine is a co-sponsor of this award.

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

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

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

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

All band coverage lets you operate 1.8-30 MHz including all MARS and WARC bands.

Super High Current Roller Inductor

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Two 500 pf Tuning Capacitors

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

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Super heavy duty three core choke balun lets you match virtually any balanced feedline antenna without core saturation.

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Read *true* Peak Power

Ameritron's active electronic *true* peak reading meter accurately reads forward and reflected power and SWR *simultaneously* on a lighted Cross-Needle meter.

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

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Ameritron's *most powerful* amplifier uses the herculean Eimac® 8877 ceramic tube. It's so powerful that 65 Watts drive gives you the full output power -- and it's just loafing because the power supply is capable of 2500 Watts PEP. All HF bands, all modes. 77 pounds, 18½Dx17Wx10H in.

Ameritron's *toughest* Amp

with Eimac® 3CX1200A7 tube

AL-1200

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Get ham radio's *toughest* tube with AL-1200. The Eimac® 3CX1200A7 has a 50 Watt control grid dissipation and the lowest history of field replacement of any modern transmitting tube that we use. 90 Watts in gives you full power out. All HF bands, all modes. 76 pounds, 18½Dx17Wx10H in.

Ameritron's *classic* Amp

with 2 graphite plate Amperex® 3-500ZG tubes

AL-82

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Most linears using 3-500s can't give you 1500 Watts because their lightweight power supplies *can't* use these tubes to their full potential. AL-82 is ham radio's *only* super 3-500 amp! 100 Watts in gives you full power out. All HF bands, all modes. Hefty 76 pounds, 18½Dx17Wx10H inches.

1.5 *plus* kW SSB HF Amp

with 2 Eimac® 3CX800A7 tubes

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NearLegalLimit™ Amp

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AL-572, $1395 suggested retail. New class of *Near Legal Limit*™ amplifier gives you 1300 Watts SSB PEP power output (70 Watts drive) for 65% of price of full legal limit amps! Instant 3-second warm-up. 40 lbs. 8½Hx15½Dx14½W inches.

1 kW Desktop HF Amp

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AL-80B, $1299 suggested retail. Gives you full kilowatt SSB PEP output (85 Watts in) from a whisper quiet compact desk- top linear. 8½x14x15½ in. Plugs into 120 VAC outlet. Graphite plate *Classic*® 3-500Z tube. Nearly 70% efficiency. Weighs 48 lbs.

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BY RICH MOSESON, W2VU

A Matter of Fairness

A few weeks ago, at the reception hosted by *CQ* and Kenwood for hams attending the National Association of Broadcasters convention in Las Vegas, I was chatting with former CQ World-Wide VHF Contest Director Pete Putman, KT2B. Pete asked me to explain to a friend and business associate the current rules on how former hams could be relicensed.

"I got my General in 1959," explained Pete's friend, "and let it lapse in 1980. I want to get back into ham radio but I'm not sure which tests I need to take."

Now, there should be a simple and consistent answer to that question—either you get credit for elements previously passed, or you don't and you have to start from scratch. There are pros and cons to both approaches, but either would be acceptable if applied consistently. But as many of us know by now, the words "simple" and "consistent" rarely appear in the same sentence as "federal government," unless it's a sentence like this one in which they're all in quotes. Back to our conversation...

"That all depends," I told him. "Did you have a Novice license before you got your General?"

"Yes," he said, "and a Technician, too."

"Do you still have your old Novice license?"

"Yes."

"Great. Take your expired Novice license with you to your test session and you won't have to take the code test."

"But what about the expired General? I had to pass a 13-word-a-minute test to get that."

"Nope. Bizarre as it sounds, FCC rules say an expired Novice license will give you code test credit. But the General gives you nothing."

"That's ridiculous."

"That's the federal government."

The simple fact of the matter is that the current regulations are not only stupid and discriminatory against people who started out at a higher license class, but may even be out-and-out unconstitutional.

According to section 97.505(a) of the FCC rules, Volunteer Examiners must give credit to anyone holding a current or "grace period" (expired less than two years) amateur license for all elements passed to get that license. So, someone currently holding a General or Advanced Class license who wants to upgrade to Extra gets credit for Element 1 (code), Element 2 (Technician written), and Element 3 (General written), and needs only to take and pass Element 4 (Extra written) to upgrade. This all makes perfect sense. But there's more...

You also get code credit if you have a current (or expired less than five years) FCC commercial radiotelegraph license; a current *or expired* Novice license; or a current *or expired* Technician license issued before the Technician code requirement was dropped on February 14, 1991. PLUS, if you have an *expired* Technician license issued before March 21, 1987, when the Tech and General written exams were split up, you also get permanent credit for Element 3, the General written ... *but not for Element 2!*

So, getting back to Pete's friend ... his expired Novice license gives him lifetime credit for the code exam; his expired pre-1987 Tech license gives him lifetime credit for both the code and the General written exam (El. 3), but NOT for the Technician written exam (El. 2), even though the basis for the credit is a Technician license! His expired General Class license, on the other hand, gets him nothing, nothing at all. Same for expired Advanced or Extra Class licenses. So in order for Pete's friend to get back his General, he needs to retake Element 2, the Tech written, and his old Tech license would give him credit for the code and the General written elements. I think even George Orwell would have trouble following this line of doublespeak!

But wait! There's more! Thousands of Tech-Plus licenses issued in 1991, after the code requirement for Tech was dropped, are reaching the end of their two-year grace periods for renewal. Those Tech-Plus hams who don't renew now, but want to return later, will have no credit for anything ... while hams who took the *exact same tests* before February 14, 1991 have lifetime code credit. This is fundamentally unfair.

Plus (yes, there's even more), with the elimination of the Tech Plus license in the 2000 restructuring, Technicians who pass a code test today have certain HF operating privileges—permanently—on the basis of a Certificate of Successful Completion of Examination (CSCE) showing that they've passed Element 1, the code test. While the operating privileges are permanent (as long as the license remains current), the *exam credit* is good for *only one year*! If you don't complete the upgrade to General within a year, you have to take the code test again in order to do so.

So we now have three groups of current and/or former hams who have taken and passed the same exam elements but who are treated very differently by the FCC based on when they took those exams. One group (the pre-1991 Techs) has lifetime code exam credit. The second (1991–2000 Tech Plus licensees) has code exam credit as long as they keep their licenses current or renew/upgrade within the two-year grace period. And the third group (current Techs who passed their code tests after March 15, 2000) has code exam credit for only one year!

We also have the 14th amendment to the Constitution of the United States, which says in part that no citizen may be denied "the equal protection of the laws." Federal regulations have the force of law and therefore must comply with the Constitution. Clearly, the current situation regarding exam element credit fails the equal protection test, as it provides different standards for amateurs who passed their code tests before 1991, between 1991 and 2000, and since 2000. It is clearly discriminatory against the more recent hams. And while the code test is the primary example, the problem extends beyond that, as evidenced by Pete's friend, whose expired pre-1987 Tech license give him General theory credit but whose expired General license gives him no credit for anything. So even if the code requirement goes away in a few years (as many people expect it will, after this summer's World Radiocommunications Conference), the basic problem will still remain and the basic inequity will still remain.

Is there a solution? Yes, and it's incredibly simple and consistent. Any license, current or expired, should give you credit for the elements passed in order to earn it. CSCEs, which the FCC considers good enough to grant permanent operating privileges, should also grant permanent exam credit. Why should one person get credit for an exam element taken 15 or more years ago while another loses credit for that same element after one year? If you passed an exam element, you should have credit for it. Period. If you're a former ham who wants to

(Continued on page 106)

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announcements

• The following Special Events are scheduled for June:

N1C, from Newington Amateur Radio League Hamfest, Newington, CT; 1700Z May 31 to 2300Z June 1 on CW 28.030, 21.030, 14.030; SSB 28.550, 21.300, 14.250 MHz. QSL to NARL, P.O. Box 31013, Newington, CT 06111 (info e-mail: <np4h@arrl.net>).

W2MO, from 11th Annual Civil War Reenactment Weekend, Peterboro, NY; Madison Oneida ARC; 1400–2000Z June 14 on 7.055, 14.055, 14.275, 21.315 MHz. QSL to Madison Oneida ARC, P.O. Box 241, Verona, NY 13478.

W3GR, from commemoration of the role of electronics in D-Day, Baltimore, MD; Historical Electronics Museum ARC; June 6–8 from 1400–2100Z each day, CW and SSB in the General/ Novice portions of 40, 20, 15, 10 meters. QSL card and 8 × 10 certificate for large SASE, QSL card only for small SASE: HEMARC W3GR, P.O. Box 746 MS 4015, Baltimore, MD 21203. (More info: <w3gr@arrl.net>.)

NC4ZO, from observance of D-Day, North Carolina Aviation Museum's 8th Annual War Bird display; Randolph ARC; 1300–2000Z June 7 on 28.400, 21.320, 14.240, 7.240 ±QRM. For certificate send QSL and $1.00 (DX QSL and 2 IRCs), no SASE needed to Randolph ARC, 6747 King Mtn. Rd., Asheboro, NC 27205.

KK5K, from Elvis Presley Festival, Tupelo, MS; Tupelo ARC; 2200Z June 6 to 2200Z June 8, all bands SSB, CW, PSK31. For QSL send QSL and SASE (or via Bureau) to: Tupelo ARC, 429 Goodlett Street, Tupelo, MS 38804 (e-mail: <tupeloarc@yahoo.com>; <www.tupelofest.org>).

VE3MIS, from Streetsville Founders Bread & Honey Festival, Streetsville, Ontario, Canada; Mississauga ARC; 1400–2000Z June 7 and June 8 on 7.227, 14.240, 21.315, 28.480 ±QRM. For certificate QSL to MARC, c/o Michael Brickell, 2801 Bucklepost Crescent, Mississauga, ON Canada L5N 1X6. (*Note:* Non-Canadians send green stamp or IRC, as U.S. postage cannot be used in Canada.) (Info e-mail: <ve3mis@rac.ca>; <www.marc.on.ca>.)

• The following hamfests, etc., are slated for June:

June 1, **Newington Amateur Radio League Hamfest**, Newington High School, Newington, CT. Contact Bob Stanwood, KB1EYZ, 860-242-2784; e-mail: <kb1eyz@arrl.net>. (Exams)

June 1, **Hall of Science ARC Hamfest**, NY Hall of Science parking lot, Flushing Meadow Corona Park, Queens, NY. Contact Stephen Greenbaum, WB2KDG, 718-898-5599 (evenings only), e-mail: <wb2kdg@arrl.net>; <www.qsl.net/hosarc>. (Talk-in 444.200, PL 136.5, 146.52; exams 10 AM—info Lenny Menna, W2LJM, 718-323-3464, e-mail: <LMenna6568@aol.com>)

June 6–8, **Wenatchee Hamfest**, Dryden Gun Club, Dryden, WA. Call 509-662-6007, e-mail: <n7rhy@gte.net>. (Exams)

June 7, **Bangor Hamfest**, Hermon High School, Hermon, ME. Contact Roger Dole, 207-848-3846, e-mail: <rdole@hermon.net>; <www.n1me.com>. (Talk-in 146.34/94, 146.52)

June 7, **Independent Repeater Assn. Hamfestival**, Hudsonville Fairgrounds, Grand Rapids, MI. Contact Kathy, 616-698-6627 after 4 PM EDST, e-mail: <ira@w8hvg.org>; <www.w8hvg.org>. (Exams 10:30 AM)

June 7, **Winston-Salem Hamfest**, Dixie Classic Fairgounds, Winston-Salem, NC. Contact Raymond Taber, KG4NTC, 336-786-8241, 336-723-7388; e-mail: <wshamfest@yahoo.com>; <http://www.w4nc.com>. (Talk-in 146.64; exams)

June 7, **Macon Hamfest**, Macon Vo-Tech School, Macon, MO. Contact Dale Bagley, KØKY, P.O. Box 13, Macon, MO 63552; e-mail: <k0ky@arrl.org>.

June 8, **Six Meter Club of Chicago Hamfest** (ARRL sponsored), DuPage County Fairgrounds, Wheaton, IL. Call 708-442-4961; e-mail: <wa9rij@mc.net>; <www.qsl.net/K9ONA>. (Talk-in 146.52, 146.37/97 [107.2 Hz]; exams 9–11 AM, call the number listed to preregister)

June 8, **LIMARC, ARRL Hudson Division Hamfest**, Briarcliffe College, Bethpage, NY. Contact Brian Gelber, WB2YMC, 516-822-0673, e-mail: <hamfest@limarc.org>; <http://www.limarc.org>. ((Talk-in 146.850, 136.5 PL)

June 8, **Wabash County ARC Hamfest & Computer Show**, Wabash County 4-H Fairgrounds, Wabash, IN. Contact John Netro, KB9NSO, 260-569-1191; e-mail: <jknetro@kconline.com>.

June 8, **National Trail ARC Electronics/Hamfest**, Percival Springs Airport, 5 miles south of Effingham, IL. Contact Russ Thomas (normal business hours) 217-342-3054; or Mark Percival, 217-536-9990. (Talk-in 146.895 [–600 with 110.9])

June 13–14, **Hamboree 2003** (Iowa State Convention, Iowa/Nebraska QCWA Quarterly Meeting, BMHA Rally), Sioux City Convention Center, Sioux City, IA. Contact Tom, WBØYNX, 712-252-4107 (10 AM – 5:30 PM, Mon.–Sat.); <www.3900club.com>. (Exams)

June 13–15, **Central Alberta League 33 Annual Picnic & Hamfest**, Burbank Campground, SE of Blackfalds, Alberta. Contact Bob King, VE6BLD, 403-782-3438 evenings; e-mail: <sparkyham@telus.net>; <www.carlclub.ca>. (Talk-in VE6QE 147.150 +600, 146.52)

June 14, **Franklin AR Repeater Assn. Picnic & Tailgate**, Bronco Club, Franklin, VA. Contact WA4JUO, e-mail: <Stu.Tyler@juno.com>. (Talk-in 147.300, 131.8 Hz PL; exams)

June 13–14, **Knoxville Hamfest, Electronics Exposition, ARRL TN State Convention**, Cokesbury Conference Center, Knoxville, TN. Contact David Bower, K4PZT, 865-670-1503; e-mail: <d.bower@ieee.org>; <www.W4BBB.org>. (Talk-in 147.300, 224.500, 444.575; exams)

June 14, **DeKalb County ARC Tailgate Outing**, VFW Fairgrounds, Fort Payne, AL. Call 256-337-3636; e-mail: <w4ozk@arrl.net>; <www.dekalbamateurradio.com>. (Talk-in 147.270, 100 Hz+ offset; exams 11 AM)

June 15, **Lake County ARC's Dad's Day Hamfest**, Lake County Fairgrounds, Crown Point, IN. Contact Lee, WD9GQO, <leeraue@msn.com>; <http://www.qsl.net/w9lj/index.html>. (Talk-in 147.00 PL 131.8, 146.52)

June 15, **MIT Radio Society Hamfest**, MIT, Cambridge, MA. Contact Nick, KA1MQX, 617-253-3776 (9–5 M–F); <http://web.mit.edu/w1mx/www/swapfest.html>. (Talk-in 146.52, 449.725/444.725 – PL 114.8)

June 21, **Raritan Valley RC Hamfest**, Piscataway High School, Piscataway, NJ. Contact Marty Ficke, KD2QK, 732-968-6911, e-mail: <KD2QK@aol.com>; <www.w2qw.org>. (Talk-in 146.025/625, 447.250/442.250, PL 141.3, 146.52)

June 21, **SilverPoint Hamfest & Tailgate Party**, SilverPoint Community Center, west of Cookeville, TN. Contact Jack, KG4MFJ, e-mail: <kg4mfj@charter.net>. (Talk-in 147.135 +600; exams)

June 28, **Barry ARA Ham Radio & Computer Swap**, Charlton Park, Hastings, MI. Vendor info e-mail: <field_day_swap2003@yahoo.com>; VE exams contact Pete, N8ZSG, <peted@msgexp.net>.

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

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

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

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When it comes to VHF contesting, the key to getting out of your own back yard may not be more power or a bigger antenna. It may be . . . getting out of your own back yard.

The Hills are Alive With the Sound of VHF DX

BY CLARKE GREENE,* K1JX

"Listen to that pile-up," you mutter to yourself. "It'll take forever to get through, especially with this rig. . . ." It took longer than you thought to hike up the trail, and eight minutes into the contest you're finally getting everything connected. The first station you tune across is pretty loud, but you still peak the beam on him. It seems as if half the world is calling this guy, but you're used to waiting in pile-ups. After all, most of the stations you hear on the VHF bands from home never hear you at all and just CQ right back in your face.

"K One Norway Kilo" flies out of your mouth and you release the microphone button.

"K1NK . . . Fox Mike Zero Eight, go ahead."

Instinctively you blurt out, "Roger, Fox November Thirty Two."

"Thanks. Nice signal. QRZed from K Eight Germany Pacific." The roar of the pile-up begins again.

You stare down at the radio you carried up the hill in your backpack. You look at the 2 meter Yagi that would poke you in the eye if you stood up too quickly from the rock you've been sitting on. Then more staring at the radio.

Nice signal? What just happened?

The station you just worked was about 400 miles away, you estimate. Maybe more. The pile-up was huge. A lot of the stations from around home, the ones with the big beams and high power, the ones who always stomp on you in the pile-ups as if you were chewing gum stuck to the bottom of their shoes, are still braying away. They're not getting through. You did, though, with your 2 watts and 8 foot long Yagi mounted on a pole just over your head.

It doesn't take much to set up a very effective hilltop VHF contest station. From a location like this you can easily work several hundred miles on 2 meters with just a couple of watts and a small beam antenna.

"Must be a band opening of some sort, or I was just lucky." More muttering. The hikers walking by are really looking at you strangely. Maybe it's the antenna.

Of course, what's the next thing you do?

"CQ Contest, CQ Contest, CQ Contest. This is K1NK. K One Norway Kilo. K1NK. Go ahead."

Instead of hearing the soothing sound of white noise that you expected, there are five people calling K1NK. This continues for the rest of the hour, and you end up with 42 stations in the log for the first hour. This goes on at a somewhat slower pace for the next five hours until it starts getting dark. With people still calling, it pains you to turn everything off, take down the antenna, pack everything up, and hike down the hill. However, at least there's the thought in your mind that you actually worked 208 stations in 36 grid squares. That's more than you've worked in the last year from home, including all the contests.

What's the trick here? It's simple science. There's a reason why television and cellular towers are located on tall buildings, high hills, and mountains. At VHF and above, radio signals tend to travel pretty much in straight lines, unless there's some kind of atmospheric signal propagation enhancement. Thus, the higher your antenna is above the surrounding terrain the farther away your radio horizon, and the farther away your radio horizon is the farther away you can talk.

Some hams are lucky enough to live on a mountaintop and have large antennas. They're the stations you always

*92B-2 Cynthia Lane, Middletown, CT 06457

You don't have to spend six hours sitting on rocks, either. With a little extra planning and packing you can have "all the comforts of home" (if you live in a tent) on a hilltop contest expedition.

hear working the DX on 6 meters and above. Most people aren't that fortunate. They miss having the ice tear down the antennas every winter. They long for the driveway that's impassible for five months out of the year because of the snow. The hour drive to the grocery store calls to them. Maybe there's a compromise.

You can have a big VHF signal without living on a mountain. You can just visit the mountain or hilltop when you want to operate. All it takes is some planning, the right equipment, and the desire.

The little homily a few paragraphs above is mostly true. The calls were changed a bit to protect the guilty (me). The rest is pretty much accurate, even the contact total. The bit about not working that many stations from home is an exaggeration, though.

At the time, my home station for 2 meters was pretty good. The antenna consisted of four of KLM's latest and greatest DX antennas, 13 elements on a 20-something foot boom. They were stacked two wide and two high on a 50 foot tower. The feed line was aluminum-jacketed hardline. The transmitter ran about 350 watts output on CW and SSB. The receiver was the latest state-of-the-art JFET preamplifier into the latest transverter from England. The location was pretty much average, maybe above average in some directions. When the band opened, almost anything heard could be worked. In one June ARRL VHF contest I worked 200 stations on 2 meters by midnight Saturday night.

Then, while I was strolling through a hamfest one summer, an ICOM IC-202 jumped out at me from one of the dealers' booths and begged me to buy it. So, being good hearted, I did. A 7-element Yagi saw what happened, pulled the same trick on me, and came home with me as well.

The September ARRL VHF QSO Party came up in a few weeks. This seemed like a great time to drag my (then) girlfriend up for a hike to the top of Mount Everett in western Massachusetts for a nice picnic. The picnic part was kind of a ruse, since the backpacks were filled with more radio supplies than food. The pieces of aluminum that were bungeed together should have been a tip off.

We really were about 8 minutes late getting started, and I really did make 208 contacts before the dry cells in the radio gave out.

The most amazing part of the whole operation was that from this hilltop, okay 2600 foot high mountain, my 2 watt station was clearly much more effective than the big station at home. Not only could I hear more, but I could work more, too. The band was also much quieter—no home electronics spewing friendly noise, all within the legal limits, of course. Not a single TVI complaint either. Lots of people stopped to ask questions, though.

That was it. The bug had bitten. From then on, every hilltop I drove past became the subject of intense scrutiny.

Most of the hilltops the radio visited after that gave results similar to the big mountain. Maybe not quite as good, but a shorter driving distance counts for a lot. A less-imposing site that can be reached after work may not perform quite as well, but the ability to get on the air more is a good trade-off. Mount Higby in Middletown, Connecticut, is only (*only* is a relative term here) about 700 feet above sea level. However, it is along a ridge, and the ridge drops off about 200 feet almost vertically. Placing an antenna 30 feet from the edge makes it pretty high. With 2 watts it's easy to work out to 300 or 400 miles almost any time of the day or night with a simple 7-element Yagi. Across most of the country there are literally thousands of spots like this. Maybe not 700 feet high, but almost everywhere there are spots that poke above the average terrain. These are the spots you want to look for and operate from.

Now that you're frothing at the mouth over the potential of making the VHF DX contacts of your dreams, how do you go about this? First, you need a radio.

The selection of radios suitable for carrying to a hilltop for VHF DX exploits is greater than ever before. Look at an example such as the Yaesu FT817. It not only covers the HF bands, but also the 50, 144, and 432 MHz VHF/UHF bands. One of those could easily fit in a small backpack or carrying bag, never mind the back seat of your car. Yaesu has other offerings as well, as do ICOM, Ten-Tec, MFJ, and a few others. You need a radio that ideally operates on both CW and SSB, is battery operable, and works on one or more VHF bands.

Fox Mike Zero Eight?

In the scenario at the beginning of this article K1NX receives a contest report of "Fox Mike Zero Eight" and replies with a report of "Fox November Thirty Two." If you're not familiar with VHF DXing and contesting, you're probably scratching your head and wondering, "What kind of reports are those?" The answer is, they're phonetics for a station's "Grid Square" or "Grid Locator," the VHF equivalent of a zone or country identifier in an HF contest. In the examples above, the grids are FM08 and FN32. For more information or to learn how to figure out your grid locator, visit <http://www.arrl.org/ locate/gridinfo.html> on the web or find a VHF DXer/contester in your area.

Over the past 25 years there have been a couple of dozen models from all the manufacturers that fit into this category. A trip to a hamfest flea market or one of the on-line trading sites might yield a very inexpensive radio that could bring a wealth of VHF DX contacts. There's also the possibility of using a transverter (that's a transmitting and receiving converter) from someone such as Down-east Microwave or Ten-Tec along with an HF radio such as the Elecraft K2 to make a very-high-performance station.

Next you need an antenna. This is a little trickier, since medium-size VHF antennas aren't sold very much. Plus, most antennas are made for durability during bad weather, not for portability. It is possible to use the commercial offerings, but it really helps a lot if you go through and replace the hardware with combinations of wing nuts and the like. Your ideal antenna is lightweight, folds into a small package, and assembles and disassembles easily and quickly. Chances are that if an ice storm appears from out of the blue, you'll be more concerned about considerations other than whether the antenna's elements are going to sag. It therefore might be best to build the antennas and supports yourself. There are a lot of

VHF hilltopping doesn't have to be a summertime-only activity. Here a little bit of snow on the ground doesn't keep the author from a three-band, in-tent operation (looks like 6 meters, 2 meters, and 70 cm).

CQ WW VHF Contest "QRP Hilltopper" Category

The 2003 CQ WW VHF Contest announcement is elsewhere in this issue. Taking a cue from K1JX, you can participate in the contest for up to a 6 hour continuous period running QRP. On your Cabrillo file entry check QRP and type "QRP Hilltopper" on the first line of the Soapbox comments. Tell us of your experiences in the contest. Additional certificates will be awarded in this time-limited sub-category. If you get really enthused and operate a second 6 hour period from a different grid, use a portable callsign indicator and e-mail me directly on how to submit your second entry. Sorry, three tries makes you a "rover."

John Lindholm, W1XX
CQ WW VHF Contest Director
e-mail: <w1xx@cqww.com>

publications that detail the design of high-performance VHF Yagis, so consulting one or more of these is a good place to begin. There are also two websites that offer some specialized information oriented to the exact task we're discussing here, and they are highly recommended.

You also need a support for your antenna. A very simple solution for that is to make a trip to your local electronics emporium and buy a couple of lightweight telescoping TV antenna masts. You want the 5 foot versions, as they'll be easier to pack in the car and carry. You'll also want a slip-ring guy collar for attaching your guys. The guys can be the relatively thin stuff often used to guy tents. You can find it at most camping stores, where you may want to buy a few plastic tent pegs as well. These can be used in some locations to anchor the guys.

You'll also need power. If your radio can run for the time you plan to operate with its built-in batteries, by all means use them. Simpleness is next to cleanliness, or something like that. Otherwise, the best solution for power is a sealed lead-acid battery, aka "Gel-Cell." These are rechargeable, and work really well under a variety of circumstances. Of course, if you're going to drive to that parking lot behind the restaurant with the magnificent view of five states (there really is a place like that in southern Vermont), you can use your car battery. Don't forget, though, that you want to be able to start your car at the end of the operating period and go home, so don't let the battery run down. If you're going to be using more than one radio, or are using transverters or a computer for logging, then you'll want some reliable means for distributing power. You can build something, or buy a RIGrunner from West Mountain Radio or a similar power strip from MFJ.

Don't forget the so-called accessories such as feedline, microphone, headphones, a CW paddle, maybe a keyer, and some means of logging. Maybe you'll want to use a laptop computer of some sort. An appropriate set of tools and a flashlight are valuable as well. When you're going to be outside on a hilltop, suitable clothes are a necessity, not a luxury (many hilltops get cold at night, even in mid-summer).

This sounds like a long list, but with a little planning and good packing you can fit all of the above into a medium-size daypack, and carry the antenna and mast together as a kind of walking stick. Just don't use the walking stick as a walking stick.

Finally, you have to choose the location and set up your station. Driving toward the highest spot on your horizon is one approach. Topographical maps can be a great aid. Delorme sells products that contain maps for entire states.

When you embark upon your search, here are a few ideas to keep in mind and items to investigate.

1. Who owns the property? Can you get permission to set up there? If it is public land, contact the government agency to get permission and learn what the rules might be for operating there. If an individual or a company of some sort owns it, you'll have to gain permission from them. It's sometimes amazing where you can get permission to operate from if you're diplomatic and explain about the amateur radio activity you'd like to pursue. Don't forget, every contest is a "test of emergency communications." There are also places where you and your radio equipment won't be greeted with open arms, even in some public parks. It really isn't worth upsetting anybody over operating a radio; you probably won't have much fun going where you're not welcome.

2. How do you get to the location? Can you drive all the way there? Do you hike? Do you need snow shoes and the company of a Mountie? These are no trivial considerations. If you can't get there, what good is it? Conversely, if everybody in the world can drive there and converge on your little operating utopia, that might not be good, either.

3. Is there a big radio or television installation on the site? This could be problematic, since most radios don't perform their best when only a few hundred feet from a 500 KW TV transmitter. Finding a site that is relatively unpolluted by RF detritus is becoming quite a challenge near most urban and suburban areas. That's why "hike-able" places often have the most promise. If there's no road, there's probably not much RF-generating equipment there.

4. Is the location safe? If the best VHF location for miles around is also the spot where some of the more enthusiastic local kids like to push flaming cars over the cliff on Saturday night, then that might not be your best choice. The hill where bears look for berries might not be good for other reasons. Or maybe it's the same reason. If you're operating only limited hours during the day, take down your antennas and pack your gear so that you can get back to your car by sunset.

5. Contests are an ideal time to work DX on the VHF bands. There's more activity during a VHF contest than at just about any other time. Many of the stations are located on the best hilltops, so they're easy to work. This also suggests that any location you choose might have an operation already planned for there. Perhaps worse is a huge operation might be planned for the next hilltop over that the owner of your site isn't aware of. This means that you not only need to scout any potential contest site, you also need to ask around to see if your operation can coexist with any nearby operation.

6. Finally, here's a guideline for good citizenship: If you decide that you really like the location from which you choose to operate, would you be welcomed back? Assume from the beginning that you would like to go back there and behave accordingly. Some places really don't want you to tie your antenna guys to trees or other living things such as park visitors. Others may not like you driving stakes into the ground for guy points. Obey any rules to the letter. Leave only footprints.

You can work out the details to make your operation more effective and more fun. This is especially true for operating VHF contests as a hilltopper. If you're only going to operate for a limited time, you don't have to worry about tents, sleeping bags, cooking meals, and so on. Chances are you'll discover what works best for you. Have fun! ■

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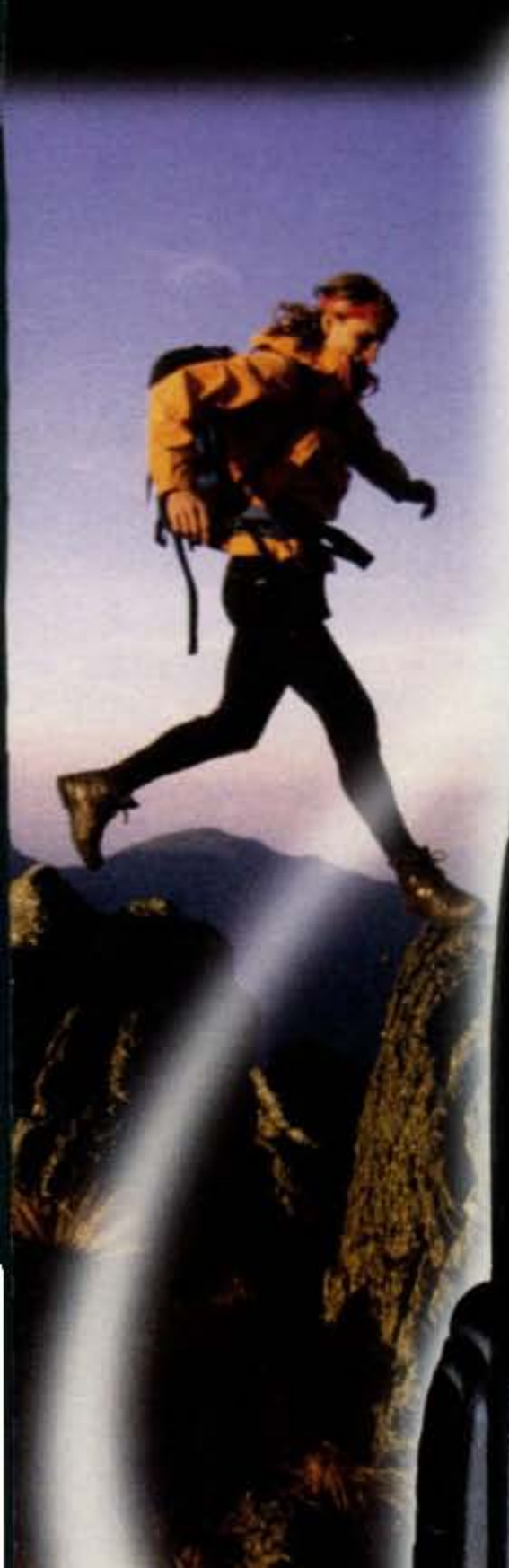

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Results of the 2002 CQ WW VHF Contest

BY JOHN LINDHOLM,* W1XX

qua•hog (kō/hôg) n. An edible clam, *Venus mercenaria,* indigenous to the Atlantic Rhode Island shore, and used in chowders. [Orig. Narraganset *poquaû-hock.*] —*Culinary Dictionary of the Sea*

The club president tried to gavel the meeting to order. The unruly members of the Contest Quahogs of Rhode Island (CQRI) would have none of it. They were too busy stuffing their faces with Krispy Kremes while washing them down with gallons of joe.

Eventually, *Robert's Rules* prevailed, as the members moved on to the contest agenda: a recap of the 2002 CQ WW VHF Contest held last July 20–21. VHF chairman KB1LN solicited input. The silence was broken by a weak-signal suggestion from the back row: "Why not replay the many submissions to the Quahog Audio Reflector?" This was met by S9 approval, and it was on to the audio tape.

Propagation

The opening bell got things off to a smashing good start almost everywhere as VE3KZ in FN03bm observed: "Six meters was wide open to Florida and the Gulf coast at the start of the contest." N3UM in FM18 (Maryland) partook of "*E*-skip Saturday afternoon just long enough in each of 11 EM grids for one QSO." N8II offered: "Activity was not the greatest, but we had *E*-skip Saturday afternoon to the southwest and Sunday morning to the northeast. I picked up two new VE2 grids, which made the effort well worthwhile."

N3HBX (FM19), although limited in time, did not miss out on the fun: "Owing to other commitments, I was able to get into the contest for only the first 3 1/2 hours. Fortunately, 6 meters was open to the southwest, which made it interesting."

The high-scoring F6IFR gang, with F6GWV as spokesperson, gave the EU perspective: "Propagation of 2 meters was normal with our very best DX to DL3RBH at 820 km. Meanwhile, 6 meter conditions were generally poor, with LA2QN our best DX at 1226 km."

Dodging the Helsinki Express

The pre-contest reflector archives yielded an important communiqué from then VHF Contest Director Gene, W3ZZ. Noting disappointments from past and potential participants, the contest dates were moved forward one weekend to avoid a conflict with the popular World Radiosport Team Championships hosted in Finland last year in conjunction with the IARU HF World Championships. This also gave some breathing room from the European Field Day, held only one week earlier. It was not all peaches and cream, however, as VE4KX, a stalwart CQ VHF Contest entrant, said: "I do not support the change. I believe *Es* conditions will not be as good later in the month." Meanwhile, NØURW "had a blast in the contest, making several 6 meter Qs with HF operators who utilized their HF/6m radios and would not have been on if not for the date change."

Roy, W3TEF, at W3SO correctly stated, "conditions were much better last year." True, conditions were absolutely super for the 2001 contest, but not so in previous years on the same weekend. Thus, "you pays your money and takes your chances," or as Roy continued, "There's always next year, and we'll be back."

The History Channel

With the comments from the reflector exhausted, the club historian, known simply as the "Old Timer," took the floor to remind everyone that *CQ* is no newcomer to sponsoring VHF contests. In fact, the August 1958 issue of *CQ* announced a "new, colossal CQ World-Wide VHF Contest, " with a power multiplier of 1/2 for input power over 1000 watts!

"Comments, complaints, and criticism" were to be directed to the Rhododendron Swamp VHF Society. The results appeared in the January 1959 issue. The 1962 edition used state, county, and serial number exchange and a power multiplier of ×20 for QRP at 10 watts. And who can forget the WPX format initiated in 1985 under the enthusiastic direction of Steve Katz, WB2WIK, and Peter Putman, KT2B? (Remember 4U1UN?)

The 2003 contest will be the fourth consecutive running in the new 6 and 2 meter only format initiated under the steady guidance of W3ZZ. In formulating the rules for our present contest, Gene followed a simple guiding principle: Eliminate everything that people do not like in existing VHF contests.

A link to the DX reflectors shows that for the 2003 contest a big media blitz has been underway to maximize exposure of the contest to DX participants. After all, this is the only *worldwide* VHF contest.

Nodding their heads in approval of *CQ's* dedication to the preservation of VHF contesting, the members of CQRI were ready to move on to a synopsis of the top scores.

The Top Scorers

For this task the club president called on W1XX, the new CQ WW VHF Contest Director, to give the other Contest Quahogs the rundown that follows. The scores reflect the downturn in conditions from the previous year, but some mighty good efforts were turned in nonetheless.

In the U.S., the W3SO club station for the Wopsononock Mountaintop Operators had the top all band single operator

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e-mail: <w1xx@cqww.com>

W3TEF operating club station W3SO in central Pennsylvania grid FN00. Roy had the contest's highest single op score from the U.S. with 54K points.

score (op. W3TEF). Roy's central Pennsylvania FN00 location is arguably the best geographical location for VHF contesting in the country. He used an IC-746PRO and amplifiers with full 1.5 KW power capability on both bands to a 7-element C3I at 75 feet on 6 meters. On 2 meters a 17-element Force-12 was able to brute force RF on a flat band as far east as Cape Cod, Massachusetts and west to the northwest suburbs of Chicago. He missed grids in the upper EM6-9x and the lower EN5-7x only because of a dearth of activity. Eighty-eight grids on a dead 2 meter band are possible here. Let's whip up some more activity, boys and girls.

Single ops K1TEO, K4QI, and KB8U all scored over 30K points. With just 80 watts from an FT-100 to a 5-element Yagi up only 15 feet (!), K5RPD had the top 6 meter score and a nice effort from Oklahoma's NL7CO for top 144 MHz honors. N6MU operating N6NB's station repeated as the QRP winner, with Iowa's NØURW not far behind. Three operators were successful in steering Alabama station W4OZK to multi-op laurels with 22K points. The "original" rover rules are very popular with the wandering set. Top-dog "best in show" rover (that's a joke, son) again went to W4VHF with his lovely bride K4LVV, who ventured to only two grids but made lots of Qs. Meanwhile, W7GHZ and N7MX underwent three oil changes en route to 19 grid locators. K9ILT with KØPG riding shotgun found the two-band rover format "wonderful," motoring to 11 grids but also making a bunch of QSOs with a host of grateful contestants.

DX activity is showing signs of coming alive. Canadians VE3KZ and VE7DXG led the all band single op contingent, with VA7MM top QRPer. Two meter FM in Thailand continues to go "gangbusters," with E21DKD leading the way over several Thai stations making over 200 contacts. In EU, PA9RX posted a nifty 144 MHz score with an even 100 Qs. Kudos to F6's IFR, CWN, HMQ, and GWV for again posting the top world multi-operator score at 76K. Their impeccable F6IFR entry with over 400 two meter contacts logs all exchanges to six grid digits. We even had a rover entry from Argentina, LU8EGS. Congratulations to all scorers in the contest!

With the contest summary now closed, the Quahogs were ripe for a pitch from the VHF Chairman to operate the 2003 CQ VHF Contest. He opened with a little philosophy. . .

Rookies and Elmers

Clearly, one of the objectives of the CQ VHF Contest is to counter the recent trend of gaining more Qs by moving the same station "up the bands." It's better to have more stations on in the first place and "run 'em" on the two most popular VHF bands.

What is puzzling is that even though HF plus 6 meter, and even HF + 6 + 2 + 432, radios have been selling like hotcakes, the owners can't find the bandswitch to go to the VHF frequencies. How about if those of you in the choir act as Elmers and get a rookie to get on in the contest? For the 2003 contest, if this is your first VHF contest or you've been contest QRT for a long time, tell us of your exploits and who your inspirational Elmer was. We'll devote space in the contest results to these stories along with a "rookie" award. Use the Soapbox lines on your electronic entry to share your experiences.

The 2003 Contest

Not yet resorting to arm-twisting, the club call went out for more stations to participate. Tell your friends . . . tell your enemies . . . tell everyone. The 2003 contest will be held July 19–20, the third full weekend of the month. See the full announcement elsewhere in this issue. The contest is now Cabrillo supported for the preferred electronic entry via e-mail to <cqvhf@cqww.com>. See the announcement for the address for paper logs. Also note that the definition of QRP had been aligned

QSO/Multiplier Leaders by Band

WORLD

QSOs

50 MHz		144 MHz	
VE3KZ	106	E21DKD	587
VE4KX	50	HS4FKF/1 (M)	462
		HSØAK (M)	449
		F6IFR (M)	420
		HS3NEX (M)	372
		HS2JFW/1 (M)	328
		E20RUZ	289
		E20YGG	282
		HS8KVA	252
		E21EIC	248

GRIDS

50 MHz		144 MHz	
VE3KZ	56	F6IFR (M)	72
VE4KX	31	E21DKD	17
		HSØAK (M)	17

USA

QSOs

50 MHz		144 MHz	
W3SO	245	K1TEO	109
K1GX	199	W3SO	102
K1TEO	176	NL7CO	96
K5RPD	164	K4QI	92
W4OZK (M)	163	KB8U	85
NW5E	159	N6MU	80
N1LDY (M)	156	W1RZF	75
KB8U	142	W3ZZ	75
N6MU	140	N4MM	64
W3ZZ	138	W6AXX	61

GRIDS

50 MHz		144 MHz	
W3SO	87	K4QI	37
NW5E	76	KB8U	34
K1GX	75	W3SO	34
K4QI	69	K1TEO	31
K1TEO	65	NØURW	24
KB8U	65	W3ZZ	23
W4OZK (M)	64	K1GX	23
W3ZZ	56	NL7CO	22
WD5K	56	W1RZF	21
N3HB	55	K5MA	20
		K3DNE	20

A "Far Out" Experience

By Jim Smith, VE7FO

Stations who score the most contact and grid totals are not always the biggest winners in VHF contests. The fun experienced by "little pistols" seeking the "New Jerusalem" of mountaintop locations can be magnificently rewarding, and it beckons to answer the cry of "wait 'til next year." VE7FO had such a "far out" experience in the great Pacific Northwest.—W1XX

Did I actually make it up the mountain without forgetting anything and hand out some rare DN09 Qs? Read on and find out.

Before leaving, my Elmer, VE7IN, advised, "You don't need a rotor for a beam that's only 10 feet off the ground." I'm really glad I listened. Emphasizing simplicity, I borrowed a laptop, a deep-cycle UPS battery...stuffed the beam elements into a tube tied to the roof rack on the car along with a 10 ft. mast and step ladder. I arrived at a lakeside motel on Saturday afternoon with the plan to rest up before a day of operating Sunday. ...dragged myself out of bed at 0430 local and was on the road to Mt. Kobau by 0530, arriving at the top at 0630.

It took three hours to get everything set up, and I confidently called my first CQ on 144.2 SSB at 0930 beaming Vancouver/Seattle. Called a few more times. Nothing. Tried CW. Tuned around a bit. Heard nothing. Well, the 706 MKII is only 10 watts on 2 meters, so I thought, "Let's head for the big time on 6 meters with 100 watts." Wondering how I'd manage the pile-up, I called CQ. Tried CW: "DN09 DN09 de VE7FO VE7FO K." Not a peep. Tuning around I heard nothing.

I got out my list of local repeaters and requested a signal check. Wow, a response. There was someone else alive out there. After CQing on 6 for about an hour and moving the beam Armstrong-style every 15 degrees, suddenly I heard a familiar call. Mine. Someone was sending *my* call. Was this an LDE? No, it was VE7DXG in CN88 calling me! I worked him, no problem, and we successfully QSYed to 2. Encouraged, I auto-CQed some more. Fifteen minutes later I heard Steve, VE7SL, calling a VE4. When they were finished, I dump ed in my call. Nada. After a while Steve came back to my CQ and we made the Q. Before I knew it, there were a bunch of W7's on the frequency anxious to work me thanks to DXG putting out the word. Unfortunately, they weren't hearing me. "Come on, guys. This is DN09 and I'm trying for that DXpedition feeling." I auto-CQed until the end and then packed up everything, finishing up with a robust three QSOs.

After leaving the site, I discovered I could drive a short distance along the ridge to another location in the clear, a dome perhaps 100 feet higher. After studying a topo map a couple of days later, I located Mt. Baldy—a ski resort at 7500 feet and service roads to towers at the top. Will I get there next year? Despite what some may see as disappointing results, it was a fun experience. If the test dates coincide with my vacation week, well . . . I just might try it again!

with the standard for VHF at 10 watts. This was universally accepted by a flood of e-mail responses to the idea floated on the common reflectors. Also see the related article on QRP VHF contest operating by K1JX in this issue, and the accompanying sidebar on the "Hilltopper QRP" category to be recognized on a trial basis for the 2003 contest.

The business of the Contest Quahogs completed, before the gavel could sound adjournment *sine die,* all the club members were in a stampede to the local donut shop for some more Krispy Kremes!

73, John, W1XX

Soapbox

Nice opening on 6 meters the first hour. Another opening to the west Saturday evening for a bit and a pretty good opening to VE1 and W1 Sunday morning. Two meters did not have much activity...**N8BJQ.** Many thanks for your continued sponsorship of the VHF Contest. I am always happy to participate, with or without propagation. I very much agree with the two-band format. It makes for more activity on the two most popular VHF bands, rather than passing stations up to UHF and microwaves, giving more time on 6 and 2 to "run" or "search and pounce" during openings. The more activity the better...**K8KFJ.** Operated from W4BRC club site on Briarpatch Mountain at 3200 feet. Our first time ever on 6 meters. Great opening to VE1/VE2 on Sunday morning. WD5K was so loud we thought he was at our operating site...**NW4N** at **NG4DX.** While putting on many new grids, tried to outrun the smoke from the great southern Oregon wildfires. Never did. It followed this rover all the way to Idaho ...**W7GHZ/R.**

The XYL and I enjoyed the contest from two mountaintops in northern Virginia, both in excess of 3500 feet. Conditions were fair at best. Our antennas consisted of stacked Omnis on 6 and Big Wheels on 2. We're sorry we didn't make it to EM97 as we had promised, but the drive was just too far...**W4VHF/R.** Glad to know others heard my 5 watts...**N8XA.** I had fun until I was shut down by deer flies and mosquitoes once evening set in. I'll participate next year with mosquito netting. Six meters had about one hour of *E*-skip between British Columbia and California/Mexico around 0030 to 0140 UTC Sunday...**VA7MM.** Good skip on Saturday, but nothing on Sunday. Activity was light...**W4NTI.** During one stretch of listening but hearing nothing, all of a sudden VE4KX popped out calling CQ. We exchanged grids and poof, he was gone...**KJ5RC.** I'm new to 6 meters. Just put the antenna up four days before the contest...**K4RKN.**

First 6 meter contest. Can't wait 'til next year ...**KJ4EX.** After procuring the callsign WW1DX from the Mohawk Contest Club, I drove to FN43 in NH to start. But after a half hour the laptop and GPS both went dead. After this false start, I took the wife and kids on Sunday to Mt.

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SS-12	10	12	1⅜ x 6 x 9	3.4
SS-18	15	18	1⅜ x 6 x 9	3.6
SS-25	20	25	2⅞ x 7 x 9⅝	4.2
SS-30	25	30	3¼ x 7 x 9⅝	5.0

MODEL SS-25M

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MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-25M*	20	25	2⅞ x 7 x 9⅝	4.2
SS-30M*	25	30	3¼ x 7 x 9⅝	5.0

MODEL SRM-30

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MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25	20	25	3½ x 19 x 9⅝	6.5
SRM-30	25	30	3½ x 19 x 9⅝	7.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M	20	25	3½ x 19 x 9⅝	6.5
SRM-30M	25	30	3½ x 19 x 9⅝	7.0

MODEL SRM-30M-2

2 ea SWITCHING POWER SUPPLIES ON ONE RACK PANEL

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25-2	20	25	3½ x 19 x 9⅝	10.5
SRM-30-2	25	30	3½ x 19 x 9⅝	11.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M-2	20	25	3½ x 19 x 9⅝	10.5
SRM-30M-2	25	30	3½ x 19 x 9⅝	11.0

MODEL SS-12SM/GTX

MODEL SS-10EFJ-98

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KENWOOD TK760, 762, 840, 860, 940, 941
KENWOOD TK760H, 762H
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SS-18EFJ
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SS-12MC
SS-10MG, SS-12MG
SS-101F, SS-121F
SS-10TK
SS-12TK OR SS-18TK
SS-10SM/GTX
SS-10SM/GTX, SS-12SM/GTX, SS-18SM/GTX
SS-10RA
SS-12RA
SS-18RA
SS-10SMU, SS-12SMU, SS-18SMU
SS-10V, SS-12V, SS-18V

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VA7DX	4,785
VE3OIL	3,312
VE3SXE	2,660
SQ6ELV	2,262

6 Meters

UR2QU	234

2 Meters

E21DKD	19,958
PA9RX	7,000
EA3ATO/P	5,780
E20RUZ	5,202
HS8KVA	4,536

QRP

VA7MM	1,003

Rover

LU8EGS	448

Multi-Operator

F6IFR	76,208
HSØAK	15,266
HS4FKF/1	11,088
HS3NEX	10,416
HS2JFW/1	7,216

USA

All Band

W3SO	54,329
K1TEO	37,824
K4QI	33,072
KB8U	30,888
K1GX	29,498
W3ZZ	22,752
N4MM	18,792
NW5E	15,853
K3DNE	15,594
K5MA	12,744

6 Meters

K5RPD	8,692
WD5K	6,720
N3DB	6,120

2 Meters

NL7CO	4,224
W6AXX	2,074

QRP

N6MU	17,100
NØURW	14,060
W1XX	9,450

Rover

W4VHF	34,034
K9ILT	30,302
W7GHZ	29,078
K7MX	18,744
NØDQS	14,094

Multi-Operator

W4OZK	22,386
N1LDY	17,688
NG4DX	5,760
K6WLC	4,950

N2GKM/R pauses at an Appalachian Trail crossing in FM19. Norm activated seven grid squares.

NØURW's 2 meter hardware in Iowa.

Wachusett in FN42 for a picnic lunch. While they explored the summit, I worked several stations, including one on the opposite side of the summit. Looking forward to doing more next year...**N1RWC** at **WW1DX/R.** I was expecting good openings with North America and the Caribbean, but was not lucky in breaking my last year's score. Maybe next time the propagation gods will smile...**WP4LNY.** Wow! What a great time I had in this one. Thanks a bunch...**AB8DY.**

I had intended to operate QRP, but after the start of the contest, forgot to turn down the wick. Sunday morning started with a 6 meter opening to the east coast, followed an hour later by an opening to FM07, FM08, and EM85. While still trying for some more east coast, W6OAL called off the back of the antenna, alerting me to propagation west. Thus, I worked a group in DM78, DM79, DN60, and DN70. Thanks for all the QSOs, guys. It was a pleasure to participate...**VE3KZ.** Activity was sparse, especially during the last several hours. Right at the beginning of the contest there was a brief *Es* opening on 6. There was a brief period on Sunday morning with weak tropo on 6 meters, but I did not observe any tropo on 2 meters at all. Keep promoting this contest. In time, it will become a major event...**VE2ZP.** I was only able to get on for one hour, but did catch a 6 meter opening. Good luck with getting this contest off the ground...**K3IXD.** The first hour and a half had openings to the north and Midwest. Then a solar flare took the band out...**K9HUY.**

Station Ops, Multi

F6IFR & F6CWN, F6HMQ, F6GWV. **HS2JFW/1 &** E20MFO, E20MFS, E20SZO, E20TFM. **HS3NEX &** HS3JWC, HS3MTB, HS3NMK, HS3NNE, HS3NQQ, HS3OPN. **HS4FKF/1 &** E20MYX, E20TTJ, E20UWZ, E20WUE, E20XAU, HS4IVS, HS5WIU, HS8KJW. **HSØAK:** E20FMC, E20HWD, E20LCH, E20MIP, E20MJC, E20NRI, E20VXI, E20XKJ, E20YCV, E27OD, HS1ZNI, HS4KLC/1, HS4ORI/1, HS7NEG/1, HS7YLE/1, HS7YLO/1, HS8AAB/1, HS9LXX/1. **KB1HAR &** N1YKH. **K6WLC &** AB6CF, KØBGL. **N1LDY &** KE1AK. **NG4DX:** K4SBM, K4TLL, K4UTJ, KG4FLA, N4VL, NO4Z, NW4N, W4NP, W4RDX, WD4LHB. **W4OZK &** KB4BSA, KE4IKM.

Rover Stations: Ops and Grids Activated

WW1DX: N1RWC, FN42, FN43. **AA2YG:** FN12, FN13, FN22. **N2GKM:** FN02, FN03, FN10, FN11, FN12, FN13, FM19. **W4VHF &** K4LVV, FM07, FM08. **KA5CVH &** KC5MPK, EL17, EL18, EL28, EL29, EM21, EM22. **KE6FI:** CM86, CM96, CM97. **KD4IDR:** CM87, CM97. **W7GHZ:** CN72, CN73, CN82, CN83, CN92, CN93, CN94, DN02, DN03, DN04, DN05, DN06, DN07, DN12, DN13, DN14, DN15, DN16, DN17. **N7MX:** CN72, CN73, CN82, CN83, CN92, CN93, CN94, DN02, DN03, DN04, DN05, DN06, DN07, DN12, DN13, DN14, DN15, DN16, DN17. **K9ILT &** KØPG, EN41, EN42, EN43, EN50, EN51, EN52, EN53, EN60, EN61, EN62, EN63. **NØDQS:** EN12, EN13, EN21, EN22, EN23, EN31, EN32, EN33. **LU8EGS &** LW8DLB, GF01, GF02.

Number groups after call letters denote the following: Class (A = all band, 6 = 6 meters, 2 = 2 meters, Q = QRP, R = rover, M = multi-operator), Final Score, Number of QSOs, Number of grids, State/Province (USA/Canada only), Grid Locator or Number of Grids Activated (rover only). Certificate winners are listed in boldface.

2002 VHF RESULTS

NORTH AMERICA

UNITED STATES

K1TEO	**A**	**37,824**	**285**	**96**	**CT**	**FN31**
K1GX	A	29,498	250	98	CT	FN31
K5MA	**A**	**12,744**	**170**	**59**	**MA**	**FN41**
W1RZF	A	7,068	111	38	MA	FN42
KB1EAA	A	4,346	91	41	MA	FN32
W1XX	**Q**	**9,450**	**124**	**54**	**RI**	**FN41**
WW1DX	R	112	11	7	MA	2
N1LDY	**M**	**17,688**	**212**	**66**	**MA**	**FN41**
KB1HAR	M	240	19	12	RI	FN41
WA2NXK	A	234	16	9	NJ	FN20
K2SZ	A	20	4	4	NJ	FM29
K2CS	**6**	**1,008**	**36**	**28**	**NY**	**FN23**
NS2P	6	665	35	19	NY	FN24
AA2YG	R	589	21	19	NY	3
W3SO	**A**	**54,329**	**347**	**121**	**PA**	**FN00**
					(Op. W3TEF)	
W3ZZ	**A**	**22,752**	**213**	**79**	**MD**	**FM19**
K3DNE	A	15,594	167	69	MD	FM19
N3JFM	A	8,788	129	52	PA	FN20
N3HBX	A	8,618	126	62	MD	FM19
N3UM	A	3,745	80	35	MD	FM18
WN3C	A	1,122	40	22	MD	FM08
K2PLF	A	1,083	43	20	MD	FM19
N3VOP	A	550	32	11	MD	FM19
K3IXD	A	444	28	12	MD	FM19
W3GN	A	84	11	7	MD	FM19
N3DB	**6**	**6,120**	**120**	**51**	**MD**	**FM18**
W6AXX	**2**	**2,074**	**61**	**17**	**MD**	**FM19**
WA2FGK	**2**	**1,254**	**33**	**19**	**PA**	**FN21**
					(Op. K2LNS)	
N2GKM	**R**	**4,796**	**76**	**44**	**PA**	**7**
K4QI	**A**	**33,072**	**220**	**106**	**NC**	**FM06**
N4MM	**A**	**18,792**	**197**	**72**	**VA**	**FM09**
NW5E	**A**	**15,853**	**175**	**83**	**FL**	**EL98**
K9HUY	A	5,934	108	46	FL	EL86
KN4SM	A	5,130	95	38	VA	FM16
KG4EFR	A	3,430	68	49	FL	EM60
AB8DY	**A**	**3,198**	**67**	**41**	**TN**	**EM66**
WD2E	A	3,115	62	35	TN	EM86
WF4R	A	2,960	55	40	VA	FM16
K4WYS	A	2,720	57	40	VA	FM16
K4FJW	A	2,001	64	23	VA	EM86
N4WD	A	532	25	19	GA	EM74
KD4EVB	A	456	23	19	KY	EM78
K4YJ	A	391	22	17	GA	EM73
W4NTI	**6**	**2,926**	**77**	**38**	**AL**	**EM73**
KU4WD	**6**	**2,178**	**66**	**33**	**FL**	**EL98**
KJ4EX	**6**	**1,344**	**42**	**32**	**GA**	**EM83**
K4JAF	6	437	23	19	FL	EM70
K4RKN	6	224	16	14	AL	EM50
N4ABC	6	143	13	11	GA	EM74
N3AWS	Q	20	5	4	FL	EM90
W4VHF	**R**	**34,034**	**264**	**91**	**VA**	**2**
W4OZK	**M**	**22,386**	**218**	**82**	**AL**	**EM74**
NG4DX	**M**	**5,760**	**100**	**48**	**VA**	**EM96**
K5RPD	**6**	**8,692**	**164**	**53**	**AR**	**EM35**
WD5K	**6**	**6,720**	**120**	**56**	**TX**	**EM12**
KJ5RC	**6**	**2,280**	**60**	**38**	**MS**	**EM42**
NL7CO	**2**	**4,224**	**96**	**22**	**OK**	**EM04**
KA5CVH	R	180	16	9	TX	6
KF6MXK	A	517	29	11	CA	CM87
N6MU	**Q**	**17,100**	**220**	**57**	**CA**	**DM05**
KE6FI	**R**	**1,464**	**39**	**24**	**CA**	**3**
KD4IDR	R	1,400	49	20	CA	2
K6WLC	**M**	**4,950**	**98**	**33**	**CA**	**DM04**
W7GHZ	**R**	**29,078**	**147**	**134**	**WA**	**19**
N7MX	R	18,744	146	88	WA	19
KB8U	**A**	**30,888**	**227**	**99**	**MI**	**EN71**
N8BJQ	**A**	**8,642**	**116**	**58**	**OH**	**EN80**
K8MR	A	2,958	55	34	OH	EN91
K2UOP	**A**	**1,100**	**32**	**25**	**WV**	**FM09**
W8IDM	A	260	17	13	OH	EN91
N8II	**6**	**2,201**	**71**	**31**	**WV**	**FM19**
K8KFJ	6	450	25	18	WV	EM98
N8XA	**Q**	**1,484**	**42**	**28**	**OH**	**EM79**
N9DG	**A**	**2,432**	**48**	**32**	**WI**	**EN53**
K9IJ	**A**	**1,450**	**40**	**25**	**IL**	**EN52**
AA9NF	A	299	20	13	IL	EN51
N9NDP	A	210	12	10	WI	EN62
K9ILT	**R**	**30,302**	**165**	**109**	**IL**	**11**
WØRT	**A**	**2,240**	**61**	**32**	**KS**	**EM27**
KT8O	A	738	29	18	MN	EN34
KG6GMT/Ø	A	90	9	9	MN	EN37
KØUK	A	6	2	2	CO	DM59
NØURW	**Q**	**14,060**	**139**	**74**	**IA**	**EN41**
NØDQS	**R**	**14,094**	**102**	**81**	**IA**	**8**

CANADA

VE3KZ	**A**	**9,636**	**126**	**66**	**ON**	**FN03**
VE7DXG	**A**	**8,194**	**171**	**34**	**BC**	**CN88**
VA7DX	A	4,785	120	29	BC	CN89
VE3OIL	A	3,312	65	36	ON	EN93
VE3SXE	A	2,660	53	38	ON	FN25
VE2ZP	**A**	**2,232**	**54**	**31**	**QC**	**FN25**
VE4KX	**A**	**2,160**	**55**	**36**	**MB**	**DO90**
VA2ADB	A	897	35	23	QC	FN25
VE7FO	A	8	3	2	BC	DN09
VE3FU	A	6	2	2	ON	FN15
VE2PIJ	6	135	15	9	QC	FN35
VA7MM	**Q**	**1,003**	**45**	**17**	**BC**	**CN89**

PUERTO RICO

WP4LNY	**A**	**12**	**3**	**3**		**FK68**

EUROPE

CZECH REPUBLIC

OK1FRG	**6**	**360**	**24**	**15**		**JN79**

FRANCE

F6IFR	**M**	**76,208**	**446**	**88**		**JN09**

NETHERLANDS

PA9RX	**2**	**7,000**	**100**	**35**		**JO32**

POLAND

SQ6ELV	**A**	**2,262**	**53**	**26**		**JO80**
SP6MLK	**6**	**308**	**22**	**14**		**JO80**

SPAIN

EA3ATO/P	**2**	**5,780**	**85**	**34**		**JN12**

UKRAINE

UR2QU	**6**	**234**	**18**	**13**		**KN77**

ASIA

THAILAND

E21DKD	**2**	**19,958**	**587**	**17**		**OK04**
E20RUZ	**2**	**5,202**	**289**	**9**		**OK03**
HS8KVA	**2**	**4,536**	**252**	**9**		**NJ98**
HS8GLR/9	**2**	**3,924**	**218**	**9**		**OJ07**
E20YGG	2	3,384	282	6		OK03
HS9CRB/8	2	2,016	168	6		NJ98
E21EIC	2	1,984	248	4		OK03
E20MXA	2	1,016	127	4		OK03
HS5AYO	2	960	60	8		NK98
E20XEI	2	720	90	4		OK03
HSØXNO	2	388	97	2		OK03
HS4BPQ	2	264	44	3		OJ06
HS6MYW/1	2	232	58	2		OK03
E20JPJ	2	100	25	2		OK03
HS5SYH	2	100	25	2		NK98
HSØAK	**M**	**15,266**	**449**	**17**		**OK03**
HS4FKF/1	M	11,088	462	12		OK03
HS3NEX	**M**	**10,416**	**372**	**14**		**OK14**
HS2JFW/1	M	7,216	328	11		OK03

SOUTH AMERICA

ARGENTINA

LU8EGS	**R**	**448**	**32**	**7**		**2**

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1.125"	$1.35/ft	2.000"	$3.00/ft
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AR2/ARX2B	$49/69
AR270/AR270B	$85/99
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C4	10/12/15/17/20/40m, 8 el	$759
C4S	10/12/15/17/20/40m, 7 el	$679
C4SXL	10/12/15/17/20/40m, 8 el	$979
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RMKII, Roof Mount Kit	$159
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TBR160S, 160m Kit	$139

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SBB2NMO, 2m/70cm Mobile	$39
SBB5NMO, 2m/70cm Mobile	$55
SBB7NMO, 2m/70cm Mobile	$75
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X200A/X3200A	$129/210
X500HNA/700HNA	$229/369
X510MA/510NA	$189/189
X50A/V2000A	$99/149
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SG7500NMO/SG7900A	$75/112

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969	$169
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Big MFJ inventory–please call

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RG-213/U, (#8267 Equiv.)	$.36/ft
RG-8X, Mini RG-8 Foam	$.19/ft
RG-213/U Jumpers	Please Call
RG-8X Jumpers	Ple ase Call

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LMR-400	$.59/ft
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LMR-600	$1.19/ft
LMR600 Ultraflex	$1.95/ft

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Challenger Guy Kit	$19
Eagle DX	$299
Eagle Guy Kit	$29
Titan DX	$329
Titan Guy Kit	$29
Voyager DX	$409
Voyager Counterpoise	$49
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LAKEVIEW HAMSTICKS

9106	6m	9115	15m	9130	30m
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All handle 600W, 7' approximate length, 2:1 typical VSWR...$24.95

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R84	$.85/ft

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9 AM–5 PM CST

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• Handles 35 square feet of antenna load at 50 MPH, 14.75 square feet at 70 MPH.

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

• MDP & MDPL models include motor drive

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

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

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

HDX SERIES CRANK-UP TOWERS

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

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

• MDPL models include motor drive

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

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

HDX SERIES HEAVY DUTY CRANK-UP TOWERS					
TOWER MODEL	MAX. HT.	MIN. HT.	WT. (LBS.)	LIST PRICE	SALE PRICE
HDX-538	38'	21'6"	600	$1,642	$1,269
HDX-555	55'	22'	870	$2,874	$2,269
HDX-572MDPL	72'	22'8"	1600	$7,528	$5,899
HDX-589MDPL	89'	23'8"	2440	$9,855	$7,699
HDX-689MDPL	89'	23'8"	3450	$19,039	$14,999
HDX-5106MDPL	106'	24'8"	3700	$20,719	$15,999

MA SERIES CRANK-UP MASTS

• Handles up to 22 square feet of antenna load. (See chart below)

• MDP & MDPL models include motor drive.

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

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

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

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

TMM SERIES COMPACT CRANK-UP TOWERS

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

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

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

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

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

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

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Announcing:

The 2003 CQ World-Wide VHF Contest

Starts: 1800 UTC Saturday, July 19, 2003
Ends: 2100 UTC Sunday, July 20, 2003

I. Contest Period: 27 hours for all stations, all categories. Operate any portion of the contest period you wish.

II. Objectives: The objectives of this contest are for amateurs around the world to contact as many amateurs as possible in the allotted 27-hour period, to promote VHF, to allow VHF operators the opportunity to experience the enhanced propagation available at this time of year, and for interested amateurs to collect VHF Maidenhead grid locators for awards credits.

III. Bands: All authorized amateur radio frequencies on 50 MHz (6 meters) and 144 MHz (2 meters) may be used as authorized by local law and license class.

IV. Class of Competition:

For all categories: Transmitters and receivers must be located within a 500 meter diameter circle or within the property limits of the station licensee's address, whichever is greater. All antennas used by the entrant must be physically connected by wires to the transmitters and receivers used by the entrant. Only the entrant's callsign may be used to aid the entrant's score.

1. Single Op—All Band. Only one signal allowed at any one time; the operator may change bands at any time.

2. Single Op—Single Band. Only one signal allowed at any one time.

3. Multi-Op. A multi-op station is one with two or more operators and may operate 6 and 2 meters simultaneously with only one signal per band.

4. Rover station. A Rover station is one that is manned by no more than two operators, must travel to more than one grid locator, and must sign "Rover" or /R. The spirit of this class is to encourage operation from rare grid locators by persons who are inclined to do so. It is not the intent of this class to encourage one operator to move from one super station to another super station in another grid locator in order to compete in this category.

5. QRP station. Any single-op station running 10 watts output, or less, is eligible to enter this category. **Note the change in power level from last year's contest.** There are no location restrictions. You may operate from your home QTH or from the highest mountain you can find.

Stations in any category except rover may operate from any single location, your home location, or any protable location. Rover stations by definition must operate from portable locations in at least two grids.

V. Exchange: Callsign and Maidenhead grid locator (4 digits, e.g., EM15). Signal reports are optional and should not be included in the log entry.

VI. Multipliers: The multiplier is the number of different grid locators worked per band. A "grid locator" is counted once per band. *Exception:* The rover who moves into a new grid locator may count the same grid locator more than once per band as long as the rover is himself or herself in a new grid locator location. Such change in location must be clearly indicated in the rover's log. It is required that rover category operators maintain separate logs for each grid locator location.

A. The rover who changes location during the course of the contest is free to contact as many other stations as he or she wishes. The rover becomes a new QSO to the stations working him or her when that rover changes grid locator.

B. The grid locator is the Maidenhead grid locator to four digits (FM13).

VII. Scoring: One (1) point per QSO on 50 MHz and two (2) points per QSO on 144 MHz. Work stations once per band, regardless of mode. Multiply total QSO points times total number of grid locators (GL) worked.

Rovers: For each new grid locator visited, contacts and grid locators count as new. Final Rover score is the sum of contact points made from each grid locator times the sum of all grid locators worked from all grids visited. The intent is to mirror the original Rover scoring rules.

Contest entrants may not transmit on 146.52 MHz, or your country's national 2 meter FM simplex calling frequencies, or commonly recognized repeater frequencies for the purpose of making or requesting contacts. Contacts made within your own country, in the DX window of 50.100–50.125 MHz, are discouraged. Contacts made on the SSB calling frequencies of 50.110 MHz, 50.125 MHz, and 144.200 MHz are discouraged. Contest participants are required to use UTC as the logging time.

Example 1. K1GX works stations as follows:

50 QSOs (50 × 1 = 50) and 25 GL's (25 multipliers) on 50 MHz

35 QSOs (35 × 2 = 70) and 8 GL's (8 multipliers) on 144 MHz

K1GX has 120 QSO points (50 + 70 = 120) × 33 multipliers (25 + 8 = 33) = 3,960 total points.

Example 2. W9FS/R works stations as follows:

From EN52: 50 QSOs (50 × 1 = 50) and 25 GL's (25 multipliers) on 50 MHz

From EN52: 40 QSOs (40 × 2 = 80) and 10 GL's (10 multipliers) on 144 MHz

From EN51: 60 QSOs (60 × 1 = 60) and 30 GL's (30 multipliers) on 50 MHz

From EN51: 20 QSOs (20 × 2 = 40) and 5 GL's (5 multipliers) on 144 MHz

W9FS/R has 230 QSO points (50 + 80 + 60 + 40) × 70 multipliers (25 + 10 + 30 + 5) = 16,100 total points

VIII. Awards: Certificates suitable for framing will be awarded to the top-scoring stations in each category in each continent. Certificates may also be awarded to other top-scoring stations who show outstanding contest effort. Certificates will be awarded to top-scoring stations in each category in geographic areas where warranted.

Geographic areas include states (U.S.), call areas (Japan), provinces (Canada), and countries, and may also be extended to include other subdivisions as justified by competitive entries.

IX. Miscellaneous: An operator may sign only one callsign during the contest. This means that an operator cannot generate QSOs by first signing his callsign, then signing his daughter's callsign, even though both callsigns are assigned to the same location.

A station located exactly on a dividing line of a grid locator must choose only one grid locator from which to operate for exchange purposes.

A different multiplier cannot be given out without moving the complete station at least 100 meters.

X. Log Submissions: Completed logs must be postmarked no later than September 1, 2003 to be eligible for awards. All paper logs should be mailed to: CQ VHF Contest, 25 Newbridge Rd., Hicksville, NY 11801 USA.

Please submit your electronic log in the Cabrillo format created by all major logging programs. Send electronic logs via e-mail to **<cqvhf@cqww.com>**. If you do not have access to e-mail, send your MS-DOS compatible computer disk containing your Cabrillo file to CQ VHF Contest at the address listed above. Questions may be sent to **<vhf-questions@cqww.com>**.

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. . . makes barely understandable speech highly understandable!

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$169.95

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

MFJ Contest Voice Keyer

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

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

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

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

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

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

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

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

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

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

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

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

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

60 dB Null *wipes out* noise and interference

MFJ-1026
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Wipe out noise and interference *before* it gets into your receiver with a 60 dB null!

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

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

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

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

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

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

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

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

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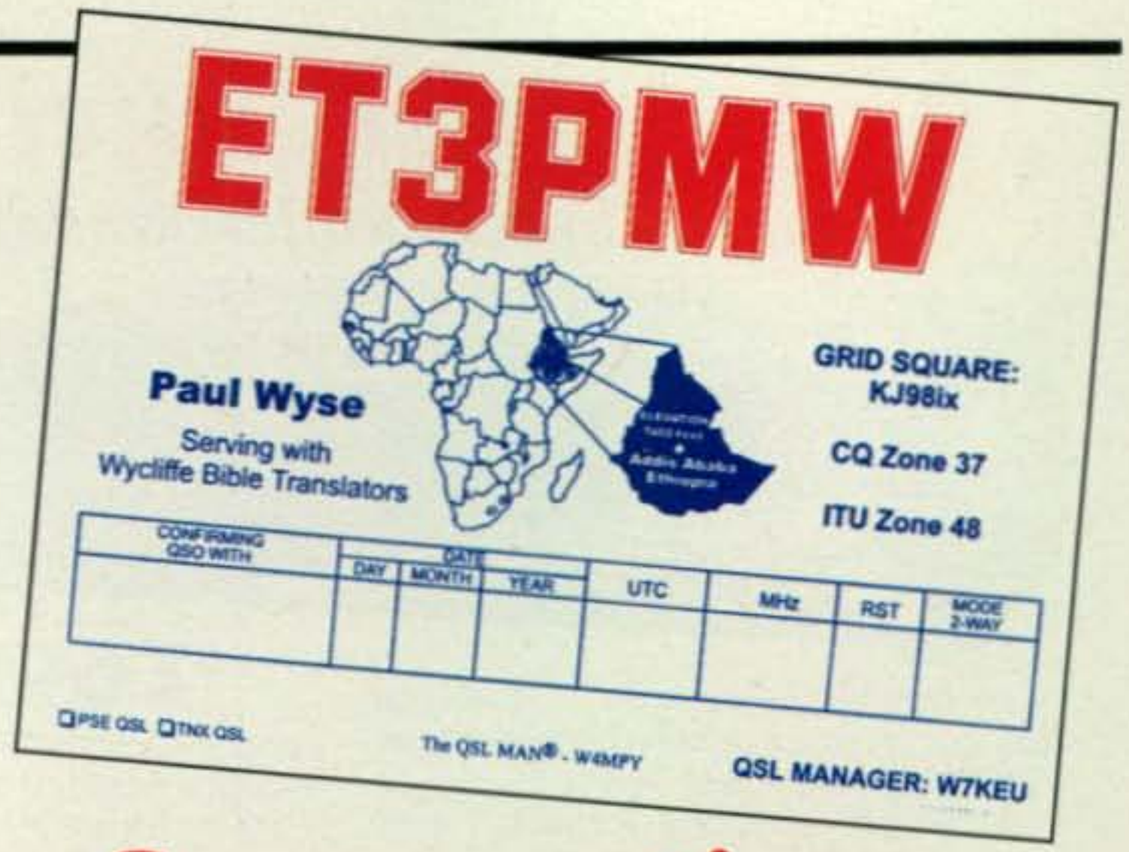
Conventional wisdom has it that DXing on 160 meters in the summertime is a waste of time. Is that because of propagation patterns, increased QRN, or partially a self-fulfilling prophecy due to lack of activity? Is it possible to consistently work 160 meter DX in the middle of the summer?



Topband DXing in Summertime from Ethiopia

BY PAUL M. WYSE,* W4PFM/ET3PMW

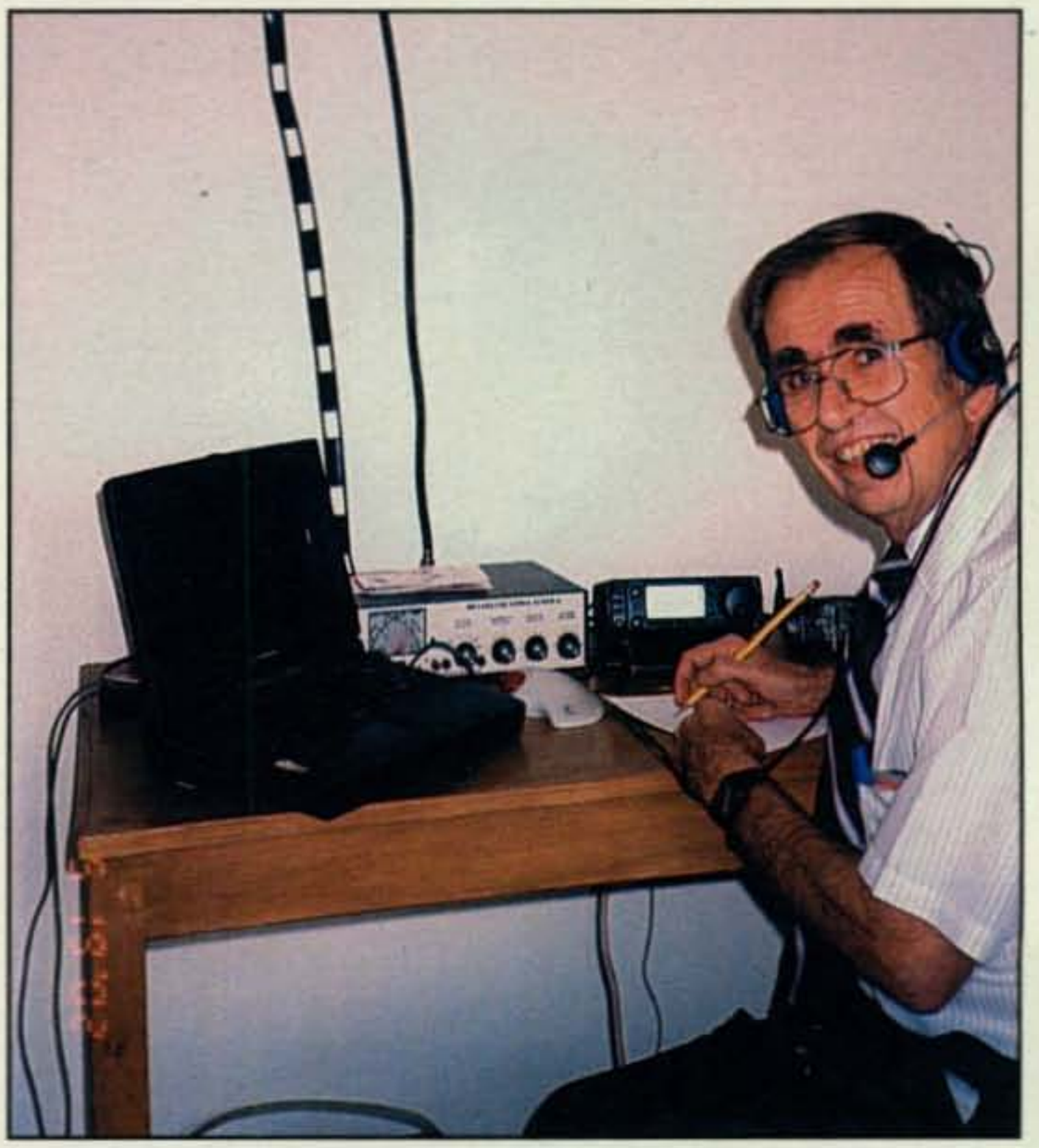
July 8, 2002 was the final day of my operation from Ethiopia as ET3PMW. That morning, using 200 watts and a simple wire antenna I worked 19 new stations on 160 meters ("Topband") before going QRT. One of those contacts was with K1HTV, running only 100 watts, for his 182nd country on 160. I was constantly amazed at the comments from this late-in-the-season operation from Addis Ababa. Topband only accounted for 2½% of my 17,335 total QSOs in Ethiopia, but it generated much more than that in excitement, feedback, and satisfaction!

Ethiopia is the fourth country from which I have worked Topband, and never do I recall having been so popular! What made this operation any different from the others? For one thing, the other operations were near the bottom of the sunspot cycle, and this was at the peak. Other factors appear to include better equipment in smaller packages and the Internet as a coordination tool.

Starting at OA8V

My first Topband experience was from the Amazon jungles in Peru, where I operated as OA8V[1] from the mid 1960s until 1983. Bob Eshleman, W4DR, encouraged me to get on Topband. He even came to the jungle to help me get started. I had the best setup there with a home-built, loaded 66 foot vertical and a kilowatt, but one thing I did not have back then was the luxury of packet cluster spots or computer logging. My logs are stashed away someplace, and I am not sure where to find them or how to extract useful data, most of which long ago left my memory!

The second operation was from 5Z4FO in Kenya. I made 256 Qs on 160 there between December 1994 and May 1995. I used the wire version of the Battle Creek Special antenna[2] and a kilowatt for a week during the Christmas holidays until I was asked by the owners to remove the antenna from our office site. After this I used a low dipole through the trees at the apartment complex where we were living. I recall that



The author at his initial ET3PMW setup in Ethiopia—an IC-706 MK II, MFJ VersaTuner, and laptop computer.

May 1995 resulted in the most activity, with 95 Qs for the month, but this was during the minimum period of the sunspot cycle. In comparison, 275 Qs were made this past June when we were just a year or so away from the sunspot peak.

Uganda, where I was licensed as 5X4F, was the most active 160 meter operation for me, with 1575 contacts. This was a battery operation using an SGC amp at 400 watts and a low inverted-Vee. I actually worked 79 countries from there. All of the contacts from Uganda were made between September

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e-mail: <paul_wyse@sil.org>

1995 and May 1997. However, there were none during June, July, or August.

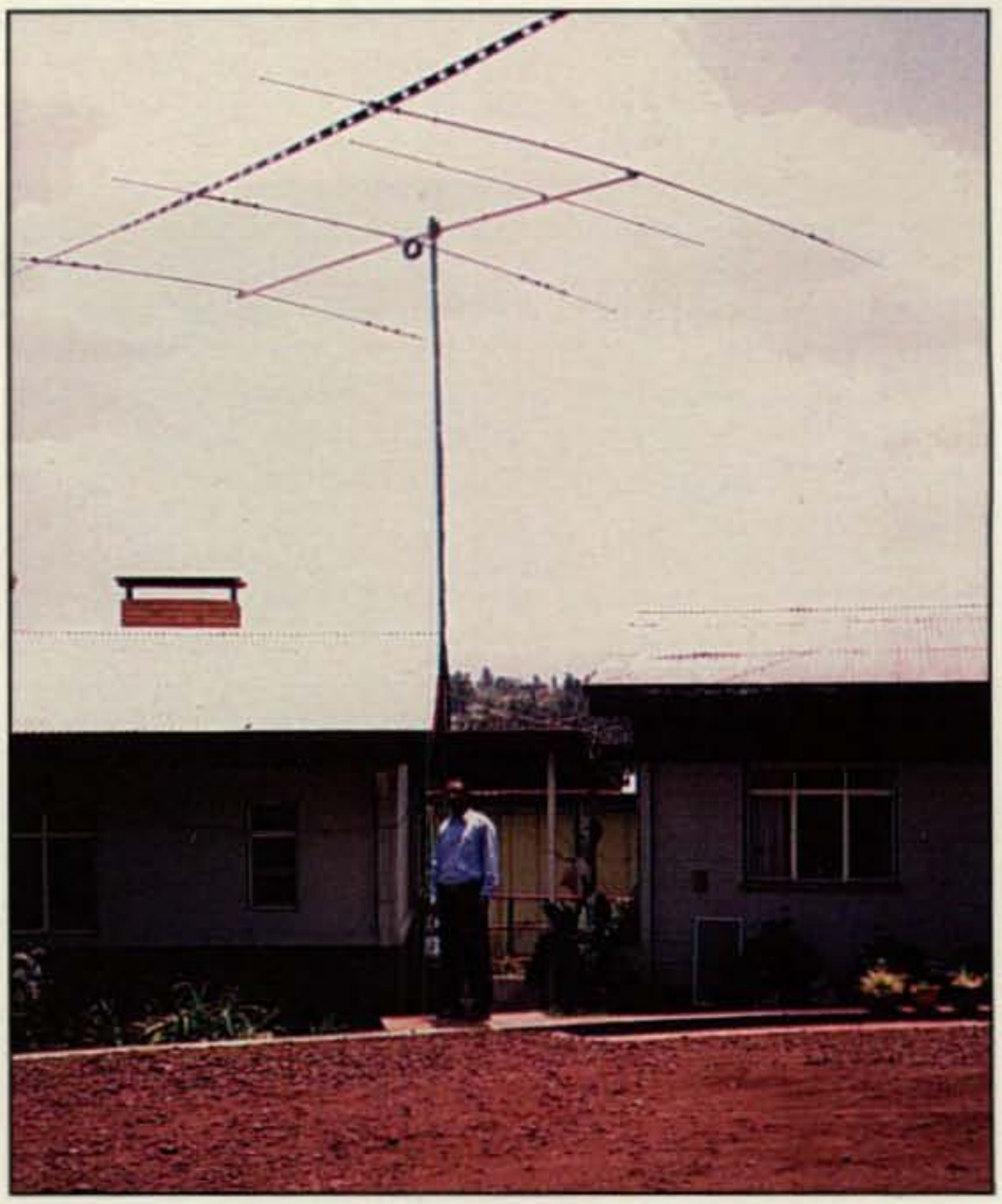
A Three-Year Dream

The Ethiopian operation that just concluded was a three-year dream. My XYL, Peggy, KB4NXR, and I had retired in 1998 after serving overseas as missionaries for nearly 40 years. Then we were asked if we'd consider volunteering with the Wycliffe Bible Translators in Ethiopia during the summer of 2000. We had plans to drive to Alaska, but the possibility of returning to Africa was too enticing and Africa won! We ended up spending four months in Ethiopia and loved it. Ethiopia has a very rich history and culture.

One day while driving to the market, Peggy noticed a quad antenna not too far from where we lived. (I had to keep my eyes on the road to avoid all the animals and people that share the roads with vehicles!) Before we had a chance to check it out, Bob, W4DR, sent an e-mail telling me of a QSO with Claudio Vascotto, ET3VSC, who I later learned was the owner of the quad. I made several visits to Claudio's QTH and even did a little operating one night. Claudio suggested that I submit a request for an ET license if I ever planned to return to Ethiopia. Processing a license application takes time there.

Amateur radio activity from ET land seemed to be quite minimal in 2000. Apart from Claudio's activity, there was the club station ET3AA with Sid May, ET3SID, as the overseer, and Peter Haferkorn, ET3BN. The club station is located on the grounds of the Sanford school and gives students and interested people an introduction to amateur radio and a chance to get their feet wet working pile-ups. Peter, however, was busy with a house-building project and not very active.

We had the opportunity to return to Ethiopia nine months later to help remodel two missionary houses up country.



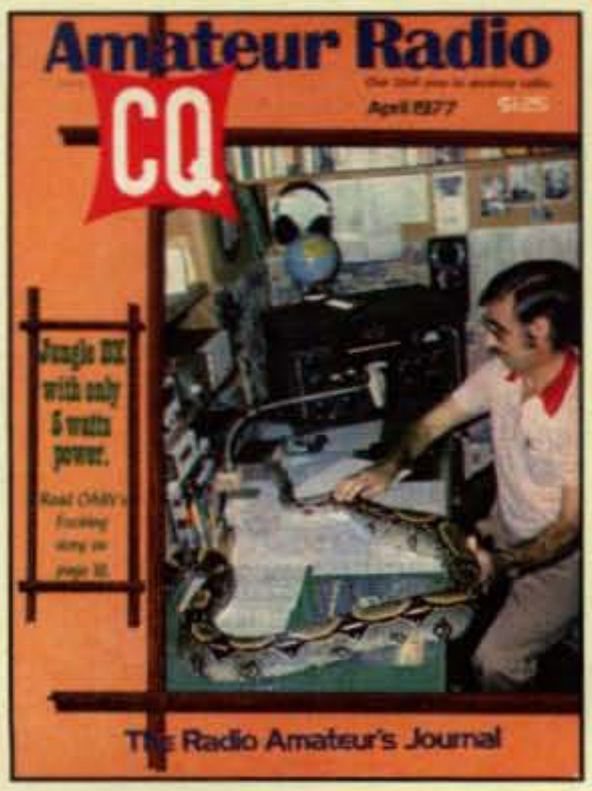
Higher frequency bands at ET3PMW were initially handled with this used Cushcraft A3 mounted at 30 feet. The feed line for the 160 meter antenna is visible in the foreground. The person in the photo is Yohannes, who helped Paul with his antenna projects.

An Inspirational Author

Paul Wyse, W4PFM, was first licensed in 1954 and served with the JAARS (Jungle Aviation and Radio Service), the technical arm of the Wycliffe Bible Translators, as radio operator, Radio Technician, and Administrator from 1964 until his retirement in 1998. He has operated from Puerto Rico as KP4AWH (1960–1964), Peru as OA8V (1965–1983; see 1977 *CQ* cover), Kenya as 5Z4FO (1989–1995), and Uganda as 5X4F (1995–1997). After "retirement," Paul has continued to volunteer with Wycliffe at its headquarters in Waxhaw, North Carolina. He has made three trips to Ethiopia for short-term assignments since 2000.

Full Circle

At the Orlando hamfest this year a ham walked up to the *CQ* booth and asked if it was possible to get a copy of the cover of an old issue of *CQ*, sometime in the late '70s. Brenda Raburn, N4FZD, explained that the ham pictured on the cover—along with a very large snake!—had inspired her husband to become a ham, and that he really wanted to hang a copy of that cover on his wall to honor his mentor. She didn't mention the ham's name, so I didn't make the connection until I got back home and dug up the April 1977 issue of *CQ*—with Paul Wyse, W4PFM, on the cover as OA8V. This article, already awaiting publication at the time, is a follow-up of sorts to Paul's "Jungle Flea Power" article of 26 years ago!



Brenda's husband, Lynn Raburn, KE4DA, explains how that cover motivated him to get his license, and how he was later able to return the favor:

"I was a pastor in Central Florida and had always wanted to be a ham. I found the *CQ* magazine with Paul's picture, along with the snake, in a convenience store. The notion that I could talk to missionaries motivated me to get my ham ticket, and I was licensed as KA4FHG. I looked for Paul on the air from Peru for years, including when I upgraded to Advanced and Extra with the call KE4DA. In 1984 I moved my family to Kenya, East Africa and was licensed as 5Z4DU. I was very active in the Radio Society of Kenya and was elected chairman. (I ended up serving two terms and was responsible for the creation of the Kenyan Novice license and wrote/edited both the Kenyan and Ugandan Novice license manuals.)

During my first term as chairman of the society I got a call from a guy who wanted help getting his local license. We compared notes, and I was thrilled to be able to sign the recommendation for Paul Wyse, OA8V, to be licensed as 5Z4FO. We have since shared many hours together both on and off the radio, including one DXpedition to 5X1HR.

I lost my copy of the *CQ* with Paul's picture when I moved to Africa. I hated that because I was always sentimental about the part it played in motivating me to go ahead and get my license. It was the snake that drew my attention, but Paul gets the credit for the inspiration."—*73, Lynn Raburn, KE4DA, 5Z4DU, 5X1HR, YJ8DA, VK4DEY*

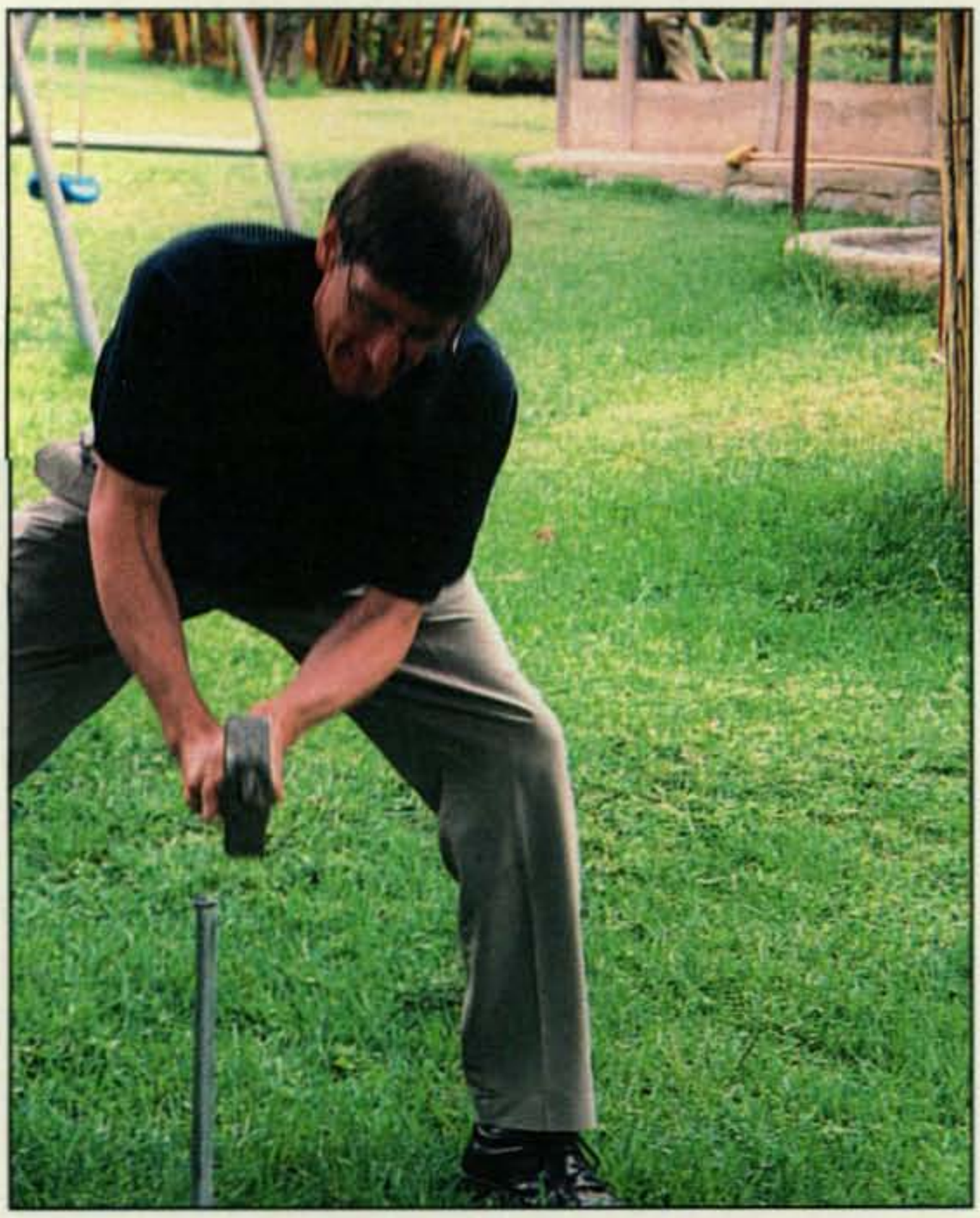
During that time I decided to test the waters and submitted my application for an ET3 amateur radio license. Although we were only there for a month that time, a friend followed through on the licensing progress while we were gone.

In late 2001 I received the good news that the application had cleared security, and along with that we had a request to return to Addis Ababa for six months to fill in for a couple on medical leave. The next month found us very busy packing. Along with the ICOM 706 MK II and MFJ-948 Versa Tuner, there was a deep well pump, motor, and some heavy tools that were urgently needed in Addis Ababa. The old pump, 500 feet down in a well, had burned out and needed to be replaced.

What a nightmare trying to pack everything into four 70 pound containers! Most of the little radio extras were left behind. I did locate a used Cushcraft A-3 and some coax already in Ethiopia, which helped solve the antenna transport problems.

Peggy and I arrived in Addis Ababa on January 18, 2002. Most things came through fine, but of all things, the ICOM 706 was damaged; the little lock that keeps the front panel attached got broken. Fortunately, it didn't affect the operation.

During the next couple of weeks my spare time involved getting settled and picking up the A-3 and going over it, making a few clamps that were missing. By February 4th the antenna was mounted at 28 feet on 1 3/4 inch pipe alongside the house. I found a small table to use for the operating position and a used battery and charger for a power supply. Two 12 volt AC power supplies on site were not operative when I arrived. On February 12th the license was issued, and I got



Dale, N3BNA, hard at work pounding in a ground rod for the K9AY receiving antenna he brought to Ethiopia in his "care package" for Paul, along with an amplifier and a variety of other gear.

Dale enjoying the fruits of his labors, operating from the newly upgraded ET3PMW using the kilowatt amp and tuner he brought to Paul.

on 15 meters the same evening. What a thrill to work a number of friends that first night, even though propagation was quite poor.

Getting on Topband

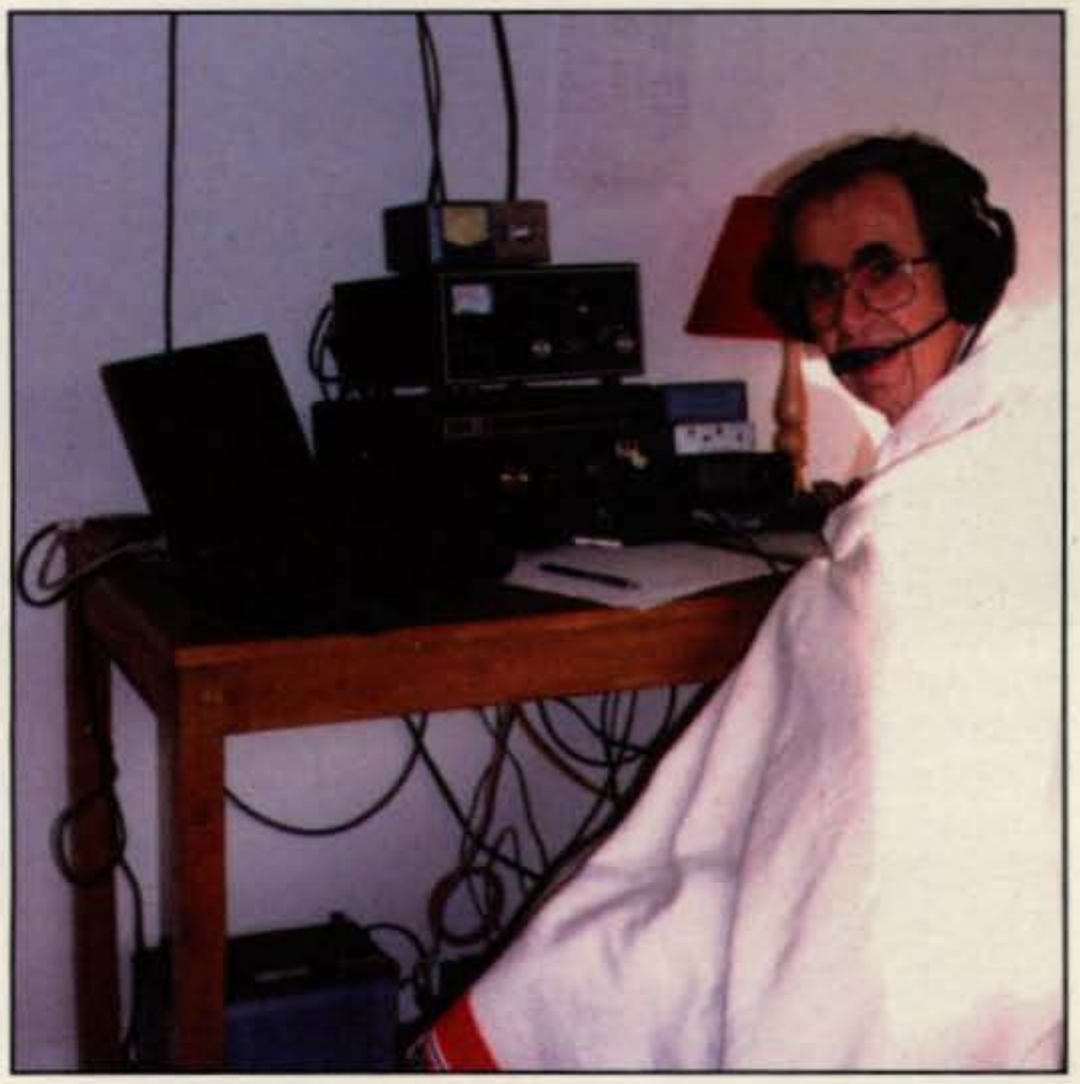
It wasn't long before I started getting requests for some low-band activity, especially 160. Having previously worked me from 5Z4FO and 5X4F, Bill Tippett, W4ZV, kept asking me to give it a try, since he needed ET3 for a new one. I listened a little down there and found the line noise was 40 over 9. That sure did not look very promising. I learned that there had been no Topband operation from ET for almost a decade. The last 160 meter activity had been in late 1992 during the 9F2CW operation by DK7PE.

I decided to give it a try. I made several trips looking for parts for a wire antenna. I finally ended up with 100 meters of 3/8 inch rope, 100 meters of #14 solid house wire, and 50 meters of lamp cord for the feed line. I could not find any insulators, so I ended up making the center insulators out of a stand-off lying around the office. There were two tall trees about 320 feet apart. I hired a climber to put a pulley on each tree at about the 65 foot level. Now I had an antenna that would tune from 160 to 10 meters, oriented pretty much broadside to Europe and North America.

The first time I tried the antenna on 160 there was a little arcing in the tuner at full power. It seemed to work fine on the WARC bands, however, and I made a few contacts on 30 and 12 meters. I finally managed to work Bill, W4ZV, on 80, but by the time I finished the QSO, little puffs of smoke were coming out of the tuner! Evidently the tuner didn't like tuning the lamp-cord feed line on 160/80. I also found the insulating washers on the antenna-matching capacitor were arcing. Well, so much for the low-band operations. I would only be there another 3 1/2 months anyway.

I forgot about 160 for a few days, and then I learned there was a FedEx package on the way with the needed tuner parts and some ladder line. Three days later I picked it up and was back on the low bands.

On May 3rd I heard SV3RF calling CQ on 1824 and worked him for my first Topband QSO. On May 5th I worked W4ZV for my first stateside Topband QSO, followed by AA1K and KX4R. I was amazed my little micro setup was making some Topband QSOs.



Mornings are cold at 7500 feet, even near the equator. A blanket was standard equipment for pre-dawn openings on 160 meters.

Meanwhile, Dale Long, N3BNA, was busy lining up an amp and other goodies at his QTH in Lititz, Pennsylvania. Earlier I had invited Dale to come and help work the CQ WW WPX Contest in Ethiopia. Dale and I met at Dayton in the mid 1990s. He had visited us in Arua, Uganda in 1997 and worked the WPX Contest from 5X4F. Dale thought I needed a more impressive low-band station, so with the help of many friends, he hand-carried a care package to Ethiopia in mid-May.

The package contained a Ten-Tec tuner, AL-84 amplifier, K9AY receiving antenna, and lots of wire and coax for antennas. Now the challenge was how to fit all the new equipment onto the small operating desk, and build control and relay circuits to key the amp and switch from the receiving antenna to the transmit antenna on the 706. Why are so few rigs set up to use a separate receiving antenna?

It was mostly smooth sailing from there, and by July 8th, when I went QRT, there were 437 Qs in the log representing 29 countries and at least 29 states. During the month of June I was on the air regularly every morning before sunrise. At least one contact was made on all but five days during the month! On at least two or three of those mornings I was not on because I slept through the alarm!

It was interesting to look at the spots on DX Summit each morning after my operations. I'd see comments such as "YIPEEEEE" from K8IP, or "QRN wins today, " or "CQing, sounds lonely." It was interesting to get the feedback. The telephone lines in Ethiopia aren't the best, and the ISP in Addis is often overloaded, although there were noted improvements during the three years we made visits there. E-mail and Internet access tend to be slow and expensive, so I normally accessed the web only for my e-mail. My costs for Internet time ran $4.00 an hour.

Keys to Success

What made this operation so successful?

Amateur camaraderie. Without the help of hams there would have been no Topband activity! Never in all my oper-

With Thanks...

I'd like to give special thanks to the following, who helped in one way or another to make this operation a success.

First to Keith Retzer, W7KEU, who has done a fantastic job as QSL manager, and then to:

Northern California DX Foundation (NCDXF)
Don, KB6KTV, ladder line and 4:1 balun
Pick, WA5PAE, tuner parts
Nadine, KC6DHO, FedEx of parts
Terry, KJ6OW, FedEx of parts
Hubert, W4DCY, FedEx of parts
Battle Creek Group (George, K8GG, and George, W8UVZ)
Bill, W4ZV, web page
Dale, N3BNA, transportation of goodies and erecting many antennas, also FedEx of W8JI box, wattmeter, and other needed items
Tom, W8JI, relay system for 706 to use receiving antenna
Mike, W1MU, donation
Steve, W3EEE, loan of AL-84
WT3Q, coax and loan of case for shipping amp, etc.
Array Solutions (WXØB) for loan of K9AY receiving antenna

ations have I had so many offers of help. Ham radio just keeps getting better.

Persistence. I was amazed at the number of hams who reported listening for days without hearing a workable signal. For WØYG near Denver, finally on June 28th at 0255 my signals peaked up to a 559 and bingo, Charlie had a new country. Other Qs were much more difficult. WA1LNP spotted me with this comment: "Like pulling teeth!"

Power helps. N3BNA brought over the AL-84 amplifier. While the amp rarely put out more than 200 watts (because of low line voltage), the average number of QSOs per day doubled.

Separate receiving antennas are often helpful. While the K9AY antenna never seemed to help me on 160, it made quite a difference on 80. One morning I worked seven PYs on 80 that I could not even hear on the flat-top transmitting antenna or the Radio Works 80 meter beam, which Dale, N3BNA, also brought over and installed.

Work with the propagation. I found the 160 meter band normally peaked to North America about 30 minutes before my sunrise, but occasionally it would completely close 40 minutes before sunrise and never open again. During the months of May and June my sunrise only varied between 0304 and 0310 UTC. The latest time a QSO was logged was at 0302 UTC. I made the same observations from 5Z and 5X, where the band normally peaked before sunrise as well. I'm not sure I have ever observed a peak at sunrise or later.

Publicity. I'm sure all the spots and comments helped a lot. In fact, during the 65 days I was active, there were only 12 days when there were no spots listed on DX Summit for ET3PMW on Topband.

Breakdown of the 435 Qs is as follows: Europe 190 Qs or 43%, North America 231 Qs or 53%, South America 3Qs, Asia 4 Qs, and Africa 7 Qs.

Problem Areas

Low DC voltage. As soon as the voltage momentarily dropped below 12 volts, the signal became unstable. Several times I had a pretty lousy-sounding signal. Sorry! I wish someone had told me earlier.

Low AC voltage. Very low AC power, especially at night. It was not uncommon for the AC voltage (supposedly 220 volt service) to be around 175 to 180 volts. I even saw a few evenings with it as low as 154 volts.

Cool temperatures. Mornings get pretty cool at 7500 feet, and there was an occasional frost in the mornings in Addis Ababa. There was no heat in the houses, so it was not very inviting to crawl out of bed at 5 AM or even occasionally at 1 AM to work Europeans. It was also difficult to work the key while shivering and all wrapped up in a blanket!

Summary

Amateur radio has been one of my hobbies since the mid 1950s. Not only has it introduced me to many wonderful people and places, it has also been a source of much of my education in the field of radio communications. Special thanks to all of you for your patience, suggestions, and feedback. Amateur radio is a great hobby and the camaraderie just keeps getting better. This was truly a team effort, and Topband is truly a gentleman's band. It was a pleasure to give many of you a new band country. Now if I could just keep from waking up at 5 AM!!

Footnotes

1. See "Jungle Flea Power," April 1977 *CQ*, page 16.
2. For more information on the Battle Creek Special antenna, and additional references, see <http://www.qsl.net/ok1rr/bacreek.html>, or *Antennas and Techniques for Low-Band DXing*, by ON4UN (ARRL, 1994). ■

R-2-06 A 'world' of listening that fits in your palm! (right) With its compact, drip resistant construction, the R-2 covers a wide 0.495-1309.995MHz range (cell blocked) in 9 bands. This little unit offers FM, WFM and AM modes along with 400 memories separated into 8 banks. Other features are auto squelch, CTCSS decode, PC programming capability (optional), data cloning capability, and quick and easy band switching. Requires 2 AA NiCad or alkaline batteries. 3.38"h x 2.28"w x 1.06"d, 6 oz ..... Closeout **$99.99**

R-3-26 See your information on screen. (left) Never before has a handheld receiver provided as much information as the 0.5-2450MHz (cell blocked) R3. Receiving frequency, tuning step, memory channel, and more are visible on the 2" color display. Not only is operation status shown, but also broadcast visual information such as TV, sporting event cameras, security, and amateur TV. Use the R3 (with an optional camera) as a baby monitor or to see aerial shots from a personal aircraft. 2.41"w x 4.72"h x 1.28"d, 10.6 oz **$339.99**

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Wireless networking using so-called 802.11 protocols is growing by leaps and bounds, mostly in spectrum shared with hams. How can we best use this "Wi-Fi" technology and are we better off using it as hams, under Part 97 of the FCC rules, or as unlicensed "regular people" under Part 15? The answers may surprise you.

Wi-Fi for Hams

Part 1: Part 97 or Part 15?

BY RON OLEXA,* KA3JIJ

If you're like me, over the past year you've been seeing more and more about Wi-Fi, 802.11, wireless hotspots, and the like. Like me, too, you may be wondering how this technology can be put to use, and if there are any amateur uses for this consumer technology. Like wired computer networks, wireless offers multi-megabit speeds and (lately) reasonable prices. The 802.11b standard operates in and around 2.4 GHz, under Part 15 of the FCC rules. However, some of the available channels happen to fall within the amateur band and therefore may be used under Part 97 rules. In this article I will explain what 802.11b is, explore the rules under which it operates, and show some of the ways you can put it to use.

What is 802.11?

802.11 is a wireless networking standard administered by the IEEE (Institute of Electrical and Electronic Engineers) that currently includes the 802.11a, 802.11b, and 802.11g specifications. An industry group known as the Wi-Fi (Wireless Fidelity) Alliance certifies its members' equipment as conforming to the 802.11a and b standards and allows compliant hardware to be marked "Wi-Fi." The Wi-Fi seal of approval tries to ensure compatibility among thousands of devices made by hundreds of vendors. In early October 2002, the group modified the Wi-Fi mark to indicate both a and b standards by noting 2.4 or 5 GHz band compatibility. Because of this guarantee of compatibility, creating a simple home wireless network is now as easy as installing a Wi-Fi certified 802.11 client card in each computer. These devices operate in the U.S. under Part 15 of the FCC Rules, so no license is needed.

802.11 is an extension of wired Ethernet, bringing the same principles to wireless communication, and as such the system doesn't care about the kinds of data that pass over it. It's primarily used for TCP/IP, but can also handle other forms of networking traffic, such as AppleTalk or PC file-sharing standards.

Computers and other devices operating Windows or Mac OS, and many flavors of Unix and Linux, may communicate over Wi-Fi using equipment from a variety of vendors. The Wi-Fi radio is typically a PC or PCMCIA card, although USB adapters and other forms (including PDA versions) are also available. Smaller devices that fit into internal

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A Wi-Fi antenna installation in Los Angeles. Note that the antenna is aimed downward to focus signals on the usage area and to minimize interference outside the area. If you look very closely at the far left of the photo (just to the right of the white vent pipe), you'll see a second Wi-Fi antenna, about 60 feet away from the first. Use of directional antennas and different channels allows multiple installations to operate virtually on top of each other without interference. (Photo by the author)

Secure Digital and Compact Flash card slots started appearing in late 2002.

The 802.11b specification allows for the wireless transmission of approximately 11 Mbps of raw data on the 2.4 GHz band. Links can span from a few hundred feet indoors to a few miles outdoors. (The 802.11a specification can handle 54 Mbps on the 5.6 GHz band, but typically at shorter distances. A relatively new standard, 802.11g, combines the 54 Mbps data rate of 802.11a with the 2.4 GHz frequency of 802.11b. The distance that can be covered for any of these versions depends, as with any radio, on RF power and path loss.)

Each Wi-Fi radio can operate in Infrastructure mode, where one Wi-Fi device acts like a hub or router for many computers, or in Ad-Hoc mode, where the Client card in each computer is a peer of all others, and the client cards communicate among themselves directly. Ad Hoc operation allows the computers on the improvised network to "talk" to each other, but not much more. Adding an *Access Point*, which acts as a base station that controls the client cards, and placing the cards in "infrastructure" mode, adds the ability to do more complex networking tasks such as network access control and sharing an Internet connection. A typical WLAN (Wireless Local Area Network) installation uses one or more Wireless Access Points, which are dedicated stand-alone radios with better antennas and an Ethernet port plus a client device for each computer on the WLAN network. Best of all, the prices for this hardware have dropped to the point where client cards can be purchased for under $50. Bridges and Access Points are now under $100.

The 802.11b standard is backwards compatible to earlier specifications, known as 802.11, allowing speeds of 1, 2, 5.5, and 11 Mbps on the same transmitters. If the signal or path is poor, the radios automatically reduce the link speed to make it more robust. Multiple 802.11b access points can operate in the same location by using different channels. The specification defines 14 channels, which are staggered at 5 MHz intervals, from 2.4000 to 2.4835 GHz. Only channels 1 through 11 are legal in the U.S., and only channels 1, 6, and 11 have no overlap among them.

By the way, 802.11a uses 12 non-overlapping channels in the 5.6 GHz UNII unlicensed spectrum—eight in the low part of the band for indoor use and four in the upper for outdoor use. 802.11a's range is generally shorter, but it can often transmit at higher

speeds than 802.11b for a given path.

Currently, 802.11b is the only standard deployed for public short-range networks, such as those found at airports, hotels, conference centers, and coffee shops and restaurants. Several companies currently offer paid hourly, session-based, or unlimited monthly access via their deployed networks around the U.S. and internationally.

802.11b products are now plentiful and cheap, and should become a boon to amateur experimentation with high bandwidth digital systems. With 11 Mbps of throughput available, many interesting communications opportunities are possible under Part 15 and Part 97 operation. 802.11b products are a great way to extend a data or Internet connection to a site by building a dedicated point-to-point link, or to build a point to multipoint Digital Base Station, which could provide a high-speed data connection shared by a number of fixed and mobile users. The remainder of this article will focus on the operation of 802.11b products in the 2.4 GHz band. If sufficient interest exists, future articles could also discuss operation at 5.6 GHz.

Available Hardware and Operating Modes

802.11x hardware consists of three subsets: *Access points,* which are the equivalent of base stations; *client cards,* which are the equivalent of computer NIC cards; and *bridges*, which can link network segments together. Client cards can communicate with each other directly (in Ad-hoc mode) or with an access point (in Infrastructure mode). Bridges are specialized devices which can be used together as point-to-point links, or with an access point as part of a point-to-multipoint link. The majority of the available equipment comes from vendors Proxim, Cisco, D-link, and Linksys.

Many newer Access Points also contain other data network management and control functions. It is now common to find an Access Point that includes a router, NAT (Network Address Translation), MAC (Medium Access Control) Address filtering, and a DHCP server. These functions are critical for developing any data network, including a wireless one.

In a typical situation the local network has one "pipe" going to the Wide Area Network (WAN), usually to the Internet. Most ISPs (Internet Service Providers) expect only a single computer to use the connection, so only one IP address per connection is provided. If our wireless network has multiple computers, each one needs a unique IP address to communicate. You could buy multiple connections or IP addresses (one for each computer) from your ISP, or you could just share a single connection. In this situation the access point (through its routing capability) is assigned the single IP address provided by the ISP. NAT functionality in the Access Point's router then maps this single IP address on the WAN side to multiple Private IP addresses (one for each of your computers) on the LAN side, allowing the WAN connection to be shared.

To handle the computers on your LAN, the Access Point uses DHCP to automatically assign a "private" IP address to each computer as it logs onto the network. Each network interface device (such as a NIC or Wi-Fi card) in a data network has a unique identifier, known as a MAC address. This is sent as part of the 802.11 handshake when a computer establishes a connection to an Access Point. The MAC address is what is mapped to an IP address in the router. MAC Address filtering can be used to block unauthorized users from gaining access to your wireless network by allowing only a preprogrammed list of MAC addresses to be granted access.

Having these functions within the Access Point avoids the need for additional equipment to perform these functions. When I built my first 802.11b system five years ago, it consisted of a Lucent Access Point, a Cisco router, and a dedicated Linux computer to handle DHCP, NAT, firewall functions, and access control. The cost of that system was over $15,000. Today you can buy an Access Point that provides the same functions for under $100 retail!

Most wireless access points and bridges are based upon the same chipset used in the Client cards. Primarily envisioned for use in portable devices, and designed to accommodate their limited battery power source, most chip sets deliver only a fraction of the 1 watt power level authorized by the FCC. In fact, most units deliver between 15 dBm (30 mw) and 23 dBm (250 mw) of output power. Also, the lower power chipsets seem to exhibit about a 6 dB reduction in receiver sensitivity as compared to the higher cost devices. If RF performance is a consideration, shop for your equipment carefully. This is not normally an area of concern. As we shall see, the utilization of high-gain antennas can achieve significant coverage distances from these low powers. If more coverage is needed, high-power access points and bridges are available, as are high-power bi-directional

linear amplifiers designed specifically for use with 802.11 hardware.

FCC Rules for Part 15 and Part 97 Operation

As delivered, 802.11 products conform to FCC Part 15 rules, which limit both the devices' RF output power and EIRP. The most stringent restrictions are placed on omnidirectional operations, since those result in the highest overall interference contribution to the surrounding area. In the case of omni operation, the EIRP is limited to 1 watt. If a directional antenna is used, the allowable EIRP jumps to 4 watts. If a fixed point-to-point link is implemented, Part 15.297 allows legal operation as long as the power level of the 1 watt TX is reduced by 1 dB for each 3 dB of antenna gain above 6 dBi. Thus, a link maximized under Part 15 using a 30 dBi gain parabolic reflector would require the TX output power to be reduced by 8 dB, calculated as follows: (30 dBi – 6 dBi)/3. This results in 158 watts EIRP being achieved legally under the Part 15 rules.

The restrictions of Part 15 are not as limiting as some may believe. Given the EIRP limits, a point-to-point link of tens of miles is certainly possible. If, on the other hand, you're a ham and you would like to have wide-area multipoint coverage, Part 97 rules (with their relaxed power constraints) could make modified 802.11 ideal for an area-wide high-speed data network. However, as I will discuss later, in many cases the limiting variable in any deployed network will be capacity, not coverage, so covering an area with multiple low-power Access Points could be a better solution than trying to use a single more powerful device to cover the same area.

Another benefit of Part 15 operation is that the Wired Equivalent Privacy (WEP) function can be enabled. All Wi-Fi certified equipment has this feature. Because information is transmitted over the air, there is an opportunity for someone to monitor that data with another receiver. In order to provide some degree of security to the data, WEP was included in the 802.11 standard. WEP requires a common key to be enabled in the access point and any client that wishes to use it. By enabling WEP you can both secure the system to only trusted users with whom you've shared the key, and provide some level of protection to the data that the user is communicating. WEP cannot be utilized under Part 97 rules because of the prohibition on encrypted communications.

A final benefit of Part 15 operation is that it has no commercial content re-

strictions. A Part 15 compliant network may be connected to the Internet, and users may interact and behave in the same manner as they would on any other Internet connection.

There are numerous considerations for Part 97 operation. Only certain 802.11b channels fall completely within the amateur allocation at 2.4 GHz. As a wideband spread-spectrum emission, the main power is contained in a 22 MHz wide window. However, the power spectrum doesn't fall to –50 dBc until twice that bandwidth. This may be important, depending upon the Out of Band Emission limits placed on spread-spectrum operations under Part 97. Since I'm not a lawyer, I'll leave the answer to this question to those who have more experience in this subject matter. Still, the best-case interpretation means that channels 1 through 5 may legally be used under Part 97. The worst-case interpretation still allows channels 2, 3, and 4 to be used while assuring that no out-of-band emissions are generated by the operator. In either case it would be prudent to avoid using channel 1, due to the possibility of causing interference to AO-40 satellite operation.

The next consideration for use of these devices under Part 97 relates to the fact that 802.11b devices are spread-spectrum devices. Part 97.311 governs SS emissions, specifically limiting power output to 100 watts, and for output powers greater than 1 watt, specifies that automatic power control (APC) must be used.

Unmodified 802.11b radios do not have a power output greater than 1 watt, so as long as we limit ourselves to antenna gain, compliance with 97.311 is trivial. While Wi-Fi devices do track the S/N ratio and other parameters used for data rate fallback (but not APC), the methods used do not exactly comply with the method stated in Part 97.311d. Implementing APC in a Wi-Fi device is probably beyond the capability of most amateurs, but clearly needs to be examined if we are to take advantage of the higher power levels we are authorized to use.

Finally, remember that use under Part 97 must comply with *all* of Part 97, including station identification, no encrypted transmissions, no commercial uses, and controlled use. Station ID is the easy part. All 802.11 devices have a Service Set Identity, or SSID, which is broadcast by the Access Point to identify itself, and received by client devices where it is used to find the network they belong to. Because SSID is constantly sent as part of the overhead data stream, setting your callsign as the SSID should suffice as station identification.

You must also assure that non-amateurs cannot gain access to the network. Keep in mind that this is Part 15 consumer technology. Any 802.11 client device will be able to see any Access Point on the air and can try to log onto it. Access control can be accomplished using MAC filtering. This feature is available in some Access Points, and allows you to limit service to known MAC addresses. To use it you would load the MAC addresses of your amateur users into the Access Point.

Probably the most onerous of the Part 97 rules relates to the no commercial content provisions of Part 97. Based on these restrictions, it would be impossible to legally connect your Part 97 compliant network to the Internet, due to the amount of commercial content and pop-up ads that appear, even when you yourself are not using the site for commercial purposes. Even e-mail can contain automatically inserted commercial messages over which the sender has no control.

I'm sure there are other Part 97 issues that will need to be addressed in order to legally use the available equipment. Apparently other amateurs have realized this, too. While researching this article, I discovered that the ARRL is supporting a project called Hinternet, for Ham Internet. Its initial focus is on the utilization of 802.11 products under Part 97 rules. They are currently working on legal and technical issues associated with Part 97 use of 802.11. Their web page is <http://www.arrl.org/hsmm/>. Hopefully by the time this article is published this group will have made some headway on the legal questions as well as set forth some technical standards that will assure peaceful coexistence with the numerous Part 15 devices already in service.

Therefore, while Part 97 use is feasible and can provide extensive coverage from a single site, it is fraught with restrictions that significantly limit the appeal of doing so. Without the ability to provide Internet access, Part 97 use will be limited to allowing amateurs to network their computers together to do file sharing and private messaging between them.

Let's Build a Wi-Fi Network

In Part II of this article we'll look at all the considerations that go into designing and building a Wi-Fi network, whether it's for "regular" Part 15 use or amateur Part 97 use. We'll examine 2.4 GHz propagation, path-loss considerations, and options for various setups. Until then, think about how you would use your Wi-Fi network and whether Part 97 or Part 15 will best serve your needs.■

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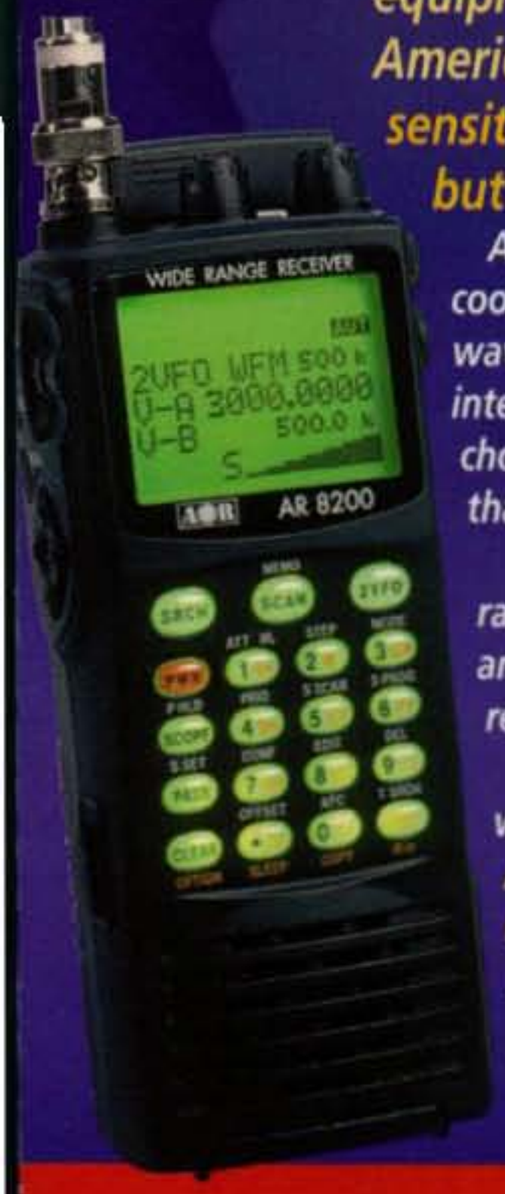

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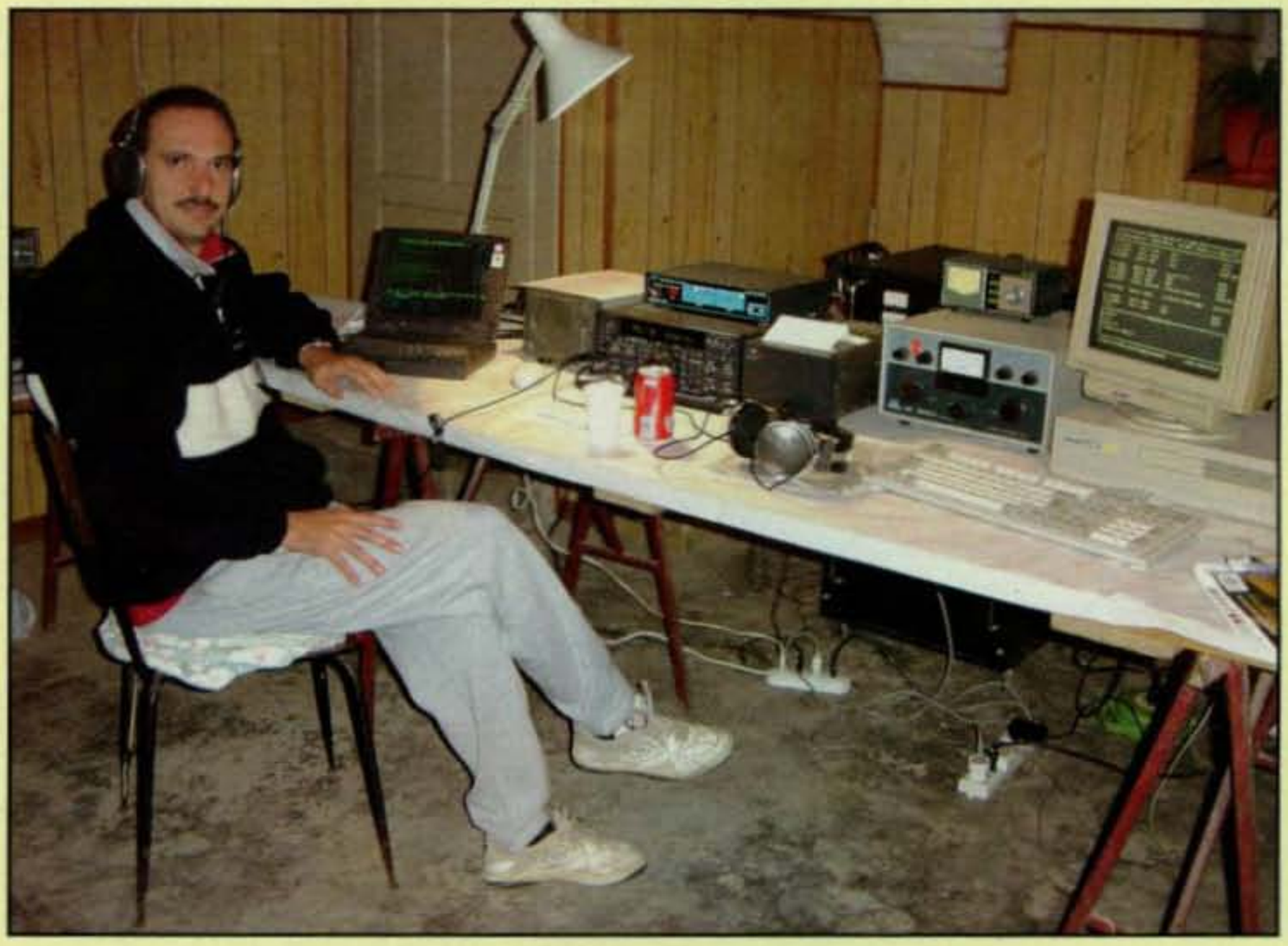
Results of the 2002 CQ/RJ WW RTTY DX Contest

BY GLENN VINSON, W6OTC,* and JOE WITTMER, K9SZ†

The 16th Annual CQWW RTTY Contest, sponsored by *CQ* and *The New RTTY Journal*, was held September 28–29, 2002 with solar Cycle 23 now clearly in decline. Nevertheless, geomagnetic conditions were generally good, with the low bands beginning to show more activity. More than 800 logs—the largest participation in any RTTY contest—were submitted, and many new regional and world records were set, including Single Operator (SO) 10 meters, SO 15 meters, SO 20 meters, Single Operator Assisted (SOA), and Multi-Operator Two Transmitter (M2). These records show, in part, how much interest in this contest continues to grow, as well as the on-going improvement in contesting skills among RTTY operators. Single ops now must make at least 3 million points to win any multi-band class, and multi-op stations must exceed 6 million points in most categories to be competitive.



Forty meter Italian powerhouse Mario, IK1HXN.

Single Operator

Single Operator, Low Power (SOL). Jacobo, P43P, was back this year and won SOL with 4,857,890 points (2725 QSOs, 599 multipliers). This class always has the most entries and is quite competitive. However, from his great P4 location, Jacobo is very tough to beat. Barry, W2UP, repeated as second in the world and North American champion, beating his own NA record set in 2001 and establishing a new NA SOL record of 3.2 million points (2015 QSOs, 627 mults), an excellent low power score from the U.S. Repeating as world third was ZX2B (Op.: PY2MNL), who scored 2.3 million points (1683 QSOs, 470 mults). Scoring close behind and placing world fourth and fifth from Asia and Europe, respectively, were UA9CDV and RU3QW.

Single Operator, Assisted (SOA). Increasing his score by 50% over 2001 (when he was world third), DL5AXX set a new SOA world record with an impressive score of 3,770,340 points (2212 QSOs, 658 mults). World second was well-known contester JH4UYB, just missing the Asia record, while scoring a fine 2.95 million points (1856 QSOs, 559 mults). Third was RN6BN, with 2.7 million points (1886 QSOs, 583 mults).

Single Operator, High Power (SOH). The most interesting development in 2002 SOH was the conversion of Don, AA5AU, from low power to high power (see Soapbox, below). Instead of duking it out with W2UP in SOL, Don won World SOH and set a new NA SOH record, achieving a score of 3,669,860 points (2416 QSOs, 653 mults), a very big total from a 1-point location. Second in the world was RK4FF, who scored 3.3 million points (2323 QSOs, 596 mults). Setting a new Oceania SOH record, KH7X (Op: KH6ND) was world third with 3.2 million points (1925 QSOs, 551 mults), more than twice the old OC record established by 9M6BG.

Single Operator, Single Band 28 MHz (28). Ten meter scores bounced back from the 2001 dip with a new world record being set by LU1HF at 765,268 points (1429 QSOs, 181 mults), exceeding ZS6EZ's 2000 record of 692,346 points. Second was PJ2EL with 506,814 points. World third was 9A5Y (Op: 9A3MN), who set a new European record with a score of 474,220 points.

Single Operator, Single Band 21 MHz (21). On 15 meters, 9A5W continued his dominance by again winning first in the world and again establishing new world and Europe SO 21 records with a score of 648,740 points (1245 QSOs, 199 mults). UXØFF moved up from SO (3.5) class into world SO (21) second with an excellent score of 566,444 points. Third in the world was S55W (Op: S57IIO), scoring 537,894 points. Also notable was the new USA SO(21) record set by ARRL Headquarters station W1AW (Op: WS7I), with a score of 436,351 points.

Single Operator, Single Band 14 MHz (14). The old SO 14 world record, set back in 1997 by CT3BX, was broken this year by S50U, who scored 589,447 points (1270 QSOs, 179 mults). We will see how long this record stands. For example, 2001 world SO14 second, and 2000 and 1997 SO14 world winner 9A2DQ was again world second and very close behind S50U with a score of 542,520 points. In addition, world third, setting a new NA and VE record, was CK6WQ, scoring 508,432 points. As predicted last year, we are seeing more new records on this band as the solar flux continues to decline.

Single Operator, Single Band 7 MHz (7). Every year we mention how tough 40 meters and 80 meters are in the RTTY World-Wide contest, partly because of different frequency allocations in different parts of the world and partly because of QRN. Nevertheless, participation and scores on these bands continue to improve as the solar cycle winds down. As in the past, European entries were dominant on 40 meters, with S50A winning the world at 243,243 points (710 QSOs, 143 mults). World second was UT2II with

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The motto of Kari, OH2BP, is "Life is for RTTY contesting!"

World Single Op. High Power champion Don, AA5AU.

157,480 points, and world third was IK1HXN at 133,200 points.

Single Operator, Single Band 3.5 MHz (3.5). Eighty meter scores continue to increase year to year, with S57AW winning this year at 99,693 points (471 QSOs, 99 mults). In second place, as he was last year, was S54E with 70,778 points, while 9A7R was third with 62,175 points.

Multi-Operator

Multi-Operator Two Transmitter (M2). This was the second year the M2 class has been run in CQ/RJ RTTY WW. As in 2001, the largest score for this contest in any class was achieved in M2 and by HC8N. The 2002's HC8N crew (Ops: N5KO, K6AW, AD1C) made 10,642,238 points (4576 QSOs, 782 mults), which is the second highest score ever made in any class in this contest, behind only the MOM results of HC8N in 1999. World second this time in M2 was the veteran RTTY contesting team at RU1A (Ops: RA1ACJ, RA1AR, RN1AM, RW1AC, UA1AKC, UA1ARX, Yuri), who established a new Europe record with 6,541,992 points, exceeding even their 1999 Europe record in MOM class. Close behind in third place was the always-welcome multiplier RW2F (Ops: UA2FZ, UA2FF, UA2FB, RN2FA) with 6,314,121 points. KI1G (Ops: KI1G, WF1B, K1AM) moved from SOA class to win world fourth, setting new NA and USA records with 5,865,985 points.

Multi-Operator Multi-Transmitter (MOM). The number of entries in MOM has started to increase again, with good entries from around the word. This time LY5A (Ops: LY2PAJ, LY1BA, LY2BIG, LY2GV, LY2TA, LY2IJ, LY3MM) was the world winner, beating RW2F's 1999 European record with 7,813,428 points (4,052 QSOs, 764 mults). World second was YL8M (Ops: YL2KL, YL3GDJ, YL1ZF, YL2KF), scoring 5,036,862 points. Returning for the second year as world third, but scoring almost twice as many points as in 2001, was KA4RRU (Ops: KA4RRU, W4DC, N4DXS, W4MGM, W4DAV, WA4TK, WB4ZNH, KR4KF, N3YBY, N8CIA, KG4QWQ, KG4JDL), making a fine score of 4,408,870 points. Very close behind from Asia was JE3VVM (Ops: JI3OPA, J34VVM, JG4CLV, JN4FEU) with 4,336,714 points.

Multi-Operator Single Transmitter, High Power (MOH). The largest number of multi-op entries has always been in the MOH class. The winner in 2002 included two operators from last year's HO1A group, but they operated this time under the callsign of HP1XVH (Ops: DJ7AA, DL4LQM, DL5LYM,

2002 CQ/RJ WW PLAQUE SPONSORS AND WINNERS

Single Operator High Power

World: Sponsored by HAL Communications Corp. Winner: **Don Hill, AA5AU**
N.A.: Sponsored by W2JGR. Winner: **George Johnson, W1ZT**
USA: Sponsored by K7VS. Winner: **Mike Sims, K4GMH**
S.A.: Sponsored by HC8N. Winner: **ZW5B (Op: Walter Skudlarek, DJ6QT)**
Oceania: Sponsored by: N6TQS. Winner: **KH7X (Op: Michael Gibson, KH6ND)**
Europe: Sponsored by K9JY. Winner: **Vlad Zaitsev, RK4FF**
Asia: Sponsored by W6RLL. Winner: **UP5P (Op: Romeo Y. Loparev, UN5PR)**

Single Operator Low Power

World: Sponsored by *The New RTTY Journal.* Winner: **Jacobo Oduber, P43P**
N. A.: Sponsored by *CQ* Magazine. Winner: **Barry Kutner, W2UP**
USA: Sponsored by WØETC. Winner: **Michael D. Lonneke, WØYR/4**
S.A.: Sponsored by N6TQS. Winner: **ZX2B (Op: Wanderly F. Gomes, PY2MNL)**
Africa: Sponsored by W6RLL. Winner: **Laguna Juan Jose, EA8AKQ**
Europe: Sponsored by AA5AU. Winner: **Yuri K. Ragachov, RU3QW**
Asia: Sponsored by KD6WW. Winner: **Oleg Usov, UA9CDV**
Oceania: Sponsored by NH7C. Winner: **9M6LSC (Op: Shunichiro Wakiyama, JH7IMX)**

Single Operator Assisted

World: Sponsored by W2UP. Winner: **Ulf Ehrlich, DL5AXX**
USA: Sponsored by K4WW. Winner: **Ron St. Laurent, ND5S**

Single Operator 21 MHz

World: Sponsored by KK5OQ. **Winner: Nikola Percin, 9A5W**
N.A.: Sponsored by Eastern Washington Amateur Radio Group. Winner: **W1AW (Op: Jay Townsend, WS7I)**

Multi-Op Single Transmitter High Power

World: Sponsored by WA6BOB. Winner: **HP1XVH (Ops: DJ7AA, DL4LQM, DL5LYM, HP1XVH)**

Multi-Op Single Transmitter Low Power

World: Sponsored by KP2N. Winner: **HG1S (Ops: HA1TJ, HA1DAE, HA1DAC, HA1DAI, HA1AG)**
N.A.: Sponsored by K1TTT. Winner: **KP2D (Ops: KP2N, NP2W, NP2DJ, NP2DZ, KP2VI, W5TTY)**
USA: Sponsored by *CQ* Magazine. Winner: **K1TTT (Ops: K1TTT, W1TO, WM1K, K1MK, KE1FO, N1XS, KM1P)**
Europe: Sponsored by K1TTT. Winner: **Z37M (Ops: Z31GX, Z32PT, Z33F, Z36W, Zoran)**

Multi-Op Two Transmitter

World: Sponsored by WA9ALS. Winner: **HC8N (Ops: N5KO, K6AW, AD1C)**
N.A.: Sponsored by W6OTC. Winner: **KI1G (Ops: KI1G, WF1B, K1AM)**

Multi-Op Multi-Transmitter

World: Sponsored by KA4RRU. Winner: **LY5A (Ops: LY2PAJ, LY1BA, LY2BIG, LY2GV, LY2TA, LY2IJ, LY3MM)**

The P43P contest battle station.

The KA4RRU contest group (left to right): KA4RRU, W4MGM, W4DC, W4DAV, N4DXS, N3YBY, KG4JDL. (Members of the group not pictured: WA4TK, WB4ZNH, KR4KF, N8CIA, KG4QWQ.)

HP1XVH). This group of operators pushed the NA record up to 6,003,315 (3127 QSOs, 639 mults), beating the 2001 HO1A record and again dominating this class from Panama. Moving up from fifth place in 2001 to second this time and setting a new Europe record was OM5M (Ops: OM3RG, OM2RA, OM2KW, OM4DW), with 4,274,004 points. Showing how tough the MOH competition was, RW9C (Ops: UA9CGA, RW9CF, RU9CK, RA9DK) also beat the old Europe record, increasing their score by 600,000 points from 2001, but still dropping from world second to world third place, with 3,810,276 points. Again the 1999 KH7R Oceania (2.6M points) and 1996 TY1RY Africa (2.7M points) MOH records survived the competition this year. Will someone challenge these old records in 2003?

Multi-Operator Single Transmitter, Low Power (MOL). The second largest multi-op category has always been MOL, and this time several new records were set. HG1S (Ops: HA1TJ, HA1DAE, HA1DAC, HA1DAI, HA1AG) won world first and established a new Europe record with a score of 3,458,924 points (2062 QSOs, 644 mults). With core team members from Z30M, the former European MOL record holder, and from last year's first-place Z37GBC team, Z37M (Ops: Z31GX, Z32PT, Z33F, Z36W, Zoran) also beat the old record but still came in world and Europe second with 3,193,320 points. World third, with a new NA record, was KP2D (Ops: KP2N, NP2W, NP2DJ, NP2DZ, KP2VI, W5TTY) scoring 2,654,232 points. K1TTT (Ops: K1TTT, W1TO, WM1K, K1MK, KE1FO, N1XS, KM1P) also beat the old NA record, but had to settle for a new USA record in world fourth with a strong 2,592,148 points.

Summary

This RTTY contest remains "The Big One," with more entries, more contacts, more mults, and more action than any other RTTY contest. To check all-time CQ/RJ WW RTTY Records, see <www.rttyjournal.com/records/cqww.html>, originally compiled by Eddie, W6/GØAZT, and now maintained by Joe, K9SZ. For comments from participants, see the Soapbox below.

We continue to progress with the electronic submission of logs, with approximately 97% of all logs (and 100% of competitive logs) submitted via e-mail to <rtty@cqww.com>. However, some participants continue to have problems with recording the required exchanges (for example, including state/province information) and in submitting logs in proper Cabrillo format. Around 250 logs required "massaging" by Joe, K9SZ, prior to being submitted into the master log-checking process. As in 2001, we received a large number of check logs which were very helpful for log-checking. Thanks to all who submitted these logs.

(Continued on page 107)

TOP SCORES

Single Op High Power

AA5AU	3,669,860	UP5P (Op: UN5PR)	2,992,550
RK4FF	3,266,080	MQ5DX	2,849,672
KH7X (Op.: KH6ND)	3,157,781		

Single Op Low Power

P43P	4,857,890	UADCDV	2,223,872
W2UP	3,223,407	RU3QW	2,201,685
ZX2B (Op: PY2MNL)	2,331,670		

Single Op Assisted

DL5AXX	3,770,340	RW9WA	2,655,248
JH4UYB	2,948,725	ON4UN	2,516,778
RN6BN	2,689,379		

Multi-Op Single Transmitter High Power

HP1XVH	6,003,315	MW2I	3,808,949
OM5M	4,274,004	W2FU	3,787,964
RW9C	3,810,276		

Multi-Op Single Transmitter Low Power

HG1S	3,458,924	K1TTT	2,592,148
Z37M	3,193,320	YL7C	1,840,035
KP2D	2,654,232		

Multi-op Two Transmitter

HC8N	10,642,238	KI1G	5,865,985
RU1A	6,541,992	3Z7TTY	5,343,855
RW2F	6,314,121		

Multi-Op Multi-Transmitter

LY5A	7,813,428	JE4VVM	4,336,714
YL8M	5,036,862	EN7Z	4,126,348
KA4RRU	4,408,870		

Single Operator

3.5 MHz

S57AW	99,693	OK2CLW	41,139
S54E	70,778	SP7ITT	39,772
9A7R	62,175		

7.0 MHz

S50A	243,242	DF8QB	120,726
UT2II	157,480	4Z8EE (Op: KI7T)	104,439
IK1HXN	133,200		

14 MHz

S50U	589,447	MØBEW	390,432
9A5DQ	542,520	SP4TXI	311,213
CK6WQ	508,432		

21 MHz

9A5W	648,740	SP5GRM	525,546
UXØFF	566,444	T94MZ	449,648
S55W (Op: S57IIO)	537,894		

28 MHz

LU1HF	765,268	CX5BW	441,524
PJ2EL	506,814	9A5E	436,450
9A5Y (Op: 9A3NM)	474,220		

What You've Told Us...

Our March survey asked about operating awards, and while more than half of you (56%) said you do **not** consider yourself to be an award-chaser (40% said yes and 4% had no opinion), a nearly equal number of you have at least one operating award: 55% of you hold the Worked All States award, followed by 49% with DXCC (DX Century Club), 46% with Worked All Continents, and 23% with Worked All Zones. After that it drops off sharply, with 11% holding CQ's WPX (prefixes) award, 10% with the CQ DX award, 9% with the USA-CA (counties) award, 7% with the "Worked 100 Nations" (W-100-N) award, and 6% each with VUCC (VHF/UHF Century Club) and IOTA (Islands On The Air) awards.

Awards and award-chasing are considered an important part of amateur radio, even by many of you who don't consider yourselves to be award-chasers, with 68% agreeing with that statement, 25% disagreeing, and 6% with no opinion. Those of you who have reached the top level of an operating award (honor rolls, etc.) are an elite few—only 16% of those responding to the survey have achieved this goal with at least one award; 74% have not; and 6% don't keep track.

The greatest number of you (34%) uses a variety of operating methods and activities to make contacts needed for award credit. Among the other options for a primary method of making these contacts, 16% of you said general operating; 13% said contests; 4% rely on DX clusters via the internet (2% prefer clusters via radio); 3% DXpeditions; and 1% each depend on DX award nets and "other" to snag those contacts.

Finally, a majority of you (53%) rely on magazine award columns to inform you about available awards, followed by 32% who say they don't chase awards, then by 8% "other," 7% World Wide Web, 5% other hams/off-air, and 3% other hams/on-air.

This month's free subscription winner is Reginald Mackey, K6XR, of Bakersfield, California.

Reader Survey May 2003

We'd like to know more about you—about who you are, where you live, what kind(s) of work you do, and of course, what kinds of amateur radio activities you enjoy. Why? To help us serve you better.

Each time we run one of these surveys, we'll ask a few different questions and ask you to indicate your answers by circling numbers on the Survey Card and returning it to us. As a bit of an incentive, we'll pick one respondent each month and give that person a complimentary one-year subscription (or subscription extension) to *CQ*.

Since this month's issue is a mobile special, we wanted to learn more about your mobile operating habits.

Please indicate... **Circle Survey Card #**

1. ... whether you operate amateur radio from any non-fixed location:
   - Yes 1
   - No 2

Please answer the remaining questions only if you answered "yes" to Question 1.

2. ... the approximate percentage of your operating time away from a fixed location:
   - 0–25% 3
   - 26–50% 4
   - 51–75% 5
   - 76–99% 6
   - 100% 7

3. ... which bands you operate while mobile (select only one):
   - HF only 8
   - VHF/UHF only 9
   - HF and VHF/UHF 10

4. ... which modes you operate while mobile (select all that apply):
   - FM voice 11
   - SSB voice 12
   - CW 13
   - Digital (other than CW) 14
   - Amateur TV 15
   - Other 16

5. ... where you operate while mobile (select all that apply):
   - In a car or other passenger vehicle 17
   - In a truck or other commercial vehicle 18
   - On a bicycle 19
   - On a motorcycle 20
   - On a boat/ship 21
   - On a bus or train 22
   - On an airplane 23
   - On horseback or other live transportation 24
   - While walking on roads/streets 25
   - While hiking on trails, etc. 26

6. ... whether your mobile station is (select all that apply):
   - Permanently installed in a motor vehicle 27
   - Temporarily installed in a motor vehicle 28
   - Permanently installed on a bicycle 29
   - Temporarily installed on a bicycle 30
   - Handheld 31
   - Backpack-carried 32
   - Other 33

Thank you for your responses. We'll be back with more questions next month.

public service

BY BOB JOSUWEIT,* WA3PZO

Hams Help Support the Troops

It's mid-March. Word comes of military action taking place in Iraq. Many Americans are glued to their television sets to watch news reports from the journalists embedded with the troops on the front lines. Many others turn to their radios to find out the latest and offer to help support U.S. troops should the need arise.

First Reports from the War Zone

One of the first amateur radio contacts was between a ham in Nashville, Tennessee and one in the small island nation of Bahrain, just south of Kuwait. During the first Gulf War Bahrain was attacked by Iraqi scud missiles.

Tom Delker, K1KY, spoke to Tom Wright, NN2X/A9, an American satellite and communications engineer supporting the U.S. military in the Middle East. The contact was not direct between the two stations, but was made using a combination of satellite and Internet technology to get his signal to London. Delker says the contact was on 18 MHz from Nashville to the W7DXX remote base located in Boston. The contact from Boston to London was via the Internet.

This may seem like an indirect route for a contact when 20 meters would have worked. However, it was done for safety's sake. "Apparently, in 1991 Saddam's troops would lock onto radio signals, any radio transmissions, and target them," said Delker. "So they would fear for their life just by turning the transmitter on and being a target for a scud missile."

A few days after the 1990 invasion by Iraqi forces into Kuwait, local amateurs started setting up secret stations around the country. Members of the Kuwait Amateur Radio Society began to communicate with the world and with the Kuwaiti government in exile. Their work became dangerous as Iraq began hunting local amateurs to keep information from getting out of Kuwait. The society issued warning notices to amateurs to work very carefully. The word got out to hams in Dubai, Cairo, Geneva, and London.

Wright commented that people in Bahrain were experiencing the aftermath of the oil fields burning in southern Iraq. "They were able to smell the oil fields, and of course the smoke; it was visible and they could smell the oil fields burning." Delker hopes to have a contact with Iraq after the war. "It'll be some of the details that you may not hear over the news—the human aspect, the personal aspect of it."

Supporting the Troops

Amateur radio groups around the country and members of the Military Affiliate Radio System

Tom Delker, K1KY, makes contact with NN2X/A9 from the shack of W1KLM. (Photo courtesy Kevin Matheny, W1KLM)

(MARS) immediately went into action to help support the troops and their families. All branches of the military are served by the three MARS programs (Army, Air Force, and Navy/Marine Corps). There are approximately 2600 operators in Army MARS alone. Family members are able to send MARS messages to the troops overseas. The messages eventually reach the soldier's military postal address.

During the 100 hour Desert Storm War in 1991 over 7000 radiograms were passed. Even with the availability of e-mail and some telephone service, MARS members are expecting to handle messages in greater numbers once the troops stop their rapid forward progress in the combat zones.

In some areas of the United States amateur radio operators set up special-event stations to either let the public talk to members of the military or to send messages to the troops. In March the Allen County Amateur Radio Technical Society, KB9DGH, set up a station at a Rally for America in Auburn, Indiana. The rally in support of those serving in the military was attended by some 20,000 people and featured many national celebrities.

Emery McClendon, KB9IBW, organized the special-event station after hearing Glenn Beck make a plea over his national radio show for a way to get the word out to our troops live that America supported them. Emery called the local station, WOWO-AM, and presented the idea of having an amateur radio station on hand to call for military QSOs during the rally. People who attended were also given the opportunity to talk to members of the Armed Forces at Keelser Air Force Base in Mississippi. According to McClendon, the amateur radio station was a big hit at the rally. It was fea-

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

Emery, KB9IBW, allows a rally attendee to make a QSO with Keesler AFB. (Photo courtesy KB9IBW)

tured on two local radio stations, a TV station, and in the local newspaper.

McClendon is already working on an even bigger hit for ham radio. He has been asked to have an amateur radio exhibit at a National Rally for America to be held on the Mall in Washington, D.C. "As part of the rally, a QSO will be presented over the public-address system for all who attend to hear," says McClendon. "This will be a big media boost for amateur radio, as this rally will be on worldwide television and radio."

In Missouri

In Jefferson City, Missouri ham radio operators also set up a station on the south lawn of the state capitol to send messages to the troops. Cole County ARES Emergency Coordinator Kevin Brown, KCØCZI, said members of the public could send the messages during the "Support Our Troops" rally. During the rally ARES members accepted the messages and sent them via a VHF packet link to an Army MARS operator who refiled them into the MARS network.

MARS Helps Military Call Home

While interest is focused on the Middle East, MARS members have also been able to provide a link home from the jungles of Belize, in Central America. Basic Field Day type training proved to work well in the jungle. At Base Camp Iceberg, Belize, the radio operators used duct tape to help support an inverted-Vee dipole that was mounted on a standard military mast. There wasn't anything fancy about the antenna except that it worked for Lt. Col. Darrel Wyatt's Army MARS station linking the 73rd U.S. Army Field Hospital Belize Detachment with its home base in St. Petersburg, Florida. The antenna had to fit in a duffel bag. There was no room for fancy antennas. During the station's maiden deployment in February the station handled priority resupply traffic plus phone-patch connections by the dozens between the deployed troops (predominately called-up reservists) and their families back home.

Charles Golden, NØROK; Missouri Representative Ike Skelton; James Kovar, KCØHOS; and Steve Morse, KBØOXU. Amateur radio operators discuss the capabilities and participation in the rally with Missouri Representative Skelton. (Photo courtesy KCØCZI)

Lt. Col. Darrel Wyatt monitors MARS operations from Camp Iceberg. (Photo courtesy Florida MARS)

Delaware County, PA ARES member Dan McMonigle, N3IXQ, tests out the EOC radio for Field Day. (Photo courtesy Joe Rzucidlo, K3CGA)

The soldiers' mission in Central America was humanitarian, with an overtone of preparedness for war. The 73rd provided medical care for Task Force Jaguar, an engineer team drawn from the Army, Air Force, Navy, and Marine Corps building community facilities for the impoverished population. Its medics also brought unfortunately rare health care to villages nearby.

Wyatt is a physician in the civilian side of his life (based in Crystal River, Florida) and a 33-year veteran in the Army reserves. He's also an Extra Class amateur radio operator known to Florida MARS by the military callsign AAV4FB, and the billet assignment of state MARS recruitment coordinator on the staff of state MARS director Bert Fow, AAA4FL.

Among the first messages handled was a MARSgram to Wyatt's friend and fellow MARS member Becky Norman, AAV4FN, back in Crystal River: "All arrived safely. No landline. No e-mail. In case of emergency send MARS priority." Becky Norman responded to the MARS operator relaying it: "Roger. Thank you, thank you, thank you."

While Belize was getting on the air, MARS phone-patch stations back in the United States went on watch to handle contacts with families back home. Operators in nearly a dozen states assisted with the calls as propagation changed. When veterans and friends in Ocala, Florida, site of Florida MARS phone-patch station AAR4CSS, heard of the operation, they began contributing phone cards to help pay for the long-distance connections within the U.S.

Army MARS Chief Bob Sutton was quick to congratulate Wyatt and his Belize crew, as well as the stateside members who worked with them. "For all of those who were/are involved, our hats are off to you," Sutton declared in his weekly broadcast. "Thanks for a job well done."

After a week Wyatt set about training fresh operators to keep the station going after his rotation home. This was on top of supervising erection of the portable hospital and providing medical care for the engineers, whose work can be dangerous.

Later, back home, Wyatt described the operation: "Base Camp Iceberg started with an empty field," he said. "No electricity, no water, no phone, no fence. Plenty of bugs, including very large scorpions! There was one small boa constrictor. . . . On rotation one, our principal duties were to establish the base camp, including the hospital. This included the establishment of water, power, and security for the site, along with sleeping quarters and the hospital. The Belize camp had representatives from all of the Armed Forces. Members lived across the country, from North Carolina to California."

To keep everyone in contact with home, Wyatt had a Kenwood TS-450S, an Ameritron 811 amplifier, and a 3 KW MFJ tuner. Power came from the hospital's two 100 KW generators. "The linear's relay circuit was inoperable upon arrival, so we did not have a functioning amplifier," Wyatt said. "Still, we had particularly good propagation to Tennessee, Missouri, New York, and Pennsylvania. Propagation was less reliable to Florida. Air Force MARS was very supportive as well."

It certainly enhanced MARS visibility in the regular armed forces. Among visitors to the station during its first couple of weeks on the air was Army Gen. James T. Hill, commander of the Southern Command, which embraces Army, Navy, and Air Force units guarding the U.S. southern flank.

Field Day–EOC Style

In just a few days amateur radio operators will be participating in one of the most popular annual operating events, Field Day. This year on June 28–29, radio signals will be heard from over 2000 stations that have set up in a field, a park, or other outdoor location. However, there will also be a new type of Field Day operation, with a new category established for stations at Emergency Operations Centers around the country. According to the ARRL, the change renews the emphasis on Field Day's 1933 origins as an emergency-preparedness exercise as opposed to a routine contest—what former ARRL Communications Manager F. E. Handy, W1BDI, called "a test of the emergency availability of portable stations and equipment." In Handy's view, Field Day would focus attention "on the subject of 'preparedness' for communications emergencies."

ARRL Contest Branch Manager Dan Henderson, N1ND, says, "This is a major change. Class F has been established to encourage groups to test and further their working relationships with established emergency operations centers." According to the Field Day rules, a Class F entry station must set up at an "established EOC" activated by a club or non-club group. An EOC is defined as a facility established by a fed-

eral, state, county, city, or other civil governmental agency or administrative entity or by a chapter of a national or international served agency. The latter could include the American Red Cross or The Salvation Army, with which the Field Day group "has an established operating arrangement." Class F EOC operation must take place in cooperation with the EOC staff.

In addition, the rules enhance the bonus for having an invited official visit the Field Day site. "Previously, you got a 100-point bonus if your site was visited by an elected governmental official or an invited representative of a served agency," Henderson said. "We have separated the two into separate bonus categories—100 points for the elected official and a separate 100 points for a representative of a served agency."

The discussion about the new Class F has been interesting and probably fits according to the makeup of your group and the equipment available at your EOC. *One group* commented that Field Day is about going outside and having fun. The idea of sitting in a room in the basement of the EOC for 24 hours just doesn't seem like fun. Another concern was raised that this particular EOC was set up for local, state, and regional communications. There were no antennas for 10, 15, or 20 meters. Others indicate that this will be an opportunity to make sure that the gear is always working at the EOC. You don't want to find out that your antennas are bad on Field Day, so *you will* check them out more often. This means the equipment and antennas will be tested more often and be available when needed. A possible concern is that you will lose bonus points for operating off emergency power. The EOC may run on commercial power, and the generator would only be tested if the entire building was placed on emergency power.

With bonus points being available for sending messages, EOC operators will have more of an opportunity to pass up to ten messages between local and state EOCs, as well as one to your ARRL Section Manager or Section Emergency Coordinator. You may also be able to attract news media attention by having the EOC show a group of volunteers testing emergency communications.

A completely different thought process is to have EOCs participate in their local state QSO Party. Most state QSO Parties are based on making contacts with hams in other counties within your particular state. An EOC should be interested in making sure it can contact other counties in its state and hams in other nearby states. Still others who handle a lot of local VHF communications may be interested in two contests held in the Philadelphia and Pittsburgh areas where the object is to work as many Zip Codes as you can in a four-hour window.

There isn't a right or wrong answer to which is the best type of Field Day operation for your group. It's important to evaluate the communications needs from each EOC and train accordingly. It might be beneficial to have your group operate from the EOC and also test field preparedness. Let us know what works for you.

It's a Wrap . . .

In our February column we questioned the status of the Memorandum of Understanding (MOU) between the ARRL and FEMA, the Federal Emergency Management Agency, since the MOU hadn't appeared on the ARRL web page for almost a year. We're happy to report that by mid-March information on the ARRL/FEMA MOU reappeared on the ARRL website. According to the ARRL, the MOU has been in place since 1984. The site indicates that the ARRL staff meets periodically to review RACES and other issues with their FEMA counterparts in Washington, D.C. "An updated MOU draft is currently on the table. This version incorporates minor editorial, non-substantive changes. The MOU is in the process of re-execution to reflect these changes."

In our April column we listed a call incorrectly. Chuck Marble, KE6OAG, was responsible for giving us some early insight into the *Columbia* tragedy from his location in California. Our apologies to Chuck for flipping the letters in his call.

Finally, we couldn't present the interesting stories we do without your help. Many individuals mentioned in the column helped us tell the story of amateur radio operators performing a public service. If you have an interesting story to share, drop us a note. Until next time.....

73, Bob, WA3PZO

beginner's corner

BY WAYNE YOSHIDA,* KH6WZ

Always the 4th Weekend in June

Since 1933, radio amateurs have reserved the fourth full weekend in June for the biggest and most fun ham radio operating event of the year—ARRL Field Day. Field Day (FD) is a communications exercise for the U.S., Canada, and recently the rest of the Americas, in which demonstrating emergency communications is the main goal. You can participate with a club or group, or you can get together with a bunch of ham-friends and create an FD team of your own. Some folks even go at it all alone. In 2002 the ARRL headquarters Contest Branch received nearly 35,000 Field Day entries. That's a lot of stations!

One of the most popular entry classes is low-power transmit running on 100% emergency power. Bonus points are awarded to those participants who maximize the spirit of the drill. Some easy-to-get bonus points include newspaper, radio, and television publicity; a site visitation by a government official; the use of unusual communications modes such as amateur TV; and the use of "natural and clean" power sources such as solar or wind power.

FD is an excellent time to test a new antenna idea, a new accessory, or a brand-new rig. Especially for hams who live in antenna-restricted situations (like me), it's a chance to erect an antenna – or multiple antennas – and operate your radios in a showing of emergency preparedness. It is also an excellent time for beginners to learn lots of stuff in all aspects of hamming, from station setups to operating techniques, and especially how to deal with problems in the field.

Another plus for beginners is that you may be able to operate on the higher class bands if an appropriate Control Operator is present. The same applies to your non-ham friends and family as well. (See FCC Rule 97.3 on Control Operators and 97.3, 97.115 on Third Party Operations.)

Fun and Funny—It's All Good

I have organized, operated, and visited a number of Field Day events over the years. I have fond memories of each and every one of them.There was the time we thought 10 meters was completely dead, only to find out at the end of the event that the coax to the 10 meter dipole was attached to the wrong antenna . . . and the time we raised a very big tri-bander up a non-crank-up tower and forgot to connect the coax . . . and the time the sprinklers turned on in the middle of the night. Then there was listening on 160 meters with a Beverage antenna . . . setting up a small "tent city" near The Quad on the UCLA campus . . . the first time we used a computer for logging and duping . . . finally working Vermont, New Hampshire, and Rhode Island all in one weekend . . . building a wire and PVC-pipe beam antenna that actually worked . . . getting excited about copying the W1AW Field Day bulletin . . . seeing all the strange and unusual bugs on the mosquito netting late at night on a farm someplace in the Pocono Mountains in Pennsylvania . . . repairing the driven element on a tri-band beam with rope, wire, and a pine-tree branch. I am sure other Field Day vet-

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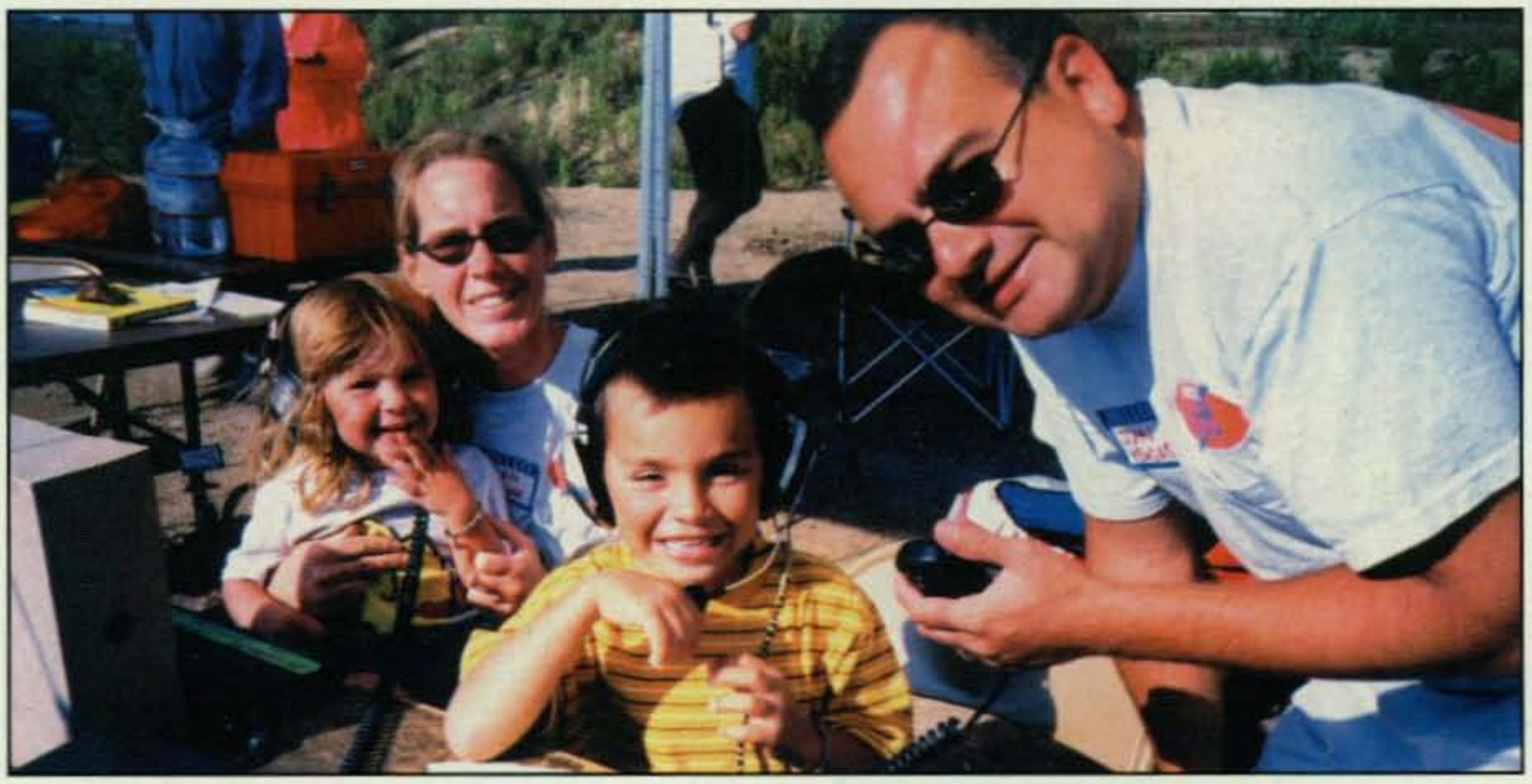

Field Day is an operating event that can be fun for the entire family. Here the Cerecedes family enjoys a shift on 20 meters SSB. Left to right: Pilar, age 3; Margret, KE6OAR; Nolan, age 6; and John, KE6OAQ.

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erans have similar and maybe even funnier stories to tell.

Whatever You Want

Your Field Day event can be serious, fun, or whatever it is you want it to be. As long as it is safe and obeys all radio regulations, there are an almost endless number of FD themes that hams follow each year.

Speaking of safety, remember that Field Day is usually done in unusual places, sometimes very far away from home. There will be gasoline-powered generators and fuel storage, creating possible fire hazards. Radio energy all around the site may create possible radiation issues. There will be danger from high voltages. Antenna guy wires, power cables, and tent guys can create "trip hazards." Everyone must take every precaution to establish a safe installation and operate with common sense and respect. Have fire extinguishers and first-aid kits, and appoint a Safety Officer for your operation to help prevent small accidents from becoming major disasters.

Getting Excited

Although Field Day is fun in and of itself, sometimes groups or clubs need something to "jump start" or "renew" enthusiasm. Here are some ideas that may make your FD event more fun:

Maximum Publicity: Set up your event in a public place such as a shopping mall, either in the parking lot or even inside. Write up a good news release, and make sure you have a Public Information Officer to handle questions from the media. Be prepared with hand-outs about ham radio and Field Day, as well as information on your club and upcoming licensing classes.

Maximum Bonus Points: Strive to achieve all 13 possible bonus-point categories: One Hundred Percent Emergency Power, Media Publicity, Public Location, Public Information Table, Message Origination to Section Manager, Message Handling, Satellite QSO, Alternate Power, W1AW Bulletin, Non-Traditional Mode Demonstrations, Site Visitation by an Elected Governmental Official, Site Visitation by a Representative of An Agency and GOTA (Get On-The-Air) station.

Maximum Number of QSOs: Take out your old FD logs, or look up your scores from the past. Beat that number.

Natural Power/Alternative Power: This could be very interesting. Try pedal- or human-power by attaching a generator to a bicycle or treadmill. You'll be able to make electricity and get a good cardio-vascular workout at the same time. If you are lucky enough to have running water at your site (no, not out of a faucet), try building a waterwheel and generate electricity from that.

VHF Only: Try FD operating only on 6 meters and up.

OSCAR Only: Similar to above, with satellites only.

Special Modes Only: A true challenge. Try FD using just SSTV, ATV, packet, RTTY, OSCAR, and anything but SSB, CW, or FM.

Homebrew Antennas Only: Another challenge—no commercially-made antennas or towers allowed.

Homebrew Radios Only: Similar to the above, perhaps a bit more difficult.

The Company Picnic FD: An emphasis on turning a ham radio thing into "quality family time" for the kids and spouses. Essentially like a company or church picnic, with raffles, group and team-building games, a cook-out, pie- and/or watermelon-eating contests, and oh, by the way, a ham radio setup for the emergency communications drill.

QRP FD: Another challenge. Use 10 watts or less and see what happens.

Random Thoughts

Establish some rules and etiquette for your FD operation. For example, no smoking except in designated areas. What do you do when the band is hot, the operator on duty is on a roll, and the QSO (contact) rate is high? Do you kick him or her off the radio because it is time for an operator shift change, or do you let the person continue so as not to disrupt the string of good luck and rhythm?

Did you know that Christmas lights can generate a lot of illumination, and they take a minimal amount of power? Also, if you get them on sale after the holiday season, you can save a lot of money. Besides, the lights will give your FD station a much more "festive" look at nighttime.

Burn some citronella and run a fan to keep flies and mosquitoes at bay. Use a DEET-based repellent. (DEET is N,N-diethyl-m-toluamide or N,N-diethly-3-methylbenamide.)

Do you have any young ladies (YLs) in your group? If so, definitely put them on a phone station. It never ceases to amaze me that the YL stations usually attract the most attention and bust through the pile-ups so easily.

Have a shaded break area with cool drinks and snacks someplace away from the radios and generator. This will be a good place to socialize and relax, and maybe even sleep.

Find some of the seasoned FD veterans who have patience and see if they wouldn't mind being radio tutors for the newcomers. This way, the art of radio communications can be passed on to the "next generation."

Finally, remember Murphy's Law: Anything that can possibly go wrong will. No matter how much you plan a Field Day operation, something strange and unexpected always seems to happen. Be flexible and ingenious to prevent a "visit from Murphy" or to minimize any problems that do crop up.

Field Day means many things to many people. It can be a very serious and competitive drill. It can be a fun and entertaining experience. It can be a teaching and learning event. It can be as fun (or funny) as a company picnic. FD is whatever you want it to be. It is all these things and more: It is an emergency preparedness exercise and a chance to expose the general public to the value of a highly trained, voluntary communications force. Are you QRV for FD?

73, Wayne, KH6WZ

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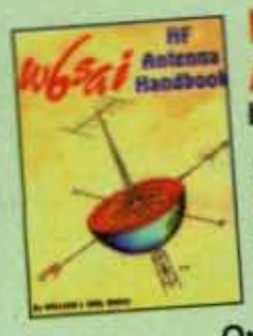

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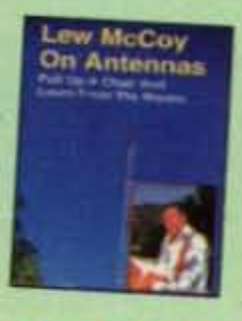

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math's notes

BY IRWIN MATH,* WA2NDM

Getting Started in THz Transmissions

As regular readers of this column know, last November and December we discussed laser safety and basic optical measurements. Those two columns were intended as a prelude for those wishing to investigate the properties of optical communications as it relates to amateur radio. Although short-range communications of all kinds at lightwave frequencies exist in the industrial marketplace (your IR TV remote control is only one example), amateur-radio-type operation is fairly new. It is an exciting mode of operation, however, and this month we will try to get you started with some very basic and low-cost equipment. How far you go after that depends on how much the following whets your appetite.

For simplicity, our light source for these initial efforts will be a common red laser pointer. Such devices have been advertised in many magazines and are now often available for under $10 if you do a bit of hunting. The laser pointer produces a concentrated beam of visible light and is ideal for "getting your feet wet," as it easily demonstrates the type of techniques you will be involved with in the THz region. Before turning on the laser pointer, however, be sure to re-read the November column, and no matter how tempted you may be, ***never, never look directly at the beam from the laser or from a reflection of the beam from a shiny surface!*** Although some laser pointers claim to be

*c/o CQ magazine

Fig. 1– A 454 THz CW transmitter.

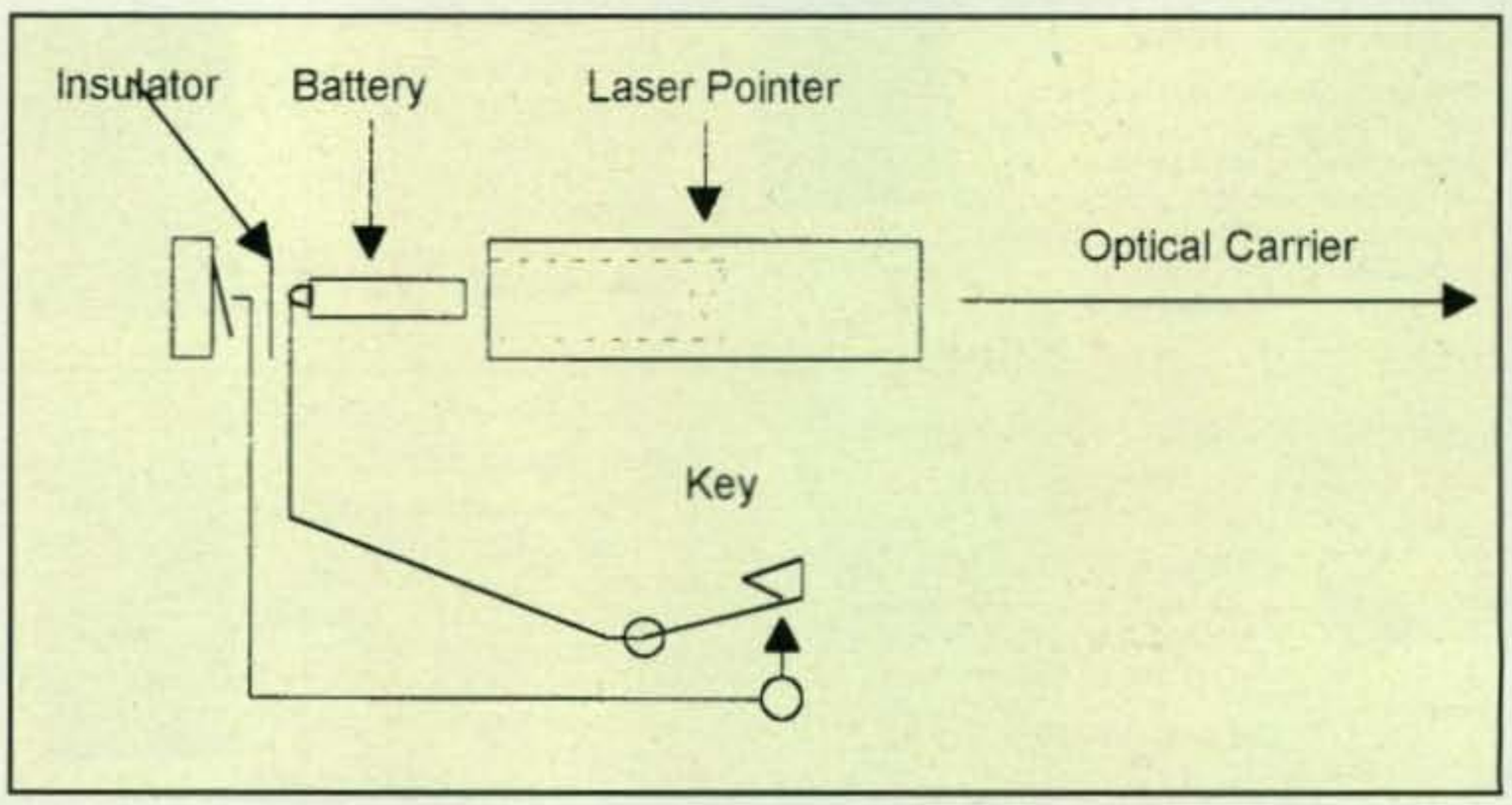
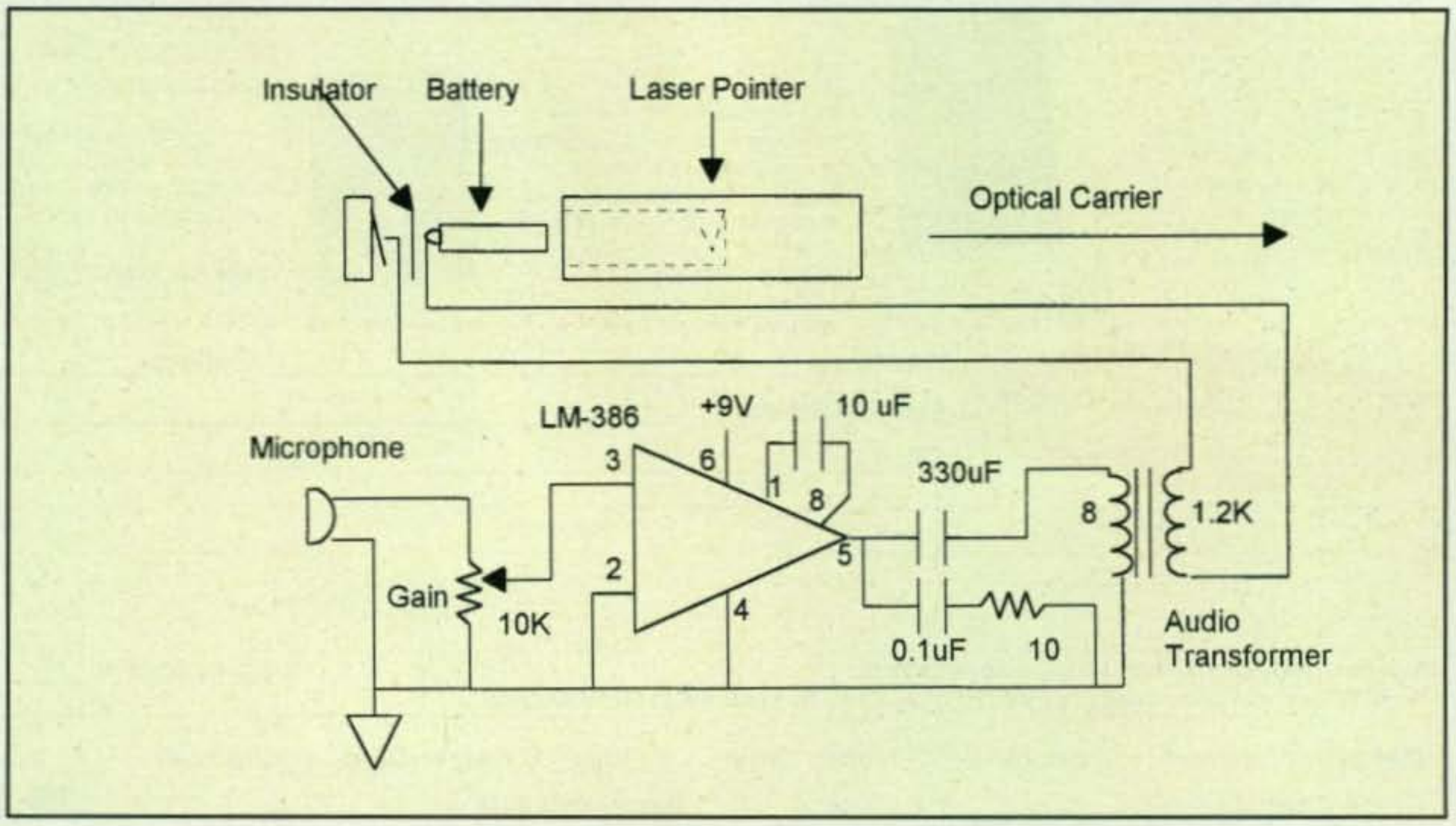


Fig. 2– A 454 THz AM transmitter.



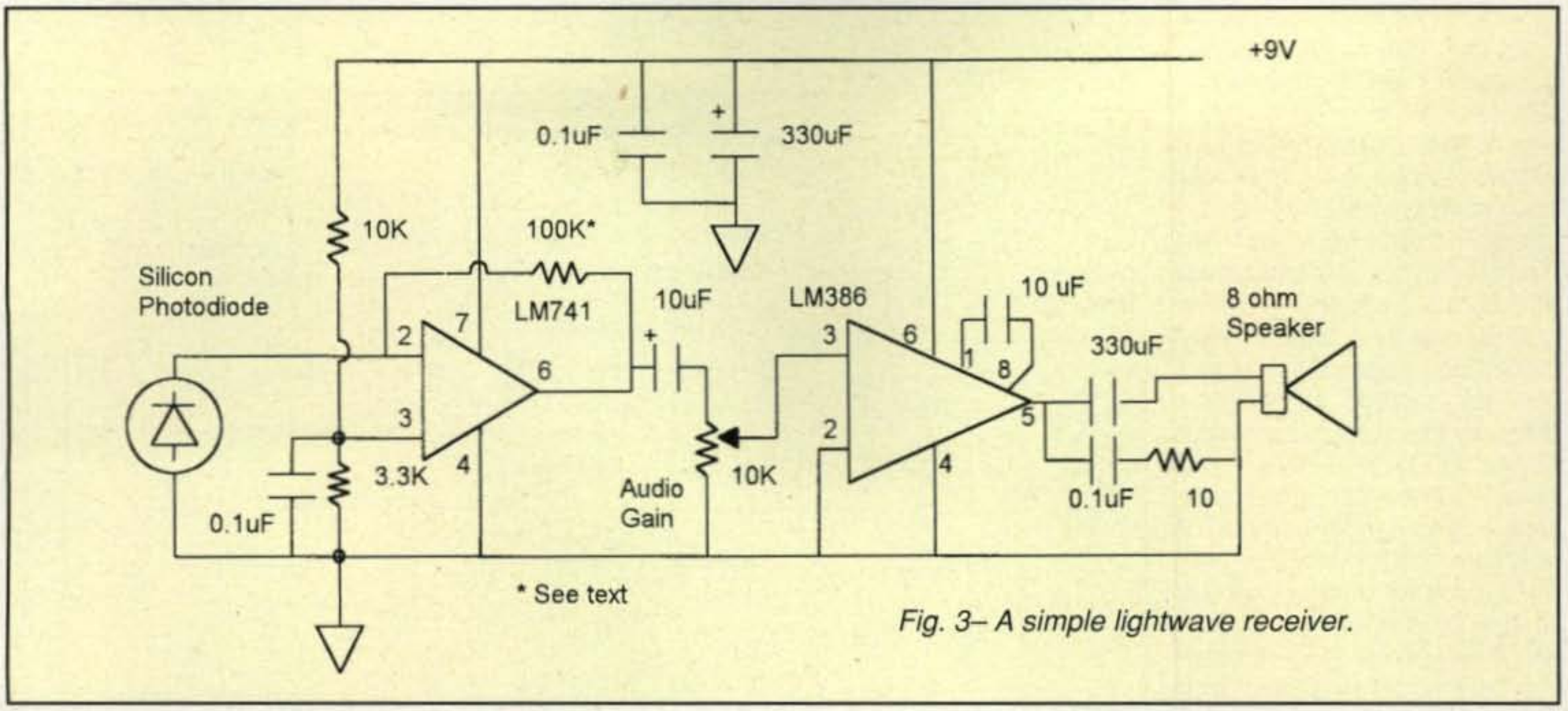


Fig. 3– A simple lightwave receiver.

"eye safe," don't even think of taking a chance. You can't replace an eye (yet)!

The Transmitter

As we mentioned last year, operating at light frequencies means operating in the terahertz (THz) region. Since wavelength is the reciprocal of frequency, the 660 nm red light from a typical laser pointer is actually the equivalent of a 454 terahertz (approximately) CW carrier. This carrier is much the same as any other RF carrier except that it is at an extremely high frequency, and, of course, it is visible. You will note that we have not indicated the exact frequency of the carrier, since the laser diode is not a narrow single-signal generator but more like a wide-band free-running oscillator similar to the wide-band type of signal a spark transmitter produced at the dawn of radio. For those of you who are interested, the output spectrum and overall stability of a typical laser diode, in RF terms, is literally hundreds of MHz wide (hence the comparison to spark emissions). Since there are no specifically allocated bands or stability requirements mandated by the FCC in the THz region yet, this type of emission is perfectly acceptable for now.

The optical carrier, being an electromagnetic signal, is very much like its lower frequency RF counterpart and can be handled in many of the same ways. The simplest mode is CW. This involves turning the laser on and off by means of a conventional telegraph key. To do this, carefully remove the battery from the laser-pointer assembly and solder a 6 inch length of hookup wire to the positive (+) terminal. Solder another 6 inch length of hookup wire to the + contact in the laser pointer housing and reassemble the unit making sure the + battery contact is insulated from the + contact in the pointer. A scrap of thin plastic will do fine. When you are done, shorting the two leads together should turn on the laser pointer. Now all you have to do is connect the leads to a telegraph key and you are ready to send CW (see fig. 1 for details).

If you are interested in phone transmission, you will need a few more parts. Following in the steps of the early lower frequency RF experimenters, the first practical voice transmission systems used amplitude modulation (AM). In these the amplitude of the RF carrier was varied in accordance with the audio signal. In a lightwave system AM equates

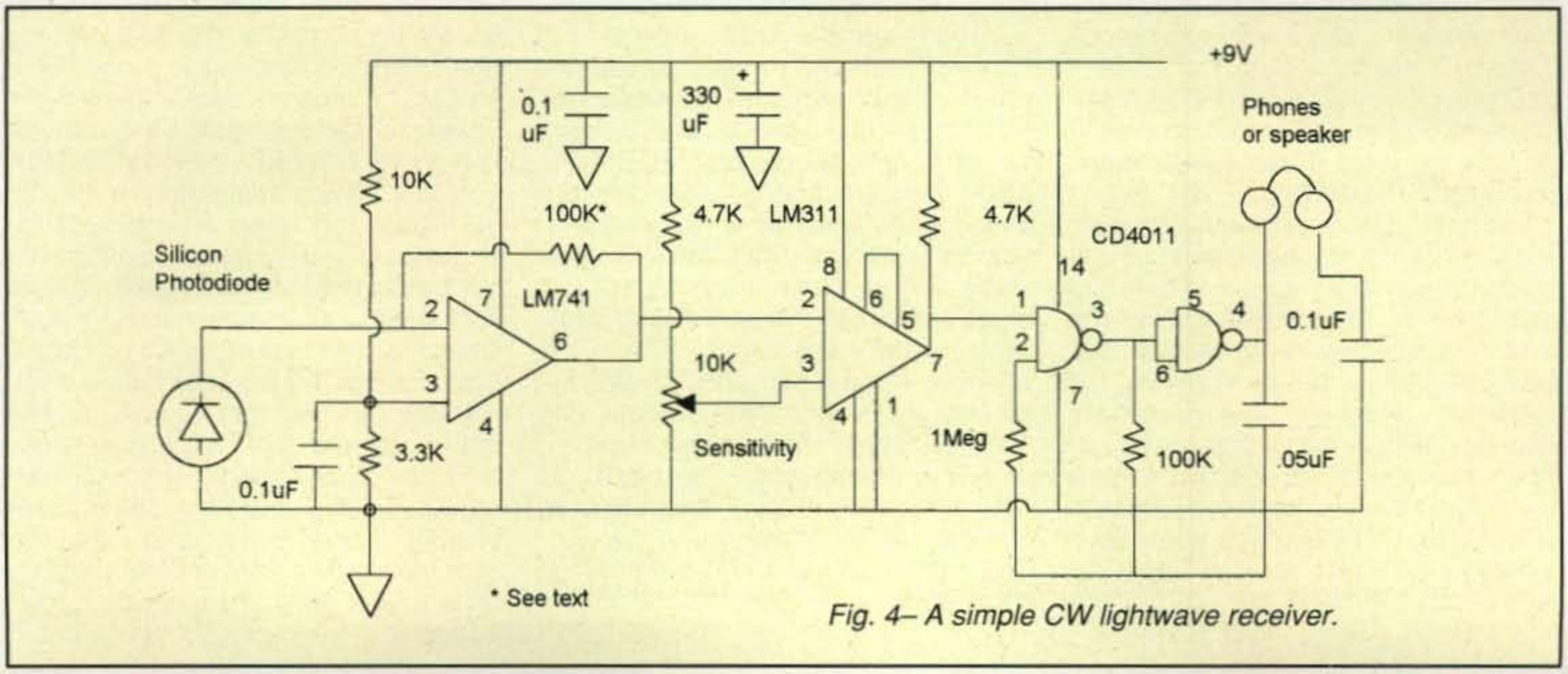


Fig. 4– A simple CW lightwave receiver.

to varying the brightness of the optical carrier. Here, however, it is called *intensity modulation* (IM), as this is more descriptive of the results. Fig. 2 is a simple lightwave IM transmitter. Like a typical plate-modulated lower frequency AM transmitter, audio is first amplified from a microphone by the LM386 and then used to vary the voltage applied to the laser via an audio transformer (Mouser Electronics part number 42TU003, or similar). If you have trouble finding the transformer, you can try using a 12 volt filament transformer with the 12 volt winding connected to the output of the LM386 amplifier and the 115 volt winding connected in series with the laser. Now by adjusting the gain of the amplifier, you can control the amount of modulated voltage applied to the laser, which in turn controls the degree (or depth) of modulation of the optical carrier.

Most laser pointers will allow at least a 50% modulation depth before they cut off, which should be more than adequate for acceptable communication purposes. Unfortunately, the generation of FM- or SSB-type signals is another story, since we cannot easily control the frequency (color) of the carrier, nor, for that matter, obtain a filter to properly eliminate the undesirable sideband.

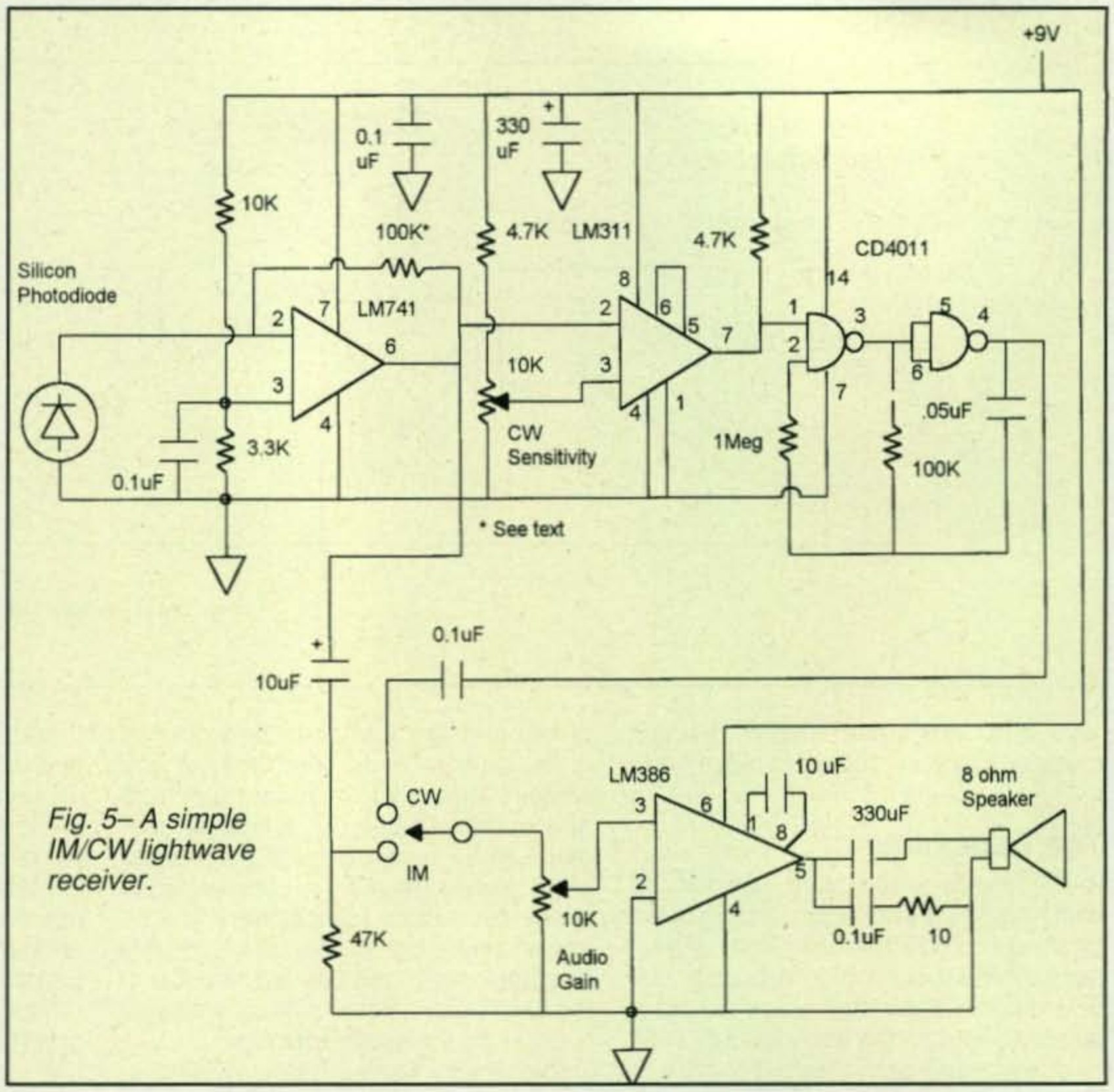


Fig. 5– A simple IM/CW lightwave receiver.

The Receiver

Just like the heart of the transmitter is the laser diode, the heart of the receiver is the photodiode. The device we have chosen is the silicon photodiode (Mouser Electronics part number 621-CLD140, or similar) due to its low residual noise and cost. Even a silicon solar cell can be used if you have trouble obtaining the "real thing."

The basic lightwave receiver consists of a photodiode connected to a current-to-voltage converter stage and then to a post amplifier. The closest similarity at lower frequencies is a crystal set, although unlike most crystal sets, the lightwave receiver is essentially untuned. While it is true that the photodiode has a finite response curve as a function of wavelength, this response is so wide that for all practical purposes it can be considered untuned. Tuned circuits or superhet-type designs at lightwave frequencies are currently in the research stage and not easy to implement by the amateur. Fixed-wavelength optical filters are available, but these are crude by lower frequency standards and not really necessary at this stage of the technology (at least for amateurs). A broadly responding receiver is perfectly adequate for initial experimentation.

Fig. 3 shows an elementary circuit of a lightwave receiver that can be used to receive the intensity-modulated (audio) carrier produced by the laser transmitter. The photodiode converts the light falling on it into a small current. The first stage then converts this current into a voltage, and since the amplitude variation of the carrier is really the audio, this stage also acts as a detector. The last stage simply raises the resulting audio level to a point where it can drive a speaker. If more sensitivity is desired, you can experiment with the value of the 100K feedback resistor between pins 2 and 6 of the op-amp. The higher its resistance, the greater the gain (and instability, unfortunately).

For the reception of CW the circuit becomes a bit more complex. Since the photodiode is only an envelope detector, CW signals will be received as a level change at the output of the op-amp and will not easily be heard. The equivalent of a BFO stage is needed to produce a readable signal. Unfortunately, there is no IF or carrier for which we can easily build a beat oscillator, so we have to resort to a different method. Fig. 4 shows one way to build such a detector. As you can see, the output of the photodiode/op-amp stage is applied to an LM311 voltage comparator. As the op-amp output varies above and below the preset reference (set by the 10K pot), the comparator switches on and off. This in turn gates an audio oscillator (at around 500 Hz) built from a couple of common CMOS NAND gates. The result is an easy to hear CW note. Changing the value of the .05 µF capacitor or one of the resistors in this stage will vary the final audio tone. The 10K pot, by the way, acts as a sort of sensitivity control and should be set for best results. Fig. 5 shows how you can combine fig. 3 and fig. 4 to produce a low-cost receiver that will operate properly for both CW and phone signals.

The Antenna

An antenna for lightwave frequencies usually consists of an optical system that often resembles a telescope. It can be as simple as a lens placed so that its focal point is centered on the photodiode, or it can take the shape of a parabolic reflector with its focal point at the photodiode as well. For the transmitter, the "bare" laser pointer is fine for short distances, but the beam will diverge too much if you are trying to work over any significant distance. As a result, here an optical system is also well worth experimenting with. There are schemes that use the same optical elements for both transmission and reception, and many of these require beam splitters, dichroic mirrors, or other exotic devices. For these a working knowledge of optical techniques will come in handy.

Summary

The circuits and techniques presented above are really simple and should serve as starting points for lightwave transmission experiments. There are many other schemes in the literature, and I am sure much more clever approaches will be developed. As an example, techniques to achieve omnidirectional antennas are needed. More powerful directly modulated light sources are also needed, as are methods to modulate CW sources such as high-output projection lamps. In the receiver arena better detectors, straylight filters, and more sensitive circuitry have to be developed. Propagation by reflecting signals from cloud layers or scattering from rain or haze are possibilities that can be investigated for longer distance communications, and even more modes that are yet to be discovered most certainly exist. Although lightwave frequencies are thousands of times higher than what you might be used to, remember what happened (so long ago) with the so-called "useless" frequencies of "200 meters and down" when amateurs got a hold of them! Who knows what we may find in this region?

At this point in time optical communications in the THz region is really fertile ground for experimentation, and it is quite possible for the amateur to "shine" (no pun intended) and come up with really worthwhile accomplishments. Also, since this is an area in which I have a personal as well as professional interest, I will be glad to discuss and publish your accomplishments in this column from time to time. Don't be afraid to contact me via *CQ* if this interests you.

73, Irwin, WA2NDM

BY DAVE INGRAM,* K4TWJ

Microphone Mania! Part I

After putting together last month's "Keys Special," I sensed many readers were asking for an equal-coverage column (or two!) featuring microphones. The idea held merit, so I invited the master of mics, Bob Heil, K9EID, to share his views and comments on this popular subject with our *CQ* audience. Bob is not only a widely respected authority on audio and microphones (he has a killer collection of the gems), he also produces a world-famous line of top-grade mics for both amateur radio and commercial broadcast use. I am sure you will find his photos and comments in both this month's and next month's column quite interesting.

Bob Heil's history in audio dates back to the early 1960s, when he traveled worldwide as the main sound engineer for well-known rock groups such as the Grateful Dead, The Who, Humble Pie, Peter Frampton, and rock guitarist Joe Walsh, WB6ACU. Bob owned all the equipment they used, from the microphones, monster amps, and massive speakers to the seven semi trailer trucks required to carry them (when these groups rolled into a town, folks knew it!).

In talking about old-time rock-'n-roll and learning experiences, Bob recalled an occasion at Madison Square Garden when he used 40,000 watts of audio(!) to almost blow down the walls "big bad wolf style," but still had difficulty understanding Peter Frampton's lyrics. Then the famous old master and father of the folded horn, Paul Klipsch, came up to Bob, introduced himself, and suggested equalization. Under Paul's authoritative guidance Bob learned about the Fletcher-Munsen curve and the why and how of equalization. He applied the concepts to his sound systems and emerged with an even more effective setup of only 5000 watts. Today Bob integrates those same techniques of audio equalization—emphasizing presence and articulation—into his world-famous Heil microphones and microphone elements.

Bob is a congenial and upbeat person, a genuine "Good Guy of Amateur Radio." He always finds the positive in everything, juggles multiple jobs and projects, and still gets on the air regularly on 20 and 15 meters SSB, 75m/3.885 MHz and 10m/29.050 MHz AM, and more. When you see him at a hamfest, step up, say hello, and mention you saw some of his collectible mics here in *CQ*. Check out his website, too: <www.heilsound.com>. You will be glad you did.

The Fletcher-Munsen Curve

During the 1930s telephone companies experienced difficulties acquiring good sound quality over long-distance lines and enlisted Dr. Fletcher and Dr. Munsen of Bell Labs to investigate the problem. After extensive audio sweeps and studies, they discovered the telephone line's response

Photo 1– Just looking at this magnificent Shure Model 51 microphone inspires visions of 1950s-era jam sessions with Wilson Pickett, Roy Orbison, and fellow rockers wearing purple suits, crawling on the floor, and singing like crazy. (Yes, we were there. Were you?) In addition to stage use, the Shure 51 was also utilized in big-time amateur radio setups of the '50s. Owner Bob Heil, K9EID, restored this delight with new chrome plating and red silk grill cloth. (Photo courtesy K9EID)

Photo 2– The legendary Shure 55S in original condition and ready to rock 'n roll all night long. Elvis Presley's frequent use of a 55S made it a favorite among many stars and the most popular Shure mic ever produced. In addition to on stage, the 55S was used in many broadcast and amateur radio stations nationwide. The 55S was also recently nicknamed the "Elvis mic" in honor of "The King." (Photo by K9EID)

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Photo 3– The Electro Voice 611 Mercury was developed as a low-cost competitor to Shure's 55S. It was introduced during the 1950s, sounded great, and was found in amateur radio and commercial broadcast circles alike. Imagine reworking and using a glitz-and-glamour mic like this with your modern rig of today. Better yet, watch for "how to do it" details coming in next month's column! (Photo courtesy owner K9EID; it was his first home station mic.)

Photo 4– Prompted by Electro Voice's introduction of the 611 and addressing a request for a less-expensive version of the 55S, Shure introduced this model 950 Cardex mic. The little delight looked fantastic, worked great, and made its way into both amateur radio and AM broadcast stations of the '50s and '60s. Look at that sparkle . . . that shine . . . that grill! (Photo by owner K9EID)

was almost constant or flat, but due to poor bone conductivity in the human ear, our hearing is quite non-linear. We can hear from 50 Hz to 20,000 Hz if the volume is very high (such as 120 dB, or a rock concert), but we lose bass response and prefer hearing mid-range tones around 2000 Hz at normal levels (such as 50 dB). Since the response of our ears varies according to frequencies or tones, and since most full-range microphones exhibit an almost flat response (pick up all tones equally), they sound flat and dull to our ears until equalized. This involves increasing mid-range pickup to improve presence and intelligibility so we are easy to understand and enjoyable to hear (copy) and boosting bass tones for richness or fullness.

This is what we call audio equalization. It begins with a microphone's response curve and is "fine tuned" with an equalizer either built-in or external to a modern transceiver. Knowing the frequency range of a microphone (100 Hz to 15,000 Hz, for example) is only half the picture. Checking its response curve to determine what tones, octaves, or frequency ranges are emphasized or reduced and by how many dB—and how an equalizer (if used) alters response—reveals the complete picture.

Photo 5– This dazzling, gold-plated D22 was made in quite limited quantity by the American microphone company of Burbank, California and was even sold in its own blue-velvet-lined box. The mic was specially designed for use on television, and its long-neck design gained immediate favor among game-show hosts for singling out one person in a crowd. Personally, we will choose it over what's behind door number three any day and have a ball using it with our favorite transceiver. (Microphone owned and photographed by K9EID)

Mic Talk

Over the years a captivating variety of microphones have been used in both broadcast and communications-related applications. Early on, ***carbon microphones,*** which functioned similar to a voice-controlled variable resistor, were employed. When sound struck the microphone element's front-located diaphragm, an attached push rod squeezed, or compressed, carbon granules in a mating chamber. By passing a small electrical current through the chamber (while its resistance changed with sounds), a small voltage equivalent to the sound resulted.

Crystal microphones, which operate on the piezo-electric principle, were next on the scene. When sound struck their element's diaphragm, an attached push rod compressed a small chamber of Rochelle salt crystals and produced a comparable output voltage. The crystal microphone delivers a strong output signal with good audio response and plenty of highs. It is also a high-impedance mic that mates perfectly with vacuum-tube rigs. A popular example of a crystal mic is Astatic's famous D104 "Silver Lollipop."

Soon afterwards, ***dynamic microphones*** were introduced into the audio field. Their operating concept is similar to a tiny voice-activated AC generator, with sound also moving their diaphragm and push rod. Here, however, a small magnet on the rod's end moves within a surrounding coil (in the element's chamber) to produce an output voltage equivalent to the sound. Dynamic mics and elements are rugged, reliable,

Photo 6– Many "old pros" should recognize this American beauty right off-the-bat. It is the classic SM1, which Turner modeled after the American D22 and made for Collins (in chrome, not gold). Every Collins owner wanted this little treat. In actuality it looks better than it sounds, but that's irrelevant. It is a genuine collectible! (K9EID collection)

Photo 7– Trim and elegant are appropriate descriptions of this SM2, which was a less-expensive version of the neat little Collins SM1. A similar version, the SM3, included a PTT switch in lieu of the base nameplate. Classy! (K9EID collection)

Photo 8– An original December 1965 Collins advertisement (from CQ, no less!) reflects the company's confident and superior attitude—no rig, just a sweet little SM3 microphone gracing a full page!

and exhibit wide frequency response that can be tailored for music or voice.

During the same time, ***condenser microphones*** also generated widespread interest, especially in recording studios and high-end broadcast applications. The element in a condenser microphone is similar to a capacitor; a back plate is mounted in a stationary position, while a front plate (the diaphragm) is allowed to move according to sounds. An external and phantom voltage-powered "preamp" then converts the changes in capacitance to changes in voltage, resulting in superb audio quality.

A spin-off of the condenser microphone that is being used quite extensively with modern SSB and FM transceivers is the ***electret-element mic.*** Described in simple terms, it is similar to a very low-cost condenser microphone with a tiny voltage-powered preamp built into its small element. The element works well for general audio applications, but it is not a condenser-grade mic. Likewise, an inexpensive (cheap!) electret element cannot be expected to sound like a more expensive electret element. The old saying of getting what you pay for (or less!) always rings true.

Styles or physical designs of microphones also have ahistory of changing every two or three decades, and common logic suggests they will continue to change in the future. Outshining those magnificent chrome-head gems such as the Shure 55S, the marvelous grill-adorned beauties such as RCA's 74B Diamond mic and today's "ice-cream-cone" styles such as Heil's Goldline, however, will be a formidable challenge.

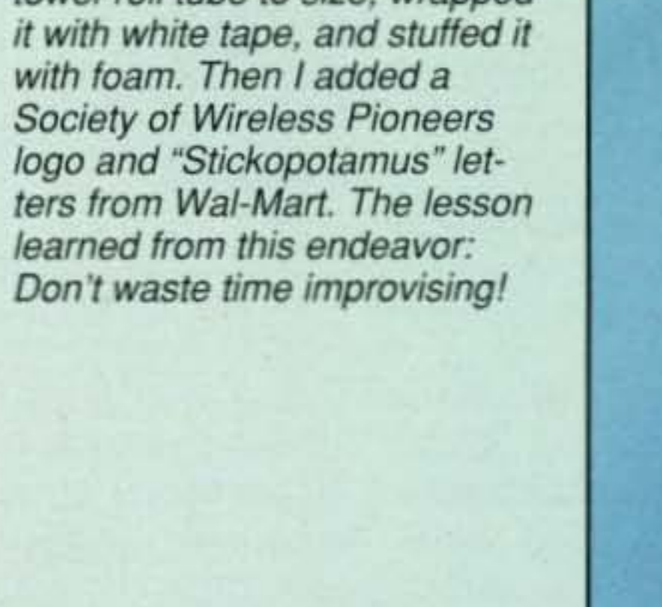
Finally, microphones can also be further categorized according to applications. Public-address mics exhibit a

Fun Time!
Make Your Own Mic ID Flag

You have seen them in TV newscasts, on-the-spot interviews, and remote broadcasts from shopping centers, and now you can make one (or several!) for your own home or portable station. We are talking about those ultra-popular call-letter and logo microphone ID flags you see affixed to round "ice-cream-cone" shaped microphones used by commercial broadcasters. Some of the flags are square, some are rectangular, and most include both call letters and logos. Their main purpose is to ensure high visibility of their associated station and/or network during important events and to serve as a makeshift shock mount when the mic is placed on a desk. Adding one to your own mic works in a like manner—well, similarly by helping you work more DX and sound like a real radio broadcast announcer (assuming you are already a big-time DXer and radio broadcast announcer, that is).

Professionally made ID flags are sort of "boxy" and challenging to homebrew, but Bob, K9EID, and I have an easier to implement alternative that may spin off a new slant or trend. Cut the flag frame from a 3 inch diameter, 2 inch long piece of Plexiglas or PVC pipe and fit the inside with some high-density foam cut from chair-cushion stuffing or similar material. Cut a small hole in the foam's center so it can slide onto a mic's back/cable end and fit snugly near its front. Add your call with stick-on letters obtained from a local craft store (and maybe a ham group logo of your choice), and your project is complete.

These things are so cool and easy to make that stopping with just one is the only drawback. You may want to make ID flags for all your microphones plus home and mobile antennas, and that's fine. The more you make, the better they get! Make one or two in metal and use them as capacity hats. Add some NE2 neon lamps to them and watch the light show when you transmit. Make flags in translucent red Plexiglas (most large cities have a supplier that will cut some tubing for you), then add white letters and stuff them with blue foam. Enjoy!



The ID flag attached to the support tube of a shock-mounted Heil Goldline microphone. The Goldline, incidentally, is a rich-sounding, full-bodied mic that really enhances an operator's voice, and it includes a switch-selectable second element—a Heil HC4/DX or HC5/mellow cartridge of your choice. A class act for sure!

Bob, K9EID, shows us how to quickly assemble a microphone ID flag similar to those you see in TV newscasts. Here he used clear Plexiglas so we can see inside. Then he added stick-on letters to the outside to personalize it.

My own attempt at making a microphone ID flag from on-hand items. First I cut a paper-towel-roll tube to size, wrapped it with white tape, and stuffed it with foam. Then I added a Society of Wireless Pioneers logo and "Stickopotamus" letters from Wal-Mart. The lesson learned from this endeavor: Don't waste time improvising!

Photo 9– Do you own an early model or pre-PRO-series ICOM? Want marvelous sounding audio in a minute? Plug in a new Heil iCM model microphone and hit the bands in high style. This platinum-finish beauty sounds even better than it looks, has high gain and "punch," and comes ready to use with an 8-pin ICOM plug. It's a romper!

rather limited frequency response, broadcast mics a wider response, recording studio mics the widest frequency response, and communications mics are peaked in the voice range. Yes, and even voice-range peaks vary between microphone models and domestic- versus foreign-made mics.

With all these variables, it is easy to understand why microphones are such hot items and popular topics of discussion among radio amateurs. They establish a mindset, a status, and our on-the-air image!

Conclusion

That's it for space for this month, friends, but watch for more views in Part II next month, plus as a special treat we'll have details on how to make your own "retro mic." Meanwhile, send us a couple of pictures of your favorite microphone (plus maybe your first homebrewed ID flag) and let's show/share your pride and joy with the world.

73, Dave, K4TWJ

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Edited by Dick Biddulph, G8DPS and Chris Lorek, G4HCL.
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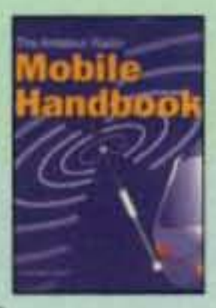

RSGB. 2002 Ed., 128 pages.
The Amateur Radio Mobile Handbook covers all aspects of this popular part of the hobby. It includes operating techniques, installing equipment in a vehicle and antennas, as well as maritime and even bicycle mobile. This is essential reading if you want to get the most out of your mobile station.

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BY FREDERICK O. MAIA,* W5YI

Unscrambling the Vanity Callsign System

We get more mail on amateur station callsigns than on any other subject, and particularly "Vanity" callsigns. Up until May 31, 1996 it was not possible for radio amateurs to receive a station callsign of their choice.

The campaign to obtain a station callsign of choice began in June 1990 when an Extra Class amateur from Tyler, Texas, Jim Wills, N5HCT, filed a Petition for Rule Making. He wanted his old callsign, WA5EHQ, restored. Wills suggested that amateurs be allowed to request a callsign change of the FCC by specifying three callsign choices in order of preference and attaching a $30 fee. The petition was denied because of the statutory exemption of Amateur Radio Service applications from fees.

That did not stop Wills, however. He began writing to his Congressmen concerning the reassignment of unused dormant callsigns. On December 9, 1991 Congressman Ralph Hall wrote back to Wills saying, "I've shared your idea with the staff of the Telecommunications Subcommittee, and they are currently conducting an inquiry in conjunction with the FCC to determine whether such a fee would collect enough money to pay for itself. If so, we may be able to make the necessary legislative changes in the FCC reauthorization bill to put such a 'vanity callsign fee' into effect."

On June 12, 1992 a letter jointly signed by Congressmen Edward J. Markey (D-Mass) and Ralph M. Hall (D-Texas) was sent to the FCC Chairman. It said, "We are writing to you on behalf of several amateur radio operators who are interested in the establishment of an FCC system for allotting distinctive callsigns. Such callsigns would be available at a fee to radio operators, in order to recover the total cost associated with the program." The addition of House Telecommunications Subcommittee Chairman Markey's signature to the letter added renewed importance to the proposal! Markey controlled the FCC budget.

Both the House of Representatives and the U.S. Senate approved legislation authorizing the FCC to issue unique amateur station callsigns at a cost of $7 per year to the ham radio community, but it happened almost without notice. Even the Commission was not aware of the short four-word line inserted into President Clinton's well-publicized Deficit Reduction Plan. The wording, added at the last minute to the Schedule of Regulatory Fees, read: "Amateur vanity callsigns $7." This was later reduced to $3 a year, or $30 for the ten-year term, the same as requested by Texas amateur Jim Wills.

Clinton signed the Omnibus Budget Reconciliation Act (the official name of the Deficit Reduction Plan) into law on Tuesday, August 10, 1993, and with it the provision for Vanity callsigns became law (Public Law 103-66).

Section 6003 (a) of the Act added a new Section 9 (a) to the Communications Act authorizing the Commission to collect annual regulatory fees to recover the annual costs of its enforcement, policy and rulemaking, user information, and international activities. The issuance of vanity callsigns for radio amateurs was one of the many reimbursable services provided for in the Schedule of Fees. It came as a complete surprise to the ARRL and the amateur community, which except for Jim Wills, N5HCT, were not involved in its enactment.

The special callsign program still had to go through FCC rulemaking before it could be implemented by the Private Radio Bureau. The FCC's version of vanity callsigns was proposed on December 13, 1993. PR Docket 93-305 provided for allowing amateur radio operators to select up to ten unassigned "Vanity" station callsigns in order of preference.

The FCC envisioned that a ham station callsign would become available for reassignment after two years following license expiration or the death of a licensee, whichever is sooner. Also, all Vanity callsigns would become available on a first-come first-serve basis.

The callsigns selected had to be within the framework of the sequential callsign system wherein certain groups of callsigns are designated for each class of operator license. In other words, a Novice could not choose an available Group "A" amateur Extra callsign. Amateurs would be required to relinquish their current callsigns when chosen Vanity callsigns were assigned. Certain prefixes were available only for amateurs having mailing addresses outside of the continental (lower 48) states. In its comments, the ARRL asked for a one-time $150 application fee.

A year later (on December 23, 1994) the FCC Commissioners adopted final rules implementing Vanity callsigns in the Amateur Service pretty much as proposed. The ARRL's suggestion to open the system gradually through four (later changed to five) "starting gates" was approved.

One point that the FCC did not go along with was the ARRL's request that an applicant only be permitted to request those callsigns that are assignable to stations in the callsign region in which the licensee has a mailing address. The Commission also elected to impose a two-year waiting period before a vacated callsign could be reassigned.

Gate One opened to prior holders of a callsign and close relatives of deceased prior holders on May 31, 1996.

By the way, Jim Wills, N5HCT, was issued the Vanity callsign W5JIM on November 4, 1996.

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

Vanity Fees

On June 14, 1995 the FCC adopted a revised Schedule of Regulatory Fees for Fiscal Year (FY) 1995. Section 9 requires that fees take into account the benefits provided to the user and the cost to provide them. Accordingly, effective September 19, 1995 the annual Regulatory Fee for Vanity callsigns was reduced to $3 instead of the initially suggested $7. Payment for a Vanity callsign had to be submitted with the application and "shall include an advance payment of the total annual regulatory fee payment due for the entire term of the license. . . ."

However, there was no guarantee that amateur Vanity callsigns would remain at the $30 level for a ten-year term—and they did not. The rules provide for adjusting regulatory fees annually, and the fee was increased to $50 effective September 15, 1997. It has bounced up and down every year since.

For the year ending September 15, 2003 the (ten-year term) regulatory fee for a vanity callsign is $14.30, or $1.43 annually. This fee is reviewed and adjusted annually and is based on the number of Vanity callsigns the FCC anticipates it will assign and the cost to issue them. For the year beginning in September 2003 the FCC has proposed to increase it to $16.30 based on an estimate that 9800 applicants will apply for vanity callsigns in FY-2003.

Complete Vanity callsign system details can be found on the FCC's website: <http://wireless.fcc.gov/services/amateur/licensing/vanity.html>.

How to Obtain a Vanity Callsign

There are three ways to file an application for a Vanity callsign. You can file online using the FCC's Universal Licensing System (ULS), file manually using paper FCC Form 605 (Schedule "D") and FCC Form 159 (FCC Remittance Advice) documents, or use a third party to handle all the details for you. The W5YI Group offers such a service, the details of which can be found at <www.w5yi.org>; click on the Vanity Call Sign button.

If you use the paper form, it is important that you use FCC Form 605 and not NCVEC Form 605 used by Volunteer Examiners. Both FCC Form 605 and 159 are available for downloading from <http://www.fcc.gov/formpage.html>. Once completed, the two forms and the required fee must be mailed to the FCC Bank Contractor at FCC Wireless Bureau Applications, P.O. Box 358130, Pittsburgh, PA 15251-5130.

If you apply online, unless you pay by credit card, you must still mail your Vanity fee with FCC Form 159 to the FCC Bank Contractor. A special address has been set up for online filers. (FCC ULS Electronic Filings, P.O. Box 358994, Pittsburgh, PA 15251-5994.)

So that electronic filers will not have an unfair advantage in getting a specific callsign, all Vanity callsign applications filed online are held by the FCC for about two weeks to allow time for mailed applications to arrive. Then all of the applications from the same day are processed together.

A radio amateur may list up to 25 currently unassigned callsigns in order of preference. In practice, however, most amateurs only request five or fewer possible calls. The first assignable callsign on the list for which the requester is eligible is granted and the original callsign is cancelled. You may not request that a callsign be reserved for future assignment.

Should no callsign on your list be assignable to your station, you will keep your old (current) call. You may obtain a refund of the regulatory fee by sending a request by letter to the FCC. Once you are assigned a Vanity callsign, your former call does not become available for reassignment for a two-year period.

A callsign is normally assignable two years following license expiration, surrender, revocation, set aside, cancellation, or death of the amateur. Where a Vanity callsign for which the most recent recipient was ineligible is surrendered, cancelled, revoked, or voided, the two-year requirement does not apply.

You may only apply for a Vanity callsign whose group is equal to or lower than your current callsign group. Certain station callsigns are not available for assignment under any circumstances. You can find a list of them on the FCC's website.

Your name and mailing address as shown on your current license must be correct. If your license grant has expired, you must first renew the license.

Use the Universal Licensing System License Search function at <http://wireless.fcc.gov/uls/> to determine if the callsign you are requesting is unassigned. Be aware, however, that an unassigned callsign may still be unavailable to you for various reasons. For example, the callsign may still be within the two-year suspended period, it may be a statutorily unavailable callsign (a list is on the FCC website), or someone else may have requested it before you did.

To request a Vanity callsign for a club station, you must also hold an unexpired club station license listing you as the license trustee. RACES and military recreation stations are not eligible for Vanity callsigns.

Some things to keep in mind:

• As a general rule, the callsign must have been unassigned for at least two years. There are a few exceptions, however.

• If you are an amateur Extra Class operator, you may apply for a callsign from any of the four groups—Group A, B, C, and D. If you are an Advanced Class operator, you may request calls only from Groups B, C, or D. If you are a General, Technician Plus, or Technician Class operator, each callsign requested must be in Group C or D. A Novice Class operator is only eligible for a Group D (2-by-3) format callsign.

• You may request a callsign designated for any callsign region (i.e., Ø through 9). You do not have to stay with your current callsign region. However, you may not apply for special prefixes reserved for areas outside the continental United States (see next item).

• Radio amateurs with mailing addresses in Alaska, Guam, Hawaii, Puerto Rico, the Virgin Islands, and other U.S. possession may apply for special prefixes. (They are AH, AL, KH, KL, KP, NH, NL, NP, WH, WL, and WP.)

• The FCC does not allow the use of a "wildcard" (examples: W9** or *9**) to request a callsign with a format having a single letter prefix and any two letter suffix (examples: K9AA, N9AZ, W9ZZ). However, the W5YI Group Vanity Call Sign Service *does* allow the use of "wild cards."

• As a former callsign holder, you may request a callsign that was previously assigned to your primary, secondary, repeater, auxiliary link, control, or space station. The two-year requirement does not apply.

• You do not have to hold a class of operator license required for the Group (A, B, C, or D) if you formerly held the callsign. A callsign request by a former holder may be from any group.

• To obtain the callsign of a now deceased amateur, the FCC database must show a status of expired or cancelled. This is accomplished by submitting a signed request for license grant cancellation accompanied by a copy of an obituary or death certificate to: FCC, Attention: Donna Scott, 1270 Fairfield Road, Gettysburg, PA 17325-7245. The information for cancellation of a callsign must be submitted prior to filing the vanity application. The callsign is

not available to the Vanity Call Sign Program until the amateur has been deceased two years.

• You may, however, request a callsign that was previously assigned to a deceased close relative without waiting the two years. A close relative is defined as a now-deceased spouse, child, grandchild, stepchild, parent, grandparent, stepparent, brother, sister, stepbrother, stepsister, aunt, uncle, niece, nephew, or in-law. The callsign is available to you once it has been cancelled from the FCC database. You must, however, be of the appropriate callsign group. For example, you must be an amateur Extra Class operator to request the Group A callsign of a deceased relative. At present, there is no way that you can designate who gets your callsign when you die. However, the FCC is currently considering a petition from the Quarter Century Wireless Association (QCWA) to change this rule.

• A club station trustee may request the callsign of a deceased member of the club. The callsign is immediately assignable following the death of the club member. You must, however, have in your station records a written statement (do not send to the FCC unless requested) from a close relative confirming the deceased person's association with the club and showing consent of the relative to your request. The club trustee must still meet the group callsign requirement (i.e., the trustee must be an amateur Extra Class operator to request the Group A callsign of a deceased member).

Your new Vanity call sign will first be posted to the FCC's license database at <http://wireless.fcc.gov/uls>. Click on "license" and enter your current callsign to see if it has been cancelled. If it has, then begin entering your Vanity callsign choices to determine which one you received. You may begin using your new Vanity call as soon as it is listed in the FCC database. Another reference point is one of the online callsign servers, such as Buckmaster <http:// www.buck.com/cgi-bin/do_hamcall> or QRZ.com <http://www.qrz.com>, which while not official, often show the new call when the old call is searched. You may then officially verify your new callsign by going to the FCC website and searching on the new call.

Hams have always considered their callsigns part of their identity. The Vanity callsign program allows amateurs to exercise some control over this part of how they are perceived by their fellow hams.

73, Fred, W5YI

digital connection

BY DON ROTOLO,* N2IRZ

HF Digital Mode Overview

Amateur radio continues to evolve. As pointed out by Ward Silver, WØAX, in his January *QST* editorial, we now find ourselves on the edge of another upheaval, another chance to evolve. The first major (r)evolution was when hams switched from spark to CW, which was followed by a movement from CW to phone, and then from homebrew to commercial gear.

Which brings us to our fourth revolution, which is going on right now—digital. The proliferation of home computers with processing power that the Department of Defense only dreamed of when I was a kid, the Internet and the freedom of thought and sharing that it embodies, and the mathematics behind Digital Signal Processing theory have combined into an exciting and revolutionary way of communicating—digitally.

Of course, the first radio communications were digital—Morse code using spark transmitters. Now with the possibility of sending and receiving signals using hardware and software instead of wetware (human brain power), we can finally break through that barrier of human limitations. Signals too fast to hear, buried beneath the noise floor, are just as easy to decode as a child's laughter.

Why write a column about HF digital for the VHF issue? Well, to tell the truth, this column was scheduled for April, but an exciting event took place, and I thought it best not to wait to write about it. In case you missed it, late last year the world's first transatlantic digital voice contact on HF was made. Now *there's* an upheaval for you. Anyway...

We will take the next few months to examine modern HF digital modes in detail, along with a how-to for getting on the air. We'll also speculate about the future of digital and communication in general. First, however, let's take a look at all the digital modes and how they work.

I invited Rich "Griff" Griffin, NB6Z, to share a part of his excellent website devoted to digital radio. Here he offers a brief description of the major modes used in amateur radio. For more detailed information, visit his website at <http://home.teleport.com/~nb6z>. Now I'll turn it over to Griff:

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e-mail: <n2irz@cq-amateur-radio.com>

The Digital Ham Radio Revolution!

Communication technologies specifically designed to improve "live" HF keyboard operation that were previously only theoretical or too complex to be practical can now be achieved. Thanks to the generosity of radio amateurs with programming knowledge and to the World Wide Web, new and powerful communications tools are available to all hams. The evolution and widespread use of the personal computer, with a digital sound card for DSP, are allowing us to use these tools to "push the envelope." The distinguishing features of live HF digital operation today are the use of lower power, compact or indoor antennas, and courteous operating technique. This reverses the trend of several years ago...

Confusion over operating frequencies is the obvious downside as new and old modes compete for band space. Crowding on a single band such as 20 meters is partly to blame for this issue. Fortunately, some new modes—MFSK16, for instance—are designed to improve performance for a wide range of operating conditions. This should allow for increased ham-band usage to relieve crowding and extend contact opportunities as propagation changes to favor different bands. I don't know what is going on with the phone portion of the ham bands, but these are exciting times for us digital operators!

An Overview of Modern Digital HF Radio Operating Modes

TOR is an acronym for Teleprinting Over Radio. It is traditionally used to describe the three popular "error free" operating modes: AMTOR, PACTOR, and G-TOR. The main method for error correction is from a technique called ARQ (Automatic Repeat reQuest), which is sent by the receiving station to verify any missed data. Since they share the same method of transmission (Frequency Shift Keying, or FSK), they can economically be provided together in one TNC

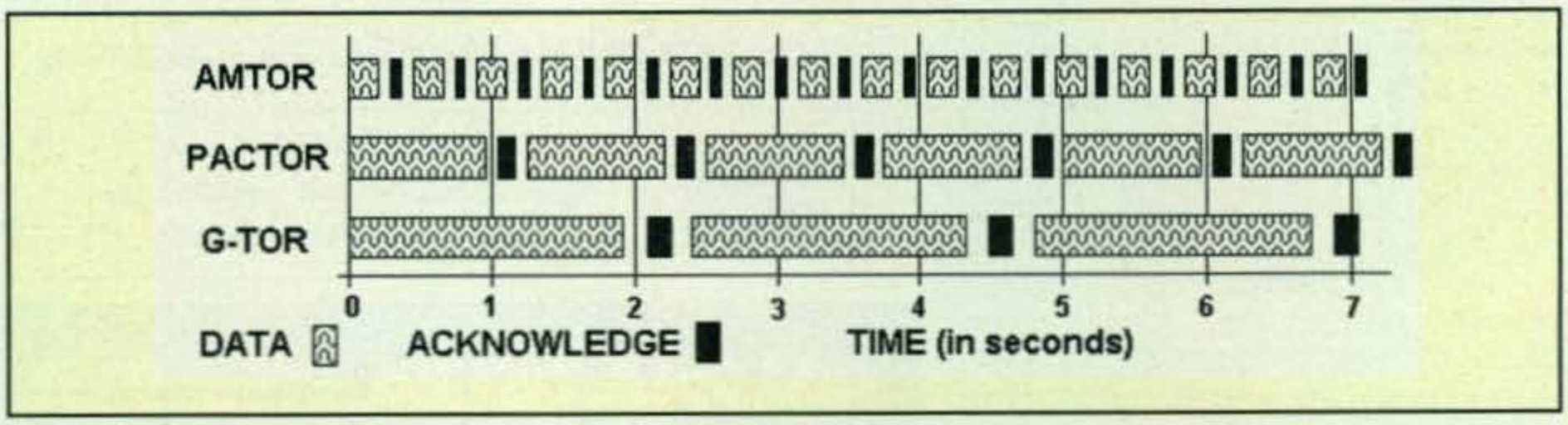

Fig. 1– A simple graphic representation of three popular HF digital modes. Some older radios, with relatively slow transmit/receive switching times, will have difficulty with some HF modes.

modem and easily operated with any modern radio transceiver. TOR methods that do not use the ARQ handshake can easily be operated with readily available software programs for personal computers. For these less-complex modes the TNC is replaced by a computer's sound card or external audio device. These modes may use redundancy or "human processing" to achieve a level of error correction.

AMTOR is an FSK mode that has been fading into history. While it is a robust mode, it only has 5 bits (as did its predecessor, RTTY) and cannot transfer extended ASCII characters or any binary data. With a set operating rate of 100 baud, it does not effectively compete with the speed and error correction of more modern ARQ modes. The non-ARQ version of this mode is known as FEC (Forward Error Correction), and by the Marine Information services as SITOR-B.

PACTOR is an FSK mode and is a standard in modern multi-mode TNCs. It is designed with a combination of packet and AMTOR techniques. It is the most popular ARQ digital mode on amateur HF today. This mode is a major advancement over AMTOR, with its 200 baud operating rate, Huffman compression technique, and true 8-bit binary data-transfer capability.

G-TOR (Golay-TOR) is an FSK mode that offers a faster transfer rate than PACTOR. It incorporates a data interleaving system that helps minimize the effects of atmospheric noise and has the ability to fix garbled data. G-TOR tries to perform all transmissions at 300 baud but drops to 200 baud and even 100 baud if difficulties are encountered. (M. Golay was a mathematician who developed the data protocol used by the Voyager space probes to send back those wonderful photographs of Saturn and Jupiter. G-TOR adapts this protocol for amateur radio use.)

PACTOR-II is a robust, powerful PSK (Phase Shift Keying) mode that operates well under varying conditions. This DSP-based mode uses strong logic and automatic frequency tracking to operate as much as eight times faster than PACTOR. Both PACTOR and PACTOR-II use the same protocol handshake, making the modes compatible.

PACTOR-III is a proprietary mode used for message and traffic handling over an HF radio circuit. Use of PACTOR-III is limited for hams in the U.S. and some other countries due to the very wide bandwidth of its signal. At present, wideband digital signals such as PACTOR-III are restricted to a few subbands: 28.120–28.189, 24.925–24.930, 21.090–21.100, 18.105–18.110, 14.0950–14.0995, 14.1005–14.112, 10.140–10.150, 7.100–7.105, and 3.620–3.635 MHz. A German company that owns the rights to this mode is the only source for the modem required to operate PACTOR-III.

CLOVER is a PSK mode that simulates a full-duplex connection. A proprietary mode developed by HAL Communications but also licensed to other manufacturers, it is well suited to HF operation (especially under good conditions). However, there are differences among CLOVER modems. The original modem was named CLOVER-I; the latest DSP-based modem is CLOVER-II. Another version, CLOVER-2000, uses software that works only with specific HAL modems. The key characteristics of CLOVER modes are bandwidth efficiency and high error-corrected data rates. CLOVER adapts to conditions by constantly monitoring the received signal. Based on this monitoring, CLOVER determines the best modulation scheme to use.

RTTY (Radio TeleTYpe) is an FSK mode that has been in use longer than any other digital mode except for Morse code. RTTY, also known as Baudot, is a very simple technique that uses a five-

bit code to represent all the letters of the alphabet, the numbers, some punctuation, and some control characters. At 45 baud (typically) each bit is 1/45.45 seconds long, or 22 ms, and corresponds to a typing speed of 60 wpm. There is no error correction provided in RTTY; noise and interference can have a seriously detrimental effect. Despite its relative disadvantages, RTTY is still popular with die-hard operators.

PSK31 is the first new digital mode in many years to find popularity on HF ham bands. It combines the advantages of a simple variable-length text code with a narrow-bandwidth phase-shift keying (PSK) signal using DSP techniques. This mode is designed for "real time" keyboard operation, and at 31 baud it is just about fast enough to keep up with the typical amateur typist. It also has a bandwidth of 31 Hz, but it appears that the "31" originally referred to the baud rate. PSK31 enjoys great popularity on the HF bands today and is presently the standard for live keyboard communications. Most of the ASCII characters are supported. A second version is available and uses QPSK, which provides Forward Error Correction (FEC) at the cost of a reduced signal-to-noise ratio. *(We'll be looking in greater detail at PSK31 next time.—N2IRZ)*

HF Packet Radio is an AFSK (Audio Frequency Shift Keying) mode that is identical to VHF packet, but sent at 300 baud. All of the abilities of VHF packet—networking, BBS operations, and so on—are available. The lower baud rate reduces the bandwidth required, which helps when dealing with noise conditions typical for HF. FCC regulations also restrict data rates to 300 baud below 28 MHz. Even with the reduced bandwidth, this mode is generally unreliable for general HF ham communications and is mainly used to pass routine traffic and data between areas where VHF links may be lacking.

Hellschreiber is a method of sending and receiving text using facsimile technology. *("Hellschreiber" means "light writer" in German.— N2IRZ)* This mode has been around a long time, but the recent use of PC sound cards as DSP units has increased interest in Hellschreiber. The single-tone version (Feld-Hell) is the method of choice for HF operation. It is an on-off keyed (OOK) system with 122.5 dots/second, or about 35 wpm text rate, with a narrow bandwidth (about 75 Hz). Text characters are "painted" on the screen, as opposed to being decoded and printed. A new "designer" flavor of this mode called *FM HELL* has some advantage for providing better quality print, at the expense of a greater duty cycle. As with other "fuzzy modes," it has the advantage of using the "human processor" for error correction.

MT63 is a new DSP-based mode for sending keyboard text over paths that experience fading and interference from other signals. It uses a complex scheme of encoding text into a matrix of 64 tones over time and frequency. This overkill method provides a good cushion for error correction at the receiving end while still providing a 100 wpm rate. The wide bandwidth (1 kHz for the standard method) makes this mode less desirable on crowded ham bands such as 20 meters. A fast PC (166 MHz or faster) is needed to use all functions of this mode.

THROB is yet another new DSP-based mode and uses Fast Fourier Transform (FFT) technology (as used by waterfall displays) to decode a five-tone signal. The THROB program is an attempt to push DSP into the area where other methods fail because of sensitivity or propagation difficulties and at the same time work at a reasonable speed. The text speed is slower than other modes, but the author (G3PPT) has been improving his MFSK (Multiple Frequency Shift Keying) program. Check his website at <http://

On the Cover

Ivan Pagacik, K1MS—K-1-Meteor-Scatter—of Littleton, Massachusetts, highlights our annual VHF special this month. While he operates on all bands from 1.8 to 432 MHz, Ivan particularly enjoys weak-signal VHF, including 2 meter EME (Earth-Moon-Earth) and, of course, meteor scatter. He's achieved 2 meter Worked All States, 6 meter Worked All Zones, and 6 meter DXCC. He's also on the DXCC Honor Roll for HF.

"Experimenting is the fun part of the hobby," says Ivan, noting that "all the new computer modes and how they relate to weak signal is fascinating." Currently, Ivan says he's getting active on the JT-44 modes, specialized sound-card digital modes for working meteor scatter and other weak-signal VHF. Radio is Ivan's job as well as his hobby. He's Director of Special RF Systems for a public-safety communications consulting firm. "Even in college, I knew I wanted to be in communications," adds Ivan, "and that's all I've ever done, be it work or hobby."

Ivan says he also enjoys "pushing things to the limit, and understanding propagation," adding that 6 meters is his favorite band because it has so many different types of propagation and is impossible to predict. Ivan explains, "Just when you think one thing's going to happen, the band does something completely different."

What draws him to weak-signal VHFing, we asked. "I just enjoy the weak-signal work," he says. "People ask, why go to all the effort to work all 50 states on 2 meters when you can do it easily on 10? I like doing the 'not everyday' stuff. There's greater satisfaction."

Finally, we asked Ivan about his formula for success in VHF DXing. His answer: "A little preparation, a little luck, and a little skill." (Cover photo by Larry Mulvehill, WB2ZPI)

www.lsear.freeserve.co.uk/page3.html> for the latest developments.

MFSK16 is an advancement of the THROB mode, encoding 16 tones. This mode uses a PC sound card and DSP techniques to decode the ASCII characters with a Fast Fourier Transform. Constant Phase Frequency Shift Keying is used to send the coded signal. Continuous Forward Error Correction (FEC) sends all data twice, with an interleaving technique, to reduce errors from impulse noise and static crashes. A new improved Varicode is used to increase the efficiency of sending extended ASCII characters, making it possible to transfer short data files between stations under fair to good conditions. The relatively wide bandwidth (316 Hz) for this mode allows faster baud rates (typing is about 42 wpm) and greater immunity to multipath distortion. This mode is becoming a standard for reliable keyboard-to-keyboard operation and is available in several popular programs.

Back to You, Don...

N2IRZ here again. This month Griff, NB6Z, gave us a nice overview of the most popular HF modes used by amateurs today. As I mentioned before, visit his website for more information about each mode, along with audio clips of how each one sounds and links to other useful sites.

One of the most important measures of any HF digital mode is its bandwidth. Wider bandwidths allow for higher data rates, while the narrower bandwidths of slower modes mean that less noise, so typical on HF, can affect the data signal. While HF circuits can be (and are) used for automated data transfer, the real fun for amateurs is keyboard-to-keyboard QSOs. Just like any other mode, we send a CQ, establish contact, and eventually have a pleasant "conversation" with another amateur station. While emergency operations and other tactical uses are prefect for the digital modes, some of us prefer the keyboard modes, whether because we are shy, have a hard time speaking, or just plain misplaced that %@&%#*! microphone.

Next time we'll look at PSK31 in greater detail—what it is, how it works, and how you can get started. As we continue this series, we'll look at the future of digital, operating techniques, and some thoughts on how this revolution we're living through will turn out. This looks like it will be a lot of fun, and I hope you think so, too. It isn't the end of amateur radio (as was the cry in the past upheavals); it's just another new beginning! *Viva la Revolución!*

73, Don, N2IRZ

what's new

BY KARL T. THURBER, JR.,* W8FX

RIGblaster pro, Keys, Mics, and More

There's a great deal of new equipment and other goodies to cover this time, so let's dig right into this month's column. We'll focus on some noteworthy radio shack and antenna accessories, software, and books we think will be of considerable interest to you. Are you ready?

Accessories for the Radio Shack

RIGblaster pro from West Mountain Radio. Del Schier, K1UHF, of West Mountain Radio, told us of the new RIGblaster pro (see photos A and B), the fourth in a series of RIGblasters. The sound-card interface, which is billed by the manufacturer as "the ultimate interface for phone and digital operating," represents a significant advancement in computer-to-radio interfaces. It's not only a sound-card interface, it is also a complete computer interface with many impressive capabilities.

The new, all-in-one unit supports operation with almost 100 different amateur radio sound-card programs that transmit and receive with over 20 distinctly different modes. Besides functioning as a sound-card interface, the new model also has a built-in rig-control interface for most radios, allowing operation with a single serial port.

The RIGblaster pro has two separate keying circuits, one for CW and one for FSK; a configurable secondary serial port provides compatibility with a wide range of software. Another innovation is the ability to bridge your station microphone to the computer as well as to a radio. Thus, you can do digital recording of both sides of an on-the-air contact or perform high-performance transmit speech processing.

Some of the many other features of the RIGblaster pro are front-panel LED status indicators, making software setup easy; transmit computer speaker muting; front-panel audio drive level control; electret microphone bias; auxiliary plug-in headset microphone jack; dual headphone and PTT jacks; radio speaker loop; DX beacon clock; power switch; transmit speech processing; and much more.

According to Del, these many features let the RIGblaster pro, a computer, and appropriate software replace at least eight different accessories and devices, all in one integrated $299.95 package. The result: a neater, more efficient station that boasts higher performance and simplified operation.

Contact West Mountain Radio, 18 Sheehan Avenue, Norwalk, CT 06854 (203-853-8080; e-mail: <sales@westmountainradio.com>; web: <http://www.westmountainradio.com>).

Heil FS-2 Dual Footswitch. As we've mentioned before, Bob Heil, K9EID, is a very capable sound engineer, one deeply involved with the intricacies of sophisticated "sound reinforcement" of live concert sound. Bob is the founder and president of Heil Sound, Ltd., and he now specializes in top-quality "home theater" design and installation. However, Bob also offers a variety of microphones, headsets/boomsets, stands, booms, switches, cables, transformers, and other accessories, many of which are designed for amateur radio use.

One such new non-audio accessory is the Heil FS-2 Dual Footswitch (photo C) which should help solve many control and interface problems in the amateur radio station. The Dual Footswitch is an ergonomically correct device with the hinge being under your heel instead of away from your foot, as with other footswitches. This footswitch configuration requires much less effort and relaxes the leg muscles during long periods of operation, such as in contesting and DXpedition operations. The hinge is a solid bar running the complete width of the footswitch assembly, thus eliminating screws or fasteners that may work loose.

Of special note, the footswitch is designed specifically for controlling two devices simultaneously. Two 10 ampere microswitches are mount-

*289 Poplar Drive, Millbrook, AL 35054-1674
e-mail: <w8fx@cq-amateur-radio.com>

Photo A– Here's the front of the RIGblaster pro, the fourth in a series of RIGblasters from West Mountain Radio. The new sound-card interface represents a significant advancement in computer-to-radio interfaces. (Photo courtesy West Mountain Radio)

Photo B– This view shows the rear panel of the versatile, high-capability RIGblaster pro. The new all-in-one unit comes with the West Mountain CD, a 12 VDC power supply, and connecting cables. (Photo courtesy West Mountain Radio)

Photo C– The Heil FS-2 Dual Footswitch is an ergonomically correct device with the hinge being under your heel instead of away from your foot, as with other footswitches. The FS-2 is designed specifically for controlling two devices simultaneously. (Photo courtesy Heil Sound)

Photo D– The new Ten-Tec/Heil Sound Studio One microphone is housed in an all-new, sleek, black, zinc die-cast shell. This is a cardioid-type unit with internal blast filters. Element response is tailored specifically for full-range SSB, AM, and FM. (Photo courtesy Ten-Tec)

ed so that the one feeding the red lead turns on first and the black lead turns on last. A typical hamshack application would be to key a transceiver with the black lead and an RF power amplifier with the red lead. The footswitch, priced at $38, is designed to eliminate any active interface problems between transceivers and RF amplifiers.

Contact Heil Sound, Ltd., 5800 North Illinois, Fairview Heights, IL 62208 (phone 618-257-3000; e-mail: <info@heilsound.com>; on the web: <http://www.heilsound.com>).

A Top-Quality Microphone and a Limited Edition Key Paddle from Ten-Tec. Ten-Tec and Heil Sound have collaborated in a new joint venture to produce what they both feel is the finest sounding microphone for amateur radio use, the Studio One (photo D). Bob, K9EID, Heil Sound, created the new microphone especially for the Orion transceiver, housing the microphone in an all-new, sleek, black, zinc die-cast shell.

Studio One is a professional-quality dynamic microphone. It's a cardioid-type unit with internal blast filters that exhibits a wide frequency response of 50 Hz through 14 kHz. Element response is tailored specifically for full-range SSB, AM, and FM operation. The

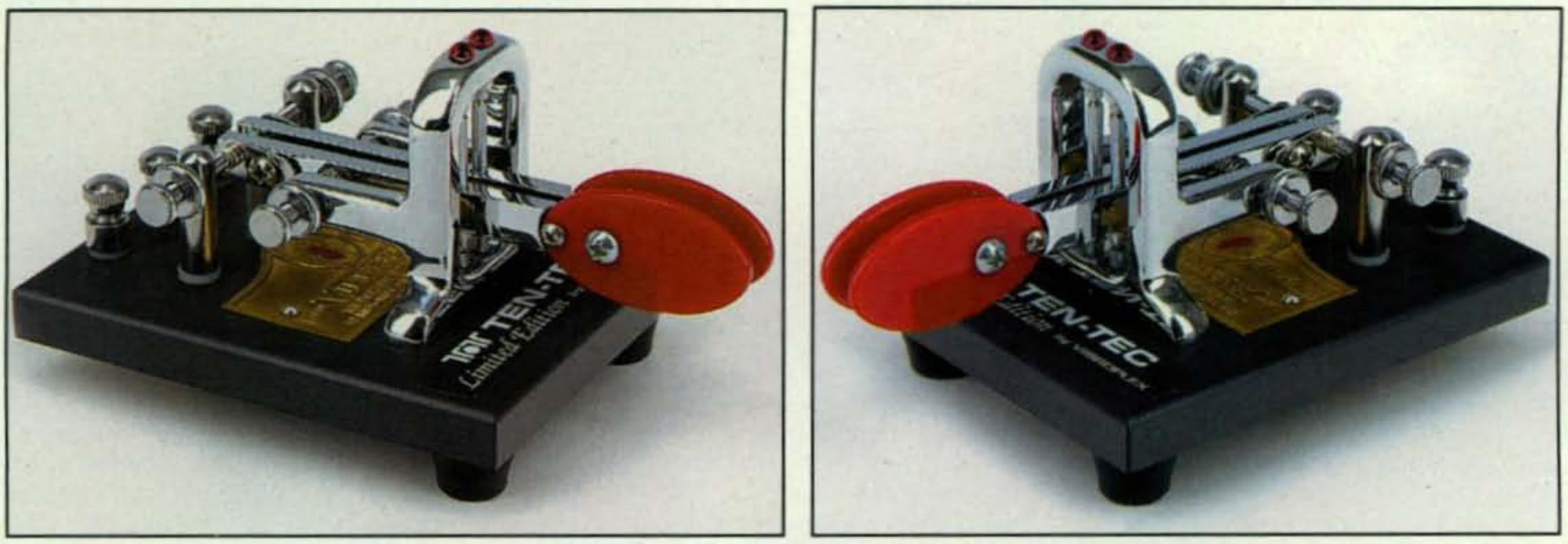

Photo E– The Ten-Tec/Vibroplex Iambic Standard Paddle is the result of a collaboration with Vibroplex. The limited-edition paddle features a gray-textured painted steel base, chrome top parts, and red finger pieces. Only 250 paddles were made, so current availability may be limited. (Photos courtesy Ten-Tec)

Studio One features a soft-touch PTT button on the microphone body, using internal gold-plated contacts. The price is $129.95, and various accessory stands, booms, and cables are available for the new mic.

Ten-Tec also has announced the limited edition TenTec/Vibroplex Iambic Standard Paddle. It's the result of a collaboration with Vibroplex, which has been building quality "bugs" and paddles for the professional and discriminating amateur radio operator since 1890.

The limited-edition paddle, priced at $169.95 and partially built by both companies, features a gray-textured painted steel base, chrome top parts, and red finger pieces (photo E). Each of the 250 paddles made sports a unique serial number, and after all have been sold, no more of the series will be manufactured. You'll have to obtain one on the secondary market.

For more information, including current availability of the limited-edition paddle, contact Ten-Tec, Inc., 1185 Dolly Parton Parkway, Sevierville, TN 37862 (1-800-833-7373; e-mail: <sales@tentec.com>; on the web: <http://www.tentec.com>).

New Kent Vail Lever Correspondent Key from Alpha Delta Communications. While we're discussing new keys, we should mention that you have the opportunity to own a piece of Morse history in the beautifully crafted replica of the first telegraph hand key ever made for Samuel F. B. Morse in 1844. It's the Vail Lever Correspondent Key, crafted by R. A. Kent Engineers of England and made available through Alpha Delta Communications.

The key is a faithful reproduction (accurate to the type of hardware used during the mid-1800s) of the first full-mechanism telegraph key that Morse's assistant, Alfred Vail, crafted for his boss. The Kent key is based on actual details from the Smithsonian Institute in Washington, D.C., where the original key is on permanent display. Each component is hand-crafted and tooled in Kent's telegraphic-works machine shop.

We should note that the original Vail Lever Correspondent Key was used in the first overland demonstration of telegraphy between the U.S. Capitol building in Washington and the Baltimore and Ohio Railroad depot in Baltimore on May 24, 1844. In this government-funded demonstration the world-famous first telegraph message "What hath God wrought?" was sent by Morse in Washington and received by Vail in Baltimore. This event, of course, served to usher in the era of telegraphy and strongly influenced hand-key designs for some hundred years.

The serialized replica keys are available for $198 each plus $8 domestic s/h. For more information and current availability, contact Alpha Delta Communications, Inc., P.O. Box 620, Manchester, KY 40962 (1-888-302-8777; e-mail: <sales@alphadeltacom.com>; web: <http://www.alphadeltacom.com>).

Antennas and Accessories

Stainless Steel Tower Support from Bo'Sun Supplies. Are you looking for a good, reliable, and reasonably-priced source of high-quality stainless-steel hardware and other components for your next tower project? If so, you may just find that maritime distributor Bo'sun Supplies has just what you need.

Bo'sun Supplies of Miller Place, New York, is a family-owned and operated business that stresses experience, knowledge, and personal service. It is best known for helping people properly equip their boats with stainless-steel marine hardware, rigging, and fittings. Recently, however, the firm has expanded its reach to include support for amateur radio tower projects, especially those which could benefit from the use of stainless-steel and titanium hardware. Bo'sun Supplies offers marine antenna mounts and brackets, wire, rope, rigging hardware, specialized fittings, turnbuckles, U-bolts, fasteners, eye bolts, shackles, spring clips and hooks, chain, tools, and more.

The firm's large indexed catalog also offers a good deal of technical information on the products it sells, including all you ever wanted to know about stainless steel. The web page, <http://www.BosunSupplies.com>, *sports a helpful* "Knowledge Page." It contains additional information on products and projects that you'll likely find quite useful.

For more information or a catalog, contact Bo'Sun Supplies, P.O. Box 5535, Miller Place, NY 11764 (telephone 1-888-433-3484; e-mail: <info@BosunSupplies.com>; on the web: <http://www.BosunSupplies.com>).

Postscript: If, like me, you're not a nautical type, we'd better mention just what a bo'sun is, to possibly save you a trip to the dictionary. A bo'sun, or boatswain, is a warrant or petty officer, usually one of the best seamen. He's in charge of a ship's rigging, anchors, cables, and deck crew.

Autek Research Advanced Antenna Analysts™. While this column mostly features new things for the radio shack, sometimes it's fun to rediscover classic products that have stood the test of time and that may not be well known

to newcomers in the amateur radio community.

Several such products are offered by Autek Research, and they bear mentioning here. Autek Research, founded by Bill Onesky, N6WO, has been turning out high-quality amateur radio accessories since 1972, most notably their line of advanced antenna analysts™. In previous columns we profiled the RF1 RF Analyst and the RF5 VHF Analyst, but we haven't mentioned the newer VA1 RX Vector Analyst. We should, since the VA1 is claimed by the manufacturer to do more than other competitive devices.

The pocket-size VA1 RX Vector Analyst (photo F) is designed to check and adjust antennas, feedlines, and RF networks. To do this, it includes a microprocessor, A/D converters, and a low-power "transmitter" with a four-digit frequency readout, continuously variable from 0.5 to 32 MHz in six bands.

Like its little brother, the RF1 Analyst, the VA1 measures RF values of true impedance (0–1000 ohms), SWR (1 to 15:1), C (09999 pF) and L (less than 0.04 to 300 µH). The VA1 model adds a true signed RF phase detector to give you the antenna load R and signed X components. You can use the device ($199.95 plus $8 s/h) to measure SWR, feedline loss, impedance, electrical length, and much more. All parameters are read out digitally on the VA1 for the highest accuracy.

Contact Autek Research, P.O. Box 7556, Wesley Chapel, FL 33544 (telephone 813-994-2199; e-mail: <mail@autekresearch.com>; on the web: <http://www.autekresearch.com>). The website offers discussion of many practical applications for the VA1, RF1, and RF5 Advanced Antenna Analysts.

Photo F– The pocket-size Autek Research VA1 RX Vector Analyst is designed to check and adjust antennas, feedlines, and RF networks. It includes a microprocessor, A/D converters, and a low-power "transmitter" with a four-digit frequency readout, continuously variable from 0.5 to 32 MHz in six bands. (Photo from the Autek Research website)

Software and Computers

Visual Callsign Database from Octavia Company. In several previous columns, most recently in June 1999, we profiled various programs offered by Octavia Company, Ltd. and developed by Valery A. Kharchenko, RA6YR. These programs were designed to be a reliable source of Commonwealth of Independent States (CIS) callsign information. The CIS, of course, represents most of the former republics of the old Soviet Union.

Now Octavia has announced the release of Visual Callsign Database 3.0 ESD (Electronic Software Delivery), a most comprehensive source of CIS callsign information. First released in 1990 as R&R Callsign Database, VCD 3.0 is designed to assist amateurs in successfully QSLing the CIS countries. The updated version spans the CIS with station information representing more than 59,000 licensed radio amateurs, including those in Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Ukraine, Uzbekistan, Tajikistan, and Turkmenistan.

VCD 3.0 provides a wide range of impressive features. These include in-

stant access to more than 81,000 entries, including current, contest, special event, and Silent Key callsigns. Data are converted to English equivalents but presented in forms recognizable by postal workers. There are more than 23,000 cross references from old to new callsigns.

The program also includes numerous personal photos and QSL card images, e-mail addresses, home telephone numbers with area codes, club membership information, grid locator, powerful search capabilities, QSL bureau listings, data export to the clipboard, label printing, and much more.

You can download a free 30-day trial version from the Octavia website, and you can purchase an unlimited license for the program securely online or via postal mail for $20 USD. Registered users get one year of free updates. Also, a fully functional CD-version is $30 USD, while a one-year CD-based VCD subscription is $50 USD. All major credit cards are accepted.

For more information, contact Valery, RA6YR at Octavia Company, Ltd., P.O. Box 40, Maykop, 385000, Russia (international telephone +7 [902] 449-5280; e-mail: <info@octavia.com>; web: <http://www.octavia.com>).

From the Bookshelf

From the ARRL: Son of *Solid State Design for the Radio Amateur.* The American Radio Relay League has announced the publication of *Experimental Methods in RF Design* (photo G), by Wes Hayward, W7ZOI; Rick Campbell, KK7B; and Bob Larkin, W7PUA. The addition to the ARRL Radio Amateur's Library is heir to the popular *Solid-State Design for the Radio Amateur,* which left an indelible mark on radio communications following its 1977 release. The new ARRL book brings professional RF design experience to the radio amateur. At the same time it's written for anyone with a driving curiosity about the design, experimentation, and measurement relating to state-of-the-art equipment.

Photo G– The ARRL has announced the publication of Experimental Methods in RF Design, *by Wes Hayward, KK7B; Rick Campbell, KK7B; and Bob Larkin, W7PUA. The book is heir to the popular* Solid State Design for the Radio Amateur, *published in 1977. The new book brings professional RF design experience to the amateur. (Photo courtesy ARRL)*

Contents of the book include basic investigations in electronics; chapters on amplifiers, filters, oscillators, and mixers; superhet transmitters and receivers; measurement equipment; direct-conversion receivers; phasing receivers and transmitters; DSP components and communications applications; and field operation, portable gear, and integrated stations.

The book is published by the ARRL at $49.95 plus $8 s/h, and it includes a CD-ROM. Contact the American Radio Relay League, 225 Main Street, Newington, CT 06111-1494 (1-888-277-5289; e-mail: <pubsales@arrl.org>; web: <http://www.arrl.org/catalog>).

Wrap-Up

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

Overheard: It seems to me that a person who frequently asks you for your advice may actually be seeking praise rather than help. 73, Karl, W8FX

Pixies, Tixies, and Milliwatts

BY DAVE INGRAM,* K4TWJ

qrp

Low-cost fun is the mainstay of QRP, and this month's column addresses that interest head-on! It features a lighthearted look at milliwatting and a quick-brew project everyone can build—the ever-popular Pixie mini-transceiver. The Pixie is not new; it is just one of those timeless circuits that is fascinating to study and modify, plus it will even operate from a regular 9 volt battery for emergency preparedness and milliwatting fun. Ah, but isn't working stations while running only a fraction of 1 watt sort of a fantasy? Definitely not, dear friends. In fact, a number of dedicated QRPers are having a ball making both in-country and DX (yes, DX) contacts using sheer milliwatts of power (QRPp) right now on 20, 30, 17, 12, and 10 meters. A couple of the boys even volunteered to share some of their experiences with us. Let's begin with their stories.

Adventures in Milliwatting

Our good friend Bill Lazzaro, N2CF, gets into QRPp in a big way (photo A). He uses a Yaesu FT-817 and Buddipole portable antenna to operate "pedestrian-mobile style" while hiking and camping, and his milliwatting success includes working more than seven VKs on 20 meters while using only 0.5 watt. Bill says he usually operates SSB using 2.5 or 5 watts and makes plenty of contacts. When he receives a report of 56 or higher, he tells the other station he is running QRP and would like to drop power to see how low he can go and still be heard. As he reduces power, he states the level twice so the other station can evaluate results, then he returns to the original 2.5 or 5 watt level and stands by for the report. Bill says the results are quite surprising, with most stations copying him at 1 watt and at 500 milliwatts. In fact, he has worked over 100 DX stations while running 500 milliwatts—on SSB, no less! What's the secret? Bill offers the following tips.

"Study the bands. Know when each band will be open and to what part of the world at any particular time of the day and year. Avoid being a one-band ham. If you cannot contact a DX station in five calls, move on. There is sure to be another good DX station down the band. Work DX contests, too (at the 5 watt level). They are great fun and a terrific way to increase your country count. Try outdoor, portable, and/or pedestrian-mobile QRP operations. It is amazing what you can work with a couple of watts—and less—and a breakdown Buddipole antenna. Maintain a 'can do' attitude, and you will succeed."

Thanks for those words of wisdom, Bill! We look forward to reading more of your comments and seeing more pictures of your QRPp ventures in future columns.

Now reflecting back on one of my own experiences, I recently answered a CQ from K3NZ on 14.060 MHz and was blown away when Norm described his rig (photo B). It was a Small Wonder Labs Rock Mite mini-transceiver built on a 2 inch by 3 inch PC board and running less than 500 milliwatts. I'm serious—less than half a watt. Norm's signal was not strong, but it was not so weak that you would just tune past it and ignore his CQ either. I didn't, and I was in a rush and pressed for time to boot. Now that is what milliwatting is all about, friends— having fun with a tiny rig you can hold in the palm of your hand or carry in a shirt pocket.

You can see close-up views of the Rock Mite's circuitry at <www.smallwonderlabs.com>, check out a supporting custom enclosure at <www.americanmorse.com>, and read about clever Mite mods at <www.qsl.net/n0rc/rm/>. Check 'em out. This is one hot mini rig!

A Tale of Two Pixies

A few years back our QRP associates in Great Britain devised a clever mini-transceiver that used its transmit output transistor to serve double-duty as a converter/mixer on receive. I am not sure who should receive credit for designing this unique circuit, but it is good. I first saw it in the FOXX transceiver designed by GM3OXX. Soon afterward, a similar version called the *Pixie* surfaced. An on-the-air contest of Pixies working Pixies plus Pixie building contests at club meets and QRP confer-

Photo A– Here's Bill Lazzaro, N2CF, hiking, hamming, and milliwatting to the max. The rig is a battery-powered FT-817 strapped around his neck, and the antenna is a popular "Buddipole" <www.buddipole.com> supported by a painter's pole that doubles as a walking stick. Bill has made numerous DX QSOs on SSB while running less than 1 watt with this setup. (Photo via N2CF)

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

Photo B– Looking over the shoulder of Norm Zoltack, K3NZ, we see what's responsible for his attention-grabbing 20 meter signal—a little 500 milliwatt Rock Mite transceiver from Small Wonder Labs mounted in an Altoids tin. Using this gem Norm has worked 45 states and 15 countries, including a record-setting 10,000 mile CW QSO with VK4CEU in Australia. Life doesn't get much better than that!

Parts List

C1, 2: 100 pF
C3: 82 pF
C4: .05 µF
C5, 15: .01 µF
C6, 7: 820 pF
C8: .1 µF
C9, 10, 11: 10 µF/16 V
C12: 5–50 pF variable cap
C13, 14: 1 µF/16 V
C16: .001 µF
D1: 1N914
IC1: LM386
IC2: 78L05
IC3: Tick keyer chip
J1: BNC antenna connector
L1: 15µH
L2: 100 µH
L3: 2.2 µH
Q1, 3, 4: 2N2222
Q2: 2N3053
R1: 1.5 K
R2: 47 K
R3: 10 K
R4: 1 K
R5, 6, 8: 4.7 K
R7: 8.2 K
R9: 33 K
SW1: N.O. momentary PB switch

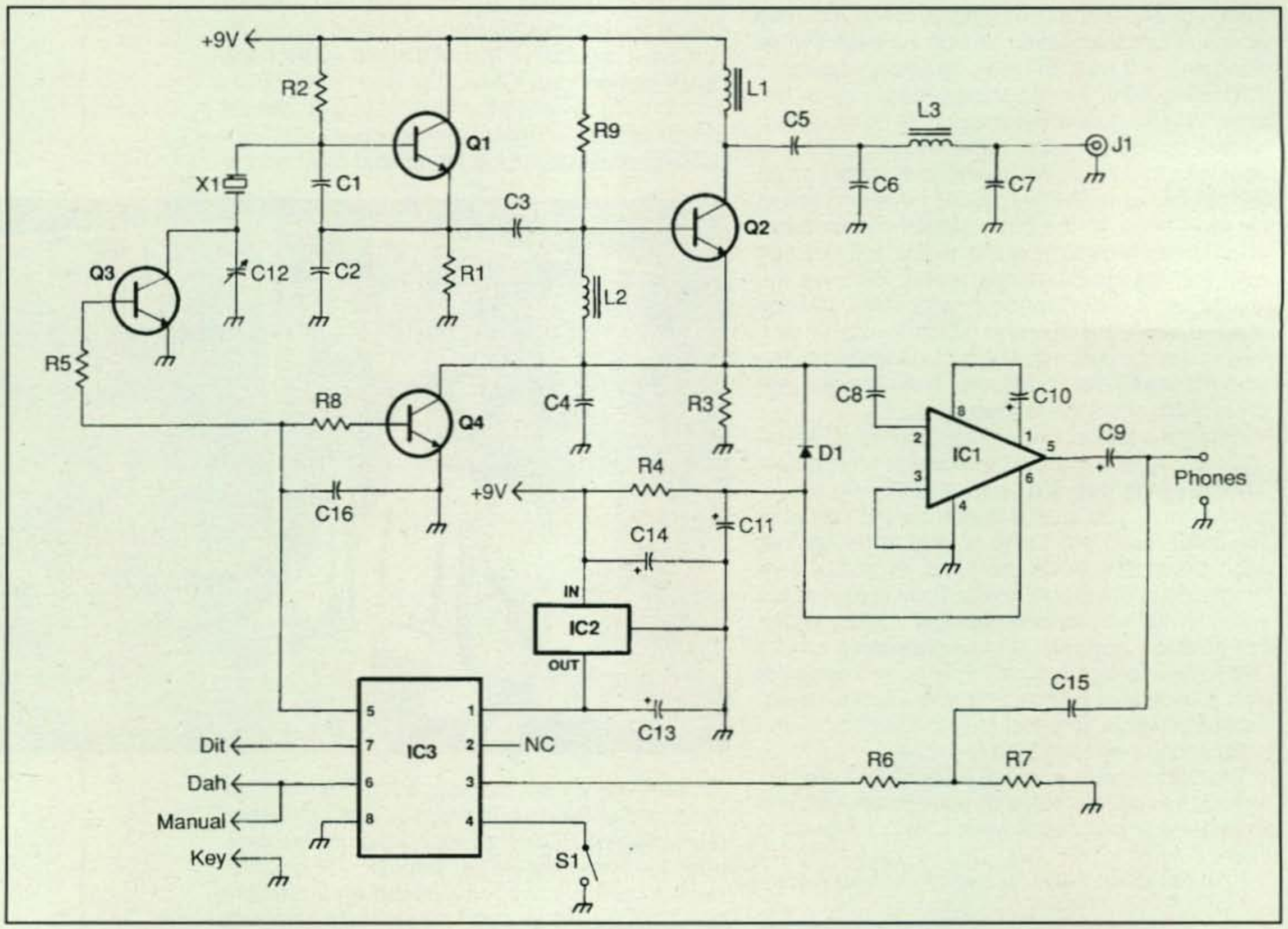

Fig. 1– Circuit diagram of the Embedded Research Tixie mini-transceiver. (Discussion in text.)

ences followed (it is a superb quick-brew project). The Pixie then became one of those classic direct- conversion circuits that periodically surfaces and fades but never dies.

The Pixie typically works 80 or 40 meters with 400 or 500 milliwatts output, but it is easily modified for 160 or 30 meters and slightly more power. It can operate from a regular "available anywhere" 9 volt battery, which makes it very appealing for emergency preparedness during these uncertain times (you do now have your own survival plan in place, don't you?). In many ways, it reminds me of a modern equivalent to that little grid-dip mini-transmitter K6ATX used to save the day in the classic amateur radio book *SOS At Midnight.* Considered from the "always be prepared" point of view, homebrewing and carrying your own Pixie every day is a good idea. The Pixie has been made in several varieties, with PC boards being offered by FAR Circuits <www.cl.ais.net/farcir/>, kits from Embedded Research <www.frontiernet.net/~embres>, and possibly others. Complete FOXX kits (which are akin to super Pixies) are also available from Kanga U.S. <www.bright.net/~kanga/kanga/kanga@bright.net>.

You are probably curious about how the Pixie works or are entertaining the thought of building one from on-hand parts and a piece of perfboard, so let's take a tour of its circuitry.

Let's use the Embedded Research Tixie (a Pixie with an on-board E. R. Tick keyer) for our circuit study (photo C and fig. 1). The actual Pixie transceiver consists of crystal oscilla-

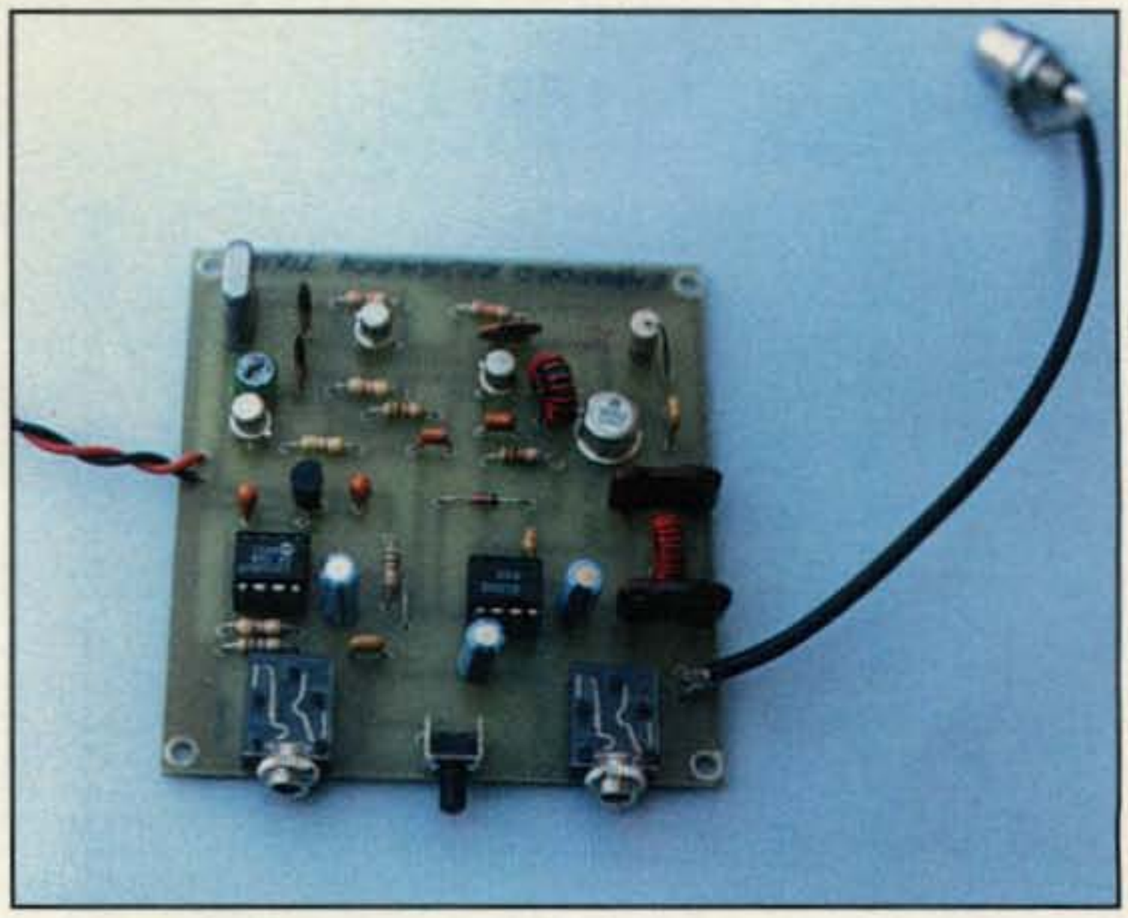

Photo C– The Tixie mini-transceiver from Embedded Research is a combination Pixie and Tick keyer on a single PC board. The little rig runs 500 milliwatts when powered from a 9 volt battery,. and more with higher voltage. Front sockets accept key and earphone. Center push-button controls keyer, sidetone, and memory functions.

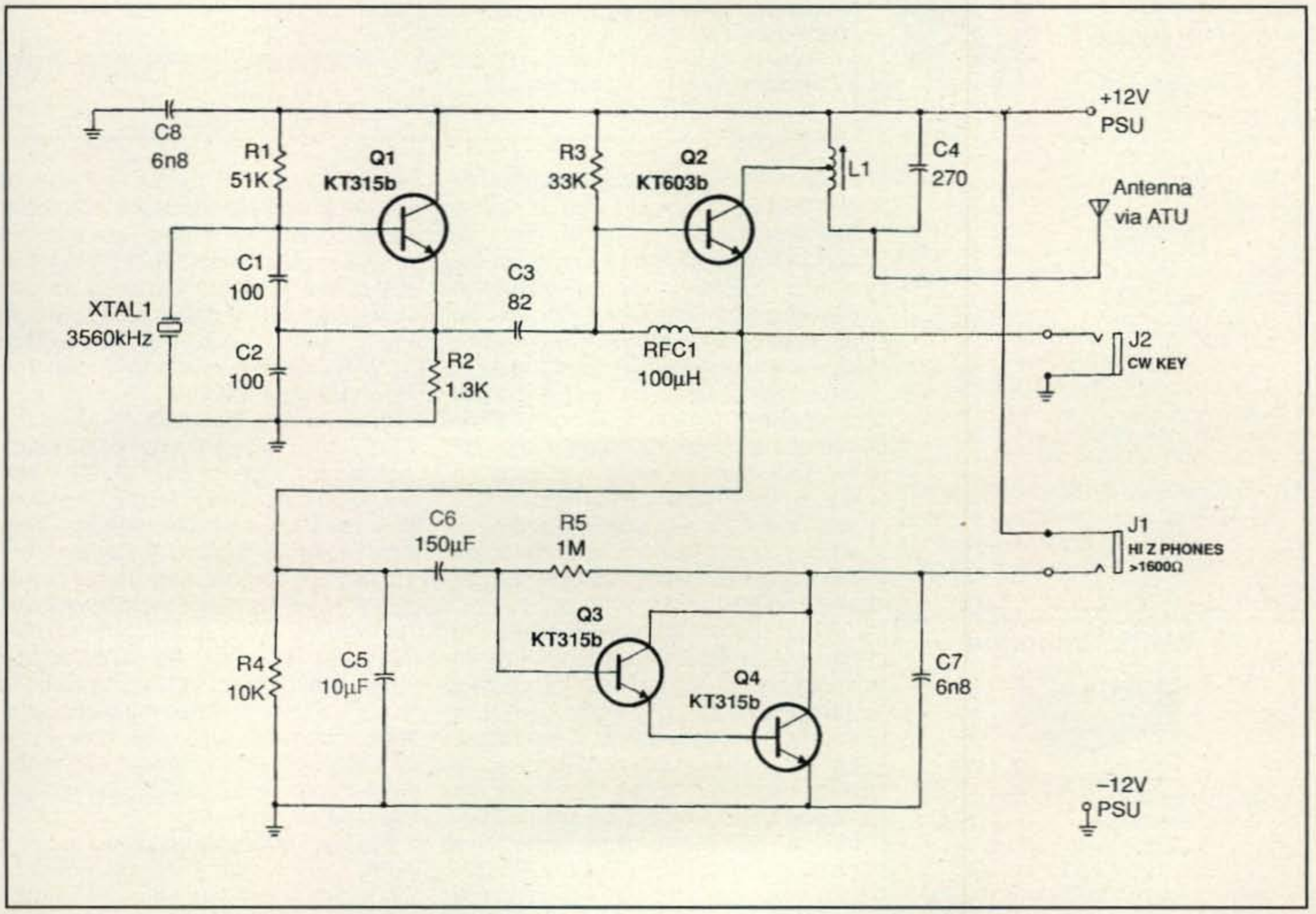

Fig. 2– Circuit diagram of the Micro 80 built by Oleg Borodin, RV3GM, and discussed in the text. The unit is essentially a modified Pixie. It was featured in the October 2002 issue of QRP Quarterly; *the QRP Amateur Radio Club International's magazine, and is highlighted here thanks to* QQ *editor Mike Goins, WB5YJX.*

Clever Carrying Cases

Say your lifestyle is a mite hectic and tends to pre-empt time for homebrewing? Relax. Where there's a will, there's a way. The approach I have used successfully for many years is carrying a "gotta build" kit or project complete with PC or perfboard, soldering iron, and mini-tools in a small case and installing just three or four parts during lunch time or after dinner each day. The process may not be quick, but it works if you stick with it. Consistency is the key. There is a lunch time in every day.

So what is the best way to carry a project and the completed rig (with extras) after assembly? I found the perfect answer in the new PowerPort Radio Wallets shown in the accompanying photo. The larger one (with tools and two kits in it) measures 3"H × 10"W × 5"D, and the smaller one is 2.5"H × 7.5"W × 4"D. Both wallets are well padded and include a layer-type divider so they can carry two rigs or a project and a rig without scratches. They are super-cool! I topped the smaller wallet with a patch from the QRP ARCI Toy Store (1640 Henry, Port Huron, MI 48060) and carry goodies in style.

Need a handy way to carry "under construction" homebrew projects and/or assembled and ready for operation QRP rigs? PowerPort's Radio Wallets work great. They go anywhere on a moments notice, and they are ideal for keeping all the pieces and tools for on-the-spot building in one place.

Radio Wallets are available from PowerPort at 1-800-206-0115, or on the web at <www.powerportstore.com>. Check 'em out!

tor Q1 and RF amplifier/receive mixer Q2 plus audio amplifier IC1 (and, of course, their associated circuitry). Transistor Q3 acts like a switch, with its collector and emitter shorting out receive-offset capacitor C12 on transmit—a clever but not mandatory feature. Likewise, Q4 is a keying transistor that simply grounds the emitter of Q2 on transmit. If you wish to assemble a strictly "bare bones" Pixie, you can eliminate Q3 and Q4 plus R5, R8, C16, the Tick keyer with programmable memory, its voltage regulator IC2 plus C14, C13, and sidetone-setting R6 and R7, plus C15. A miniature hand key can then be connected "across" or in parallel with R3.

When the key is up, the oscillator signal from Q1 (which is established by the frequency of crystal X1) is coupled through C3 to Q2's base. Simultaneously, incoming signals pass through low-pass filter C7, L3, and C6, plus coupling capacitor C5 to Q2's collector. Incoming and oscillator signals mix at the base of Q2, and resultant audio tones develop across emitter resistor R3. The tones then pass through C8, get amplified by IC1, and go to the earphone(s).

When the key is closed, it shorts out R3 and grounds the cathode of D1. This cancels received signals developing across R3, cuts off operating voltage to IC1, and direct-grounds the emitter of Q2 so it becomes a full-power transmit amplifier. Remember C12? If it is left in the circuit (with Q3 removed as discussed earlier), it becomes a mild tuning or "warping" capacitor. Add a 10 or 16 µHy coil in series with it, and you have a simple VXO.

Now for fun, let's think "outside the bun"—err . . . box. First, IC1 plus its support components of D1, C8, C10, and C9 (remember R6, R7, and C15 were deleted if/when we dropped the Tick) can be eliminated and the audio from R3 can be routed to an external amplifier. A small transistor radio works well here, just wire its volume control in parallel with R3, using C8 to block DC. Better yet, connect the output from R3 and C8 to one of those rinko cassette-tape adapters and play the Pixie through your Walkman or car radio. Feel creative? Build the Pixie right into the tape adapter!

Finally, I offer one additional idea for home experimenters. Consider designing and building your own crystal-controlled one-transistor transmitter that will use a regular NPN transistor so you ground its emitter to transmit. Add a potentiometer between that emitter and

ground, tap off the potentiometer to acquire audio for external amplification, and then short the potentiometer with a key to transmit. Add fine touches such as VXO, etc., and you have a *one transistor transceiver.* Build it surface-mount style, and it also becomes the world's smallest transceiver!

Column space is now tight, but there's more—a second Pixie. It is nicknamed the Micro 80 (although a Micro 40 or Micro 30 is possible with a crystal and output filter change). It was built by Oleg Borodin, RV3GM, described in a past issue of the G-QRP Club's magazine *Sprat,* revisited in the QRP Club International's *QRP Quarterly* magazine of October 2002, and is shown in fig. 2. Compare this little treat's circuit with our previously discussed Tixie/Pixie, and you will notice they are quite similar, with mild oscillator changes and a transistor rather than IC-based audio amplifier section. Oleg also used a parallel L-C output filter (L1 and C4) rather than a P1 filter.

See how easy it is to modify circuits? What about those strange European KT315 and KT603 transistors, you ask? No problem. Just substitute 2N2222s or 2N3866s and use a 2N3053 for the transmit PA. Dink and enjoy!

Our special thanks to the QRP Amateur Radio Club International (QRP ARCI) and *QRP Quarterly* for permission to feature the RV3GM circuit here in *CQ.*

Join QRP ARCI

If you are interested in QRP to any degree, I heartily encourage joining the QRP Amateur Radio Club International and following all the hot news, contests, and fun projects discussed in their *QRP Quarterly* magazine. Every issue is packed with page after page of neat stuff. Editor Mike Goins, WB5YJX, is an enthusiastic QRPer, and his excitement for QRP is reflected in *QQ.* Have a question? You can reach Mike at <mgoins @usa.net> or check out the club's website at <www.qrparci.org>. Joining is also easy. Club dues and a *QQ* subscription are $15 a year ($18 VE, $20 DX) and go to QRP ARCI, 117 E. Philip St., Des Moines, IA 50315-4114.

Conclusion

That overflows space for this time, gang, but stay tuned for more good information highlighting QRP-attractive antennas, 60 meter QRP pioneering, and new goodies in future columns. Meanwhile, have a ball enjoying today's fastest growing pursuit—QRP!

73, Dave, K4TWJ

contesting

BY JOHN DORR,* K1AR

Volunteering Your Time

June's Contest Tip of the Month

Are you "multiplier aware" when you operate contests? Regardless of the operating event, it's a good strategy to have a running list of needed multipliers that matches the contest's rules. For example, try spending a few minutes during slow operating times to compile a list of easy-to-work needed countries by band. Keep that information readily at hand and you'll be amazed at the overall improvement you'll see in your contest scores. Avoiding the negative effects that come from missing easy multipliers is one sure way to improve your contest score in the next one!

Calendar of Events

May 17–18	Baltic DX Contest
May 17–18	US Counties SSB QSO Party
May 17–18	Anatolian WW RTTY Contest
May 24–25	**CQ WW WPX CW Contest**
May 31–June 1	Great Lakes QSO Party
June 7–8	IARU Region 1 Field Day
June 14	Portugal Day Contest
June 14	Asia-Pacific Sprint Contest
June 14–15	ANARTS WW RTTY Contest
June 14–15	West Virginia QSO Party
June 14–15	WW South America CW Contest
June 21	Kid's Day
June 21–22	All Asian CW Contest
June 21–22	SMIRK 6M Contest
June 28–29	ARRL Field Day
June 28–29	Marconi Memorial HF Contest
July 1	RAC Canada Day Contest
July 5–6	Venezuela Independence Day Contest
July 12–13	IARU HF World Championship
July 19–20	**CQ WW VHF Contest**

It may be the poor conditions from the recent CQ WW WPX SSB Contest that spurred my thinking this month. On the other hand, it may be an old bug-a-boo of mine that wishes more contesters would proactively share their experiences with others in the spirit of adding to our ranks and improving amateur radio in general. Whatever the case, volunteerism has become one of this decade's popular buzzwords. There simply are not enough days in the week to allow an individual to serve in the hundreds of organizations and worthy causes that need volunteers in one form or another.

Contesters Have Great Experience

Without a doubt, volunteerism is one vehicle that can help boost our hobby both in terms of numbers and involvement. Contesters, in particular, are perfect candidates to lead in this area. Yet I wonder, are we missing the opportunity? A predictable dynamic for many contesters is that, as a whole, we are very active amateurs. Not only do we enjoy a variety of on-air activities outside of contests (i.e., DXing, awards chasing, etc.), we are intimately involved in the technical side of the hobby. The nature of contest operating itself demands the need to push our hobby's technical edge—something that benefits all amateurs in the long run.

While this aspect of our involvement is all well and good, the area that I would like to focus on this month goes beyond operating and technical achievements. It is an area of commitment that is at the very core of every amateur radio operator's being—serving through volunteerism.

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Here's Roman, RZ3AA, sitting in front of one of the world's most famous stations, 4U1ITU. (Tnx RZ3AA)

Teaching Others

Take a minute and consider the opportunities for volunteerism in our hobby. Without giving it too much thought, some obvious ones come to mind. Being part of the volunteer amateur exam program is a great way to lead in this area. Have you ever experienced the look in another person's eyes as he or she passed that first amateur exam? It can be as rewarding for the examiner as it is for the new ham.

Another related area is classroom teaching. While you may not feel that you have a gift in this area, there are so many other ways you can provide assistance besides stand-up teaching. Consider ideas such as the development of curriculum, producing classroom materials, setting up radio demonstrations, videotapes, etc. Who in amateur radio has better experience in this area than a hardcore contest operator who has spent years pushing the hobby to its limits?

The Local Club

Local club involvement, especially in traditional general-purpose clubs, is another area worth pursuing.

More on Bad Packet Spots

Last month K1AR tackled the increasing problem of incorrect callsigns being "spotted" on packet clusters during contests, and those bad spots working their way into way too many contest logs. We were very squeezed for space in the May issue and didn't have room for Table I, a compliation of bad spots gathered by John over the course of a single contest, the 2003 ARRL DX SSB. Here's his "snapshot" of this growing and disturbing trend.

—W2VU

Spotted Call	Correct Call	Freq.
4L6GM	4L6AM	14185.0
5NOEVR	5NØEVR	24980.0
5Z2GT	5Z4GT	21215.1
6D2FM	6D2YFM	3760.9
6Y2DFM	6D2YFM	14237.0
6Y8X	6Y8Z	28555.0
9A2A	9A1A	14248.2
9A2A	9A1A	3755.6
9Y2TYG	9Y4TBG	28397.7
9Y4TB	9Y4TBG	28382.7
AP1A	8P1A	14228.0
AP1A	8P1A	14264.5
AP1A	8P1A	14274.4
BW3/UA3VCS	BW4/UA3VCS	3776.5
BY4BJB	BY4BZB	21289.7
C02TK	CO2TK	28428.2
CM6RCL	CM6RCR	1877.2
CN2	CN2R	21281.0
CO8T	CO8TW	28506.3
CQØWW	CQ0BWW	14194.0
CQ2BWW	CQØBWW	14193.0
CQ2BWW	CQØBWW	14193.0
CT1BAP	CT1BOP	21390.0
CT1BO	CT1BOP	21234.1
D44DT	D44TD	21321.2
DJ2HJ	DJ3HJ	28384.8
DK8TU	TI8/DK8TU	14260.3
DK8TU/TI	TI8/DK8TU	14314.4
EA1DD	EA1DDO	21249.0
EA3GU	EA3KU	21432.7
EA8BK	EA8BH	3780.0
EA9BH	EA8BH	3789.4
EM5A	TM5A	21365.0
FM5NA	PJ5NA	14171.6
FY5K	FY5KE	28445.4
FY5K	FY5KE	21341.3
FY7KE	FY5KE	1852.0
HBØAUS	HB9AUS	14288.4
HG5S	HG1S	21397.4
HG5S	HG1S	21397.4
HI8/K4UN	TI8/K4UN	28437.8
HU1UA	HU1A	7269.0
IK1MJD	IK1MJG	21365.9
IK1MJD	IK1MJG	28492.0
IO47	IO4C	28528.7
IT9WPA	IT9WPO	14308.8
IT9ZM	IT9ZMX	21305.9
IU9SU	IU9S	14237.0
JA6YBK	JA3YBK	14255.9
JA8RWJ	JA8RWU	14285.0
JC1XX	KC1XX	14158.0
JD2ZJW	JA2ZJW	14228.2
JF1HOL	JF1HOH	28538.7
JG2SHN	JG2SON	28527.1
JG3UFB/1	JG3UOB/1	21434.8
JG3UOB	JG3UOB/1	21427.6
JG3UXB	JG3UOB/1	21427.6
JG3UXB	JG3UOB/1	21427.6
JH1EFQ	JH1EAQ	3794.0
K8TU/TI8	DK8TU/TI8	21377.8
K8TU/TI8	DK8TU/TI8	14314.5
KC4XX	KC1XX	3807.0
KH6/K2PLE	KH6/K2PLF	14282.6
KH6/K2PLE/	KH6/K2PLF	14282.6
KH6RRR	KH6RR	28424.9
KH6RRR	KH6RR	21277.0
KH7/K2LPF	KH6/K2PLF	21383.0
LUØDVI/H	LU2DVI/H	21281.6
LU1F	LU1FF	14200.1
LU1F	LU1FF	14200.1
LU2FM	LU2FA	28405.2
LU5ETB	LU6ETB	28466.1
LU7H	LV7H	21251.0
LU8DX	LU8DW	28381.7
LWØN	LVØN	14315.0
LW9E	LW9EOC	28436.0
LZ1250	LZ125O	21349.8
NP3XH	NP3XF	14288.1
NY2DX	NY6DX	14323.8
OA4A	OA4O	14348.7
OA4A	OA4O	28332.0
OE5CIL/5	OE5CWL/5	21421.4
OE6SKQ	OE8SKQ	14282.4
OMØMO	OMØM	3734.9
OMØMOM	OMØM	3725.8
OMOM	OMØM	3730.0
OZ1HWQ	OZ1HXQ	21329.0
P47KP	V47KP	3775.3
P47KP	V47KP	28535.0
P47KP	V47KP	28561.7
P47KP	V47KP	21318.7
PJ5/A1ACX	PJ5/UA1ACX	28550.0
PT2TEL	PY2TEL	21285.2
PT2YEL	PY2TEL	21285.2
PY5DBU	PY4DBU	28563.4
PYOFF	PYØFF	14174.0
RL3AW	RL3A	14277.5
RM2F	RW2F	21350.8
RW2FRW	RW2F	14261.0
S50Ø	S5ØO	3711.0
S53Ø	S53O	3720.3
SN2A	SN3A	21362.2
TI8/K4NU	TI8/K4UN	21250.1
TI8/K4U	TI8/K4UN	3787.1
TI8/K4UG	TI8/K4UN	14223.3
TI8/K4UG	TI8/K4UN	14223.3
TI8/K8TU	TI8/DK8TU	28402.7
TI8/K8TU	TI8/DK8TU	28402.0
TU2SZ	TU2XZ	28487.2
TU2SZ	TU2XZ	28500.0
UAOZC	UAØZC	21250.0
UAOZC	UAØZC	21260.0
UK1D	UQ1D	14227.0
V44KP	V47KP	21384.7
V47KD	V47KP	21318.6
V47KPZ	V47KP	1851.9
V74KP	V47KP	3772.0
V74KP	V47KP	28560.8
V74KP	V47KP	28560.0
V9/W6PH	VP9/W6PH	3794.2
VP8A	VP5A	28492.3
VP8A	VP5A	28492.3
VP9/26PH	VP9/W6PH	3784.5
W2LPL	W3LPL	14315.2
YV4FSM	YV4FZM	3773.8
YV4FSM	YV4FZM	3792.4
YY5JNN	YY5JMM	28470.0
YY5MM	YY5JMM	28355.6
YY5UMM	YY5JMM	28355.5
ZF3AH	ZF2AH	21310.6
ZL1BI	ZL1BX	28650.0

There's not a club to be found that doesn't have a need for someone to pitch in and help, and most clubs are clamoring for experienced hams to be those volunteers. Whether it is editing the club newsletter, coordinating Field Day, or offering technical support, the needs are endless. It can also be as simple as giving a talk on contesting to a few clubs in your local area over a planned period of time.

Some of you may be aware of a program in the Yankee Clipper Contest Club called Contest University. The idea was spawned to introduce contesting to less-experienced members as a way of pushing them along to the ranks of the "old timers." Why not consider implementing a "contest university" within a non-contest club to move the members towards a higher level of on-air activity? As an alternative, you could make it more generic and simply introduce your hungry crowd to the thrill of HF operating. The beauty of club involvement is that the results of your labor can be extremely meaningful and immediate.

Being an Elmer

One of the longstanding traditions in our hobby has been the art of Elmering newcomers into the fold. Take a minute and think about the Elmer you may have had when you started out. Wasn't he great? My Elmer was an incredibly patient guy who had all the time in the world for me. I was young and filled with enthusiasm, and he was ready and able to channel that enthusiasm into productive hamming. It's all too easy, after being a ham for 20 or 30 years, to forget how little we knew about ham radio when we first started out. Something as simple as putting up a dipole or learning the ancient technique of tuning for rare DX without packet spots is absolutely an acquired skill that can be passed on to others. There's probably no better way to volunteer than by informally taking a new ham under your wing of experience and helping him or her along.

Public Volunteerism

Beyond serving ourselves, if you will, is the area of amateur volunteerism which serves the public. We've all heard of the need for 2 meter "crowd control" operators at a parade or other public event. Have you actually ever served in that capacity? Can you envision the effective communication that could come from a group of contest operators leading the charge in this area at the next high-profile sporting event in your city?

Beyond serving in events is getting involved in activities that promote amateur radio to the public at large. Shopping malls, libraries, and other public venues are excellent ways to do this. It just takes people to make it happen. It takes volunteers. Any school teacher will nearly jump out of the chair when offered the chance to have ham radio demonstrated to a classroom of inquisitive students. Similarly, a ham radio demonstration conducted by a local club at one of the local shopping malls is likely to be extremely well received by both mall officials and the public. It exposes hams as they are—active individuals who care about serving others and enjoy their hobby, not as introverts who live in the dungeons of their basements destroying home electronics worldwide.

Update

Since we went to press with our May issue, we learned that High Sierra Antennas has added a 3/8-24 mount for its HS-900 shortened HF mobile antenna. This adds the HS-900 to the category described by Contributing Editor WB6NOA in his article "Small Motorized HF Antennas," introducing a class of mobile HF antennas that may be mounted on trunk lip or window mounts. At 4.5 pounds, the 900 is somewhat heavier than the two antennas described in the article, but its 2 foot base section and 5.5 foot maximum height puts it squarely into this new category. For more information, visit the High Sierra website at <http://www.cq73.com>:

Now A Call to Action

I want to take this opportunity to challenge all of us by suggesting a call to action. As the summer is rapidly approaching, there's no better time to take some of this month's topic to heart. Let's be honest. In today's day and age time is a precious commodity. However, then again so is our hobby. Its long-term health is, in part, dependent on what we put into it—not what we take out. Are you up to the task? Can you identify an area in which to serve and actually follow it through to the end? If you take the challenge, I guarantee that you and ham radio will be better off for it. If you have a success story or personal experience, I'd love to share it with others. The ball is in our court.

Final Comments

As summer approaches, so does the opportunity for those antenna projects. For those of us who are easily overwhelmed by what "can be done," try picking one band this summer as your target and focus on improvements in that one area. As the sunspots continue to deteriorate, 40 and 80 meters may be just the place to focus your attention.

Well, that's all for this month. Now get to work outside before it starts to rain!

73, John, K1AR

BY CARL SMITH,* N4AA

DXing Through QRP Lenses

This spring has been interesting for DXing. With the situation in the Persian Gulf area and the deadly virus emanating from southeast Asia, travel was somewhat restricted for a lot of folks. I know some DXers who had been looking forward to coming to Dayton and had to cancel their plans for one or the other of the reasons stated above. Hopefully everything will settle down later this year and we can get back to "normal" travel arrangements.

Some areas were not affected by the problems, however, as evidenced by the German group who put Sudan on the air in March/April as ST0RY. It was an outstanding operation, putting nearly 50,000 QSOs in their logs and giving many DXers a new one on many bands.

Another operation coming up in mid-April as this is being written will be S05X from Western Sahara. That one should have livened up the bands for a week or so with an around-the-clock operation from a group of eleven experienced, well-traveled DXpeditioners.

Two operations are coming up in July from Lesotho. Called the "African Double Jump" with operation from Botswana July 2–5 and then Lesotho July 7–11, this operation will be by Fabrizio, IN3ZNR; Mauro, IN3QBR; and Joe, AA4NN. The trip is more of a "ham vacation" than DXpedition, as they plan park tours, safaris, sight seeing, and night-life activities. For more details on this operation see their neat website at: <http://qsl.net/xu7aay/africa/index.html>

The other operation from Lesotho, July 18–25, will be by three Texans and one Canadian: Frosty, K5LBU/7P8CF; Madison, W5MJ/7P8MJ; Tom, WW5L/7P8TA; and Neil, VA7DX/7P8NK. This will be an all-band/mode operation, and Frosty says, "We hope to have at least one station on the air 24 hours a day." They will operate from the Hotel Mount Maluti near Mohale's Hoek and will use their individual callsigns. QSL requests should go to the respective home calls.

The team who operated as K5C from Cat Island (NA-082). Left to right: K5YG, KD5CQT, K2FF, and W5UE. (Photo courtesy Darryl, KD5CQT)

Paul, K1XM, operating as S9MX from Principe in the CQ WW DX CW Contest 2002. (Photo courtesy Charlotte, KQ1F)

Thoughts on Our Hobby

One of our readers sent along an interesting piece that I'd like to share with you. Although not a QRPer myself, I have the greatest respect for these folks. Read the following:

Reflections from a QRPer

by Larry Maso, NU4B

I've been back on the air for almost two years now after several years of home remodeling. Tonight I'm up DXing and thinking about the state of our hobby. At least what I know of it.

These last couple of years have been very enjoyable. operate CW and QRP. I certainly didn't know what to expect when I got back on the air. With the move to no code requirements, I wondered if anyone still used the code—LOL (lots of luck). Actually, I was kind of worried. Nothing is more relaxing to me than getting home from work, turning on the radio, and getting lost in the world of dots and dashes. It's a language all its own. I would probably never have learned it had it not been for the requirement when I got my license. I hope others will not deprive themselves of such a wonderful experience just because it's not required. I just think it's such an awesome mode of communication, and I guess there's some romanticism and nostalgia involved.

The idea of staying up late listening to signals from all corners of the Earth still gives me goose bumps—just as it did when I was a kid. My parents got me a shortwave radio for my 13th birthday, and that was that. I was hooked. It is something that to me can't be replaced by the Internet. I'm sure others feel that way. The question becomes how to get new people into the hobby. I don't know where amateur radio stands from that point. I've

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e-mail: <n4aa@cq-amateur-radio.com>

The WPX Program

CW

3103 ..... T94GB
3104 ..... WA2BQI
3105 ..... KA4RRU
3106 ..... W2JLK
3107 ..... K3GW
3108 ..... JA1TNL
3109 ..... SP3JUN

SSB

2859 ..... KA4RRU
2860 ..... K3GW
2861 ..... KR4TU
2862 ..... GWØSLM

Mixed

1914 ..... KA4RRU
1915 ..... K3GW
1916 ..... WK5K

CW: 450 JA1TNL. 700 SP3JUN. 800 KA4RRU. 1000 K3GW, KØARS. 1100 F5MQW.

SSB: 400 K3GW. 900 G3TSZ. 950 KA4RRU. 1350 GWØSLM.

MIXED: 950 KA4RRU. 1150 K3GW. 1200 KA4RRU.

Europe: K2PH

Award of Excellence Holders: N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GQ, W4BQY, IØJX, WA1JMP, KØJN, W4VQ, KF2O, W8CNL, W1JR, F9RM, W5UR, CT1FL, WA4QMQ, W8ILC, VE7DP, K9BG, W1CU, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, I8YRK, SMØAJU, N5TV, W6OUL, WB8ZRL, WA8YM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, ABØP, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POF, DJ4XA, IT9TQH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, KBØG, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1PO, K9LNJ, YBØTK, K9QFR, 9A2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MC, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IV4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBP, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, KZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, S53EO, DF7GK, I7PXV, S57J, EA8BM, DL1EY, KØDEQ, KUØA, DJ1YH, OE6CLD, VR2UW, 9A9R, UAØFZ, DJ3JSW, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RAØFU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A, IZ5BAM, W4GP, K4LQ, KØKG, DL6ATM, VE9FX.

160 Meter Endorsement: N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8RSW, W8ILC, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF N4NX, SMØDJZ, DK3AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR1QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N8JV, ONL-4003, W5AWT, KBØG, F6BVB, YU7SF, DF1SD, K7CU, I1POR, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, WBØDD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA5CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, KØDEQ, DJ1YH, OE6CLE, HB9BIN, N1KC, SM5DAC, S51U, RAØFU, UAØFZ, CT4NH, W1CU, EA7TV, LY3BA, RW9SG, K1NU, W1TE, UA3AP, OK1DWC, KX1A, IZ5BAM, W4GP, DL6ATM.

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

The WAZ Program

10 Meter SSB

550 ..... W9OP
551 ..... NE5S

15 Meter SSB

590 ..... W9OP
591 ..... HL4CBX
592 ..... K8GWU
593 ..... HL3GOB
594 ..... I5HOR

20 Meter SSB

1109 ..... W6WI
1110 ..... I5ZGQ

10 Meter CW

180 ..... W9OP

12 Meter CW

38 ..... W9OP

15 Meter CW

309 ..... W9OP

17 Meter CW

48 ..... W9OP
49 ..... ON5GL

20 Meter CW

533 ..... W9OP

40 Meter CW

231 ..... K6YUI
232 ..... W9OP

6 Meters

59 ..... OK1MP (30 zones)

160 Meters

16 ..... W4ZV (endorsement, 40th zone)
132 ..... SP3CB (endorsement,39th zone)

All Band WAZ SSB

4856 ..... KØQZ
4857 ..... JG2REJ
4858 ..... VE2EH

Mixed

8215 ..... DH1JU
8216 ..... W5NH
8217 ..... KD5CQT
8218 ..... K6UO
8219 ..... DJ4DY
8220 ..... JA2VQF
8221 ..... KA5AGM
8222 ..... HL3GOB

All CW

356 ..... K9WJU
357 ..... DM3PKK
358 ..... OK1DAU

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

Mike, OE6MBG, is very active on most bands. He likes building antennas, and his signal shows he knows how it's done. (Photo courtesy John, KDØJL)

read we are dwindling in numbers and aging quickly. I've even read articles questioning if we will still have a hobby at the next peak of the solar cycle. Seems like a doomsday scenario for amateur radio.

My first Novice rig was an HW-8, which I still have. Although my Elmer advised me against it, at the time it was all I could afford and I wanted to build it. Well, I built it, it worked, and I received my license about the same time. I was a DXer from the start. Contacts across the state were nice, but after years of SWL DXing and even MW DXing I wanted to *talk* to the world. This really convinced my Elmer that I was crazy given the rig I was using. He kept on saying, "Just don't expect much." But with my dipole up and the HW-8, I was ready to go. Since the HW-8 doesn't have 10 meters, and I was a Novice (no 20 meters), 15 was my DX band. I still remember my first DX QSOs with ZF2DA, OH2BAD, and F6GNI.

Today my station includes an HW-9, a Ten-Tec Argonaut V, an MFJ 9020, and my HW-8 (which needs some work). Since getting back on the air in June 2001, I've made over 4700 QRP QSOs, mostly DX. My antennas are an HF5B (on a RadioShack mast on the roof) and a ground-mounted HF2V. Tonight there's tons of DX and pile-ups, hams on the air. From the ZK to YS, to OY to C5, to TA, everyplace I go there's a pile-up. Maybe the end of CW is not so near.

At least I feel better reading that CW contest entries are increasing, and I've noticed the big increase in QRP category contest entries. In any case, I know I've been able to work many new countries (or "entities," as they are called today) since getting back on the air. I'm up to 254 QRP countries and waiting for SØ, FO/M, and VK9X operations. In the meantime, I'm working on 5 Band DXCC QRP and QRP WAZ. I need one more zone—26. I also need a couple more on 40 meters and a bunch on 80 for 5 Band. Then there's also 30, 17, and 12 meters, so there's plenty to keep me busy. I guess with QRP you don't have to worry about working everything in a few months and then have nothing to shoot for.

That brings me to QSLs. I've had a phenomenal return rate since getting back on the air—like 84%. I've noticed it helps to follow instructions. Of course I've had my problems, but actually I'm quite pleased with my response. Several hams have gone out of their way to get me the cards. Really, other than several experiences, hams have been fantastic. So when I get an e-mail from a concerned DXer needing my card for an award, I ship it off airmail.

I'm not sure what I think about e-qsls. It's kind of like instant gratification versus waiting for the mailman to come with that long-awaited new one, but that's half the fun. Once you get the card, the thrill's gone (expense is a great argument for e-qsls). I laugh when I read the comments of some of the impatient, or those who don't follow instructions. Come on; this is a hobby, not discovering the next medical breakthrough. There was one comment on the internet from a ham who said 3B9FR doesn't QSL. He had

5 Band WAZ

As of April 15, 2003, 617 stations have attained the 200 zone level and 1321 stations have attained the 150 zone level.

New recipients of 5 Band WAZ with all 200 zones confirmed:
PY5PS

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

N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
WØPGI, 199 (26)
W2YY, 199 (26)
VE7AHA, 199 (34)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40m)
KL7Y, 199 (34)
NN7X, 199 (34)
IK1AOD, 199 (1)
DF3CB, 199 (1)
F6CPO, 199 (1)
KC7V, 199 (34)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W6SR, 199 (37)
W3NO, 199 (26)
K4UTE, 199 (18)
HB9DDZ, 199 (31)
RU3FM, 199 (1)
HB9BGV, 199 (31)
N3UN, 199 (18)
OH2VZ, 199 (31)
K5MC, 199 (22)
W1JZ, 199 (24)
K2UU, 199 (26)
W1WAI, 199 (24)
W1FZ, 199 (26)
SM7BIP, 199 (31)
PY5EG, 199 (23)
SP5DVP, 199 (31 on 40)
KY7M, 199 (34)
W8AEF, 199 (40)
K8RR, 199 (26)
UU5JR, 199 (4)
W8GF, 199 (22)
EA5BCX, 198 (27, 39)
G3KDB, 198 (1, 12)
KG9N, 198 (18, 22)
KØSR, 198 (22, 23)
UA4PO, 198 (1, 2)
JA1DM, 198 (2, 40)
9A5I, 198 (1, 16)
K5PC, 198 (18, 23)
K4CN, 198 (23, 26)
KF2O, 198 (24, 26)
G3KMQ, 198 (1, 27)
N2QT, 198 (23, 24)
OK1DWC, 198 (6, 31)
W4UM, 198 (18, 23)
US7MM,198 (2, 6)
K2TK, 198 (23, 24)
K3JGJ, 198 (24, 26)
W4DC, 198 (24, 26)
N4XR, 198 (22, 27)
OE2BZL, 198 (1, 27)
N4PQX, 198 (24, 26)
RU3DX, 198 (1, 6)
UT5JAJ, 198 (12, 30)
N8PR, 198 (18, 24)
N6HR/7, 198 (34, 37)

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

KD5ZD (150 zones)
I5HOR (186 zones)
N8LJ (181 zones)

Endorsements:

JT1CO (200 zones)
N5ORT (171 zones)
W8GF (199 zones)
N6HR/7 (198 zones)
UA4SKW (192 zones)
UT4UZ (200 zones)
K9RR (180 zones)
OK1DX (200 zones)

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

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

sent several cards to him direct. I was thinking 3B9FR has had the same manager for years, and in fact, I had just received a QSL for a 17 meter contact.

In my little QRP world DXing, contesting, QSLing, and the spirit among hams doesn't seem to be a lot different than in the past. While the days of automatically sending a QSL for every QSO may be gone (due to time and expense), in general I think you can get those needed cards. Actually, since 1978 I've only had one guy tell me point blank he doesn't QSL. But he's honest.

One thing I noticed (from a positive point of view) was the recent announcement for

THE WPX HONOR ROLL

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

MIXED

5062 ....9A2AA	3823....VE3XN	3230....KF2O	2952....W2WC	2454 ....K2XF	2226...JN3SAC	1958 ...CT1EEB	1587 ....W2EZ	1369 ..KW5USA
4539 ....W2FXA	3726....I2PJA	3167....S53EO	2944 ....IT9QDS	2436 ....W7OM	2212 ...PY2DBU	1949 ....VE6BF	1573 ....VE9FX	1226 ...EA2BNU
4154....F2YT	3668....N4MM	3140....K9BG	2824....W2ME	2421 ....W9OP	2203 ....W4UW	1837 ....AA1KS	1561 ....N1KC	1163 ....K6UXO
4146....W1CU	3633....YU1AB	3187..WB2YQH	2964..YU7GMN	2390....W8UMR	2126 ..WB3DNA	1724 ....W7CB	1487 ....WT3W	1130 ..PY1NEW
4098 ....EA2IA	3548 ....N9AF	3121...PAØSNG	2655 ..WA1JMP	2361....W6OUL	2018....HA9PP	1697 ....Z35M	1472..OK1DWC	742 ....K5IC
4014 ....9A2NA	3489...SM3EVR	3043....KØDEQ	2545....W9IL	2340....K5UR	1999 ....I2EAY	1674 ....YBØAI	1448 ....NG9L	728....VE3NQK
3928 ....N4NO	3465 ....N5JR	3008 ....IK2ILH	2522....9A4W	2304...OZ1ACB	1976 ....DJ1YH	1641....KØKG	1421 ....KX1A	697 ....KL7FAP
3833....N6JV	3289 ....I2MQP	3005....HAØIT						

SSB

4446 ....IØZV	3165....EA2IA	2719 ....KF2O	2325 ....CX6BZ	1969....CT1EEB	1821 ....W9IL	1555....W2FKF	1218....WT3W	990 ....HA9PP
4050....ZL3NS	3117....I2MQP	2594 ....I8KCI	2301 ....HAØIT	1954....CT1EEN	1736 ....K3IXD	1520....DF7HX	1194 ....N1KC	959 ....VE7SMP
4018 ....VE1YX	3068....N4NO	2570....LU8ESU	2270....IN3QCI	1937 ....I8LEL	1721....DK5WQ	1415 ....KI7AO	1193....I2EAY	903....N9DI
3705 ....I2PJA	3049....F2VX	2509 ....EA5AT	2259....K5RPC	1893 ....NQ3A	1704 ....IT9SVJ	1384 ...LU3HBO	1190 ....K4CN	844....KX1A
3649 ....F6DZU	2960 ....I4CSP	2487 ....KF7RU	2002 ....LU5DV	1864....K2XF	1685 ....W6OUL	1377 ....VE89FX	1162....EA5DCL	822 ....K1BYE
3260....CT4NH	2885....N5JR	2455 ....EA1JG	1994 ....W4UW	1862 ....EA7TV	1606 ....K8MDU	1368 ....NG9L	1078 ....EA3KB	812 ....KU6J
3234 ....N4MM	2875 ...CT1AHU	2388 ...OE2EGL	1988 ....K5UR	1852....W7OM	1562 ....W2ME	1254 ....JN3SAC	1062 ....AG4W	776 ....YBØAI
3211 ....9A2NA	2741 ...PAØSNG	2337 ....W2WC	1978....N6FX	1839....I3ZSX	1562 ...SV3AQR	1238 ....LU4DA	1048....EA3EQT	702 ....KU4BP
3180....OZ5EV	2734 ....4X6DK							

CW

4223...WA2HZR	2831 ....9A2NA	2399 ....HAØIT	2147....I7PXV	1905....JN3SAC	1798....W7OM	1520 ....4X6DK	1158....YU1TR	953....KX1A
3834....N6JV	2822 ....LZ1XL	2325 ....KF2O	2102....N6FX	1898 ....K5UR	1728 ....W9IL	1483 ....EA6AA	1146....K6UXO	898....WT3W
3485....N4NO	2583 ....W2ME	2315....KA7T	2009....OZ5UR	1847....IK3GER	1679...EA7AAW	1332....EA2CIN	1118 ...EA2BNU	830 ....N1KC
3469 ...VE7CNE	2578....N5JR	2312....JA9CWJ	1955....G4SSH	1846....KS4S	1671 ....DJ1YH	1309 ....AC5K	1118 ...HB9DOT	809 ....KU6J
3217....K9QVB	2558 ....N4MM	2301 ....EA7AZA	1938 ....LU2YA	1852 ....VE6BF	1668....I2EAY	1282 ....DF6SW	1071 ....W4UW	604 ....VE9FX
3178....EA2IA	2428 ....W2WC	2197 ....W8UMR	1919....K2XF	1803....W6OUL	1624....I2MQP	1218 ....WO3Z	1032 ..WA2VQV	

Everett, WA3DVO, of Palmer Park, Maryland has plenty of equipment in his ham shack for DXing or anything else. (Photo courtesy Everett, WA3DVO)

the Rock Mite Transceiver in the last issue of *QST*. It's just a little kit to build and play with, and I ordered one. I checked out the Small Wonder Labs website. They have the shipping status listed so you can track where you are on—get this—the waiting list. As I tracked my kit, I could tell they were a little overwhelmed by the response, with orders for at least a couple of hundred of these things. It just seems to me, as a good thing, that there is still a lot of interest in getting your hands a little dirty rather than doing the appliance thing all the time.

I read a lot of doom and gloom about our hobby. Maybe my head's in the sand, but is it that bad?

I see a lot of good things: some super operators out there; some great QSL Managers; still a lot of interest in CW, the internet, computers, and technology in general; a lot of nice people; people still building and learning (look at the success of the K2); some really good stories that I've seen in the news about the value of ham radio and the

CQ DX Awards Program

SSB

2399 ....AC4PY	2401 ....JA2EOW		
2400 ....XE2LV	2402 ....K3PT		

CW

1042 ....EA3AXM

SSB Endorsements

320 ....XE1VIC/335	320 ....N1ALR/326		
320 ....K4JLD/334	310 ....XE2LV/310		
320 ....N4CH/334	275 ....VE7SMP/297		
320 ....K3UA/334	275 ....K4IE/282		
320 ....K3PT/330			

CW Endorsements

320 ....K3UA/334	275 ....K4IE/291		
320 ....N4CH/331	275 ....IKØTUG/290		
320 ....K4JLD/327	200 ....K6UXO/225		
320 ....K1FK/323			

RTTY Endorsements

320 ....K3UA/320

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. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business-size, No. 10, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Currently we recognize 335 active countries. Please make all checks payable to the award manager.

people operating in emergencies, and of course in *QRZ DX*.

What worries me the most: (1) the lack of enforcement around the world of our ham bands; (2) our ability (or lack of) to get new and/or young people involved; (3) no-code license; and (4) is technology passing us by?

If I can pick up a cell phone and talk to anywhere in the world, is there any reason to buy or build a rig, put up an antenna, and call CQ? I can think of a bunch of reasons; I hope others can, too. When I look up in the sky I think about all the radio waves up there from all over the world. After all these years I still get goose bumps thinking about it.

73 es good DX, Larry, NU4B

After reading Larry's thoughts, I just might want to try this QRP thing myself.

Until next time, enjoy the summer fun,

73, Carl, N4AA

Tom, WØGLG/HR, spent some time in Honduras in early March as a member of a medical team sponsored by the International Health Service. While there he operated from Cayos Cochinos Island (NA-160). (Photo courtesy Tom, WØGLG)

QSL Information

3A/IK2YSE via bureau
3B8RS via DJ6QT
3D2MN via DF8AN
3W5KVR via EA5KB
3XY1L via UY5XE
4D2B via G3OCA
4D2B via UA4SKW
4D2C via UA4SKW
4D2C via G3OCA
4L1FX via DJ1CW
4X/DJ6QT via DJ6QT
4X25/DJ6QT via DJ6QT
5B4AHJ via G3PMR
5B4XX via 4Z4DX
5NØNAS via KZ5RO
5R8GZ pirate
5T5/DJ6QT via DJ6QT
5U7/DJ6QT via DJ6QT
5X1CW via F6GQK
6J1YYD via EA5KB
6W/F5VHQ via F5VHQ
6W1RD via KZ5RO
6Y5/DJ6QT via DJ6QT
7S2E via SM2DMU
7X3WDK via EA5KB
8J1RF via JAØWJN
8P9BX via VE3WFS
9G1OH via EA5KB
9H3AS via DL5SDK
9L/DJ6QT via DJ6QT
9M2/G4ZFE via G4ZFE
9M2/GM4YXI via N3SL
9M2RPN via 9M2RPN
9M6VPR via 7M2VPR
9N7DX via 4Z4DX
A3/SP9FIH via SP9FIH
A35SM via DL8YRM
A35XM via DL8YRM
A92FF via A92FF
AX3ITU via VK3ER
AX9YL via VK3DYL
AY1ECZ via EA5KB
AY1QS via EA5KB
AY4DX via EA5KB
AY5DT via EA5KB
AY7AWP via LU7AWP
AY8A via LU8ADX
AY9RBI via EA5KB
BD5RT via F6FNU
BD5RV via F6FNU
BW4/UA3VCS via UA3VCS
C21TA via VK3DYL
C53CW via YL3CW
C53KL via YL2KL
C53M via YL1ZF
C53ZF via YL1ZF
C53ZF/P via YL1ZF
C56HF via RZ4HF
C56HTX via RZ4HTX
C56R via YL1ZF
C56TA via LY2TA
C5M via YL1ZF
C5P via YL2KL
C6ALK via K7RE
CB4Y via CE4FXY
CB5A via XQ5SM
CE2GLR via EA5KB
CE2LZR via EA5KB
CE2SQE via EA5KB
CE5CSV via EA5KB
CM6QN via EA5KB
CM6YD via EA5KB
CM8WAL via EA5KB
CO2AJ via EA5KB
CO2AV via EA5KB
CO2CR via EA5KB
CO2FN via EA5KB
CO2FU via EA5KB
CO2GL via EA5KB
CO2GP via EA5KB
CO2OR via F6FNU
CO2PH via F6FNU
CO2QX via EA5KB
CO2TK via F6FNU
CO2VQ via EA5KB
CO3CJ via IZ8EBI
CO3JR via EA5KB
CO3ME via EA5KB
CO6BR via EA5KB
CO6FU via EA5KB
CO6RD via EA5KB
CO6TH via EA5KB
CO6TY via EA5KB
CO6XN via N3ZOM
CO6YY via EA5KB
CO8CH via EA5KB
CO8CY via EA5KB
CO8EJ via EA5KB
CO8LY via EA7ADH
CO8OT via EA5KB
CO8UN via EA5KB
CO8XI via EA5KB
CP4AY via EA5KB
CP4BT via EA5KB
CP4IC via EA5KB
CS6V via DL5AXX
CU3AA via CU3AA
CU5AM via EA5KB
CU5AOA via EA5KB
CVØZ via EA5KB
CV1F via EA5KB
CV1Z via EA5KB
CV5Y via EA5KB
CWØZ via EA5KB
CW1OO via EA5KB
CX1CCC via EA5KB
CX1UI via EA5KB
CX2AM via EA5KB
CX2AQ via EA5KB
CX2PI via EA5KB
CX2SA via EA5KB
CX2TG via EA5KB
CX3UG via EA5KB
CX3VB via EA5KB
CX5AO via EA5KB
CX5UR via EA5KB
CX7OV via EA5KB
D7ØHL/2 via D7ØHL
DK8TU/TI8 via DK8TU
EA5/JI6KVR via EA5KB
EA5KB via EA5KB
EA5KB/EA2 via EA5KB
EA6/DJ6QT via DJ6QT
EA6FB via EA5KB
EA8OK via EA8AKN
EA9/DH1PLY via DH1PLY
EA9/DK8RE via DK8RE
EA9/JI6KVR via EA5KB
EJ9HQ via WA7OBH
EL2AR via EL2BA
ES85J via ES1RA
ES85M via ES1RA
ES85M via ES1QD
EW3BF via EW3BF
EW5HST via EU1SA
EY8MM via K1BV
EZ8YL via DJ1MM
F6FNU via F6FNU
FM/F5LBG via F5LBG
FM/T93M via DJ2MX
FO/F8DQL via F8DQL
FR5FA via F6FNU
FS/G3TXF via G3TXF
FY5GS via F6FNU
GU/DJ6QT via DJ6QT
GWØNWR/P via GWØDSJ

(The table of QSL Managers is courtesy of John Shelton, K1XN, editor of "The Go List," P.O. Box 3071, Paris, TN 38242; phone 731-641-4354; e-mail: <golist@golist.net>.)

BY JOE VERAS,* N4QB

James Millen, A Legend

James Millen left an indelible mark on one communications equipment company and his name upon another. He was an active amateur and a strong supporter of the American Radio Relay League in the 1930s. Millen became an industry and hobby icon, though a controversial one. Today, more than a decade-and-a-half after his passing, many of us in the amateur- and vintage-radio collecting hobbies celebrate the man and his equipment in both formal and informal ways.

Millen DFP-501. James Millen displayed his expression of the ultimate ham/shortwave receiver at a Chicago trade show in 1947. This prototype is the only example ever produced. (Photos by Joe Veras, N4QB)

The world of communication intersected with James Millen's life when he built a spark-transmitter/galena-crystal receiver station in Forest Hills, New York in 1916. The 12-year-old Millen (he was born June 11, 1904) immediately set out to improve the performance of the apparatus consisting mainly of some large coils, an automobile spark coil, and a crystal and cat's whisker. World War I interfered with on-the-air activity for several years, and he did not actually sit for the amateur license examination until 1921. He was issued the call-sign 2BYP.

Making a decision that would set the cornerstone of his product-design philosophy, Millen chose to pursue a degree in Mechanical Engineering. He enrolled at Stevens Institute (Hoboken, New Jersey) in 1922. Before Jim completed his degree, however, his father died, forcing the younger Millen to draw upon his own resources to meet tuition expenses. He turned to something requiring little capital investment, yet, even as a schoolboy, had provided him with an income. Jim Millen created his college tuition with words and a blank sheet of paper.

At age 12 he was already a published author. The October 1916 issue of *Popular Science Monthly* (now *Popular Science*) carried an article by young Millen on a device for the home workshop. One hopes that when the youngster purchased a copy from among the first to hit the newsstands, he was not terribly shattered to notice his article had been credited to one James Mullen, Jr.

By the mid-1920s publishers spelled his name correctly, both on the bylines and checks they sent to him for magazine articles, as well as a newspaper column in which he solved technical problems submitted by readers. All this published writing was not only a source of ready cash, but also a terrific public-relations tool for spreading the Millen name. Marketing and political types today would call it branding or name-recognition. Whether Millen was conscious of that or not, he graduated from Stevens with a string of contacts, well and widely known in industry through his prolific writing. He parlayed this into consulting contracts with a number of businesses, among them the National Company of Malden, Massachusetts.

Millen's penchant for mechanical innovation and product development were evident early on. While still in school, he conceived, patented, and arranged for the manufacture of a screwdriver with a special tip. The tool was designed to hold the screw, making it easier to insert and start into a

Millen DFP-201. Only a few prototypes of this receiver were completed before production-cost calculations revealed it would be far too expensive for the 1947 amateur radio market.

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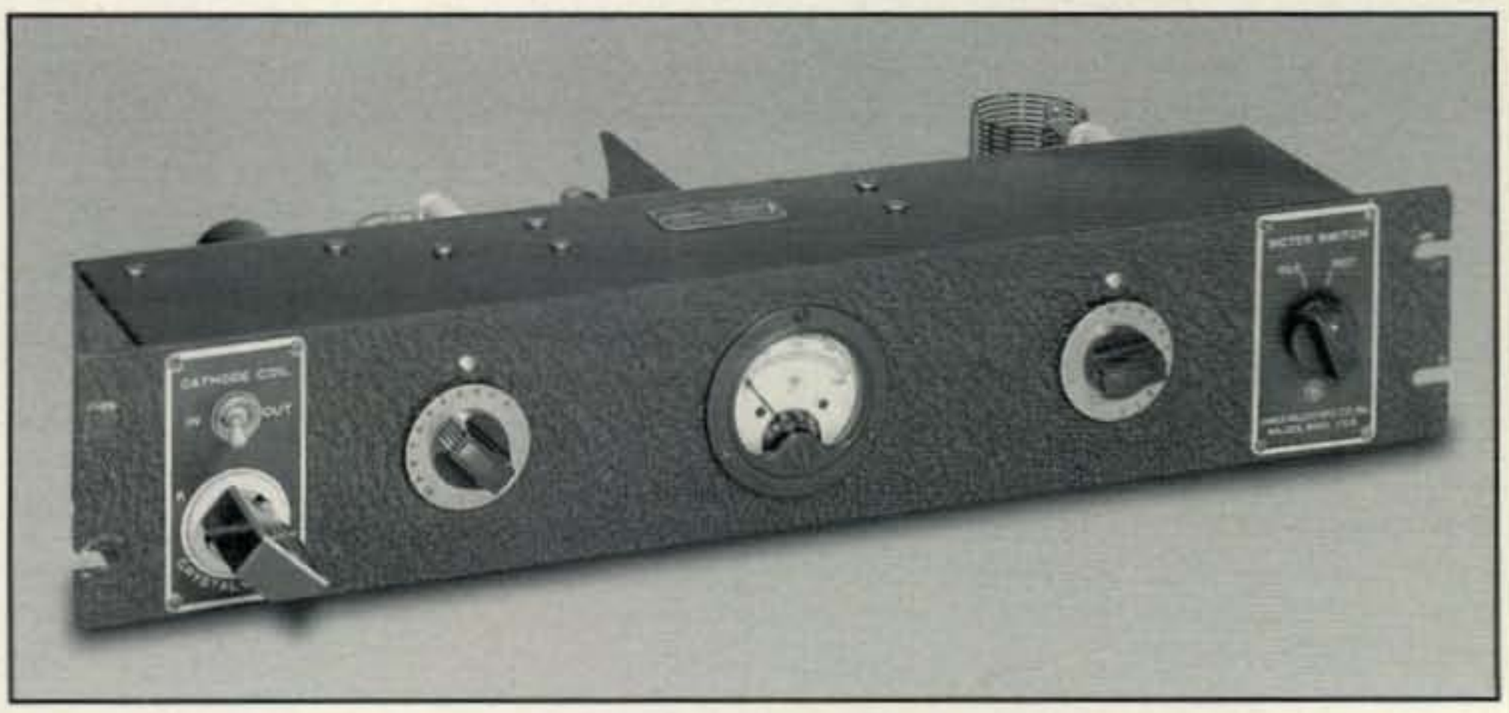
Millen 90651A Grid Dip Meter. Test equipment, such as this grid dipper, was an important part of the Millen product line during the life of the company.

hole. Millen sold them himself, buying ad space in the classified section of hobby magazines. He made and sold radio receivers the same way.

The things Millen learned in his quest for tuition money and his post-graduate consulting work were a great addition to his degree from Stevens. He soon narrowed the focus of consulting to one client, National, and in 1927 the company offered him the position of General Manager and Chief Engineer. The principals behind National wanted to increase its involvement in the radio business; they had hired the right man. Up to this point, National's radio product line was limited to sets for the broadcast market. Millen not only continued development of these TRF (tuned radio frequency) sets, but stepped into exciting new territory—regenerative shortwave receivers.

The first of these receivers was the SW-2, a two-tube (untuned RF amp + regenerative-detector) set of simple chassis and panel construction. It was produced without the setting up of any formal production machinery at the National Company's new Sherman Street plant in Malden. A third, audio-amplifier tube was eventually added to the design. Other regenerative sets followed: the SW-4, SW-5, SW-45, and SW-58. In those days the naming convention at National had the number designating either the number of tubes in the set or the type of tube in the audio amplifier. The famous SW-3, one of the



Millen 90800 Transmitter. Millen's 1946 6L6/807 transmitter owed much of its design to a pre-war magazine article. Power output was 50 watts on 80–10 meters.

company's longest-lived products, was an SW-5 deprived of its audio amplifier tubes in an effort to reduce the receiver's price during the Great Depression. Pictures and more information on these sets are available on my website, <www.n4qb.com>.

Next Millen took on the design and production of a superheterodyne receiver for the Civil Aviation Administration (forerunner of the FAA). In the early days of the airline industry, communication between aircraft and ground was on HF. Both the government and airlines needed a receiver for the ground station end of this link. Millen's answer was the National AGS (for *Aeronautical Ground Station*). The high-performance receiver, introduced in 1933, covered 1.5 through 20 MHz with plug-in coils and had a 500 kHz IF. Band-spread coils were available for amateur use, as was an optional crystal filter.

More than a year later, the receiver considered Millen's masterpiece and National's trademark appeared. Promised and hinted at in the closing months of 1934, the HRO did not come to market until the spring of 1935. In succeeding variations, it remained on the scene another 30 years. For all that run it retained the wonderful PW dial. At a time when some ham bands occupied only an inch or two on the dials of some receivers (making tuning and separating signals difficult), the PW dial spread out each ham band the equivalent of 12 linear feet on the HRO. The receiver also followed Millen's maxim that a high-performance receiver must use plug-in coils. Until 1950, all HROs employed an external power supply, another Millen philosophy designed to chase the twin demons of heat- and hum-producing components from the main receiver cabinet.

As he continued product development at National in the mid-1930s, Millen kept quality in mind. Not everything could be top-of-the-line; neither the amateur nor the shortwave hobby markets would support that. However, he believed in giving the customer value for money paid. He also believed in staying on top of component quality control by setting up machinery for their production onsite. This gave National another profit center in the sale of components.

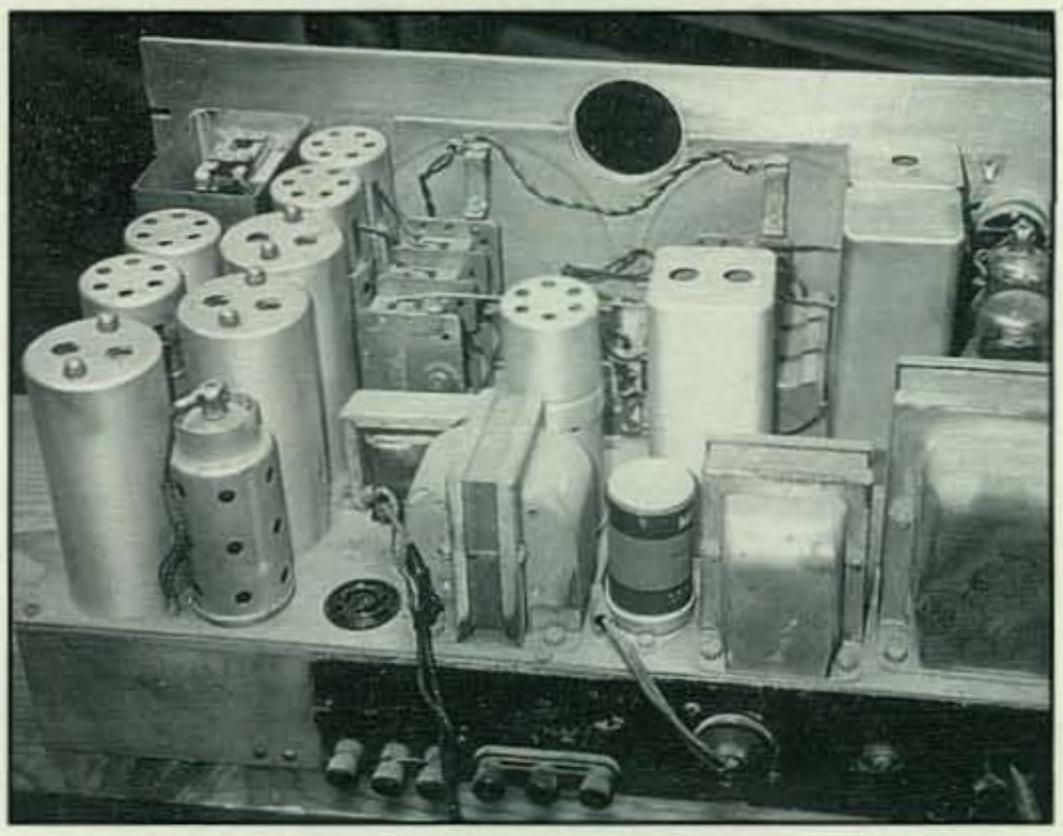
For as long as he could, Millen held the line on using consumer-level broadcast receiver components in National's shortwave sets. He said, in print advertising, those were, "For the other manufacturers." He was apologetic in the same medium when his company introduced the entry-level NC-44, saying it was necessary to cut corners to make the best receiver possible for $49.50. The set used a broadcast-type tuning capacitor, iron-core IF transformers, and less-expensive coils than one would expect in a National receiver.

One of the factors hastening Millen's departure from National in 1938 was a desire from the company's leadership that it enter the consumer electronics market. This is speculation and editorial comment, but I believe Millen felt that market was shabby territory for his ideas and ambitions. At the introduction of the NC-44, he said, "We miss the usual thrill that comes when we add a new receiver to the National line, because we have to cut corners for the sake of price." Except for very few products . . . one can't even call things the Cadillac of this or that anymore . . . that very well describes the consumer market.

The other thing that helped send James Millen on his way had nothing to do with radio and everything to do with business. Some officers of the company worked its finances in such a way as to maximize their own returns while minimizing Millen's. For him, that was enough. The June 1939 issue of *QST* carried a simple, full-page announcement that James Millen had withdrawn from the National Company in order to establish a new firm. The new company would be known as the James Millen Manufacturing Company, Incorporated. It would be devoted to the design and production of new radio communication products, including components, receivers, and transmitters. James Millen Manufacturing was first located at 6 Pleasant Street in Malden (it later moved to 150 Exchange Street and remained there until its doors closed in 1977).

A catalog insert with a comprehensive product line also appeared in the same issue of *QST*. Although the move came as a surprise to some, it obviously had been on Millen's mind for a long time. With all the reins of a company in his own hands, Millen soon learned which way and how hard to pull to keep things moving in the right direction. Much of the company's business consisted of subcontract work done for larger companies such as General Electric and RCA.

James Millen Manufacturing's first ham product was the Hetrofil, a wien-bridge audio filter designed to be inserted



What Is It?

The two pictures in this sidebar were sent to me by a reader, Bill Brown. He recently came by this receiver and asked me to identify it. I think it's an RME-69 derivative, maybe a rack-mount 69-A. The front panel is one-quarter inch aluminum. Anyway, I present the photos here for your opinions. You may address responses to me at <n4qb@cq-amateur-radio.com> or to Bill at <jbrown62@earthlink.net>. Bill's main interest is restoring old BC sets and he might wish to sell this one. If you are interested in buying, e-mail *him*, not me!

between a pair of headphones and the headphone output of a receiver. Its phasing action could notch out an interfering heterodyne on a phone or CW signal. The design was originally presented in a September 1939 *QST* article by Raymond Woodward, W1EAO. He licensed it to Millen for manufacture and it ran in the company's ad a month later. This practice became commonplace in the years to follow, with many products based on magazine or handbook circuits, but was something of a two-way street first paved by Millen at National.

In his monthly *QST* ads, as well as articles penned for that magazine and others, Millen often shared circuits and ideas with readers. National, and later James Millen Manufacturing, made components as well as complete sets. In an era when home-brewing was more prevalent, advertising parts made good sense. If you're old enough to remember the Millen ads, think back to how many months were devoted to touting a single component, standing there in its little circle of light.

If you bought Millen equipment and received a handbook circuit, you weren't exactly getting short-changed. It was well-made gear using quality components. Given his dedication to quality first, perhaps this arrangement kept it affordable. I know of another approach that did not work out so well.

The love of high-performance receivers had to be somewhere near the core of Jim Millen's soul. When he started his own company, it was on his mind to design one, something to follow the HRO. These plans, along with those of so many others, were shelved during the war years, but in 1947 his ultimate receiver emerged. The DFP-501 had direct frequency readout, motor-driven band switching of ten ham and general-coverage bands, motor-assisted tuning, and a crystal filter in the 455 kHz 2nd IF. The 19-tube set used a movable coil catacomb much like the NC-100/101 designs. Bands changed at the push of a button. Every feature of the receiver was the ultimate for its time; this, combined with its build quality, made the production cost prohibitive. It would had to have been priced far beyond what the amateur market would pay. The receiver pictured in this column is the only one ever produced.

Millen went back to the drawing board and a simpler, less feature-laden Model DFP-201 was designed. The 201 was also double-conversion and had a sliding coil catacomb, but lacked the power steering and push-button band changing of the 501. Several DFP-201 prototypes were completed, and examples of both models were taken to a trade show in Chicago during May 1947. Meanwhile, it was discovered that production cost alone on the 201 prototypes was more than two thousand dollars apiece, so it was added to the scrap heap along with the 501. James Millen almost made a receiver branded with his own name, but that never came about.

Most Millen ham equipment would qualify as vintage gear today. The company, under Jim Millen's guidance, lasted until 1977, although the name has been revived a couple of times since. He died a decade later in June of 1987 at his residence in North Reading, Massachusetts. No obituary ran in the Malden newspaper, the location of James Millen Manufacturing for nearly 40 years, but a street in North Reading now bears his name.

Another curiosity: It is reported that much ARRL editorial work, on both *QST* and the *Handbook*, took place at Millen's farm in the 1930s . . . that through Jim's influence National Company ad money heavily subsidized League publications. His obit in *QST* 50 years later rated but two brief paragraphs, one only a short sentence in length.

Some of what you read here is in conflict with things already published, especially where dates, ages, and locations are concerned. It is my nature to research, fact check, and write as carefully as possible. I stand by my version, but am happy to be corrected by documented sources.

My thanks to Alan Douglas for allowing me to photograph his Millen receivers. The grid dipper and Millen transmitter are two more items from the collection of N4CH . . . Thanks, Herman!

73, Joe, N4QB

BY JOE LYNCH,* N6CL

The Beginning of the VHF Contest Season

There is something about this month that makes it seem like the beginning of the contest year. Yes, there were plenty of contests earlier in the year, but none as big in the VHF-plus arena as the ARRL June VHF QSO Party (June 14–16), and that makes it seem like a beginning. The preceding contests of the year should have been used to tweak and fine-tune skills and equipment to get ready for this one. In addition, there are contests on both of the successive weekends following the VHF QSO Party, and each of them has a VHF component. They are the SMIRK Six Meter Klub Contest and Field Day.

VHF Plus Calendar

June 1	Very poor EME conditions
June 2	Highest Moon declination
June 7	First quarter Moon
June 8	Good EME conditions
June 12	Moon perigee
June 14	Full Moon
June 14–16	ARRL June VHF QSO Party (see text for details)
June 15	Lowest Moon declination; very poor EME conditions
June 21	Last quarter Moon
June 20–22	Ham Com ARRL National Convention (see text for details)
June 21–22	SMIRK Six Meter Klub contest (ee text for details)
June 22	Moderate EME conditions
June 25	Moon apogee
June 28-29	ARRL Field Day (see text for details)
June 29	New Moon; very poor EME conditions

—EME conditions courtesy W5LUU.

A Mixed-Up Month

This June something peculiar happens. The month begins on a Sunday, and whereas the successive contests will begin on the second, third, or fourth Saturday of the month, each respectively will end on the third, fourth, or fifth Sunday. Why is this significant for the VHF-plus contest operator? In a word—sporadic-*E*.

There is a school of thought that says that once we are off the peak of the sunspot cycle we will start to see an increase in sporadic-*E* propagation. If this is true, then it is possible that we will see more propagation activity this month than we have in June in recent years.

Even with an increase in sporadic-*E*, however, will the contests benefit from such an increase? As you can see, this year the June VHF QSO Party is in the middle of the month. Sporadic-*E* propagation is sometimes very intense earlier in the month. Will this year's VHF QSO Party be outside the window of this intense propagation?

What about Field Day? It is almost at the end of the month. Sometimes it has witnessed some intense multi-hop sporadic-*E* QSOs between North America and Europe. However, the question is whether Field Day may be scheduled too late in the month for such spectacular openings to occur during the contest.

This year the contest that may really benefit from sporadic-*E* propagation could be the SMIRK Six Meter Klub Contest. Normally activity for this contest is way down because everyone is recovering from having worked so hard the weekend before in the VHF QSO Party, and the diehard Field Day operators are getting themselves ready for the next weekend. However, because of the SMIRK contest's position in the month, participants could very well benefit from some really good multi-hop sporadic-*E* propagation. In short, coupling a spike in the cyclical nature of sporadic-*E* propagation with the dates of the Six Meter Contest this year, SMIRK could have their best contest in years! Then again, I could be wrong, because as we know, 6 meters is the Magic Band! One never really knows when propagation will occur. It could happen at any time, contest dates notwithstanding.

Contest Planning and Strategy

Considering sporadic-*E* propagation's unpredictable nature, how do we take advantage of it? We do so by planning. One advantage of the late dates of the contests this month is that for us procrastinators, we have nearly another week for planning our participation in the various contests. What are we going to do with this extra week? For most of us, it will be more procrastination. However, for the serious VHF contester, it will be a time to get all the bugs out of our plans.

Perhaps you have never operated in a VHF contest. Perhaps you have only operated in HF contests. If either of these is the case, then what follows should help fill in the gaps in your knowledge of VHF contest operating.

VHF-plus and HF contesting are alike yet different. VHF-plus contesting is like HF contesting in that the setting of goals and the preparation involved are the same. In addition, some software written for HF contests is also available for VHF-plus contests.

The principal difference between VHF-plus and HF contesting is the length of time between contacts. For instance, when the band isn't open (on 6 meters) or when there's simply no one to work (on the higher VHF-plus frequencies), you may have hours between contacts. On the other hand, in the next 15 minutes 6 meters may open and you then begin a 90-QSO hour. Patience is one thing you must have on the VHF-plus ham bands that's not as necessary on HF.

Knowing when to wait and when to quit is also very important. Generally speaking, VHF contesting doesn't take place overnight. However, if a good 6-meter sporadic-*E* opening is underway, it may last into the wee hours of the morning. Furthermore, many meteor-scatter and EME QSOs take place during the night. Otherwise, it is so quiet that you can enjoy a relatively good night's sleep.

What does it take to create a winning contest station? Most of the advice that follows applies to the general VHF-plus contests. However, some of the strategy also applies to Field Day and, to a lesser extent, the SMIRK contest.

Your Body: How you feel is just as important to the success of your contest endeavor as the equipment you use. Have you had enough rest before the con-

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test? Even though VHF-plus contests almost always allow you to get a good night's sleep (because the bands shut down at night), you still need to be in top shape for the endurance associated with contesting.

What are you eating? Some operators prefer a diet of pasta because it's high in carbohydrates. Taboos include caffeine (that includes chocolate) and sugar. Some operators even avoid fruit because of the high fructose content. Both caffeine and sugar are stimulants that after they wear off could leave you in an energy crash. Don't try any new foods—especially spicy foods—just before the contest. Your digestive track may not approve.

Your Goals: Your biggest decision is probably to define what it means to win. Winning for you may involve being top in the country in your category, or it may mean making ten contacts on 10 GHz. Setting a goal and writing it down helps you focus on what you intend to accomplish during the contest. Always remember, whatever your goal, if you achieve it, you're a winner.

Your Station: What may seem to be the most obvious ingredient is also the most taken for granted. If you're contemplating operating a contest, your station must be in top shape. If you recently purchased a new piece of equipment, use it before the contest as much as it takes to become very familiar with it. Know the knobs and buttons and their functions. Know the equipment's strengths and weaknesses. If possible, make several dozen contacts with it.

Make sure every aspect of the station is working to your satisfaction. Check the antenna, coax, rotator, and rotator lead-in. Check the radios, power supplies, preamps, amplifiers, and cables used to connect all these items.

Are you operating away from your home QTH? Assemble your antennas and towers or masts just as you plan to use them in the field. There are two important reasons to go through the exercise of setting everything up beforehand. The obvious one is to make sure the equipment is working properly. The second is to ensure that you have overcome the learning curve associated with station assembly. This, hopefully, will make station assembly in the field much easier and faster.

Once assembled, make several contacts with your "portable station" set up in the back yard. Be sure to make duplicate sets of cables, and check to see that they are working to your satisfaction. Also, make sure your field location is viable. Take a mobile or portable radio to the site. Check for power-line noise or other reception problems. Make sure the lay of the land is sufficient to allow enough room for every station.

Look around your station. Is the setup comfortable? When you're sitting in your ergonomically correct chair, is everything within easy reach?

Are you using software or paper logs? If you've chosen to use software, make sure the computer is working and you really know the software (don't try to learn it the night before the contest). If you're using paper logs, make sure you have enough log sheets, dupe sheets, scratch paper, and pencils (yes, pencils, because then you can erase an entry when you need to make a change).

On the Air: VHF-plus contests have an entirely different pace than HF contests. This sometimes frustrates HF operators who try contesting on VHF. Unless the band is open, you won't get the steady runs that HF contest operators experience. Therefore, it's imperative to tune through all the bands that you have available. This isn't as hard as it seems, because the other operator is just as motivated as you are to make multiple contacts.

Stay off the calling frequencies. If you have a loud signal, people will come to you. If not, you can go to the loud signal.

It takes only one station on the calling frequency to ruin it for everyone. When on 6 meters, stay out of the DX window. Reserve it for contacting DX stations only! During the 1987 June VHF QSO Party operators in England were hearing stations as far away as the southwestern portion of the United States, but couldn't be heard because of stateside QRM in the DX window.

The Successful Rover Expedition

Since the weather in June is pretty hospitable across the country, many VHF-plus operators choose to operate as a Rover. How does one put together a successful Rover expedition? Perhaps the most important factor is *planning.* This includes how far in advance you plan for your trip, where you go, how long you stay within a particular grid locator, what kind of equipment you take, what kind of vehicle (or vehicles) you drive, what time of year you take your trip, how long your trip will be, and who will go with you. It helps to make a list of all of these items and check them off as you accomplish them.

First, consider your destination. To a large extent, where you go will be dictated by the rarity of the surrounding grids. For example, in the panhandle and western part of Texas there are several grids that are relatively rare. A Rover might start in DM96 and work his way down to DM91, spending most of the time in the most rare grid locator, DM94.

Unless you're out for a Sunday afternoon drive and you just happen to have your 6 meter rig in the car, you'll be better off if you have a good idea of the location of the high points in the grids you plan to visit. This means you almost have to travel the route before your trip, or at least get in touch with someone who knows the area and has pictures.

Second, you must secure permission to operate from the sites you've selected. This means getting permission from property owners, local authorities, and so on, which may be very difficult, especially in light of our increased awareness of homeland security. After your trip, please be sure to thank your host for allowing you to use the property for your hobby.

How long should you stay at a given location? There are several factors to consider. Are you on an extended trip, or are you participating in a contest? Is the grid you're within relatively rare and worth the effort involved in spending some extra time? Are you in the contest to win, or are you just having a good time? If you are contesting, how long will you stay to work every last station before moving on? Is it worth it to you to stay just so someone can finally complete that contact on 23 cm, even though you're delayed an hour? During contests some of the on-the-air intimidation from the intense operators on the other end can be relentless. Remember, you are in control. You make the decision when to pack up and move on.

What kind of equipment you take depends on how many bands you want to operate. For ease of operation, many operators choose out-of-the-box multiband radios. The newer low-power dual HF/VHF radios, such as Yaesu's FT-817 and FT-897, have proven to be very popular with Rover or fixed QRP operations, principally due to the multiple VHF bands and the internal battery options. Despite their age, the old Yaesu workhorse FT-726 and FT-736 transceivers also continue to be very popular, since they offer the ability to operate on more than one band with a flick of the switch. Unfortunately, this benefit is also a drawback. If there's more than one person on your team, operating on one band will keep one of you very busy, while the other operator stands around waiting for a turn at the mic (or key). If you plan to operate more than one band on the air simultaneously, take the necessary equipment.

You'll also need backup equipment. If something fails, you can't just drive home and replace it. Make sure you have extra microphones, extra coaxial cable, and plenty of extra connectors. In your box of spare connectors include microphone connectors, coaxial connectors, and phone plugs.

Bring all the tools you think you'll need, and then some. What about a soldering iron? Some hardware stores sell a butane-powered soldering iron for around $30. Also, don't forget the solder!

Antennas and rotators are a challenge. Some operators choose to mount the antennas atop their van. This saves setup and disassembly time. However, this means their vehicle is their rotator. Others bring along a tower. It takes longer to put up the antennas, but they're also higher in the air. Still others opt for something between these two choices—that is, assembling their antennas on a single mast and attaching the mast to the van. They use an "armstrong" rotator (you know, your strong arm), or an inexpensive TV antenna rotator powered by the generator or an inverter (that's equipped to power a motor).

The type of power you run tends to dictate how you'll run your equipment. If you run more than a brick (100 to 150 watts), you'll need either a small gas generator or deep-discharge marine-type batteries. Notice, I said batteries. Even if you use just a brick, a marine battery is something to consider. It was awfully mortifying to find myself standing by the road holding my jumper cables in the air on Sunday morning during the 1992 June contest. Fortunately, I didn't have to answer too many embarrassing questions once a very kind motorist stopped to assist me.

How do you keep track of your contacts? You can use a lap-top computer. However, most of the people I've talked with who have tried this method have returned to pencil-and-paper logs. The chief complaint is that the software used isn't versatile enough to accommodate the logging needs of the Rover, and the computer is just one more item that can break. If you go with paper logs, bring plenty of pencils and paper. Have a safe place to stow the logs. Keep containers full of sharpened pencils near the operating positions, because you never know when you'll drop one or break a point.

How do you keep track of time? If you're going to run meteor schedules, you must have an accurate time source for the sequencing. Most computers provide such a means for keeping accurate time. If having a laptop isn't in your budget, then you'll need an HF radio and an antenna that will pick up the WWV signal, plus a clock on which you can control the seconds setting.

What's the best way to operate CW? The cheapest way is a hand key. However, some operators use programmable keyers that can double as beacons. The choice is up to you. Remember to bring a hand key as a backup. You never know.

What kind of vehicle makes a good Rover station? The most popular seems to be a full-size passenger or panel van. With the increased popularity of SUVs, many are using this type of vehicle. Others choose a small trailer towed by their choice of towing vehicle. Whatever you choose, it's imperative that it be in excellent running condition (down to the tires) for the trip. Your automobile-club towing service will never find some of the locations you choose. Also, know how to operate what you are driving. Towing something takes a certain set of skills. Driving something with limited side and rear vision takes another set of skills. If you're driving something with a limited field of vision and towing something else, your work is really cut out for you.

In addition to choosing the type of vehicle you plan to use, you must decide where you're going to stay. This refers back to planning your route. If you stay inside the vehicle, be sure you're protected from the elements. If you choose to stay at a motel, know where to find one once you arrive at your destination.

What about operating while in motion? If you're in a contest, the temptation exists to make as many points as possible. One source of points is FM simplex (if you are near a metropolitan area that supports this type of activity). The other is via 6 meters,

if the band is open. However, it's safer to have a copilot do the operating. Trying to operate contest style and log at the same time can be very distracting, not to mention dangerous. If you choose to operate and drive and find yourself in a pile-up, pull over. If you don't, you might find yourself in another type of pile-up.

Whom will you take on your trip? You may want to go by yourself. However, the long stretches between band openings make for lonely times. If you choose to travel with someone, make sure you are compatible before you go on a long trip.

How many of you should there be on a trip? If you're operating in a contest, all contest rules (as they are written now) state that there may be no more than two operators. However, Rover rules do not preclude the use of a non-operating driver. This is the safest way to go and also opens the opportunity to bring along a non-ham friend for the fun. The caveat of this idea is that your friend my decide to become licensed and do his or her own Rover operation next year.

During the planning stages of your trip, check out your equipment exactly as it is to be used. Knowing what to expect before you leave can save you from a headache when you arrive at your destination.

Probably the most important part of your planning is giving someone your itinerary. Without it, your friends won't know where to look if something happens to you. Your family, not to mention your many friends on the VHF-plus frequencies, care about you. They want you to have fun on your trip. They also want you to return home—or at least know how to find you if you don't make it back.

What about publicity? Many Rover operations are publicized on the W6YX VHF Group website <vhf@w6yx.stanford.edu>. (To subscribe, send an e-mail to <vhf-request@w6yx.stanford.edu> and include the word "subscribe" in the body of the e-mail.) Remember, the more publicity, the more successful your trip.

You need to decide on a callsign for your operation. When I operate Rover, generally I use the club call, WRØVER. As you can see, it is a novelty vanity callsign. Due to its length it can be confusing, but when other operators have caught on to its double meaning, it has created some brief pile-ups on 6 meters. Generally speaking, however, use as short a callsign as possible, such as a 1 × 2 or 2 × 1 Extra class call. The addition of Rover to the callsign sometimes gets lost in the QRM or the heat of a pile-up on the other end of the QSO.

Finally, Have Fun!

This hobby is supposed to be fun, so naturally contesting should also be fun. Unless you make it enjoyable for yourself, you'll find the whole experience frustrating and unfulfilling.

How can you make it fun? One way is by setting goals. You may want to work enough stations to earn a pin in one of the ARRL contests. You may want to work stations in new grids only. You may want to run QRP and see how many stations you can work with as little power as possible.

Speaking of fun and Rover operating, I had the most fun in all of my contesting years operating as a Rover. The first fun Rover trip was operating with Jim Rudnicki, NZ7T, during the 1993 June ARRL VHF QSO Party. The second was operating with Oscar Morales, CO2OJ, in and around Havana, Cuba during the 1994 June QSO Party. Both trips had many fun moments that we will always remember.

Current Conferences

Allen Katz, K2UYH, has arranged for the first "Ham Social" at this year's **IEEE/MTT International Microwave Symposium** to be held June 8–13 at the Pennsylvania Convention Center in Philadelphia, PA. The reception is scheduled for Sunday, June 8 from 7:30 to 9:30 PM. in the Convention Center, room 307 AB. This location is in the same building and not far from the RFIC Reception also scheduled for Sunday evening. For more information, contact Al at <a.katz@ieee.org>. For information on the symposium see <http://www.ims2003.org/>.

The annual **Ham-Com** will be held June 20–22 Arlington, TX. This year's hamfest is also the site of the ARRL National Convention. As always, the North Texas Microwave Society will present a microwave forum. For more information, see <http://www.hamcom.org/>.

Calls for Papers

Calls for papers are issued in advance of 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. To date this year the following organizations or conference organizers have announced calls for papers for their conferences:

Central States VHF Society (July 25–27): Contact Joe Lynch, N6CL, at <n6cl @utulsa.edu>. The deadline for submitting papers is June 1.

Microwave Update (September 25–28): Contact Jim Christiansen, K7ND, at <k7nd@att.net>. The deadline for submitting papers is July 1.

22nd Annual ARRL and TAPR Digital Communications Conference (September 19–21): Contact Maty Weinberg at <maty@arrol.org>. The deadline for submitting papers is August 5.

Current Contests

The **Six Club WW Contest** begins at 2300 UTC May 30 and lasts until 0200 UTC June 2. *Contest rules:* Each QSO is worth one point in his/her own country, two points for each contact out of your country, and one extra point for each Six Club member you make contact with and get his/her six club number on your log. Note all calls and numbers must be correct and complete to count. *Scoring:* Multiply total QSO points by the total number of grids worked. All entries must be received by June 30, 2003. Send logs to: Wayne Lewis, W4WRL, Contest Director, either via e-mail at <W4WRL@aol.com>, or via his home address, 3338 South Cashua Dr., Florence, SC 29501-6306. More info see <http://6mt.com/contest.htm>.

ARRL June VHF QSO Party: The dates for this contest are June 14–16, as mentioned at the beginning of this column. Complete rules are in the May issue of *QST*. Rules can also be found on the ARRL website: <http://www.arrl.org>. Many are making plans to activate rare grids. For the latest information on grid expeditions, check the VHF reflector ,<vhf@w6yx.stanford.edu>, on the Internet. This is by far the most popular VHF contest. For weeks in the run-up to the contest postings are made on the VHF reflector announcing Rover operations and grid expeditions. It is a contest that will create plenty of opportunities to introduce the hobby to friends who are not presently working the VHF-plus bands or who are not hams.

SMIRK Contest: The SMIRK QSO Party, sponsored by the Six Meter International Radio Klub, will be held from 0000 UTC June 21 until 2400 UTC June 22. This is a 6 meter only contest. All phone contacts within the lower 48 states and Canada must be made above 50.150 MHz; only DX QSOs may be made between 50.100 and 50.150. Exchange SMIRK number and grid square. Score 2 points per QSO with SMIRK members and 1 point per QSO with nonmembers. Multiply points times grid squares for final score. Awards are given to the top scorer in each ARRL section and country. Send a legal-size SASE for a copy of the log forms. Log requests and logs should be sent to Pat Rose, W5OZI, P.O. Box 393, Junction, TX 76849-0393. Logs must be mailed by August 1, 2003. For more information go to <http://www.smirk.org>.

Field Day: The ARRL's classic, Field Day, will be held on June 28–29. New this year is Class F, for stations operating from emergency operations centers. Complete rules for this contest can be found in *QST* and on the ARRL's website: <http://www. arrl.org>. In years past tremendous European openings have occurred on 6 meters. Also, as happened in 1998, tremendous sporadic-*E* openings can occur. This is one of the best club-related events to involve new people in the hobby.

Current Meteor Showers

Between June 3 and 11 the *Arietids* meteor shower will once again occur. This is a daytime shower, with the peak predicted to occur on June 9. Activity from this shower will be evident for around eight days, centered on the peak. At the shower's peak you can expect around 60 meteors per hour traveling at a velocity of around 37 km/sec (23 miles per second).

On June 9 the *Zeta Perseids* is expected to peak at around 0900 UTC. At its maximum it produces around 40 meteors per hour. On June 28 the *Delta Aquarids S* shower is expected to peak. The *Bootids* is expected to make a showing between June 26 and July 2, with a predicted peak on June 27 at 1930 UTC. On June 29 the *Beta Taurids* is expected to peak at around 0800 UTC. Because this is a daytime shower, not much is known about the stream of activity. However, according to the book *Meteors* by Neil Bone, this and the *Arietids* are two of the more active *radio* showers of the year. Peak activity for *Beta Taurids* seems to favor a north-south path.

And Finally . . .

"We brought our own Echo," is what my wife Carol, W6CL, and I used to say when we went to ham radio gatherings with her Seeing Eye dog guide named Echo. That statement was especially applicable when we hung out with weak-signal operators who specialized in working EME. We even assigned to her the honorary callsign K9ECHO.

Echo was a hit wherever she went, particularly being patient with children who petted her with motions more akin to pounding than petting. Carol used her as a service dog extensively during the last ten years of her career as a special-education teacher for the Oklahoma City Public School District.

An especially poignant ham radio visit occurred in the fall of 1992, when after attending the barbeque at Jimmy Treybig, W6JKV's QTH we made a visit to Joel Paladino, N6AMG, who was hospitalized in San Francisco in the advanced stages of his reoccurrence of cancer. Joel was especially fond of dogs. Knowing this about Joel prompted us to bring Echo into the hospital with us. We convinced the nurses to let us very briefly bring Echo into Joel's room, which seemed to especially cheer him. Sadly, a few weeks later Joel became a Silent Key.

Carol had not used Echo much since retiring from her teaching position. Occasional walks around the block and chasing cats out of our antenna farm in the back yard became Echo's primary occupation in recent years.

In recent months, however, Echo slowed considerably. Walks around the block became shorter and shorter and chasing the cats stopped being part of the game plan. As Echo slowed her physical activities, she began spending more time lying on the floor next to the ham station when Carol was on the air. Somehow Echo knew when Carol was about to QRT because she would show increased enthusiasm about getting fed just as Carol was about to end the net that she was controlling.

This past April Echo quietly ended her career as Carol's companion and our best canine friend, when after a short bout with congestive heart failure she peacefully passed away. Carol has no immediate plans to replace Echo, although we are talking about Carol making a tentative date to go back to the Seeing Eye guide-dog school in Morristown, NJ in August 2004 when I plan on attending the EME conference that Al Katz, K2UYH, will be hosting.

We will miss Echo. Even so, in our loss we are comforted by a phrase that says not even a sparrow unknowingly falls to the ground.

Until next month . . .

73, Joe, N6CL

awards

BY TED MELINOSKY,* K1BV

Awards Programs Dos and Don'ts

There are certain dos and don'ts to consider if you or your group is planning on creating an awards program. The idea is to make the awards interesting—and achievable! The following are four sure-fire ways to kill any interest in your award. (Warning: This is satire!)

1. Charge $10 or more for a piece of wallpaper. This is an automatic killer, not because hams are cheap, but because for the most part they're smart. If you say that excess receipts go to benefit crippled children, for example, not many will believe you—with good reason.

2. Restrict contacts so that the only good ones date from the current year (i.e., 2003). When it takes a year or more to get bureau cards, the average ham will have long forgotten your award. Of course, they have otherwise valid cards in their collection from contacts made in 1994, 1997, and 2000, but they're "no good."

3. Not-in-my-lifetime category. Awards that are so difficult that the sponsor occasionally wonders why nobody applies. How about Work All North Korean Provinces? Then more realistically there's the Work 5 Members of Podunk ARC Award, except that the club is down to three living members, two of whom carry their shack on their belt, and the third is active only on 10 meter Hellschreiber. You get the idea.

4. A variation on number 3, which requires *all* applicants to work the same number of club members, whether they live in the same town as the club or on the other side of the globe. Most of us would be lucky to work one of the members in a lifetime, let alone the required 25 out of the 30 in the club!

As shown by the above points, even if they are a bit farfetched, it takes a realistic approach to an awards program for it to have a chance at being successful. When you have the program laid out and ready to go, send me the information and a sample of the certificate and we'll help you promote it!

James Rounds, K9WA
USA-CA All Counties #1060

This month we hear from K9WA, who was awarded USA-CA #1060 on March 13, 2003.

I'm not sure just when I became interested in radio. I do remember spending time listening to one of those old, large console radios my dad had in our garage. The shortwave bands had all these interesting sounds and signals from around the world. I guess from those days I was hooked. So after working all summer on a farm, I was able to buy a used Hallicrafters SX-99 receiver, and after studying and learning the code, I took the exam, and as a lad of 14 I was issued the call KN9DDA in January of 1961. Shortly after that my parents bought me a used Johnson Adventurer transmitter and I was on the air.

I soon received my General class ticket, and with the same station I began my ham career, which is still very active and consists of over 99% CW operating. I had nothing against phone; I guess I just never got too excited about it. Looking back on it now, I think the lure of CW for a youngster first hearing it may be the mystery of what secrets might be being passed. I may get on SSB on rare occasions during a state QSO Party, when I can find the mic—hi! Eventually I was able to update the station and acquired a Johnson Ranger and a Hammarlund HQ-170 receiver which will always remain one of my favorite stations.

As K9DDA I became interested in chasing wallpaper and joined the old Certificate Hunters Club, the CHC, which in its heyday in the '60s. Along the way I began working counties as a means to qualify for certain awards. It was a very casual pursuit. I also spent time working toward many of the awards a lot of hams aspire to attain, such as WAS, DXCC, WPX, WAZ, all on CW. Being a normal high school kid at the time, there were several other interests, such as athletics, social activities, and of course studies, which took up much of my time.

After spending four years in the US Navy from 1965–69, I got my discharge, came home, and built a Heathkit HW-100 transceiver and became active again. It was around 1971, after marrying my XYL, Susan, that I began keeping track of what counties I had worked. I found out about the CW County Hunters Net run at the time by Jim, K1ZFQ, among others. With the help of many active mobile CW ops I was able to obtain USA-CA 500, 2×CW #981 in November 1973. By May 1982 I had endorsements for 2500, all 2×CW. I also did some mobile CW myself using the FT-101B to give out some counties around the Midwest. Along the way the FCC opened up the flood gates, and I swapped the old call for K9WA, which I felt was a decent call on CW.

USA-CA Special Honor Roll

James A. Rounds, K9WA
USA-CA All Counties #1060
March 13, 2003

USA-CA Honor Roll

500

SV2BOH	3232
EI9HQ	3233
HA5UK	3234
EA3CCN	3235

1000

K8AO	1623
PA3ARM	1624
EA3CCN	1625

3000

K9WA	1080

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.

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

As things went along I managed to get closer to working most of the counties. But I still needed a few hundred, and I figured I would never get them all, especially on CW, so I never got that serious. When the sunspot cycle was up, I spent most of my time working DX and some contests and enjoying the conditions. When the cycle was on the way down, I spent more time on the CW CHN. I also noticed there were more mobile ops on CW and I saw a few hams getting all counties on CW, so I knew it could be done. When I got down to my last 50 or so, the chase was really on. I found many from checking the CHN websites for trips and also found a few in the QSO Parties. Finally, miraculously, I was down to my last few. Then I was finished!

Over the 35+ years of chasing counties it would be impossible to remember and thank all those who helped along the way; there were just too many of them. Suffice it to say I am very grateful and certainly needed the help. But I must make mention of the people who gave me those last few. My friend and neighbor Pete Beedlow, NN9K, with whom I've shared many a mobile trip, and his XYL Nancy, N9DQS, who went out of their way while on vacation to give me six of the last seven counties I needed, finishing KY and KS. To Don, K3IMC, who although not a CW man, was so kind as to make a go of it on CW and give me my last one, Morgan, TN. To these folks and many others along the way I say thanks! It has been a fun journey, and I appreciate the ride you all have given me. —*K9WA*

Awards Available

Marko Polo Award (Croatia). Did you know that Marco Polo was born in what is now Croatia? Actually, the city of his birth lies directly to the east of the Italian "boot," a short distance across the Adriatic Sea.

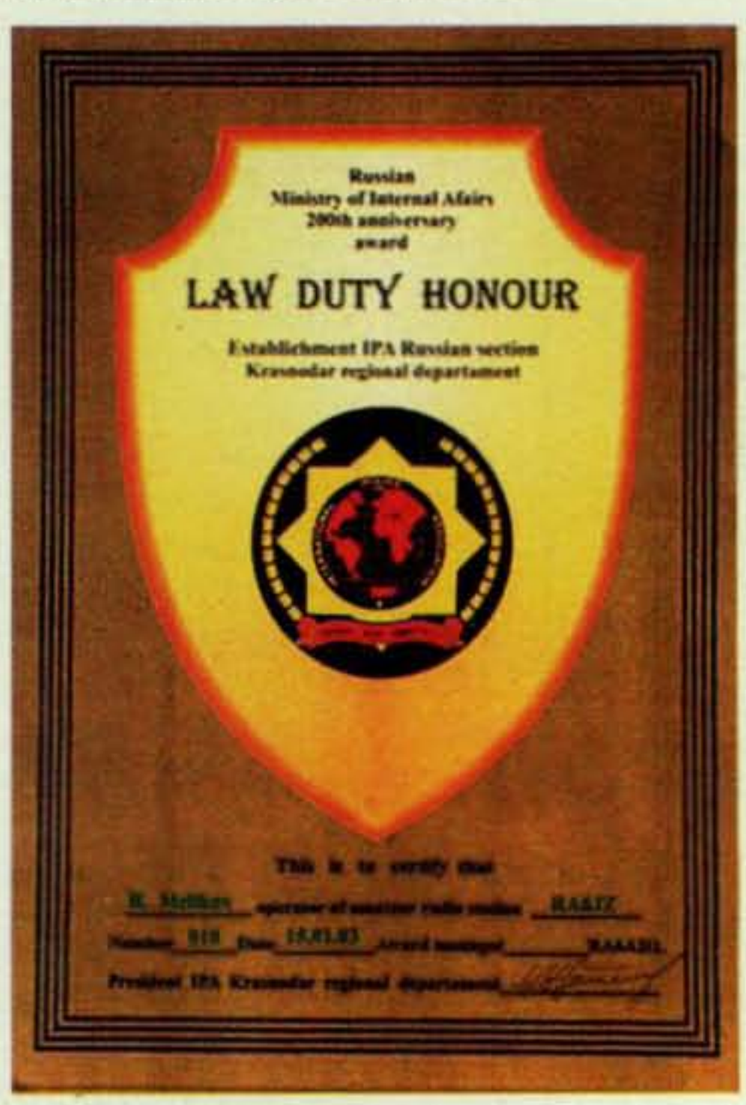
This award is similar to some of the other awards honoring world-famous explorers. It is offered by Croatia's "Marko Polo" International Center and Radio Club Korcula, 9A1CLM, to publicize the historical links between this well-known world traveller and the town of Korcula. The requirements are that you contact current countries through which this explorer made his way. It's a challenging list, since it includes the Middle East, central Asia, and China.

Make one QSO with Marco Polo's home town of Korcula, Croatia and at least 20 confirmed contacts with DXCC countries that are geographically located on the historical Silk Road. Contacts with China/BY and Korcula are required. All bands and modes, but cross-band contacts are not permitted.SWL okay. All contacts must be made from the same country or or after 5 July 1992.

The Marko Polo Award is offered by the "Marko Polo" International Center and Radio Club Korcula, 9A1CLM, to publicize the historical links between this world traveller and the town of Korcula, Croatia.

The 20 countries must come from the following list: Afghanistan (YA), Armenia (EK), Azerbaijan (4J,4K), China (BY), Egypt (SU), Georgia (4L), Greece (SV), India (VU), Indonesia (YB, YC), Iran (EP), Iraq (YI), Israel (4X), Italy (I), Kazakh (UN,UQ), Kirghiz (EX), Lebanon (OD), Mongolia (JT), Palestine (E4), Singapore (9V), Sri Lanka (4S), Syria (YK), Tadjik (EY), Turkey (TA), Turkoman (EZ), Uzbek (UJ, UM), and West Malaysia (9M2–4).

The list of the stations that are active from the town of Korcula is as follows: 9A1CLM, 9A2FL, 9A2QQ, 9A2ZM, 9A3EG, 9A5ABX, 9A6KUD, 9A7PSL. (M/M or /P contacts okay). Cards need not be sent in, although the award manager reserves the right to ask for any. Send GCR list and fee of US$7 to: Nenad Kosovi, 9A7N, Sv. Nikole 73, 20260 Korcula, Croatia; e-mail: <nenad.kosovic @du.tel.hr>; web <http://www.korcula.net/mpolo/> or <http://www.korcula.net/grad/9a1clm/>.



The "Law, Duty, and Honour" Award is sponsored by the Krasnodar reg. Russian section of the International Police Association, which is made up of hams who are in law enforcement officers.

"Law, Duty, Honour" Award (Russia). The International Police Association, made up of hams who are in law enforcement, offers a number of interesting awards for working its members. In general the awards are open to all, not just members.

The newest award is sponsored by the Krasnodar Region Russian section. The certificate design shows a metallic badge on a very military-olive-green background. Contact different IPA members from Russia since 1 January 2002. Earn 200 points from following schedule:

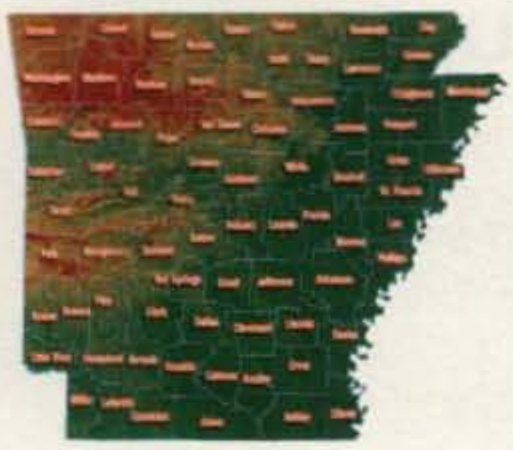
Every QSO for European part of Russia 50 points, for all others 100 points.

QSOs made on 28 March, 5 September, 30 September, 10 November, or on 1.8 MHz count double.

IPA Russian section members: RW1AP, RN1TA, UA1CKC, RA3YA, RU3HD, UA3AFL, UA3RDO, RA3ASA, RA3ASR, UA3GMB, RU4CF, RA4CO, RA6AHL, RA6JZ, RV9CEC, RA9LL, RU9DX, UA9XK, RWØJB, RAØLL. (Silent Keys UA4RZ, RUØSL since 28 March 1992.)

Send GCR list and fee: for Russian stations $1.00; Belarus, Ukraine, Kazakhstan stations $1.50; all others $5 or 10 IRCs. Apply to: Vitaly Kravchenko, RA6AHL, Lenina 40-9, Kuschevskaya, Krasnodarskj, 352030 Russia.

Worked All Arkansas Award. Not all states have an individual or group that offers a certificate for contacting all counties in a particular state. The list grows slowly, and the latest



WORKED ALL-ARKANSAS

ARKAN
Amateur Radio Klub of the Arkansas Northwest

To earn the Worked All Arkansas Award, sponsored by the Amateur Radio Klub of the Arkansas Northwest, contact each of the 75 counties of Arkansas.

The Great Lakes Award is earned by contacting the Canadian province of Ontario and the U.S. states which border the Great Lakes.

one is Arkansas. The award is sponsored by the Amateur Radio Klub of the Arkansas Northwest (ARKAN).

Contact each of the 75 counties of Arkansas. Mixed band and mode okay. Write to the sponsor for the special application/worksheet. SWL okay. Send GCR list and fee of US$5 to ARKAN, P.O. Box 9701, Fayetteville, AR 72702; e-mail: <k1ark@arrl.net>; <http://www.arkan.us>.

In discussions with the sponsor, it was suggested that it might be good to offer an entry-level certificate requiring contacts with a smaller number of counties, then have several steps to the "all counties" level. Arkansas is a difficult state due to its size, rural nature, and number of counties. The club is working on a separate certificate after becoming aware of a map of Arkansas showing its original 30 counties. It turns out that many of the current 75 counties were among the first 30. For example, old Washington county had Madison and Carroll as parts of it, so a card from any of the three could count for Washington for a basic award. The club's website will have an announcement when this is ready.

The Great Lakes Award. This award is reasonably easy to earn, requires a modest fee, and is sponsored by an active club. The design incorporates images of several generations of commercial vehicles used in Great Lakes commerce and a map of the lakes and surrounding states and province required to earn the award. The Michigan Amateur Radio Alliance issues the award in memory of its designer, James "Kingfish" Norton, KA8SHZ.

Work the Canadian province of Ontario and the U.S. states which border the Great Lakes: VE3/Ontario, MI, IL, IN, WI, OH, PA, NY, and MN. Contacts after 30 September 1991. All bands and modes okay, except repeater contacts may not be used. A copy of the cards must be submitted along with fee of US$6. Apply to: Great Lakes Award, Michigan Amateur Radio Alliance, P.O. Box 670, Comstock Park, MI 49321-0670; e-mail: <lldgrd@netscape.net>; <http://www.w8usa.org/Great_Lakes.htm>.

URL of the Month

The website of Piotr, SP5PB, features images and English-language rules for Poland's official PZK awards series and other groups as well. Many of us have a nice collection of SP cards, and this may be the excuse you need to organize them and apply for some very handsome awards. Go to: <http://www.qsl. net/sp5pb/polish_awards.htm>.

I'm interested in seeing your club's or group's award with complete rules and samples. Just reread the beginning of this month's column and keep the price and requirements reasonable. Publicity is key to a successful award program, and *CQ* magazine will do its part.

73, Ted, K1BV

BY TOMAS HOOD,* NW7US

Field Day and Summer Fun

It is that time again when we grab tents, tables, batteries, generators, and if we are not very forgetful, some radio gear, and we head out to a park or other remote location to practice our emergency communications skills. We pick some trees, or perhaps raise a small tower or mast kit, and start stringing wire and cable to create some workable antenna system. Those living in the eastern United States try to angle their wires in such a way as to favor the Midwest and Southwest, while those located in the western states aim east and south. Midwest operators engineer their antenna systems to be omni-directional. Somewhere scattered about the many Field Day sites are the small, lightweight beams.

If you wish to maximize your on-the-air efforts, you'll want to check out the Last-Minute Forecast and the DX Propagation Charts in this column. In addition, I have prepared tables based on locations in each region of the United States, from WØ to W9. These are rough guides that might help you plan your operation. Refer to the Short-Skip Charts in last month's issue, and this month's DX Propagation Charts, for more detailed forecasts, using the Last-Minute Forecast if you wish to get specific details of possible openings.

The weekend of Field Day, June 28–29, should see good to excellent conditions, with little geomagnetic activity. Of course, this outlook is based on the 27-day cycle of the sun's rotation. You will want to check conditions 27 days before Field Day to see how conditions will be, closer to the event.

Current Solar Cycle Progress

The World Data Center for the Sunspot Index (Belgium) reports a monthly-observed mean sunspot number of 61.5 for March 2003, up from February's 46. The 10.7 cm monthly observed mean solar flux for March 2003 is 132, as compared to 180 from March 2002, but up from February's 125. The observed monthly mean *Ap*-index for March 2003 is 19, as compared to 10 for March 2002. The sunspot low for March 2003 was 8 on March 22, and the high of 112 occurred on March 29, 2003.

During the month, solar sunspot activity rarely rose above 100. Propagation on the higher frequencies has suffered as a result. The cycle is gradually declining, but there is enough activity to bring moderate propagation. Expect a number of days when we will see active to stormy geomagnetic conditions due to frequent CME (coronal mass ejections) and elevated solar wind activity. June conditions will be generally fair to good, barring solar events and geomagnetic storms.

Expect a smoothed sunspot level of about 61 and a 10.7 cm solar flux of about 113 for June 2003. The geomagnetic planetary *A*-index (*Ap*) will be higher, as we are in the summer season in the northern hemisphere.

*P.O. Box 213, Brinnon, WA 98320-0213
e-mail: <cq-prop-man@hfradio.org>

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for June 2003

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 1, 6-7, 14-16, 27-28	A	A	B	C
High Normal: 2, 5, 8, 12, 22-24, 29	A	B	C	C-D
Low Normal: 3-4, 9, 13, 18, 20, 25-26, 30	B	C-B	C-D	D-E
Below Normal: 11, 17, 19	C	C-D	D-E	E
Disturbed: 10, 21	C-D	D	E	E

Where expected signal quality is:

A—Excellent opening, exceptionally strong, steady signals greater than S9.

B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S3, with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing on the following pages.
2. With the *propagation index,* use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 3 will be excellent (A) on June 1, good (B) on the 2nd, fair to good (C-B) on the 3rd and 4th, etc.

June Propagation

June marks the changeover from equinoctial to summertime propagation conditions on the shortwave (HF) bands. Solar absorption is expected to be at seasonally high levels, resulting in generally weaker signals during the hours of daylight when compared to reception during the winter and spring months.

Ten meter propagation to DX locations east and west are a rare event during the peak of summer. With the lower solar flux, and decline of the cycle, I don't expect to see much on 10 meters, unless sporadic-*E* openings occur. The flux just won't support a high-enough maximum usable frequency (MUF) on most DX paths. North and south paths on 10 meters may still present DX, especially around sunrise and sunset, but these openings will be short.

Seventeen and 15 meters will be just a bit more reliable than 10, holding some promise. However, these will still be a challenge with the decreased solar activity. Watch for days when the flux peaks high. During those peaks 15 meters may support excellent EU/USSR openings at night and during much of the day.

Twenty meters will be good to excellent during the hours of darkness, but will be a bit weaker during daylight hours. The best openings on 20 will be the hours around sunrise. MUFs during the daytime hours are considerably lower during June and the summer months than during the other seasons. They are considerably higher during the hours of

About The Tables and How to Use Them

The following tables are based on a smoothed sunspot number of 61, predicted for June 2003. They were calculated with a SNR >= 24, with a required reliability of 90%. The power level used was 100 watts, with an isotropic antenna. All times are the local times in the zone of each area as follows:

W1 - Eastern
W2 - Eastern
W3 - Eastern
W4 - Eastern
W5 - Central
W6 - Pacific
W7 - Pacific
W8 - Eastern
W9 - Central
WØ - Mountain

These tables are estimates. In the real world, conditions might be better, or they might be very bad. By selecting your region at the top of the table (if you are in Seattle, choose W7; if you are in Arizona, use the W6 area) and band, you can see what times you might be successful in working into the region listed on the left. (Based on the decline of this solar cycle, the predictions show no openings on 10 meters; therefore no table is included here.) Check the Short-Skip Charts in the May 2003 issue and the Last-Minute Forecast this month for additional help in scheduling your Field Day operation.

80 Meters SSB

From:	W1	W2	W3	W4	W5	W6	W7	W8	W9	WØ
To:										
WØ	N/A	N/A	N/A	N/A	02-12	03-13	05-12	08-10	06-11	00-23
W1	00-23	00-12, 22-23	00-12, 23	02-04, 07-09	N/A	N/A	N/A	00-11 22-23	01-10	N/A
W2	00-12, 21-23	00-23	00-23	00-11, 23	09	N/A	N/A	00-13, 22-23	00-11	N/A
W3	00-11, 23	00-23	00-23	01-03, 06-10	09	N/A	N/A	00-15, 19-23	00-12, 23	09
W4	N/A	02, 06-09	01-02, 05-10	00-23	06-10	N/A	N/A	02, 05-10	07-09	N/A
W5	N/A	08-09	06-09	02-10	00-23	04-11	N/A	04-10	03-10	02-12
W6	N/A	N/A	N/A	N/A	03-11	00-23	04-12	N/A	07-09	02-13
W7	N/A	N/A	N/A	N/A	08-09	04-12	00-23	N/A	09	04-12
W8	00-11	00-13, 22-23	00-15, 19-23	02, 08-10	09-10	N/A	N/A	00-23	00-14, 21-23	09-10
W9	06-10	01-11	00-12	N/A	09-10	N/A	N/A	00-14, 21-23	00-23	07-11

40 Meters SSB

From:	W1	W2	W3	W4	W5	W6	W7	W8	W9	WØ
To:										
WØ	10	03-11	02-11	02-11	00-14	00-15	02-14	02-12	01-13	00-03, 16, 18-23
W1	00, 22-23	00-03, 11-23	00-05, 10-23	00-10	01, 08-10	09	08-09	00-07, 09-13, 21-23	00-12, 23	10
W2	00-03, 11-23	00-01, 22-23	00-01, 22-23	00-11, 23	01-11	N/A	09-10	00-04, 12-23	00-13, 22-23	02-11
W3	00-05, 10-23	00-01, 22-23	00-01, 22-23	00-12, 23	00-11	N/A	09-10	00-02, 17-23	00-06, 11-23	02-11
W4	00-10	00-11, 23	00-12, 23	00-03, 13-23	00-12	N/A	N/A	00-12, 23	00-12, 23	02-11
W5	08-10	01-11	00-11	00-12	00-04, 14-23	01-14	03-12	00-12	00-12	00-14
W6	08-09	07-10	07-10	05-10	01-14	00-04, 15-23	02-14	N/A	02-12	00-15
W7	08-09	08-10	07-10	N/A	03-12	02-14	N/A	11	03-11	01-14

40 Meters SSB *(continued)*

W8	00-07, 09-13, 21-23	00-04, 12-23	00-02, 17-23	00-12, 23	00-12	N/A	N/A	00-01, 23	00-03, 13-23	02-12
W9	00-12, 23	00-13, 22-23	00-06, 11-23	00-12, 23	00-12	04-12	09-11	00-14, 21-23	00-01, 23	01-13

20 Meters SSB

From:	W1	W2	W3	W4	W5	W6	W7	W8	W9	WØ
To:										
WØ	04-05, 12-13, 22-23	00-05, 12-15, 21-23	00-05, 13-23	00-06, 11-14, 22-23	00-02, 16-21	18-21	02-03, 16-23	00-04, 13-23	00-03, 15-22	N/A
W1	N/A	N/A	N/A	00-04, 11-23	03-05, 11-13, 22-23	02-03	N/A	N/A	00-01, 14-21	04-05, 12-15, 22-23
W2	N/A	N/A	N/A	00-03, 12-23	00-05, 12-23	01-03	N/A	N/A	16-18	00-05, 12-15, 21-23
W3	N/A	N/A	N/A	00-03, 13-23	00-05, 12-23	01-02	N/A	N/A	N/A	00-05, 13-23
W4	00-04, 11-23	00-03, 12-23	00-03, 13-23	N/A	00-05, 12-23	01-03, 08-10	03	00-03, 13-23	00-04, 12,23	00-06, 12-14, 22-23
W5	03-05, 11-13, 22-23	00-05, 12-23	00-05, 12-23	00-05, 12-23	N/A	00-06, 14-23	00-07, 13-15, 23	00-04, 13-23	00-03, 14,23	00-02, 16-21
W6	N/A	N/A	N/A	00-03, 08-10	00-06, 14-23	N/A	00-05, 15-23	06-07, 12-14	00-06, 13-15, 22-23	18-21
W7	N/A	N/A	N/A	03	00-07, 13-15, 23	00-05, 15-23	N/A	06, 03-14, 23	00-06, 14-23	02-03, 16-23
W8	N/A	N/A	N/A	00-03, 13-23	00-04, 13-23	06-07, 12-14	06, 13-14, 23	N/A	N/A	00-04, 13-23
W9	00-01, 14-20	16-18	N/A	00-04, 12-23	00-03, 14-23	00-06, 13-15, 22-23	00-06, 14-18, 23	N/A	N/A	00-03, 15-22

15 Meters SSB

From:	W1	W2	W3	W4	W5	W6	W7	W8	W9	WØ
To:										
WØ	N/A	N/A	N/A	00-02, 23	N/A	N/A	N/A	N/A	N/A	N/A
W1	N/A	N/A	N/A	N/A	00-01, 23	N/A	N/A	N/A	N/A	N/A
W2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
W3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
W4	N/A	N/A	N/A	N/A	N/A	15, 18-20	N/A	N/A	N/A	00-02, 23
W5	00-01, 23	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
W6	N/A	N/A	N/A	15, 18-20	N/A	N/A	N/A	00-02	N/A	N/A
W7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
W8	N/A	N/A	N/A	N/A	N/A	00-02	N/A	N/A	N/A	N/A
W9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

HOW TO USE THE DX PROPAGATION CHARTS

1. Use chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8, KP4, KG4, and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9, and 0 areas; the Western USA Chart in the 6 and 7 areas; and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 meters) for a particular DX region, as shown in the left-hand column of the charts. An * indicates the best time to listen for 160 meter openings.

3. The propagation index is the number that appears in ( ) after the time of each predicted opening. The index indicates the number of days during the month on which the opening is expected to take place as follows:

(4) Opening should occur on more than 22 days
(3) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific *propagation index* is likely to occur, and the signal quality that can be expected.

4. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. Appropriate *daylight* time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 7 hours in PDT Zone, 6 hours in MDT Zone, 5 hours in CDT Zone, and 4 hours in EDT Zone. For example, 14 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 03 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts CW, or 1 kw, PEP on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level; for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce, Boulder, Colorado 80302.

June 15 - August 15, 2003
Time Zone: EDT (24-Hour Time)
EASTERN USA To:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	*Nil*	11-16 (1) 16-18 (2) 18-19 (1)	06-09 (2) 09-13 (1) 13-15 (2) 15-17 (3) 17-22 (4) 22-00 (3) 00-03 (2) 03-06 (1)	20-22 (1) 22-23 (2) 23-01 (3) 01-02 (2) 02-03 (1) 22-00 (1)* 00-01 (2)* 01-02 (1)*
Northern Europe & European CIS	*Nil*	14-18 (1)	09-15 (1) 15-18 (2) 18-19 (3) 19-21 (4) 21-23 (3) 23-02 (2) 02-07 (1) 07-09 (2)	21-22 (1) 22-00 (2) 00-02 (1) 21-00 (1)*
Eastern Mediter-anean & Middle East	*Nil*	11-16 (1) 16-18 (2) 18-19 (1)	12-14 (1) 14-17 (2) 17-19 (3) 19-23 (4) 23-01 (3) 01-03 (2) 03-06 (1) 06-08 (2) 08-09 (1)	20-22 (1) 22-00 (2) 00-01 (1) 22-00 (1)*
Western Africa	16-18 (1)	10-12 (1) 12-14 (2) 14-15 (3) 15-17 (4) 17-19 (3) 19-20 (2) 20-22 (1)	03-07 (1) 07-09 (2) 09-15 (1) 15-16 (2) 16-17 (3) 17-23 (4) 23-01 (3) 01-03 (2)	20-22 (1) 22-02 (2) 00-02 (1) 22-00 (1)*
Eastern & Central Africa	16-17 (1)	11-14 (1) 14-15 (2) 15-16 (3) 16-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	14-16 (1) 16-17 (2) 17-18 (3) 18-21 (4) 21-23 (3) 23-02 (2) 02-06 (1)	21-00 (1)

Southern Africa	10-13 (1)	09-11 (1) 11-12 (2) 12-13 (3) 13-14 (2) 14-15 (1)	00-01 (1) 01-05 (2) 05-07 (1) 15-16 (1) 16-18 (2) 18-19 (1)	21-22 (1) 22-00 (2) 00-02 (1) 23-01 (1)*
Central & South Asia	*Nil*	10-12 (1) 19-22 (1)	17-20 (1) 20-23 (2) 23-03 (1) 06-09 (1)	19-21 (1)
Southeast Asia	*Nil*	10-12 (1) 19-21 (1)	19-21 (2) 21-23 (1) 23-01 (2) 01-02 (1) 06-07 (1) 07-09 (2) 09-11 (1)	*Nil*
Far East	*Nil*	10-12 (1) 17-18 (1) 18-20 (2) 20-21 (1)	06-07 (1) 07-09 (3) 09-10 (2) 10-12 (1) 19-20 (1) 20-23 (2) 23-00 (1)	*Nil*
South Pacific & New Zealand	18-21 (1)	15-17 (1) 17-19 (2) 19-21 (3) 21-22 (2) 22-23 (1)	18-21 (1) 21-23 (2) 23-01 (3) 01-03 (4) 03-04 (3) 04-07 (2) 07-09 (3) 09-10 (2) 10-12 (1)	01-03 (1) 03-06 (2) 06-08 (1) 04-06 (1)*
Austral-asia	18-20 (1)	10-12 (1) 18-19 (1) 19-20 (2) 20-21 (3) 21-22 (2) 22-23 (1)	23-01 (1) 01-02 (2) 02-04 (3) 04-05 (2) 05-07 (1) 07-09 (2) 09-10 (1) 16-18 (1)	03-04 (1) 04-06 (2) 06-07 (1) 04-06 (1)*
Caribbean, Central America & Northern Countries of South America	09-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	08-09 (1) 09-11 (2) 11-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	07-10 (4) 10-16 (3) 16-00 (4) 00-03 (3) 03-06 (2) 06-07 (3)	19-21 (1) 21-23 (2) 23-03 (3) 03-05 (2) 05-06 (1) 22-23 (1)* 23-04 (2)* 04-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	12-14 (1) 14-16 (2) 16-18 (3) 18-19 (1)	08-09 (1) 09-11 (2) 11-15 (1) 15-16 (2) 16-17 (3) 17-20 (4) 20-22 (3) 22-23 (2)	11-16 (1) 16-17 (2) 17-18 (3) 18-02 (4) 02-04 (3) 04-07 (2) 07-09 (3) 09-11 (2)	20-21 (1) 21-22 (2) 22-02 (3) 02-04 (2) 04-05 (1) 22-03 (1)*
McMurdo Sound, Antarctica	*Nil*	16-20 (1)	17-19 (1) 19-23 (2) 23-01 (3) 01-03 (2) 03-05 (1) 07-09 (1)	02-05 (1)

Time Zones: CDT & MDT
(24-Hour Time)
CENTRAL USA To:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	*Nil*	15-18 (1)	05-06 (1) 06-08 (2) 08-15 (1) 15-17 (2) 17-18 (3) 18-20 (4) 20-22 (3) 22-00 (2) 00-02 (1)	20-23 (1) 23-01 (2) 01-02 (1) 22-00 (1)*
Northern Europe & European CIS	*Nil*	13-17 (1)	05-06 (1) 06-09 (2) 09-15 (1) 15-18 (2) 18-21 (3) 21-00 (2) 00-01 (1)	20-00 (1)
Eastern Mediter-ranean & Middle East	*Nil*	15-18 (1)	13-16 (1) 16-18 (2) 18-22 (3) 22-00 (2) 00-01 (1) 07-09 (1)	21-23 (1)
Western Africa	16-18 (1)	10-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-20 (1)	14-15 (1) 15-16 (2) 16-18 (3) 18-21 (4) 21-23 (3) 23-01 (2) 01-03 (1)	20-00 (1) 22-00 (1)*
Eastern & Central Africa	16-18 (1)	13-15 (1) 15-16 (2) 16-17 (3) 17-18 (2) 18-19 (1)	15-17 (1) 17-18 (2) 18-21 (3) 21-23 (2) 23-01 (1)	20-23 (1)
Southern Africa	10-12 (1)	09-10 (1) 10-12 (2) 12-13 (1)	22-00 (1) 00-03 (2) 03-07 (1) 13-15 (1) 15-17 (2) 17-19 (1)	21-22 (1) 22-00 (2) 00-01 (1) 22-00 (1)*
Central & South Asia	*Nil*	10-12 (1) 18-21 (1)	17-19 (1) 19-22 (2) 22-03 (1) 05-07 (1) 07-09 (2) 09-10 (1)	*Nil*
Southeast Asia	*Nil*	10-12 (1) 19-22 (1)	04-07 (1) 07-09 (2) 09-10 (1) 22-23 (1) 23-01 (2) 01-02 (1)	03-05 (1)
Far East	*Nil*	10-15 (1) 18-20 (1) 20-22 (2) 22-23 (1)	05-07 (2) 07-09 (3) 09-10 (2) 10-12 (1) 20-22 (1) 22-00 (2) 00-02 (3) 02-03 (2) 03-05 (1)	04-05 (1) 05-06 (2) 06-07 (1) 04-06 (1)*
South Pacific & New Zealand	18-20 (1)	13-16 (1) 16-18 (2) 18-20 (3) 20-21 (4) 21-22 (3) 22-23 (2) 23-00 (1)	17-19 (1) 19-23 (2) 23-01 (4) 01-05 (3) 05-07 (2) 07-09 (4) 09-11 (2) 11-13 (1)	23-01 (1) 01-03 (2) 03-05 (3) 05-07 (2) 07-08 (1) 01-04 (1)* 04-06 (2)* 06-07 (1)*
Austral-Asia	17-20 (1)	14-15 (1) 15-17 (2) 17-19 (1) 19-20 (1) 20-21 (3) 21-22 (2) 22-23 (1)	22-00 (1) 00-01 (2) 01-05 (3) 05-07 (2) 07-09 (4) 09-11 (2) 11-12 (1)	01-03 (1) 03-07 (2) 07-08 (1) 03-06 (1)*
Caribbean, Central America & Northern Countries of South America	10-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	07-09 (1) 09-10 (2) 10-11 (3) 11-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	02-05 (2) 05-07 (3) 07-10 (4) 10-11 (3) 11-13 (2) 13-16 (3) 16-22 (4) 22-02 (3)	19-20 (1) 20-23 (4) 23-00 (3) 00-03 (2) 03-05 (3) 05-06 (1) 20-21 (1)* 21-23 (2)* 23-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	12-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	07-08 (1) 08-10 (2) 10-14 (1) 14-16 (2) 16-19 (4) 19-20 (3) 20-22 (2) 22-23 (1)	14-16 (1) 16-17 (2) 17-18 (3) 18-23 (4) 23-02 (3) 02-05 (1) 05-07 (2) 07-10 (1)	20-21 (1) 21-22 (2) 22-02 (3) 02-03 (2) 03-05 (1) 20-03 (1)*
McMurdo Sound	*Nil*	15-16 (1) 16-19 (2) 19-21 (1)	17-19 (1) 19-23 (2) 23-01 (3) 01-03 (2) 03-05 (1) 07-09 (1)	03-06 (1)

Time Zone: PDT
(24-Hour Time)
WESTERN USA To:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	*Nil*	09-11 (1) 15-17 (1)	05-06 (1) 06-08 (2) 08-15 (1) 15-21 (3) 21-23 (2) 23-03 (1)	20-23 (1)
Northern Europe & European CIS	*Nil*	14-16 (1)	00-06 (1) 06-08 (2) 08-10 (1) 13-16 (1) 16-20 (2) 20-22 (3) 22-00 (2)	20-22 (1)
Eastern Mediter-ranean & Middle East	*Nil*	13-15 (1)	14-16 (1) 16-20 (2) 20-22 (3) 22-23 (2) 23-00 (1) 06-08 (1)	20-21 (1)
Western & Central Africa	14-16 (1)	07-09 (1) 11-13 (1) 13-17 (2) 17-18 (1)	14-16 (1) 16-18 (2) 18-20 (3) 20-21 (4) 21-23 (3) 23-03 (2) 03-04 (1) 07-09 (1)	20-22 (1)
Eastern Africa	*Nil*	13-16 (1)	16-19 (1) 19-22 (2) 22-00 (1)	*Nil*
Southern Africa	09-11 (1)	09-10 (1) 10-12 (2) 12-13 (1)	15-17 (1) 22-23 (1) 23-01 (2) 01-03 (1) 06-08 (1)	20-23 (1)
Central & South Asia	*Nil*	10-12 (1) 19-21 (1)	05-07 (1) 07-09 (2) 09-11 (1) 16-19 (1) 21-23 (2) 23-01 (2) 01-02 (1)	05-07 (1) 19-20 (1)
Southeast Asia	*Nil*	10-12 (1) 19-21 (1)	23-01 (1) 01-03 (2) 03-06 (3) 06-07 (2) 07-10 (1) 16-19 (1)	02-06 (1)
Far East	*Nil*	13-15 (1) 15-17 (2) 17-18 (2) 18-19 (2) 19-20 (1)	19-21 (1) 21-23 (2) 23-02 (3) 02-04 (4) 04-07 (2) 07-09 (3) 09-11 (2) 11-13 (1)	01-02 (1) 02-03 (2) 03-05 (3) 05-06 (2) 06-07 (1) 03-05 (1)*
South Pacific & New Zealand	13-15 (1) 15-18 (2) 18-20 (1)	10-12 (1) 12-15 (2) 15-18 (3) 18-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	17-19 (1) 19-21 (2) 21-02 (4) 02-06 (2) 06-08 (4) 08-10 (3) 10-11 (2) 11-12 (1)	22-23 (1) 23-01 (2) 01-06 (3) 06-07 (2) 07-08 (1) 23-02 (1)* 02-05 (2)* 05-06 (1)*
Austral-Asia	15-17 (1) 17-20 (2) 20-21 (1)	13-15 (1) 15-18 (2) 18-19 (3) 19-21 (4) 21-22 (3) 22-23 (2) 23-00 (1)	20-22 (1) 22-23 (2) 23-00 (3) 00-03 (4) 03-05 (3) 05-06 (2) 06-08 (3) 08-09 (2) 09-13 (1) 13-15 (2) 15-17 (1)	22-00 (1) 00-01 (2) 01-05 (3) 05-06 (2) 06-08 (1) 01-04 (1)*
Caribbean, Central, America & Northern Countries of South America	09-11 (1) 11-13 (2) 13-15 (1) 15-17 (2) 17-18 (1)	09-11 (1) 11-14 (2) 14-16 (3) 16-19 (4) 19-20 (2) 20-21 (1)	18-01 (4) 01-03 (3) 03-05 (2) 05-08 (3) 08-11 (2) 11-14 (1) 14-16 (2) 16-18 (3)	19-21 (1) 21-23 (3) 23-04 (2) 04-05 (1) 20-04 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	13-15 (1) 15-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	08-11 (1) 11-16 (2) 16-17 (3) 17-19 (4) 19-20 (2) 20-21 (1)	14-16 (1) 16-18 (2) 18-19 (3) 19-23 (4) 23-01 (3) 01-02 (2) 02-05 (1) 05-07 (2) 07-10 (1)	20-21 (1) 21-00 (2) 00-02 (1) 02-03 (3) 03-04 (2) 04-05 (1) 02-04 (1)*
McMurdo Sound, Antarctica	*Nil*	17-21 (1)	16-18 (1) 18-19 (2) 19-24 (3) 24-03 (2) 03-07 (1)	00-06 (1)

**Indicates best times to listen for 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2) or higher.*
For 12 meter openings interpolate between 10 and 15 meter openings.
For 17 meter openings interpolate between 15 and 20 meter openings.
For 30 meter openings interpolate between 40 and 20 meter openings.

Propagation charts prepared by George Jacobs, W3ASK.

darkness in June than during the same hours of darkness in the winter. This changeover should have its greatest impact on 20 meters.

Watch for solar-flare activity and CMEs, as we are still in a moderately active part of Cycle 23. Solar-flare events will generally shut down the HF frequencies, starting first with the lower bands (160 to 20 meters). CMEs will cause geomagnetic storminess, degrading higher latitude signal paths more than middle- and low-latitude paths. Thunderstorm noise and other natural static increases considerably during June and the summer months. These higher static levels should be noticeable on all HF bands, especially 40, 80, and 160 meters.

The 30 and 40 meter bands should offer good DX conditions during the night despite higher static. Look for Europe and Africa as early as sunset. After midnight start looking south and west for Pacific, South America, and Asia. Short-skip should be possible out to about 750 miles during the daytime.

Expect some openings on 80, similar to how 40 meters will be acting. Fairly frequent short-skip openings up to 1000 miles are possible during darkness, but expect very few daytime openings with all the static and absorption.

Sporadic-*E* propagation peaks during June and the summer months. Expect an increase in the number of short-skip openings on HF, and often on 6 and 2 meters, with paths open between 50 and 2300 miles.

VHF Conditions

The summertime sporadic-*E* (*Es*) season for the Northern Hemisphere begins in force in May. Within the normal *E*-layer region of the ionosphere, regions of abnormally intense ionization are formed. We do not yet understand why they form, but we do know a lot about how they behave.

During the late spring and summer months at mid-latitude a sharp increase in *Es* propagation occurs. Through June you can expect to see 20 to 24 days with some *Es* activity. Usually these openings are single-hop events with paths up to 1000 miles, but June's *Es* are often double-hop. Europe can generally be worked from the East Coast throughout June. Signals will be weaker than *F2* signals, but with so many more stations on the air, these *Es* openings will be more utilized.

During the daylight hours monitor 6 meters for transcontinental openings, as well as between Hawaii and the western states, and the Caribbean and Central and South America. The best time to look for these openings is during the afternoon hours, especially when conditions are High Normal or better.

There is usually a seasonal decline in transequatorial propagation (TE) during the summer months, but some 6 meter openings may still be possible during June. The best time to catch an opening across the geomagnetic equator is between 8 and 11 PM local daylight time.

With Cycle 23 still at the peak of activity, there is still a chance of occasional aurora activity. Check the Last-Minute Forecast for days when conditions are likely to be Below Normal or Disturbed. Don't forget that you can also visit my propagation page, <http://prop.hfradio.org/>, to view current conditions, including aurora activity.

Until next month, I wish you great DX. Write me with questions or observations, and look for me on the bands!

73, Tomas, NW7US

Zero Bias *(from page 6)*

come back, great! The FCC should make it as easy as possible, considering that you've already passed your tests. The current system of confusion and discrimination should be replaced by a simple, consistent standard: If you can show you've passed an exam element, ever, you get credit for it.

Furthermore, the FCC can and should do this administratively, without going through the full rulemaking process. It's not a matter of writing new rules but rather one of adjusting the rules to apply an existing standard consistently and to bring the rules into compliance with the "Equal Protection" clause of the Constitution. We encourage the FCC to do this, and to do it soon.

Speaking of Fairness...

While we're on the topic of fairness and equal protection of the laws, another area in which a good dose of fairness is needed is the patchwork quilt of state and local regulations regarding antennas and towers (antenna support structures in government-speak). This is a problem that extends beyond amateur radio and includes the broadcasting, cellular, and land-mobile industries, among others.

There is a group in Washington called the National Antenna Consortium (http://www.antenna-consortium.org) that's pushing for the federal government to establish a uniform national antenna policy. This would establish a single set of standards by which people who use RF, and state and local governments, would need to abide. The group is an outgrowth of a 1999 commitment by the Society of Broadcast Engineers to provide startup funding for a tower consortium. The group is seeking a national antenna policy that would:

- Provide for antennas sufficient to meet the requirements for effective implementation of FCC licensed and permitted operation consistent with our national security and economic needs;
- Encourage policies and practices that minimize the number and impact of antenna and tower structures and building rooftops;
- Encourage community planning that provides for antennas, towers, and building rooftops; and
- Encourage a simple, fair, and reasonable approval process.

The NAC's Board of Directors is made up mostly of people in the broadcast industry, but at least four of them, plus the association's Executive Director, are hams, and the membership categories include "Supporting or Amateur Member," with dues of just $25/year (half the regular individual rate). The Chairman is KGØKI and the Executive Director is W2GLA. Clearly, this group will not forget the interests of amateurs as it proceeds in its efforts to bring uniformity and fairness to antenna regulations around the United States. In fact, NAC's literature mentions amateur radio just as prominently as any other radio service. We urge you to visit their website, read their goals in more detail, and if you agree with what they're trying to do and how they're trying to do it, consider supporting their efforts by joining.

73, Rich, W2VU

The Problem With Packet Spots

According to CQ World-Wide DX Contest Director Bob Cox, K3EST, logs submitted for last year's contest included some 100,000 unique callsigns. After running all the logs through the log-checking and comparison routines, it was determined that those 100,000 calls actually belonged about 23,000 stations. The rest were errors in copying, often multiplied many times over by the pasting of (incorrect) packet spots into contest logging software. The problem of bad calls on packet spots is something K1AR discussed last month in his contesting column, and which is reinforced by these astounding figures. We ran out of room last month for a table K1AR made of bad calls he observed posted on packet from just one contest. That table appears in John's column this month. We encourage you to take a look at it, and think long and hard in the next contest before blindly plugging a call from a packet spot into your log. — *W2VU*

Results of the 2002 CQ/RJ WW RTTY DX Contest *(from page 40)*

A final word: Our old friend and RTTY enthusiast, Eddie Schneider, W6/GØAZT, has now retired from RTTY contesting and log-checking. He is well and continues to live in Richmond, California.

The 2003 CQWW RTTY Contest

The 17th Annual CQWW RTTY Contest will be run on September 27–28, 2003. Please note that **Cabrillo**-format logs are **highly** *encouraged* for **all** entrants, with **e-logs required** from **all** potential **high-scoring** entrants in any category. Also, any computer-generated log with **more than 100 contacts must** be submitted via **e-mail** or on a **3.5" diskette** via snail mail. For those who submit diskettes, please remember to send the diskettes in a protective envelope. E-mail is clearly the most reliable and easiest mode for log submissions, but we welcome all logs, including (subject to the restrictions described above) paper logs, no matter how they are sent. Finally, the **deadline** for log submissions is **November 14, 2003**.

The full text of the 2003 rules will be published in the July issue of *CQ* and on the *CQ* website at <www.cq-amateur-radio.com>. **Please read the rules carefully prior to the contest**, and please note that **all** logs submitted via e-mail go to **<rtty@cqww.com>**.

73, Glenn, W6OTC, and Joe, K9SZ

Soapbox

AA5AU...I had the perfect contest. Condx may have been better here on 10 and 15 than they were on the East Coast. I ran SO2R with two Kenwood TS-870's and two AL80B's running 500 watts each to either a Cushcraft A3S with a 40 meter add-on, a Cushcraft A3S fixed at 20 degrees or an 80 meter inverted vee. Too much DX to mention. *KI1G*...What a weekend. Conditions were great, lots of DX activity, and the right number of ops for a Multi-2 without killing oneself. *W2UP*... Wow—the activity was unreal. Solid wall of signals 050–150 on the high bands. Never heard so much activity before! *9A6W*...A lot of activity and I finally got the best score on 15 meter ever done by myself. *KP2D*...Great conditions and scores. Our group had one goal in mind: to break the existing NA record which we did. 20 M was open 24 hours and 10 M was active for 18 hours. We couldn't work them fast enough. *LY5A*...3 ops (of 7) with no RTTY experience at all (before contest)...nothing broke.

KA4RRU...Lots of fun. *JH4UYB*...Great activity. *W9HLY*...Mother Nature was in a fine mood. Never heard signals louder on 40 at my house. How to feel good about yourself: Have a 7Z return to your CQ. *W9ILY*... Another fine contest! Ten meters was Great on Sunday! Just like the old days. Really fun! *VE6YR*...This was my best contest effort ever. Thank you to the propagation gods...It was great to work the Big Guns on five bands, but it was the JA's and the D's and E's that boosted my number of QSOs. *W1AW (WS7I)*...First contest experience from the East Coast. Planning on moving soon! Very special to be at W1AW. *NT1V*...In a very few words, I had a blast! I worked into 4X, ZL2, KL7, KH6, and throughout Europe. *MMØBQI/p*...What a weekend! Band conditions were perfect and it was wall-to-wall RTTY in the lower parts of the bands. Next year the master plan is to have everything set up and working on the Friday then not move until midnight Sunday!

K4WW...Another one in the log with what is becoming a far-too-familiar question: "Anyone else Not work KY?"! *VE7CF* ...Certainly the highest participation I have ever seen in a RTTY contest since 1980. Conditions were fantastic, so there should be no excuses. *3Z7TTY*...Great conditions! Lots of activity. We worked all U.S. states and so many stations. *GUØSUP*...Well, I am still hearing RTY tones from things like the fridge, checkout tills, and various other gadgets, so I am not sure I am fully recovered yet! The highlights are many, but are mainly due to working some choice DX. *WA9ALS*...This was our second attempt at M2, and again, great fun. I just can't emphasize how much fun it is operating multi! Participation was *incredible and propagation* was great.

Important RTTY Contest On-Line Resources

To prepare for the 2003 contest, please refer to the following on-line resources:

Contest rules: <www.rttyjournal.com/rules/cqww.html or www.cq-amateur-radio.com>
Contest records: <www.rttyjournal. com/records/cqww.html>
Cabrillo specifications: <www.kkn.net/~trey/cabrillo/spec.html>
Cabrillo template for the RTTY contest: <www.kkn.net/~trey/cabrillo/cqww-rtty.txt>
Log Submissions: <rtty@cqww.com>

Number groups after callsigns denote the following: QSOs, Points, Zones, Countries, US/VE, Final Score. Certificate winners are listed in boldface.

SINGLE OPERATOR ALL BAND HIGH POWER

AA5AU	**2416**	**5620**	**116**	**309**	**228**	**3,669,860**
RK4FF	**2323**	**5480**	**113**	**341**	**142**	**3,266,080**
KH7X	**1925**	**5731**	**114**	**225**	**212**	**3,157,781**
UP5P	**1918**	**5441**	**112**	**322**	**116**	**2,992,550**
M0SDX	**1864**	**4718**	**109**	**316**	**179**	**2,849,672**
P3F	**1836**	**5386**	**90**	**273**	**139**	**2,703,772**
IKØYVV	**1609**	**4165**	**114**	**304**	**167**	**2,436,525**
AHØB	**1937**	**5766**	**90**	**222**	**109**	**2,427,486**
UW5Q	**1813**	**4375**	**102**	**294**	**157**	**2,419,375**
EA3NY	**1716**	**4352**	**95**	**278**	**177**	**2,393,600**
W1ZT	**1694**	**4247**	**95**	**274**	**193**	**2,386,814**
K4GMH	**1737**	**4368**	**100**	**275**	**167**	**2,367,456**
RZ3AZ	1706	4011	106	318	136	2,246,160
ZW5B	**1536**	**4518**	**94**	**239**	**144**	**2,155,086**
OH2BP	**1549**	**3833**	**107**	**299**	**145**	**2,111,983**
W3FV	**1580**	**4237**	**87**	**268**	**141**	**2,101,552**
VA3DX	**1360**	**3682**	**99**	**281**	**167**	**2,014,054**
DKØEE	**1392**	**3473**	**102**	**308**	**156**	**1,965,718**
LY3BH	**1375**	**3534**	**104**	**273**	**145**	**1,844,748**
WW7OR	**1564**	**3761**	**100**	**228**	**161**	**1,839,129**
WX4TM	**1511**	**3661**	**89**	**238**	**171**	**1,823,178**
SM4RGD	**1378**	**3465**	**91**	**273**	**153**	**1,791,405**
DL5WW	1349	3235	98	298	140	1,733,960
SM5FUG	1311	3222	98	295	144	1,730,214
HA3LI	**1415**	**3473**	**85**	**264**	**147**	**1,722,608**
YU7YG	**1390**	**3331**	**96**	**285**	**130**	**1,702,141**
IT9GSF	**1257**	**3132**	**101**	**281**	**155**	**1,681,884**
K5AM	**1568**	**3653**	**85**	**213**	**158**	**1,665,768**
W4GKM	1411	3231	89	242	176	1,638,117
EA1AKS	1391	3444	82	227	156	1,601,460
OK2BXW	**1301**	**3372**	**83**	**240**	**148**	**1,588,212**
EA1BD	1295	3282	81	244	153	1,568,796
YO9HP	**1321**	**3144**	**90**	**273**	**121**	**1,521,696**
I1COB	1326	3346	75	222	156	1,515,738
RV9FQ	**1273**	**3657**	**79**	**247**	**88**	**1,513,998**
IK2RZP	1306	3225	85	251	131	1,506,075
JA1BWA	**1091**	**3078**	**115**	**261**	**112**	**1,502,064**
WØETC	**1219**	**2897**	**91**	**244**	**154**	**1,416,633**
UA6AHF	1443	3275	81	257	82	1,375,500
LO7H	**1277**	**3772**	**67**	**181**	**111**	**1,354,148**
IK6SNQ	1063	2625	96	256	126	1,254,750
RV9BB	1037	2918	83	272	75	1,254,740
LN1HQ	**1125**	**2771**	**91**	**242**	**116**	**1,244,179**
DL6JZ	1060	2519	90	261	125	1,199,044
EA5DFV	1177	2884	74	209	131	1,193,976
ZL2AMI	**1067**	**3167**	**78**	**183**	**110**	**1,174,957**
W4UK	1151	2681	85	207	133	1,139,425
VE7CF	**1089**	**2724**	**82**	**179**	**153**	**1,127,736**
DAØBH	989	2479	87	236	129	1,120,508
OM8A	**1018**	**2648**	**74**	**209**	**138**	**1,114,808**
VE6YR	**1033**	**2675**	**83**	**184**	**140**	**1,088,725**
RUØLL	1062	2986	79	203	82	1,086,904
K3SV	1029	2665	73	215	114	1,071,330
K5ZD	**904**	**2336**	**83**	**241**	**111**	**1,016,160**
VE3GLA	**876**	**2299**	**80**	**221**	**126**	**981,673**
N8KM	**923**	**2383**	**82**	**215**	**110**	**969,881**
GI4KSH	**1135**	**2781**	**59**	**180**	**106**	**959,445**
LA7CL	976	2327	76	228	103	947,089
KB3TS	917	2497	72	213	89	933,878
UT4HZ	994	2294	80	238	89	933,658
W8LU	911	2365	82	212	92	912,890
NN6XX	**916**	**2108**	**86**	**187**	**146**	**883,252**
YL2GC	**953**	**2252**	**68**	**230**	**93**	**880,532**
GW4KHQ	**986**	**2220**	**73**	**248**	**58**	**841,380**
HB9DCM	**801**	**2067**	**81**	**199**	**127**	**841,269**
DL2HYH	786	1908	84	241	94	799,452
LN1V	954	2288	63	188	93	787,072
SP9LJD	**797**	**2008**	**64**	**178**	**128**	**742,960**
OK2SG	664	1654	85	255	107	739,338
W6IHG/4	716	1800	85	217	108	738,000
RD4M	770	1823	81	216	97	718,262
DF3GY	631	1641	82	202	130	679,374
RN1AO	832	1976	70	187	80	665,912
OK1OX	664	1635	79	212	80	606,585
OH2GI	680	1698	67	186	88	579,018
N2FF	**618**	**1555**	**74**	**192**	**92**	**556,690**
WØHW	658	1588	72	173	96	541,508
DL1YD	576	1455	76	196	98	538,350
AD6KA	688	1513	69	152	130	531,063
NW6S/4	603	1457	72	184	104	524,520
G3UFY	587	1499	65	177	95	505,163
N9QQK	**586**	**1527**	**70**	**184**	**75**	**502,383**
JA2FSM	**581**	**1653**	**69**	**149**	**83**	**497,553**
K9DJ	643	1650	58	149	87	485,100
G3XTT	553	1356	70	192	92	480,024
RW3LB	605	1379	70	209	59	466,102
JA2ZJW	515	1478	74	147	91	461,760
WD4DDU	531	1360	71	188	80	461,040
W6OAT	595	1453	62	151	101	456,242
OK1FAV	604	1470	66	172	64	443,940
K1US	599	1601	54	164	57	440,275
DF3IS	616	1442	60	171	72	436,926
N6EU	572	1214	70	139	133	415,188
I2SVA	500	1214	70	170	93	404,262
K6RIM	529	1190	68	150	118	399,840
NA2M	526	1233	67	155	97	393,327
KY7M	541	1283	61	139	93	375,919
WØTY	494	1143	76	155	95	372,618
K4LQ	445	1207	73	178	54	368,135
DL9NDV	442	1060	66	175	63	322,240
KE5K	375	971	75	165	63	294,213
WA3AAN	423	962	53	141	108	290,524
LU1BJW	423	1207	57	117	63	286,059
W4TTY	387	1024	62	155	52	275,456
IKØCNA	447	1056	51	129	73	267,168
DL4MFP	372	974	61	131	80	264,928
N2ED	381	989	63	143	59	262,085
TA9J	**482**	**1409**	**41**	**128**	**17**	**262,074**
SQ4CTS	570	1233	35	133	39	255,231
DJ1TU	363	858	66	167	52	244,530
ES4RD	**589**	**1354**	**39**	**116**	**24**	**242,366**
TF3AO	**433**	**1064**	**37**	**93**	**69**	**211,736**
JN1BMX	375	1081	43	116	16	189,175
SP4EEZ	294	737	61	140	50	184,987
W5BBR	284	697	68	134	61	183,311
KØJPL	323	704	66	104	77	173,888
N5PA	352	848	43	113	47	172,144
N4GI	304	741	52	117	62	171,171
DK7ZT	314	739	47	116	57	162,580
HL3AMO	**246**	**670**	**68**	**113**	**44**	**150,750**
N5LYG	358	631	52	87	91	145,130
W1NR	244	673	51	126	23	134,600
W6JOX	259	765	51	123	0	133,110
N5KR	263	633	46	100	51	124,701
W7DPW	268	568	53	78	85	122,688
W9SE	264	509	54	91	84	116,561
N6VH	215	498	55	86	57	98,604
PA3EVY	**237**	**561**	**43**	**95**	**24**	**90,882**
K5CM	219	559	38	81	30	83,291
AD6WL	196	407	58	68	72	80,586
K7JJ	206	491	41	74	42	77,087
KY5G	172	397	43	83	52	70666
KC7V	165	448	45	83	18	65,408
RN2FA	**175**	**425**	**38**	**88**	**18**	**61,200**
RX9TX	161	460	28	76	12	53,360
DK4RL	149	381	39	68	15	46,482
ACØM	145	392	19	63	18	39,200
AI6A	101	297	36	80	0	34,452
W4UW	114	320	34	52	6	29,440
WØMN	95	228	27	53	27	24,396
4W6MM	**95**	**279**	**16**	**20**	**2**	**10,602**
CP1FF	**48**	**133**	**16**	**29**	**6**	**6,783**
YL2KF	21	47	13	18	2	1,551

Ops: KH7X (KH6ND), **UP5P** (UN5PR), **P3F** (5B4AGN), **AHØB** (JA2VUP), **UW5Q** (UR3QCW), **ZW5B** (DJ6QT), **DKØEE** (DL4MDO), **WW7OR** (W7GG), **LN1HQ** (LA6FJA), **DAØBH** (DL3GA), **OM8A** (OM3RM), **LN1V** (LA4LN), **RD4M** (UA4LU), **JA2ZJW** (JH2CMI), **4W6MM** (TF3MM)

SINGLE OPERATOR ALL BAND LOW POWER

P43P	**2725**	**8110**	**105**	**277**	**217**	**4,857,890**
W2UP	**2015**	**5141**	**112**	**325**	**190**	**3,223,407**
ZX2B	**1683**	**4961**	**85**	**230**	**155**	**2,331,670**
UA9CDV	**1618**	**4672**	**93**	**280**	**103**	**2,223,872**
RU3QW	**1714**	**3967**	**106**	**322**	**127**	**2,201,685**
UW5U	**1454**	**3475**	**99**	**296**	**140**	**1,859,125**
ZC4DW	**1402**	**4108**	**88**	**257**	**90**	**1,786,980**
LX5A	**1520**	**3745**	**84**	**254**	**118**	**1,707,720**
UY8IF	1495	3497	83	269	123	1,661,075
EU1MM	**1335**	**3163**	**96**	**296**	**124**	**1,632,108**
ON4ADZ	**1237**	**3059**	**102**	**275**	**144**	**1,593,739**
VP5JM	**1325**	**3548**	**69**	**198**	**142**	**1,451,132**
VE3IAY	**1073**	**2822**	**86**	**236**	**165**	**1374,314**
WØYR/4	**1155**	**3077**	**79**	**239**	**114**	**1,329,264**
G4RS	**1164**	**2834**	**87**	**252**	**129**	**1,326,312**
UR5MID	1182	2821	89	249	118	1,286,376
WB8K	**1174**	**2907**	**87**	**229**	**125**	**1,281,987**
EU1AZ	1187	2780	83	255	102	1,223,200
4Z5CP	**1115**	**3196**	**82**	**234**	**62**	**1,208,088**
EA7FTR	**1181**	**2901**	**73**	**205**	**137**	**1,203,915**
9M6LSC	**1103**	**3270**	**87**	**187**	**87**	**1,180,470**
PS7TKS	**1047**	**3086**	**72**	**189**	**113**	**1,154,164**
KI6DY	**1159**	**2586**	**72**	**200**	**168**	**1,137,840**
PA3EMN	**968**	**2339**	**86**	**251**	**129**	**1,089,974**
DL7VOG	**937**	**2310**	**83**	**263**	**124**	**1,085,700**
UA3SAQ	**1026**	**2382**	**90**	**266**	**99**	**1,083,810**
UR7EU	1090	2583	76	223	107	1,048,698
S56A	**886**	**2224**	**89**	**247**	**130**	**1,036,384**
VE2AXO	**982**	**2710**	**73**	**205**	**101**	**1,027,090**
OK2PMS	**936**	**2261**	**85**	**239**	**128**	**1,021,972**
OK2VWB	873	2171	89	250	130	1,018,199
WA1EHK	**912**	**2318**	**82**	**234**	**123**	**1,017,602**
F6AUS	**932**	**2332**	**80**	**219**	**133**	**1,007,424**
H2E	**974**	**2810**	**69**	**228**	**57**	**994,740**
AH6OZ	**893**	**2645**	**74**	**146**	**155**	**991,875**
4Z5AV	895	2613	77	212	85	977,262
J49XB	**989**	**2289**	**85**	**230**	**96**	**940,779**
YU7AM	**858**	**2154**	**78**	**231**	**120**	**924,066**
9A3ZI	**935**	**2345**	**70**	**205**	**116**	**916,895**
VE3BUC	862	2253	77	199	119	889,935
OK2WH	882	2124	70	229	106	860,220
K7SV	**768**	**1924**	**92**	**236**	**119**	**860,028**
YO3JF	**990**	**2457**	**68**	**175**	**103**	**850,122**
W3SE	**892**	**2000**	**86**	**162**	**168**	**832,000**
SM5UFB	**949**	**2265**	**60**	**197**	**102**	**813,135**
W8UL	803	2050	82	210	97	797,450
N4DSL	821	2013	74	187	135	797,148
YO3APJ	727	1838	86	231	108	781,150
JS1OYN	**797**	**2208**	**86**	**177**	**89**	**777,216**
UA4FX	970	2171	69	211	76	772,876
DL2FAG	777	1883	81	221	100	756,966
RA9FRD	**782**	**2247**	**73**	**209**	**54**	**754,992**
N6OJ	848	1992	69	163	133	727,080
MMØBQI/P	**856**	**1974**	**79**	**215**	**74**	**726,432**
PAØWRS	709	1830	81	200	114	722,850
UA3PW	830	1922	78	225	69	714,984
JI1RXQ	715	2029	86	167	95	706,092
OK2RU	687	1689	83	235	99	704,313
RA9XF	724	2046	71	210	55	687,456
DK3VN	725	1785	64	192	110	653,310
F6IRF	659	1619	76	206	120	650,838
SP6IHE	**701**	**1652**	**79**	**221**	**86**	**637,672**
SP6EKS	682	1803	69	170	112	632,853
WD4GBW	785	2179	55	173	61	629,731
W1VET	704	1771	67	183	98	616,308
KL7AC	799	2003	60	111	131	604,906
JK1IQK	642	1753	84	170	90	603,032
F6FTB	621	1546	81	200	105	596,756
OK2PCL	663	1781	72	162	101	596,635
SM6BSK	606	1514	75	212	106	595,002
Z31MM	**706**	**1693**	**69**	**197**	**85**	**594,243**
W6RLL	**678**	**1547**	**81**	**172**	**130**	**593,267**
OK1FHI	626	1528	83	211	93	591,336
DJ3NG	700	1661	69	189	91	579,689
DL4RCK	714	1622	68	207	74	566,078
GW4MVA	**679**	**1613**	**66**	**188**	**84**	**545,194**
KK6T	597	1390	85	174	129	539,320
PAØEHF	600	1505	73	183	97	531,265
DM5GI	635	1458	74	210	79	529,254
EA7AJR	688	1665	54	157	103	522,810
W2WB	**563**	**1372**	**75**	**197**	**105**	**517,244**
DL8NFU	614	1458	65	198	85	507,384
WW3S	**608**	**1631**	**71**	**175**	**62**	**502,348**
VE9DX	**551**	**1396**	**71**	**171**	**116**	**499,768**
UN6G	**667**	**1855**	**63**	**174**	**30**	**495,285**
DF7ZS	579	1388	67	200	82	484,412
GUØSUP	**541**	**1338**	**71**	**194**	**97**	**484,356**
4X6UU	622	1784	60	183	28	483,464
K2PS	566	1471	70	169	84	475,133
AC6JT	682	1304	72	140	149	470,744
UX1IL	640	1481	69	198	50	469,477
WG7Y	619	1382	75	159	105	468,498
UW7F	646	1437	67	214	45	468,462
DL8NBE	581	1381	70	195	74	468,159
DL3PS	760	1664	55	184	42	467,584
VA6MM	**603**	**1520**	**54**	**124**	**123**	**457,520**
DL2YCA	606	1390	70	191	68	457,310
UA4FCO	682	1479	70	235	0	451,095
ZL3JT	**563**	**1660**	**60**	**127**	**83**	**448,200**
VE3GSI	519	1386	70	171	80	444,906
KØCIE	**608**	**1362**	**65**	**153**	**101**	**434,478**
IU1DCI	630	1579	48	124	102	432,646
DK3WN	573	1348	64	183	71	428,664
UA9CR	509	1441	63	184	49	426,536
RA9AU	611	1770	45	157	38	424,800
S52U	572	1348	66	185	63	423,272
RA3BB	585	1470	62	132	86	411,600
RW6BN	587	1307	63	199	50	407,784
K6HGF	586	1271	61	137	118	401,636
SV5/G4OBK	**618**	**1440**	**58**	**151**	**68**	**398,880**
K6EP	501	1105	76	135	147	395,590
WF3M	501	1272	69	165	75	393,048
SP3OL	473	1181	70	186	73	388,549
PA3FGJ	535	1306	60	171	66	387,882
IZ8DVD	557	1289	65	172	55	376,388
OM5XX	472	1297	70	134	85	374,833
UT5UML	488	1178	72	184	62	374,604
VU2WAP	**530**	**1466**	**64**	**137**	**53**	**372,364**
JR1NHD	448	1280	62	157	68	367,360
PY7ZY	483	1407	54	123	84	367,227
AY4DX	**474**	**1367**	**58**	**130**	**77**	**362,255**
T93Y	**414**	**1124**	**71**	**156**	**95**	**361,928**
6J1YYD	**571**	**1363**	**51**	**103**	**110**	**359,832**

9H9PA	**682**	**1563**	**45**	**125**	**57**	**354,801**
JO3JYE	**529**	**1434**	**63**	**134**	**50**	**354,198**
IZ4DZD	524	1208	64	183	42	349,112
EA6DD	**508**	**1202**	**55**	**153**	**74**	**338,964**
DL1ZU	426	1090	69	158	79	333,540
VE1AOE	**611**	**1625**	**37**	**106**	**60**	**329,875**
UN4PG	458	1264	62	165	31	326,112
VE3AGC	435	1074	60	139	103	324,348
K3ZV	440	1071	69	153	79	322,371
HB9CAL	**502**	**1228**	**55**	**143**	**62**	**319,280**
HA3VAM	**453**	**1103**	**60**	**148**	**79**	**316,561**
OM5JA	499	1167	55	167	42	308,088
SM3ETC	527	1211	53	149	50	305,172
RAØFN	453	1287	53	132	51	303,732
W1BYH	423	951	59	153	107	303,369
MØBEX	456	1096	49	139	87	301,400
N7UJJ	463	1078	60	123	95	299,684
WN1OTV	436	1051	57	148	78	297,433
KC4SAW	409	1034	66	150	70	295,724
W3MEL	540	1615	35	148	0	295,545
SP8FHJ	425	1020	71	164	54	294,780
LY1CT	**525**	**1181**	**51**	**161**	**37**	**294,069**
YU1LM/QRP	458	1088	57	153	57	290,496
W6ZL	419	1014	72	135	77	287,976
WM7A	411	880	72	136	119	287,760
YU1KT	462	1079	58	159	48	285,935
MØCOP	438	1039	55	148	72	285,725
6F1LM	413	1050	52	125	91	281,400
SW2A	**435**	**991**	**61**	**158**	**64**	**280,453**
JA1XUY	386	1051	71	138	56	278,515
DL5PW	379	955	66	151	72	275,995
HB9AWS	444	1047	56	155	52	275,361
SM7BJW	399	1017	56	136	68	264,420
GMØJHF	443	1041	52	139	62	263,373
DJ5IR	448	1006	57	164	40	262,566
N6TQS	428	965	63	116	90	259,585
4K6DI	**400**	**1099**	**57**	**151**	**28**	**259,364**
OK2PAD	367	937	68	150	57	257,675
SQ4CTS	570	1233	35	133	39	255,231
K6UM	355	873	69	132	85	249,678
VE7ASK	**383**	**910**	**61**	**101**	**111**	**248,430**
W5MK	408	954	53	127	78	246,132
DL2AL	396	927	61	155	45	241,947
LA5TFA	**620**	**1330**	**40**	**140**	**1**	**240,730**
ON4KGL	404	980	55	131	59	240,100
6J2AUB	435	1087	49	91	80	239,140
F5UTN	470	1046	58	170	0	238,488
K1HTV	361	917	62	138	56	234,752
SN8R	429	971	58	181	0	232,069
6J2AC	399	998	33	90	92	214,570
VE9FX	327	854	56	119	76	214,354
K6TA	383	863	63	99	86	214,024
SP2EWQ/2	360	841	55	147	49	211,091
JA1BHK	363	985	53	122	38	209,805
PA3BFH	363	848	56	152	38	208,608
DH9SB	328	814	58	129	59	200,244
N7DB	348	803	58	103	86	198,341
JA3HBF	293	840	60	125	49	196,560
UN7JX	405	1121	38	106	31	196,175
OHØJV	**383**	**865**	**46**	**148**	**29**	**192,895**
W4BCG	307	694	63	137	74	190,156
IK2WYI	330	800	53	132	52	189,600
WA7YAZ	345	806	63	105	67	189,410
WØSM	388	953	46	99	52	187,741
DJ1OJ	290	762	57	110	79	187,452
K9RT	293	792	61	139	32	183,744
RN4SS	407	870	43	140	27	182,700
RZ6AEW	440	926	42	150	0	177,792
TF3VS	**369**	**847**	**43**	**120**	**44**	**175,329**
N3WT	299	834	54	133	23	175,140
TA1BM	**349**	**787**	**59**	**160**	**0**	**172,353**
JH4BTI	**289**	**835**	**54**	**112**	**36**	**168,670**
KR4U	321	719	47	112	75	168,246
N1MGO	283	682	58	117	71	167,772
RA3TT	305	767	54	118	44	165,672
RW4HIF	365	799	43	145	19	165,393
N7PWZ	306	672	51	110	83	163,968
DL6ZNG	314	746	54	127	37	162,628
W7GTO	318	651	57	97	95	162,099
W4TIJ	311	750	46	115	54	161,250
VA3PL	269	711	50	118	58	160,686
SP9FT	287	700	55	131	39	157,500
K8HF	277	662	55	125	57	156,894
OH2LO	**308**	**741**	**47**	**132**	**32**	**156,351**
L54EU	331	957	41	94	27	155,034
SP7FBQ	347	772	41	128	31	154,400
FO5PS	**306**	**895**	**45**	**54**	**72**	**153,045**
JA1XRH	248	669	66	98	58	148,518
VA3XRZ	256	655	47	114	65	148,030
K6OWL	293	697	53	98	61	147,764
KSØM	262	652	56	123	46	146,700
WA6BOB	303	644	58	75	88	142,324
JA7KM	**246**	**719**	**51**	**102**	**43**	**140,924**
JA2QVP	**253**	**726**	**51**	**102**	**40**	**140,118**
PS7ZZ	238	670	45	110	54	140,030
UA1AFZ	318	689	46	128	26	137,800
SM3AF	241	607	46	133	43	134,754
PY3OL	244	695	49	102	42	134,135
DK6CQ	243	647	53	100	53	133,282
N6PC	281	583	50	90	88	132,924
KS5V	265	611	51	97	68	131,976
KT4U	233	638	57	126	21	130,152
UA3UCD	280	633	48	156	1	129,765
GØ/N9LYE	288	653	40	114	44	129,294
K3IU	236	575	55	111	55	127,075
N7ON	246	562	59	99	67	126,450
SV1CAX	327	700	42	137	1	126,000
SP9CQ	250	616	57	120	23	123,200
KH6GMP	259	771	39	54	65	121,818
SV1BDO	326	699	38	134	0	120,228
HB9CRV	279	627	43	127	21	119,757
ON7SS	281	643	44	112	29	118,955
N7GVV	238	549	53	99	57	114,741
CT4DX	**246**	**586**	**41**	**103**	**49**	**113,098**
W6KY	232	536	55	88	66	112,024
S59AA	222	551	44	101	55	110,200
KJ6RA	219	549	50	105	44	109,251
SP4BOS	249	585	51	115	19	108,225
W7WHY	229	505	53	97	63	107,565
DK7FP	207	539	48	84	66	106,722
RZ4AG	213	526	43	115	44	106,252
WB6BWZ	246	452	47	81	102	103,960
WA2HFI	231	490	51	91	66	101,920
LY2FN	226	566	41	91	48	101,880
SP2MKI	220	562	41	85	54	101,160
JA2KCY	201	577	49	97	28	100,398
AG4TJ	211	531	46	101	42	100,359
EA4BT	249	570	41	112	22	99,750
DK3RA	205	511	50	108	37	99,645
IV3KSE	212	524	46	98	43	97,988
CT1BNW	215	531	41	98	41	95,580
JF2IGP	210	605	41	81	31	92,565
OH2LZI	278	620	31	101	17	92,380
OH3YM	263	590	36	106	13	91,450
DL1DTL	258	582	38	86	30	89,628
NN5T	190	441	53	95	53	88,641
G3URA	244	564	36	88	33	88,548
KL7WP	**220**	**553**	**38**	**66**	**56**	**88,480**
DL1ARJ	178	497	48	65	63	87,472
EA8AKQ	**228**	**684**	**29**	**67**	**30**	**86,184**
WBØYRQ	215	461	38	87	59	84,824
K6BIR	193	448	50	83	56	84,672
JA1BNW	192	559	37	95	18	83,850
DL2DBS	240	540	37	92	24	82,620
EX2U	**245**	**653**	**29**	**85**	**9**	**80,319**
KA2D	182	531	41	104	6	80,181
YU1AB	192	460	47	115	10	79,120
SP4MPH	191	482	47	84	33	79,048
SP6NVK	223	500	36	99	23	79,000
RU3WR	227	492	32	118	9	78,228
DL1NUB	194	469	44	91	28	76,447
IV3KAS	188	442	43	89	40	76,024
WDØBNC	192	490	36	88	29	74,970
K1JN	166	440	43	100	24	73,480
SP8NFF	207	472	37	95	20	71,744
NØYKN	167	426	45	92	30	71,142
N3NZ	176	447	45	85	29	71,073
SP9NH	167	445	44	73	42	70,755
DL9ST	192	453	42	94	18	69,762
IK3ASM	161	411	49	84	35	69,048
NØUX	204	443	35	66	52	67,779
KC2FBK	176	400	36	76	49	64,400
DL8HCO	184	423	41	95	15	63,873
K9PY	156	406	48	89	20	63,742
ZS1JY	**163**	**487**	**33**	**69**	**28**	**63,310**
RAØANO	155	430	37	82	23	61,060
N9KO	164	376	42	84	35	60,536
KF2XF	148	381	42	85	25	57,912
NI4S	162	428	34	78	21	56,924
LU8CM	140	398	40	67	32	55,322
WN3C	152	431	31	86	10	54,737
RZ9IB	170	456	34	78	7	54,264
DL8SDC	136	366	39	60	48	53,802
VE2OWL	139	351	42	71	40	53,703
RX3DTN	155	403	36	69	28	53,599
W3DSX	152	446	33	87	0	53,520
F5RD	180	409	32	87	10	52,761
NEØP	143	326	44	65	48	51,182
W4JH	136	379	39	81	13	50,407
M3OKU	180	393	26	83	19	50,304
F5PHW	154	359	41	89	8	49,542
IK2WFN	146	356	39	69	30	49,128
PA3CDN	161	358	40	93	0	47,614
PAØLSK	182	410	32	84	0	47,560
DL5YAS	146	352	36	75	23	47,168
WBØULX	134	352	37	78	18	46,816
PY7IQ	121	338	39	70	25	45,292
UA3RW	134	332	30	78	28	45,152
IK3CST	160	353	29	73	25	44,831
K9SZ	142	303	34	67	43	43,632
ER3ZZ	**169**	**371**	**29**	**87**	**0**	**43,036**
K8RT	125	361	35	80	3	42,598
AK6DV	108	300	45	82	13	42,000
YO5TP	140	374	29	49	31	40,766
JA8AGI/1	**116**	**316**	**47**	**71**	**11**	**40,764**
JG3NKP/1	124	362	30	61	19	39820
WB9BSH	133	331	29	66	25	39,720
K6RFM	136	307	32	54	43	39,603
KB3IEO	111	302	38	76	15	38,958
K1JE	109	267	46	73	26	38,715
SM6BUV	114	300	34	53	42	38,700
DK3WI	171	393	21	60	17	38,514
WA4FXX	123	364	27	77	0	37,856
AA8EN	119	297	38	65	21	36,828
N2LEB	114	284	33	68	23	35,216
SQ7FSM	134	311	24	65	23	34,832
WB9NOV	120	332	28	74	1	34,196
YO2NAA	116	283	32	61	27	33,960
VE2FFE	106	277	30	60	31	33,517
EW1EA	112	285	36	63	18	33,345
EA1AHA	120	277	28	65	26	32,963
OM7JG	129	288	33	80	0	32,544
DL1DRD	100	258	37	64	21	31,476
SM4XIH	131	299	32	72	0	31,096
VE5SF	**102**	**268**	**35**	**55**	**24**	**30,552**
UT4ZX	98	262	34	49	30	29,606
KAØEIC	107	258	31	58	25	29,412
OE1KTS	**103**	**266**	**33**	**46**	**31**	**29,260**
KØRY	95	266	39	62	9	29,260
HSØ/VK3DXI	**119**	**325**	**29**	**60**	**1**	**29,250**
LW9ETQ	110	299	25	42	29	28,704
KE6QR	110	235	30	50	41	28,435
K9BJM	100	240	28	59	24	26,640
N4GXP/8	108	271	31	50	14	25,745
JQ1AHZ/2	94	273	28	53	11	25,116
F6ACC	115	251	24	64	9	24,347
JA2UJ	91	271	24	39	26	24,119
M3OKT	120	257	19	61	4	21,588
KB2EOQ	102	194	28	38	43	21,146
W5WZ	96	207	28	43	30	20,907
W1TW	90	207	29	46	25	20,700
DL6ABB	90	214	26	55	15	20,544
EU6TV	94	220	29	58	5	20,240
N5ZC	80	196	33	48	22	20,188
DL7BW	81	224	36	42	12	20,160
SM4RLD	117	248	23	51	4	19,344
IZ8DWH	106	227	21	52	2	19,295
K3MZ	71	193	34	54	8	18,528
T95DVD	93	206	26	56	5	17,922
DJ6TK	92	201	22	60	0	16,482
IZØBXZ	100	168	28	54	12	15,792
SP6RGC	71	188	27	35	18	15,040
PA1VC	100	218	12	39	10	13,298
K3FH	58	171	24	48	0	12,312
K2SD	67	196	20	37	0	11,172
JH1TUX	53	141	30	34	14	10,998
CX4SS	**76**	**223**	**14**	**16**	**17**	**10,481**
W3FQE	61	158	19	35	12	10,428
6J3OYJ	56	163	20	38	3	9,943
KE5OG	62	125	20	28	21	8,625
M5DND	60	135	22	36	5	8,505
JA1IZZ	53	150	18	36	0	8,100
W2QQ	50	117	15	30	17	7,254
M3GOJ	45	108	13	29	9	5,508
NØLZ	29	69	20	22	9	3,519
KV4CN	29	76	13	23	6	3,192
RA9FTM	47	132	5	19	0	3,168
N1EO	24	70	16	24	0	2,800
DL5CX	20	60	15	14	4	1,980
AE4EC	21	57	13	18	3	1,938
VE7MOB	21	47	13	16	11	1,880
WP2S	**14**	**32**	**13**	**14**	**2**	**928**
KC7WUE	12	29	11	12	4	783
UT5UGQ	10	25	9	9	2	500
RA2FW	**9**	**23**	**7**	**8**	**0**	**345**
KB2Z	5	15	3	5	0	120
HP1ALX	**4**	**8**	**4**	**3**	**2**	**72**

Ops: ZX2B (PY2MNL), **UW5U** (UY2UA), **G4RS** (GØURR), **9M6LSC** (JH7IMX), **H2E** (5B4AGE), **J49XB** (DJ9XB), **UW7F** (UR5FEO), **IU1DCI** (IK1GPG), **6J1YYD** (XE1YYD), **9H9PA** (PA7PTR/9H3TE), **HA3VAM** (HA3FPL), **SW2A** (SV2AEL), **6J2AUB** (XE2AUB), **SN8R** (SP8ONZ), **6J2AC** (XE2AC)

SINGLE OPERATOR 10 METERS

LU1HF	**1429**	**4228**	**31**	**96**	**54**	**765,268**
PJ2EL	**1109**	**3291**	**25**	**76**	**53**	**506,814**

9A5Y	**1007**	**2620**	**34**	**95**	**52**	**474,220**
CX5BW	**986**	**2924**	**25**	**77**	**49**	**441,524**
9A5E	**949**	**2494**	**34**	**88**	**53**	**436,450**
LT1A	**855**	**2511**	**27**	**88**	**51**	**416,826**
N4BP	**939**	**2471**	**30**	**86**	**46**	**400,302**
MØTTT	**912**	**2398**	**31**	**84**	**49**	**393,272**
HA1WD	**840**	**2225**	**34**	**88**	**50**	**382,700**
KK5OQ	**834**	**2197**	**30**	**84**	**45**	**349,323**
S5ØR	**795**	**2094**	**31**	**82**	**52**	**345,510**
6J1KK	**875**	**2249**	**27**	**74**	**51**	**341,848**
K4EA	**787**	**2099**	**29**	**90**	**42**	**337,939**
HC1JQ	**774**	**2285**	**23**	**74**	**49**	**333,610**
IY4W	**747**	**1970**	**33**	**82**	**52**	**328,990**
DL1LH	**729**	**1907**	**33**	**86**	**50**	**322,283**
5B4AHA	**754**	**2156**	**25**	**67**	**34**	**271,656**
YO6BHN	**473**	**1234**	**32**	**81**	**37**	**185,100**
SP8NR	**439**	**1211**	**30**	**72**	**46**	**179,228**
US9QA	**525**	**1286**	**22**	**68**	**38**	**164,608**
ES7AAZ	**406**	**1059**	**30**	**85**	**38**	**162,027**
KE6YTT	**475**	**1154**	**25**	**73**	**39**	**158,098**
LZ2JA	**398**	**1025**	**26**	**72**	**45**	**146,575**
KØMP	**498**	**1258**	**22**	**59**	**35**	**145,928**
UT2UZ	375	992	30	76	38	142,848
LT1D	426	1250	18	54	41	141,250
AB8K	**396**	**1070**	**25**	**76**	**22**	**131,610**
F5IJT	**413**	**1030**	**28**	**68**	**28**	**127,720**
ON6NL	**354**	**929**	**26**	**67**	**43**	**126,344**
JA7EMH	**308**	**888**	**30**	**72**	**30**	**117,216**
EU1SA	**307**	**825**	**27**	**69**	**42**	**113,850**
OHØHEY	**281**	**742**	**30**	**75**	**36**	**104,622**
F6IRG	313	819	23	57	41	99,099
OK1DDO	**277**	**763**	**22**	**52**	**47**	**92,323**
JA1SJV	**258**	**734**	**27**	**64**	**33**	**91,016**
W9ILY	**287**	**759**	**21**	**66**	**13**	**75,900**
RF4R	**297**	**692**	**20**	**59**	**25**	**71,968**
RV3APM	212	536	26	64	26	62,176
SN2X	151	419	20	43	33	40,224
RU3XB	149	373	21	44	25	33,570
LU7DNN	131	377	18	39	29	32,422
JA5ATN	**131**	**383**	**16**	**46**	**16**	**29,874**
OH7JJT	**157**	**361**	**19**	**48**	**13**	**28,880**
LW1HDJ	110	322	18	44	21	26,726
OH5KUY	157	362	16	44	10	25,340
OK1ACF	98	283	22	32	28	23,206
TA1EQ	**125**	**307**	**18**	**31**	**19**	**20,876**
UR5FCM	110	274	13	29	23	17,810
CT2GRF	**100**	**239**	**14**	**39**	**18**	**16,969**
4J9NM	**124**	**357**	**6**	**32**	**0**	**13,566**
SP8MI	73	201	11	27	18	11,256
EW6OO	60	160	16	31	15	9,920
LW5DR	61	172	19	30	8	9,804
SP3PL	73	197	17	31	0	9,456
PY4PW	**62**	**164**	**15**	**25**	**12**	**8,528**
KG4FSN	62	144	16	27	12	7,920
K8OSF	51	123	17	20	8	5,535
JG3WCZ	**2**	**6**	**1**	**2**	**0**	**18**

Ops: 9A5Y (9A3NM), **LT1A** (LU3CT), **6J1KK** (XE1KK), **IY4W** (IK4MHB), **LT1D** (LU4DJC), **OHØHEY** (OH3TY), **RF4R** (UA4RC), **SN2X** (SP2DWG)

SINGLE OPERATOR 15 METERS

9A5W	**1245**	**3260**	**37**	**106**	**56**	**648,740**
UXØFF	**1192**	**3013**	**33**	**100**	**55**	**566,444**
S55W	**1089**	**2846**	**36**	**98**	**55**	**537,894**
SP5GRM	**1008**	**2709**	**36**	**102**	**56**	**525,546**
T94MZ	**978**	**2512**	**33**	**92**	**54**	**449,648**
DL4MCF	**971**	**2494**	**32**	**92**	**56**	**448,920**
LV5V	**883**	**2589**	**31**	**91**	**51**	**447,897**
W1AW	**1060**	**2677**	**30**	**85**	**48**	**436,351**
UK9AA	**964**	**2698**	**32**	**88**	**38**	**426,284**
S51FB	872	2287	32	84	54	388,790
UAØCA	**847**	**2331**	**29**	**83**	**50**	**377,622**
UT5UGR	**817**	**2012**	**34**	**94**	**46**	**350,088**
JK3DGX/3	**747**	**2103**	**31**	**88**	**47**	**349,098**
RUØAM	798	2198	28	82	45	340,690
VR2BG	**785**	**2135**	**32**	**74**	**51**	**335,195**
IK2FIL	**753**	**1970**	**32**	**83**	**54**	**332,930**
L44DX	**667**	**1956**	**29**	**77**	**50**	**305,136**
GW4SKA	**705**	**1769**	**30**	**83**	**52**	**291,885**
OH7N	**731**	**1818**	**29**	**81**	**46**	**283,608**
JG1GGU	**518**	**1464**	**28**	**78**	**48**	**225,456**
OZ9GA	**574**	**1494**	**28**	**73**	**49**	**224,100**
JR3RIY	524	1479	26	78	43	217,413
CX4AAJ	**491**	**1449**	**28**	**75**	**43**	**211,554**
RN6AL	**598**	**1415**	**26**	**76**	**40**	**200,930**
LU8ADX	440	1292	28	74	40	183,464
UT4EO	517	1211	30	83	37	181,650
SP8AQA	478	1193	28	77	44	177,757
JE1GMM	408	1152	30	76	44	172,800
5NØNHD	**453**	**1359**	**19**	**62**	**36**	**159,003**
JA2BY	**372**	**1068**	**25**	**66**	**47**	**147,384**
HA3JB	**373**	**943**	**33**	**77**	**43**	**144,279**
VK2KM	**347**	**1022**	**30**	**74**	**29**	**135,926**
JH3SIF	333	928	27	73	35	125,280
EC2AFA	**475**	**1099**	**22**	**55**	**34**	**121,989**
OM1AXO	**390**	**1019**	**21**	**56**	**42**	**121,261**
ON4VV	**336**	**866**	**27**	**67**	**45**	**120,374**
RA3BT	351	890	27	62	44	118,370
YB5QZ	**345**	**1018**	**25**	**76**	**13**	**116,052**
YBØECT	273	806	30	71	23	99,944
SM7JUR	**302**	**750**	**26**	**68**	**35**	**96,750**
W4LC	**313**	**876**	**23**	**65**	**18**	**92,856**
OH8MWD	310	739	23	68	30	89,419
DH5WB	261	648	29	63	35	82,296
YO8FZ	**290**	**693**	**27**	**69**	**21**	**81,081**
W6IWO	**283**	**651**	**20**	**53**	**38**	**72,261**
UAØCW	212	611	27	68	23	72,098
JA7DNO	**211**	**601**	**23**	**59**	**29**	**66,711**
EA6/DL8NBY	**243**	**575**	**20**	**58**	**33**	**63,825**
AG4W	**207**	**534**	**21**	**59**	**23**	**55,002**
UWØF	212	515	21	56	28	54,075
UAØFZ	196	543	20	59	12	49,413
YO2BEH	195	456	19	54	27	45,600
UR5QU	166	408	26	63	20	44,472
HB9DTM	**183**	**461**	**15**	**40**	**33**	**40,568**
AY5DT	140	410	25	61	10	39,360
OK2PTC	**157**	**393**	**18**	**52**	**25**	**37,335**
JL3SBE	111	320	24	48	26	31,360
JA1EMQ	125	359	21	44	19	30,156
VK5LA	**119**	**343**	**22**	**52**	**13**	**29,841**
SP9UH	100	248	20	49	16	21,080
WA1FCN	**107**	**287**	**17**	**41**	**15**	**20,951**
SP3CCT	113	278	22	53	0	20,850
UA3UBT	95	227	15	42	16	16,571
K5WW	**103**	**199**	**16**	**28**	**29**	**14,527**
K3PP	**98**	**276**	**10**	**34**	**8**	**14,352**
JR1NKN	85	233	18	37	0	12,815
UN9FD	**84**	**227**	**15**	**34**	**4**	**12,031**
OK2SJI	47	122	14	22	15	6,222
JA1XPU	32	89	14	19	9	3,738
SP3MY	40	106	9	17	9	3,710

Ops: S55W (S57IIO), **LV5V** (LU5VV), **W1AW** (WS7I), **L44DX** (LW1DTZ), **OH7N** (OH7MN), **AY5DT** (LU5DT)

SINGLE OPERATOR 20 METERS

S5ØU	**1270**	**3293**	**32**	**92**	**55**	**589,447**
9A2DQ	**1191**	**3014**	**32**	**93**	**55**	**542,520**
CK6WQ	**1131**	**2956**	**32**	**87**	**53**	**508,432**
MØBEW	**971**	**2352**	**31**	**85**	**50**	**390,432**
SP4TXI	**787**	**1933**	**29**	**85**	**47**	**311,213**
YU7AE	**777**	**1896**	**28**	**83**	**48**	**301,464**
K9JY	**789**	**1914**	**30**	**78**	**45**	**292,842**
UA9CKP	**645**	**1871**	**26**	**79**	**44**	**278,779**
IT9STX	**777**	**1837**	**25**	**75**	**51**	**277,387**
DH6LS	**697**	**1718**	**27**	**85**	**43**	**266,290**
SV1CQN	**764**	**1829**	**24**	**71**	**46**	**257,889**
P43W	**575**	**1697**	**24**	**70**	**47**	**239,277**
LP7H	**510**	**1489**	**27**	**70**	**44**	**209,949**
F6FJE	**564**	**1290**	**26**	**81**	**38**	**187,050**
UX6F	**616**	**1414**	**23**	**67**	**36**	**178,164**
RW4PL	**511**	**1216**	**29**	**74**	**42**	**176,320**
RZ6AUL	530	1181	26	74	37	161,797
UV8M	443	1073	24	72	41	147,001
UA3LEO	444	1032	26	78	37	145,512
UT7FP	497	1152	21	66	38	144,000
7K4QOK	**322**	**882**	**28**	**78**	**25**	**115,542**
RU3DNN	437	970	23	72	24	115,430
DJ2XC	368	860	26	76	29	112,660
SV1FJN	447	1014	17	60	30	108,498
PT2BW	**314**	**910**	**21**	**59**	**37**	**106,470**
RK3DQK	345	780	18	67	26	86,580
SP8KAF	309	756	20	58	36	86,184
UT2AU	322	741	23	68	23	84,474
SV1EPX	375	844	18	54	28	84,400
RA3DRA	339	760	21	66	19	80,560
UN4PD	**241**	**685**	**24**	**58**	**23**	**71,925**
DL4JYT	280	650	19	62	24	68,250
DK2GZ	244	572	19	57	34	62,920
UA9FGJ	**219**	**622**	**20**	**56**	**23**	**61,578**
JH1RFM	213	598	21	60	17	58,604
UR5ZMK	207	519	22	58	31	57,609
TA1DX	**296**	**639**	**14**	**54**	**12**	**51,120**
UA6ADC	218	477	19	60	22	48,177
DL6EDD	202	478	16	58	26	47,800
EA3AJW	**214**	**486**	**17**	**58**	**18**	**45,198**
RW3DIA	246	526	11	52	17	42,080
RA1OK	199	440	19	55	17	40,040
TA2FT	210	597	12	49	6	39,999
PY7XC	152	451	16	40	24	36,080
HP1KZ	**150**	**370**	**11**	**34**	**32**	**28,490**
DL9MBZ	164	369	17	49	11	28,413
I4DOO	**130**	**291**	**16**	**54**	**14**	**24,444**
K1UG	**107**	**245**	**16**	**44**	**29**	**21,805**
W4XDX	111	227	15	33	32	18,160
SP3JHR	123	260	17	31	15	16,380
YO4CVV	**135**	**296**	**7**	**43**	**3**	**15,688**
KØCOP/4	**73**	**173**	**12**	**34**	**18**	**11,072**
SP7DQR/5	97	210	8	37	2	9,870
JH2OJS	60	167	19	31	8	9,686
YO3III	59	158	14	25	20	9,322
VU3DJQ	**46**	**129**	**12**	**32**	**1**	**5,805**
EA4WC	42	107	10	20	11	4,387
KØSRW	**66**	**81**	**9**	**8**	**25**	**3,402**
PA5PR	**24**	**53**	**7**	**19**	**2**	**1,484**
RK3DOV	23	42	4	17	0	882
E21EIC	**15**	**42**	**10**	**10**	**0**	**840**
RA4LK	9	24	7	8	1	384

Ops: CK6WQ (VE6WQ), **LP7H** (LU9HS), **UV8M** (UX3MR), **7K4QOK** (JR2BNF), **SP8KAF** (SQ8GHY)

SINGLE OPERATOR 40 METERS

S5ØA	**710**	**1701**	**23**	**71**	**49**	**243,243**
UT2II	**552**	**1270**	**24**	**73**	**27**	**157,480**
IK1HXN	**484**	**1110**	**18**	**64**	**38**	**133,200**
DF8QB	**503**	**1059**	**18**	**68**	**28**	**120,726**
4Z8EE	**384**	**1123**	**17**	**58**	**18**	**104,439**
UR5FFC	**382**	**802**	**15**	**61**	**11**	**69,774**
SP9ODY	**351**	**745**	**14**	**57**	**17**	**65,560**
UA3LID	**275**	**596**	**20**	**59**	**22**	**60,196**
T94DO	**308**	**646**	**9**	**50**	**12**	**45,866**
UA3RF	276	567	15	53	6	41,958
UR5NX	273	574	11	50	11	41,328
TA1GS	**279**	**587**	**12**	**52**	**3**	**39,329**
F5KSE	**133**	**292**	**10**	**39**	**17**	**19,272**
NT1V	**107**	**213**	**15**	**35**	**30**	**17,040**
JH1APZ	**63**	**172**	**19**	**24**	**11**	**9,288**
4Z8EE	**29**	**39**	**6**	**6**	**20**	**1,248**

Op: 4Z8EE (KI7T)

SINGLE OPERATOR 80 METERS

S57AW	**471**	**1007**	**15**	**62**	**22**	**99,693**
S54E	**383**	**823**	**11**	**52**	**23**	**70,778**
9A7R	**403**	**829**	**12**	**55**	**8**	**62,175**
OK2CLW	**333**	**653**	**9**	**50**	**4**	**41,139**
SP7IIT	**329**	**652**	**8**	**48**	**5**	**39,772**
OK2ZC	274	540	8	45	6	31,860
T95A	**246**	**498**	**6**	**42**	**0**	**23,904**
UTØH	**181**	**363**	**9**	**40**	**3**	**18,876**
RK6BZ	**167**	**333**	**7**	**40**	**0**	**15,651**

SINGLE OPERATOR ASSISTED

DL5AXX	**2212**	**5730**	**127**	**331**	**200**	**3,770,340**
JH4UYB	**1856**	**5275**	**115**	**290**	**154**	**2,948,725**
RN6BN	**1886**	**4613**	**113**	**312**	**158**	**2,689,379**
RW9WA	**1755**	**5048**	**93**	**302**	**131**	**2,655,248**
ON4UN	**1617**	**4237**	**110**	**305**	**179**	**2,516,778**
ND5S	**1449**	**3508**	**102**	**275**	**174**	**1,932,908**
DF3IAL	**1291**	**3240**	**112**	**320**	**161**	**1,921,320**
KU1CW	**1443**	**3564**	**94**	**238**	**152**	**1,724,976**
RA3WA	1338	3146	104	293	118	1,620,190
NO2T	**1191**	**2939**	**87**	**248**	**152**	**1,431,293**
VE4COZ	**1068**	**2755**	**82**	**208**	**163**	**1,248,015**
K4WW	**1049**	**2589**	**86**	**231**	**142**	**1,188,351**
SM7BHM	**1000**	**2432**	**77**	**251**	**125**	**1,101,696**
VA7SW	**1064**	**2694**	**79**	**157**	**147**	**1,031,802**
N5JR	**977**	**2490**	**83**	**214**	**104**	**998,490**
OH2LU	**844**	**2017**	**94**	**277**	**77**	**903,616**
LU8EKC	**850**	**2450**	**71**	**175**	**96**	**837,900**
DK3GI	727	1916	82	189	133	774,064
VK6GOM	**809**	**2391**	**75**	**176**	**63**	**750,774**
7L4IOU	**692**	**1870**	**89**	**181**	**86**	**665,720**
N2BJ	**723**	**1926**	**63**	**173**	**68**	**585,504**
UAØAGI	671	1827	73	182	53	562,716
8P6SH	**596**	**1590**	**61**	**171**	**111**	**545,370**
JA8JCR	**623**	**1735**	**81**	**177**	**50**	**534,380**
VA3PC	**571**	**1518**	**70**	**181**	**101**	**534,336**
WØBR	499	1198	72	175	91	404,924
JA1WSK	**455**	**1284**	**65**	**167**	**76**	**395,472**
KU4J	488	1213	75	177	73	394,225
GØMTN	**491**	**1195**	**59**	**155**	**87**	**359,695**
JH5OXF	**458**	**1265**	**73**	**154**	**55**	**356,730**
DJ4PI	473	1153	67	161	66	338,982
KD6NA	398	1001	67	171	74	312,312
OK2ZJ	**451**	**1059**	**61**	**156**	**56**	**289,107**
KØBX	427	1098	53	140	54	271,206
EA3GIP	**293**	**737**	**67**	**155**	**58**	**206,360**
JR1BAS	265	769	61	112	50	171,487
JS3CTQ	**306**	**803**	**55**	**122**	**28**	**164,615**
DL7VEE	238	587	81	170	26	162,599
RU4LM	**278**	**651**	**44**	**133**	**39**	**140,616**
DL6LAU	216	519	66	127	23	112,104
K4RVH	199	499	52	119	35	102,794
WAØSXV/5	267	496	51	60	92	100,688
DL4RU	206	467	49	111	12	80,324
RU3AT	163	410	54	97	43	79,540

NA4M	205	494	42	61	44	72,618
SV1XV	**152**	**406**	**53**	**83**	**40**	**71,456**
JY9QJ	**177**	**515**	**38**	**75**	**20**	**68,495**
N3JIX	**137**	**378**	**31**	**80**	**14**	**47,250**
PY1NX	**140**	**406**	**25**	**54**	**27**	**43,036**
7Z1SJ	**226**	**675**	**11**	**43**	**8**	**41,850**
K6XT	**103**	**284**	**37**	**65**	**11**	**32,092**
N5ZM	119	227	37	52	45	30,418
W8WEJ	**94**	**247**	**39**	**63**	**16**	**29,146**
KA8PTT	98	290	25	65	0	26,100
7N2DAB	**86**	**249**	**29**	**52**	**16**	**24,153**
OE1TKW	**72**	**204**	**33**	**39**	**21**	**18,972**
JJ1BDX/3	51	124	27	30	14	8,804

MULTI-OPERATOR TWO TRANSMITTER

HC8N	**4576**	**13609**	**137**	**381**	**264**	**10,642,238**
RU1A	**3518**	**8793**	**134**	**399**	**211**	**6,541,992**
RW2F	**3254**	**8319**	**143**	**395**	**221**	**6,314,121**
KI1G	**3131**	**7895**	**127**	**379**	**237**	**5,865,985**
3Z7TTY	**2975**	**7645**	**125**	**363**	**211**	**5,343,855**
W5KFT	**2555**	**5863**	**114**	**295**	**233**	**3,764,046**
RO4M	**2600**	**6059**	**116**	**330**	**127**	**3,471,807**
VE5RI	**1411**	**3647**	**84**	**190**	**155**	**1,564,563**

Ops: HC8N (N5KO, K6AW, AD1C), **RU1A** (RA1ACJ, RA1AR, RN1AM, RW1AC, UA1AKC, UA1ARX, YURI), **RW2F** (UA2FZ, UA2FF, UA2FB, RN2FA), **KI1G** (KI1G, WF1B, K1AM), **3Z7TTY** (SP7GIQ, SP7PS, SP5UAF, SP5HNK, SQ5BPM, SQ5EBJ), **W5KFT** (K5PI, W7WW, K5DJ, K7WM), **RO4M** (RA4LW, RA4LZ, RN4LP, RU4HP, RU4HU, RW4LE, UA4LDP), **VE5RI** (VE5CMA, VE5FF, VE5FN, VE5WI, VE6EZ, VE6SF)

MULTI-OPERATOR SINGLE TRANSMITTER HIGH POWER

HP1XVH	**3127**	**8235**	**127**	**353**	**249**	**6,003,315**
OM5M	**2353**	**6132**	**130**	**361**	**206**	**4,274,004**
RW9C	**2099**	**5991**	**127**	**375**	**134**	**3,810,276**
MW2I	**2365**	**5833**	**117**	**341**	**195**	**3,808,949**
W2FU	**2235**	**5722**	**116**	**343**	**203**	**3,787,964**
OH5Z	**2077**	**5359**	**117**	**347**	**168**	**3,386,888**
UT9F	**1883**	**4544**	**112**	**335**	**157**	**2,744,576**
T77CD	**2124**	**5456**	**88**	**257**	**143**	**2,662,528**
OL5Q	**1776**	**4558**	**95**	**269**	**178**	**2,470,436**
WØDC	**1717**	**4121**	**102**	**281**	**198**	**2,394,301**
NØNI	**1653**	**3946**	**115**	**288**	**191**	**2,343,924**
LRØN	**1573**	**4625**	**99**	**233**	**160**	**2,275,500**
JJ3YBB	**1572**	**4468**	**90**	**227**	**131**	**2,001,664**
OK1KSL	**1378**	**3422**	**100**	**296**	**146**	**1,854,724**
KJ7TH	**1524**	**3585**	**99**	**222**	**176**	**1,781,745**
TK/OM5RW/P	**1563**	**3693**	**87**	**269**	**126**	**1,780,026**
KI5XP	**1333**	**3213**	**99**	**266**	**168**	**1,712,529**
K7ZUM	1300	3026	89	202	166	1,382,882
KE7AJ	1188	2783	88	199	145	1,202,256
OA4O	**961**	**2832**	**70**	**163**	**126**	**1,016,688**
VE3FJB	**909**	**2473**	**72**	**200**	**90**	**895,226**
RK9JWZ	**955**	**2655**	**72**	**214**	**49**	**889,425**
PAØVHA	**946**	**2266**	**61**	**176**	**96**	**754,578**
VE7GL	**651**	**1742**	**65**	**136**	**96**	**517,374**
LW8EXF	**651**	**1861**	**64**	**166**	**42**	**506,192**

Ops: HP1XVH (DJ7AA, DL4LQM, DL5LYM, HP1XVH), **OM5M** (OM3RG, OM2RA, OM2KW, OM4DW), **RW9C** (UA9CGA, RW9CF, RU9CK, RA9DK), **MW2I** (GW4JBQ, GW5NF, G4VXE, WW2R), **W2FU** (W2FU, N2WK, W1TY, K1PY, K2CS, N1OKL, K2ZS, N2OPW, NG2P), **OH5Z** (OH5CW, OH5HCK), **UT9F** (UT9FJ, URØFO, UT4FJ, UTØFT, UR5FEO, UT5UGW), **OL5Q** (OK1HRA, OK1VSL, OK1FLC), **WØDC** (WØBV, WØDC, NØKE, WØLSD), **NØNI** (NØNI, NØAC, NØHR, WOØV, KØWHV, KØKD), **LRØN** (LU2NI, LU1NDC, LU8NA, LW7EIC), **JJ3YBB** (JA3PJL, JA3FHL, JH3FQF, JS3VEX), **KJ7TH** (KJ7TH, KW7N), **TK/OM5RW/P** (OM5RW, OM3PC), **KI5XP** (KI5XP, WA5CHX, N5RLM, W5WMU), **K7ZUM** (K7ZUM, AC7LX, KI7Y), **KE7AJ** (KE7AJ, K7OX), **OA4O** (OA4DJW, OA4AHW, OA4CZO, 9A6DX), **VE3FJB** (VE3FJB, VE3IJM, VA3NX, VA3FN, VA3CW, VA3DG, VA3YC), **RK9JWZ** (RX9JM, UA9JIJ, UA9JLO, UA9JMD), **PAØVHA** (PAØVHA, PA3BSQ), **VE7GL** (VE7GL, VE7TTQ, VA7OO), **LW8EXF** (LU1AEE, LU2BA, LU7DW, LW7DQW, LW8EXF)

MULTI-OPERATOR SINGLE TRANSMITTER LOW POWER

HG1S	**2062**	**5371**	**121**	**334**	**189**	**3,458,924**
Z37M	**2127**	**5340**	**101**	**312**	**185**	**3,193,320**
KP2D	**1962**	**5124**	**89**	**242**	**187**	**2,654,232**
K1TTT	**1664**	**4108**	**110**	**322**	**199**	**2,592,148**
YL7C	**1480**	**3615**	**90**	**278**	**141**	**1,840,035**
9A7P	**1430**	**3552**	**88**	**260**	**162**	**1,811,520**
YU7AL	**1312**	**3282**	**89**	**265**	**143**	**1,631,154**
9A7T	979	2435	95	252	134	1,171,235
EA2RY	**894**	**2161**	**85**	**237**	**122**	**959,484**
LU7FJ	**937**	**2749**	**69**	**174**	**101**	**945,656**
WA1Z	**769**	**1848**	**86**	**231**	**134**	**833,448**
3Z1V	**679**	**1726**	**89**	**255**	**117**	**795,686**
ES1U	**838**	**1980**	**75**	**227**	**75**	**746,460**
OK6A	**780**	**1827**	**70**	**209**	**75**	**646,758**
RZ9SWP	**535**	**1505**	**48**	**138**	**35**	**332,605**
KL7IWC	**486**	**1185**	**58**	**104**	**109**	**321,135**
9H3HG	**477**	**1109**	**54**	**154**	**58**	**297,122**
F8KFN/P	**402**	**943**	**55**	**141**	**62**	**243,294**
RK3DZD	**368**	**857**	**39**	**98**	**26**	**139,691**
AE5DL	**174**	**416**	**32**	**76**	**43**	**62,816**

Ops: HG1S (HA1TJ, HA1DAE, HA1DAC, HA1DAI, HA1AG), **Z37M** (Z31GX, Z32PT, Z33F, Z36W, ZORAN), **KP2D** (KP2N, NP2W, NP2DJ, NP2DZ, KP2VI, W5TTY), **K1TTT** (K1TTT, W1TO, WM1K, K1MK, KE1FO, K1XS, KM1P), **YL7C** (YL2MD, YL2GQT), **9A7P** (9A6XX, 9A5AEI), **YU7AL** (YZ7EM, YU7AL), **9A7T** (9A2EU, 9A4KJ, 9A5MR), **EA2RY** (EA2RY, EA2RU), **LU7FJ** (LU3FLV, LU4FXI, LU5FF, LU5FII, LU7FNI, LU8FAH), **WA1Z** (WA1Z, NE1I), **3Z1V** (SP1MHV, SQ1FTD), **ES1U** (ES1QV, ES2DJ), **OK6A** (OK2MTW, OK2ACM, OK2PSE), **RZ9SWP** (RA9SUS, RA9STH, RA9STT, UA9SH), **KL7IWC** (KL7IWC, WL7CQA), **9H3HG** (9H3HG, GISELA, 9H3HG/DK9GG, 9H3SG/DJ4KW), **F8KFN/P** (F5TEF, F8DPP, F8CHR), **RK3DZD** (RK3DSL, RZ3DAN, RK3DPL, RK3DUF), **AE5DL** (AE5DL, AE5NL)

MULTI-OPERATOR MULTI-TRANSMITTER

LY5A	**4052**	**10227**	**139**	**413**	**212**	**7,813,428**
YL8M	**2969**	**7429**	**116**	**363**	**199**	**5,036,862**
KA4RRU	**2763**	**6670**	**113**	**328**	**220**	**4,408,870**
JE4VVM	**2503**	**7006**	**133**	**330**	**156**	**4,336,714**
EN7Z	**2729**	**6634**	**109**	**337**	**176**	**4,126,348**
IV3TMV	**1948**	**4936**	**112**	**326**	**167**	**2,986,280**
YV4A	**1826**	**5415**	**89**	**248**	**179**	**2,794,140**
LZ9R	**1812**	**4344**	**93**	**315**	**140**	**2,380,512**
WA9ALS	**1740**	**4107**	**105**	**269**	**186**	**2,299,920**
OH2K	**485**	**1106**	**50**	**157**	**0**	**228,942**

Ops: LY5A (LY2PAJ, LY1BA, LY2BIG, LY2GV, LY2TA, LY2IJ, LY3MM), **YL8M** (YL2KL, YL3GDJ, YL1ZF, YL2KF), **KA4RRU** (KA4RRU, W4DC, N4DXS, W4MGM, W4DAV, WA4TK, WB4ZNH, KR4KF, N3YBY, N8CIA, KG4QWQ, KG4JDL), **JE4VVM** (JI3OPA, JE4VVM, JG4CLV, JN4FEU), **EN7Z** (UTØZZ, UR7ZZ, UX2HO[EM1HO], UWØZZ, UT4ZO), **YV4A** (YV4A, YV4GLD, YV4GME, YV4YC, YV5KAJ, YV5AMH, YV5NSF), **LZ9R** (LZ1QV, LZ1ZM, LZ3YY, LZ5XQ), **WA9ALS** (WA9ALS, KB9YTW, WD9GMK), **OH2K** (OH2LRE, OH2LNH, OH2KNU)

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Looking Ahead...

Here's some of what we're working on for upcoming issues of CQ

Antenna Special in July

- "The OH2BH Antenna Farm," by ON4UN
- "Mobile HF Antenna Mounting," by WB6NOA
- "A Multiband Mystery Antenna," by W5GI

Plus...

- "WiFi for Hams, Part 2," by KA3JIJ
- "Ham Radio Goes to Scout Camp," by WI8X
- "Resonance," by K5YNR
- "What Deed Restrictions?" by AA5QT

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

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*Jan. 2003

FT-857 DESIGN HIGHLIGHTS

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

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

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Actual Size

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

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

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

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