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Amateur Radio

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COMMUNICATIONS & TECHNOLOGY

MAY 2001

CQ

Solar Cycle Stalled

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ay Balch, K6VX, of Macdoel, California, y impressive antenna system. Details

THE RADIO AMATEUR'S JOURNAL

"Just back from K5K, Kingman Reef. The IC-756PROs again performed flawlessly and were a factor in our breaking 80,000 QSOs. I was a participant in FOØAAA, A52A and now K5K, all in 2000, and your radios made a combined 237,000 QSOs. You must be very proud to have your wonderful radios used by these DX'peditions that are now ranked as 3 of the top 6 Dx-peditions in terms of QSOs in the history of our hobby."

- K5K member, Bob Allphin, K4UEE

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Three of the top six DX'peditions in history!

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Just listen to the guys who actually used them - they know better than anyone what the power of 32 bit DSP technology can do for ham radio. In fact several members were so impressed that they bought '756PROs for their own ham shacks. "It just doesn't get any better than this" - says Glenn Johnson, WØGJ. Is it any wonder - the world's top DX'ers choose ICOM.

"All seven of the '756PROs worked flawlessly. We ran RTTY perhaps more than 50% duty cycle, and the radios never even got warm at maximum output. The digital filter controls were so easy to adjust and switch...a contester's dream! We had seven radios, most of the time with three modes at once on any given band. There was NO interstation interference. All of our antennas (except for the 160M & 80M verticals) were within a 75 meter circle."

- A52A member Glenn Johnson, WØGJ

" I was particularly impressed with the '756PRO's front end resistance to overloading. I never heard intermod noises or de-sensing even with the huge pileups we generated. Several times I listened carefully for such problems but they simply weren't there. On CW, once I had picked out a station, I could run the selectivity down to 50Hz and hear ONLY the station I wanted. I have worked pileups from several DX'peditions and have never encountered a radio that held up so well."

- FOØAAA member Mike Goode, N9NS.

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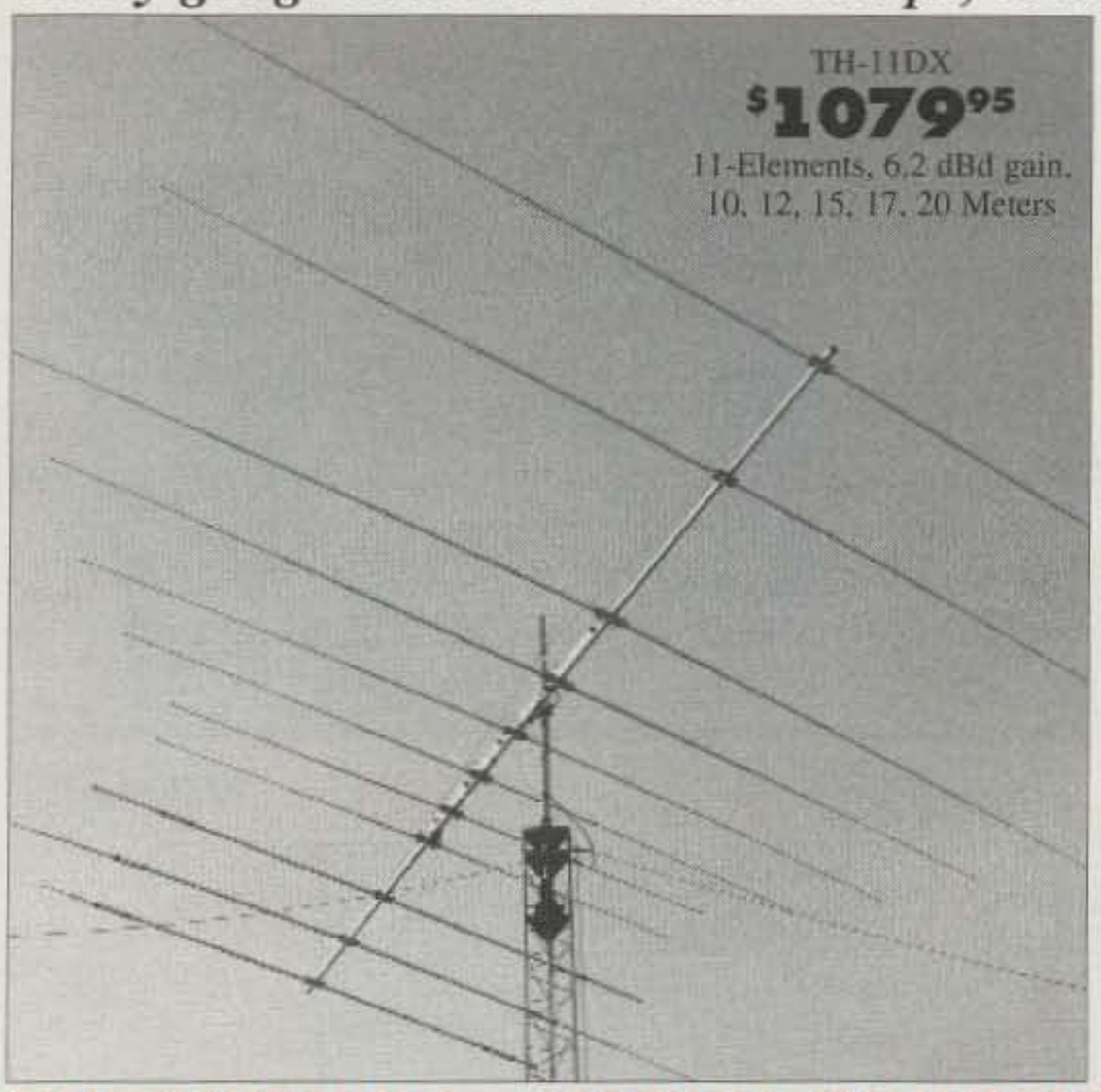

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11-Elements, 6.2 dBd gain.
10, 12, 15, 17, 20 Meters

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TH-7DX, $819.95. 7-element, 6.57 dBd Gain, 10,15,20 Meters

7-Elements gives you an incredible avg *6.57 dBd gain -- the highest* of any Hy-Gain tri-bander!

Dual driven for broadband operation without compromising gain. SWR less than 2:1 on *all* bands.

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The broadband *five element* TH5-MK2 gives you an outstanding 6.1 dBd average gain.

Separate air dielectric *Hy-Q* traps let you adjust for maximum F/B ratio on each band.

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The super popular TH-3MK4 gives you the *most gain for your money* in a full-power, full-size durable Hy-Gain tri-bander!

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The 2-element TH-2MK3 is Hy-Gain's *most economical* full power (1.5kW PEP) full size tri-bander.

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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.

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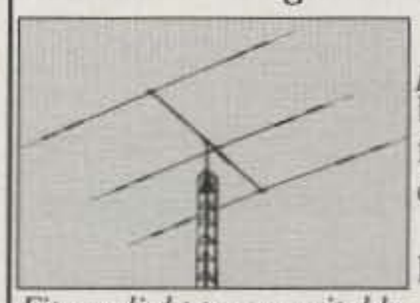

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TH-11DX	11	6.2	22	4000	10,12,15,17,20	12.5	100	24	37	22	88	1.9-2.5	T2X	$1079.95
TH-7DX	**7**	**6.57**	**21**	**1500**	**10, 15, 20**	**9.4**	**100**	**24**	**31**	**20**	**75**	**1.5-2.5**	**HAM-IV**	**$819.95**
TH-5MK2	5	6.1	20	1500	10, 15, 20	7.4	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 opt. 30/40	7.5	100	14	31.5	17.25	45	1.9-2.5	HAM IV	$549.95

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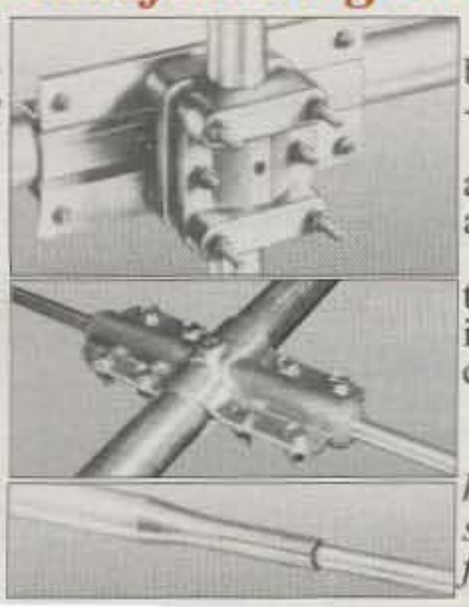

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Ham Radio News

From The CQ Newsroom

CQ's Own W3ASK Named Dayton Ham of the Year

CQ Propagation Editor George Jacobs, W3ASK, has been named the Dayton Hamvention's Amateur of the Year for 2001. Jacobs, who celebrated his 50th anniversary as CQ's propagation columnist in our March issue, is being honored by the Dayton Amateur Radio Association for his half-century of helping amateurs understand radio propagation. Also being honored this year are Special Achievement Award winner Frank Bauer, KA3HDO, for his work with amateur radio in space; and Technical Achievement Award winner Peter Martinez, G3PLX, for his development of the PSK-31 digital mode.

A professional broadcast engineer, Jacobs is credited with pioneering the world-wide broadcasting system of the Voice of America, and with overseeing the post-1974 modernization of Radio Free Europe and Radio Liberty broadcasting facilities. An expert in international broadcast regulations, he has served as a member of U.S. delegations to nearly every major international broadcasting conference since 1949. Jacobs is also co-author of CQ's The New Shortwave Propagation Handbook.

"George has shared his knowledge of radio propagation with CQ's readers for five decades," noted CQ Editor Rich Moseson, W2VU. "As a result, many of today's most active hams have a far greater understanding of how propagation works, and of what to expect from different ham bands under different conditions. It has been our great fortune to be associated with George for so many years."

CQ Publisher Dick Ross, K2MGA, added, "One of the most important things George has done for our readers each year is his last-minute predictions of conditions during the CQ World Wide DX Contest. It is a testament to his great skill that, over the course of a half century, he has been right over 90% of the time. All of us at CQ congratulate George Jacobs on this well-deserved honor."

Jacobs, Bauer and Martinez will receive their awards at the Dayton Hamvention Banquet on May 19, 2001.

AMSAT Issues Detailed Report on AO-40 Woes

AMSAT North America President Robin Haighton, VE3FRH, has issued a detailed report on the events that led up to the problems experienced by the AMSAT OSCAR-40 (Phase 3D) satellite soon after launch, including a previously undisclosed revelation of a second "anomaly" after a motor burn went on too long. The letter also concludes that an unintended pressurization of the fuel system during tests on December 11 may have been responsible for the subsequent loss of communication from the satellite and apparent permanent damage to some systems.

In an open letter to all members, Haighton explained that a valve in the fuel system -- which had been replaced by the manufacturer before launch due to sticking problems, apparently malfunctioned several times in orbit. The near-loss of the satellite came during a maneuver to "exercise" the valve prior to a second attempt to raise the satellite's orbit, Haighton said. "It is believed that during this exercise the system became pressurized and that a leakage of fuel was the end result," explained Haighton, adding, "intial thoughts were that the spacecraft was completely dead ... with the possibility that AO-40 was in multiple pieces."

NORAD, the North American Air Defense Command, which tracks all satellites in Earth orbit, later confirmed that OSCAR-40 was still in one piece, and AMSAT ground controllers managed to regain contact with the spacecraft on December 25.

As of late March, ground controllers had slowed the spacecraft's spin rate from more than 17 revolutions per minute (RPM) to about five, a rate at which they feel confident they can regain full control of the satellite's attitude, or position relative to the Earth, and try to make minor adjustments to its orbit. Once that is accomplished, says Haighton, they will be able to begin tests to see which of the radio systems are still in operation.

ARRL Seeks Input On 160 Meter Band Plan

Citing "ever-increasing activity" on the 160 meter band, the ARRL is asking users for advice on possibly revamping its band plan for "top band." One-sixty is the only amateur band below 30 MHz without an FCC-mandated split of CW and voice operation, and current arrangements are by "gentlemen's agreement" only. The League says it has established an ad-hoc 160 Meter Band Plan Committee and is soliciting input from users. Comments may be submitted by e-mail to <160-BANDPLAN@arrl.org> (be sure to include a subject line or the message will be "bounced"), or by mail to ARRL HQ.

ARRL Seeks 216–220 For Amateur Use

The ARRL is trying to persuade the FCC to open the entire 216–220 MHz band for amateur use on a secondary basis. Theoretically, hams already have a secondary allocation on 219–220 for point-to-point digital message forwarding systems (packet "backbones"). However, limitations on use and the requirement for specific permission from the primary occupant of that band segment has resulted in a total inability by amateurs to use the band.

In comments to the FCC on a proposal to reallocate 216–220 from government to private use, the ARRL says it asked for a secondary amateur allocation across the entire range, to "provide at least some opportunity for amateurs to engineer fixed links into the band, which would not be possible in the 219–220 MHz segment alone." The League's comments are in addition to a separate attempt to ease restrictions on the use of 219–220. For details of this effort, see this month's "VHF Plus" column on page 95.

Kenwood Plans Live Dayton Webcasts

Kenwood Communications is trying to help amateurs who can't physically attend the Dayton Hamvention to join in via the Internet. Kenwood has contracted with Interactive Netcasting Systems, Inc. to provide live webcasts of events and interviews from the Hamvention floor. Details will be posted on Kenwood's website at <http://www.kenwood. net>.

Live webcasts from Dayton were pioneered several years ago by Tucson Amateur Packet Radio (TAPR) and the Newsline "Ham Radio Town Meeting." Kenwood's entry means it will be possible for more amateurs than ever to "experience" Dayton, even if they can't be there in person.

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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Zero Bias

BY RICH MOSESON, W2VU

An Editorial

The Hamfests of Our Lives

Native Americans used to count summers to track the passage of years. Today, school children and their parents use grade levels (I have a fifth grader and an eighth grader). Hams use hamfest seasons, and many of us count years in units known as "Daytons." This will be my tenth Dayton with *CQ*, and I'm quickly approaching the 20th anniversary of my first Dayton (*everyone* remembers their first Dayton). The really special anniversary this year, though, is Dayton's itself. This is Dayton's 50th Dayton!

Going to the Dayton Hamvention is a very special experience for hams, and even for non-hams. It's what my wife calls "the total ham radio experience." She knows this first-hand, even though she's not a ham, since *her* first visit to Dayton came just six months after we were married. She quickly became a Hamvention veteran, with her own memories of mud, winning an antenna at the banquet (she, not I!), more mud, meeting the late Jean Shepherd, K2ORS—did I mention mud? — and meeting Astronaut/Senator/Astronaut John Glenn.

Dayton is unique, no question. But just about any hamfest in the country can generate some level of fun and excitement, even if it's not on the scale of Dayton. Hamfests are a very important part of our hobby, and are often viewed as a barometer of its health. If you think about it, ham radio is mostly a solitary activity. You sit by yourself in your shack, just you and your radio, reaching out to make contact with people you may never see. You may get to know them by their voices, or by their "fists" (although this is becoming less common in the age of electronic keyers), but rarely by their faces. Club meetings and hamfests are the only real opportunity that most of us have to meet our fellow hams in person. And while some of us revel in the anonymity that the radio offers, there are others among us who actually enjoy social interaction!

Club meetings provide some opportunities, but they tend to be structured and programmed by somebody else. Hamfests are free-form. Commercial vendors, tailgaters, forums, test sessions, and food of questionable origin are all there for you, but you're free to do what you want when you want, in the order that you want. The bigger the hamfest, the more you'll have to choose from, but even a small local swapmeet provides an opportunity for socializing, and for trading some of your old junk for someone else's ... um, uh ... unrecognized treasure. At the dozen or so really big hamfests scattered around the country each year, you'll also find multiple dealers plus manufacturers showing off their newest products. Not everyone can get to Dayton, but most of us live within driving distance of one of the country's major hamfests. It's worthwhile, at least once, to share in the experience of a major show.

I'm writing this in mid-March—the "in between" zone. Winter's not quite over, spring hasn't quite begun; the winter hamfest season is over, the spring-summer hamfest season hasn't quite started. For me, it's a two-month pause in hamfests between Charlotte and Dayton. And it's a good time to take a pause, to reflect, to look forward, and to let my body recover from airline and hamfest food.

Looking back at this year's Charlotte Hamfest, I am again impressed by both the similarities and differences between the hamfest exhibits and those on the other side of the Trade Mart, where the hamfest is held, at the annual Charlotte Woodworking Show. Again, the main similarity is the people—they look the same (minus the callsign hats); they walk out carrying armfuls (or wagonfuls) of stuff; and they have the same kind of dedication to and knowledge of their craft as most hamfest attendees have about ham radio. There's even some direct crossover. While I was wandering around the wood show this year, I saw at least a half-dozen people wearing callsign tags!

The main difference is what's happening at the booths. Don't get me wrong: The Charlotte Hamfest had a *great* crowd this year. The corridors were packed and everybody was busy nearly all day Saturday (Sunday was another story, but most hamfest Sundays are). But the booths were *passive*. You could look at stuff, and generally even touch it. There were knowledgeable people there to tell you all about it. And of course, you could *buy* stuff. Over at the wood show, though, virtually every booth had something going on. There were demonstrations, opportunities to try out tools and widgets for yourself, and more demonstrations. There was probably as much RF in the air there from those wireless headset mics used by the demonstrators as there was at the hamfest from the gaggle of handhelds (including a *lot* of Family Radio Service HTs).

At the risk of looking like I'm cutting and pasting from last May's editorial, the manufacturers and dealers who exhibit at hamfests are missing out on a tremendous opportunity to build excitement and sales by, well, *building* stuff. If you're an antenna manufacturer, you should have someone at your booth spending the whole day assembling, disassembling, and reassembling the antenna of your choice, all the while talking his or her way through each step and passing along helpful hints. If you sell kits, assign one of your people to demonstrate kit-building techniques. If you manufacture radios, take one apart and show people how well it's made and walk them through the various features by pointing out where on the circuit board each one happens. And whenever possible, hook up at least one radio to an antenna and let people use it on the air! Let them talk to their buddies on 2 meters or 440 (or, dare I say it? 220?). Let them get on HF and try to work somebody QRP (you don't want to get into the PA system). Tune in some international broadcast stations. Think of other ways to be active and generate excitement.

Sometimes it seems that the only group that's got it right is AMSAT. At virtually every hamfest that I attend, there are periodic announcements that "in the parking lot, so-and-so from AMSAT will be making a contact with his handheld through the OSCAR-27 satellite." I've been to those demos. They *always* draw a crowd. Why? Because they're *doing something*. They're *interesting*. And in between satellite passes, there's almost always a computer at the AMSAT booth, demonstrating a tracking program, showing you where a certain satellite is right now and how soon it will be in range again. Virtually every exhibitor can demonstrate *something*, and many more need to try it.

Before I leave the topic of hamfests, we have an excellent article in this issue by John Wood, WV5J, with tips on organizing and running a successful hamfest. John contacted the heads of large and small hamfests across the country for their thoughts and advice, and he's presented an excellent blueprint, starting on page 48, for getting any hamfest off to a good start.

Now, what if you're not an exhibitor or a flea marketeer or a hamfest organizer? Your assignment is simple: Go to as many hamfests as your schedule and budget will permit. If there's a local show, it needs your support. If there's a big regional or national-level show nearby, it still needs your support, and you may find that you

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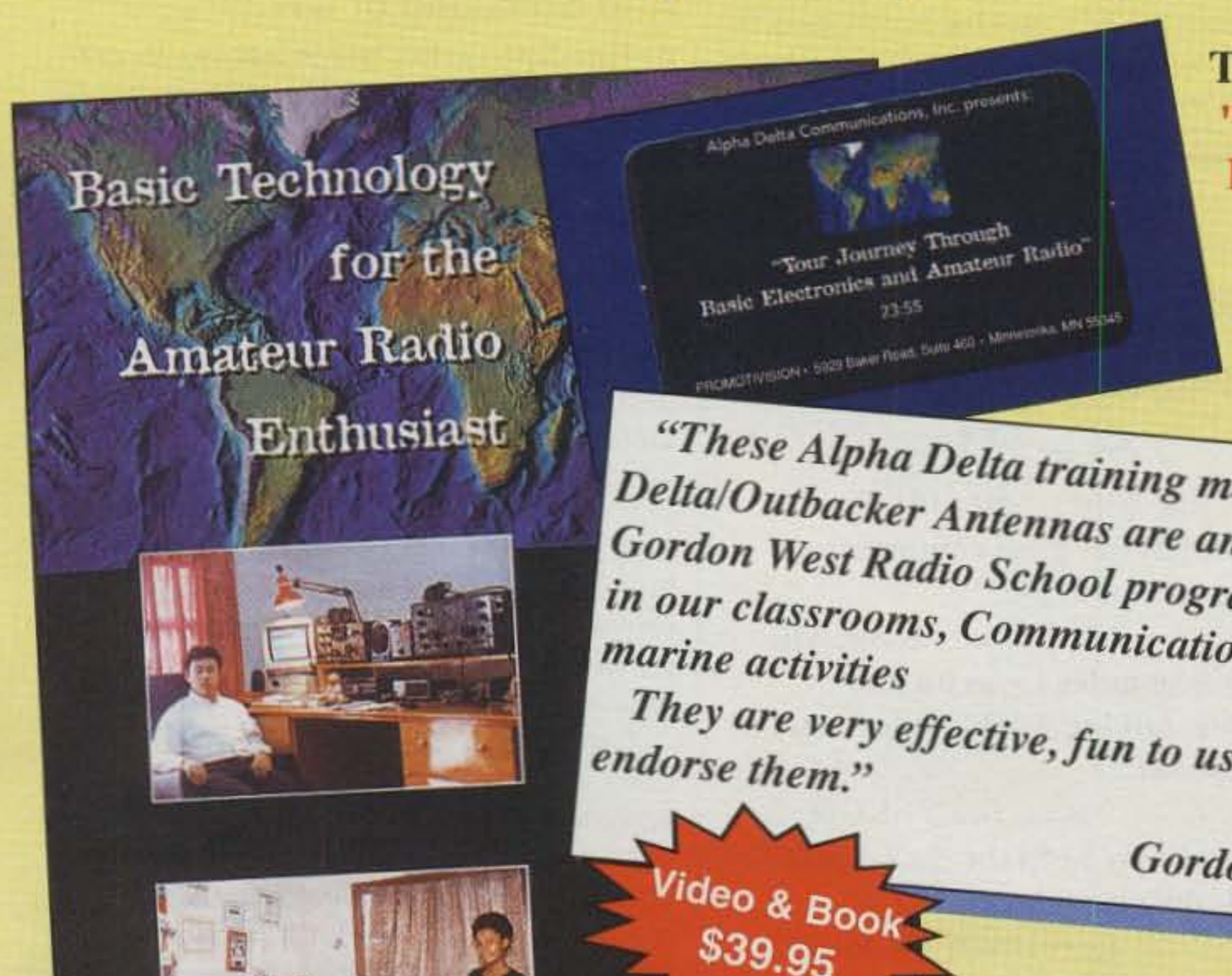

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get much more out of being there than you might have expected. Should you go even if you're not in a position to buy anything right now? Absolutely. There's no better way to keep yourself up-to-date on the latest gear, and to exchange information with other hams. Go! You'll have a great time! I'd also like to invite you to fill out this month's reader survey (page 44), which is on the topic of hamfests.

Feedback to AA6JR

In his March "Magic in the Sky" column, Contributing Editor Jeff Reinhardt, AA6JR, had some very blunt and forthright comments about inappropriate and illegal on-air behavior, especially on 75 meters. The reader response to that column has been tremendous, and about 95% supportive. Jeff is gathering all of the mail received on that column and will present a representative sampling of the response in his next column. One of the earliest responses came from the FCC's Riley Hollingsworth, K4ZDH, who requested reprints to hand out wherever he speaks!

We also asked for opinions about on-air behavior problems in March's reader survey. Among the responses (page 44) were several comments, such as "this is why I don't operate the low bands much anymore" and "we don't have these problems on CW." A powerful argument for the value of CW if ever there was one!

And Speaking of CW...

As I predicted in this space last month, criticism of the ARRL for reversing its hardline stand on the international code requirement has begun. In the April issue of another ham magazine, which reported in its news section that the on-air reaction to the move has been "ho-hum," there is a long and prominently-placed article raking the ARRL over the coals for nearly every problem facing ham radio today and staunchly defending the value of Morse code in ham radio. The writer made several excellent points about the challenges that our hobby faces today, and the fact that very few of them have anything to do with Morse code. And I've shared his observation that kids today find code fascinating. However, he missed the main point.

There is a big difference between code's value as an operating mode—something that is acknowledged by the vast majority of active hams—and its continuing value as an international licensing requirement. The writer's implication is that once the international requirement is gone, people will stop learning code, and the current CW bands will be sacrificed to bigger phone bands. I'm sorry, but I just don't buy it.

People will continue to be drawn to CW by its unique nature, its fun, and its challenges, its spectrum-efficiency, its value in underdeveloped countries where SSB equipment is just too expensive, and its unquestioned ability to "get through" in marginal conditions (all reasons put forth by the writer of the other article). As long as people are drawn to CW for all of these good reasons, they'll continue to learn it and use it, whether or not it's an international requirement. As long as it's fun, or it helps to achieve a goal, such as more countries, more grids, or more contest points, people will continue to use it. And as long as there are plenty of people making good use of the CW band segments, they will not be in danger. The FCC doesn't like to reallocate busy frequencies, but underused frequencies are always in danger, regardless of the mode(s) people use on them. If you're truly concerned about the future of CW, the best thing you can do is to use it regularly on the air and share your enthusiasm about it with hams and non-hams alike. May this year's hamfest season be a happy one for you.

73, Rich, W2VU

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Announcements

7Z1AC (home call W5FJG), from the US Consulate, Jeddah, Saudi Arabia, beginning mid-April for two years. QSL via WA4JTK. Web page provides logs, operating updates, pre-operation DX survey: <http://sites.netscape.net/joeyjeep99usa/homepage>.

W1ACT/P, from the Gay Head Lighthouse (IOTA NA046), Aquinah, Massachusetts; Fall River ARC; 1800Z May 4 to 1900Z May 6 on 14.260, 21.260, 28.460, 50.130 MHz. QSL via N1JOY, SASE only.

KV2W, from commemoration of the birthday of Glenn H. Curtiss, pioneer of aviation, Glenn Curtiss Aviation Museum, Hammondsport, New York; Keuka Lake ARS; 1400–2100Z May 12 on 3.900, 7.250, 14.250, 28.400 MHz. For certificate send SASE to Roy Koehler, KB2WXV, P.O. Box 451, Avoca, NY 14809.

N2UL, from Signal School CQ Memorial Day, Fort Monmouth, New Jersey; Robert D. Grant United Labor ARA; 1200–2400Z May 28 on 28.420, 14.240, 21.380 MHz. For certificate sned SASE to RDGULARA, WA2VJA, 112 Prospect St., Nutley, NJ 07110-0716.

W2EF, from Grover Cleveland's birthplace, Caldwell, New Jersey; West Essex ARC; 1400–2200Z May 5 on SSB 28.350, 21.330, 14.250, 7.250 MHz (±20 kHz). For Grover Cleveland $1000 bill certificate QSL with contact number to W2EF (WEARC), POB 54, Essex Fells, NJ 07021.

K3ARS, from re-enactment of 1774 Chestertown Tea Party, Chestertown, Maryland; Kent ARS; 1400–2100Z May 26 on 7.040, 7.240, 14.240, 28.340 MHz (±20 kHz). For certificate send SASE to Paul Gerhardt, K3PG, 313 Chesterfield Ave., Centreville, MD 21617.

W5CRC, from commemoration of the last battle of the Civil War, battle site between Brownsville, Texas and the Gulf of Mexico; C.H.A.R.R.O. ARC; 1500–2300Z May 12 on 14.250, 21.325, 28.325 MHz. For certificate or QSL send SASE to C.H.A.R.R.O. ARC, 2414 Central Blvd., Brownsville, TX 78521.

N7LFK, mobile from annual pilgrimage across the US from Ontario, California to Washington, DC in support of POWs and MIAs; 1600Z May 16 to 0700Z May 26 on SSB 14.265, 21.365, 28.465 MHz. For certificate send QSL to RFTW (Mike Paxton), P.O. Box 2625, Gearhart, OR 97138-2625.

W8BI, from 50th Dayton Hamvention celebration, Dayton, Ohio;May 14–20 on 3.870/3.650, 7.270/7.050, 10.170/10.110, 14.270/14.050, 18.130/18.090, 21.370/21.050, 28.670/28.050, 147.55 simplex (all frequencies ±QRM). QSLs and certificates: Dayton ARA, W8BI, P.O. Box 44, Dayton, OH 45401.

W8YAF, from Memorial Day commemoration, Yankee Air Force Museum, Willow Run Airport, Belleville, Michigan; 1200–2000Z May 28 on SSB 7.270 ±QRM. For certificate send QSL and 9 × 12 SASE to Frank A. Nagy, N8BIB, 24315 Waltz Rd., New Boston, MI 48164-9167.

•The following hamfests are scheduled for May:

May 4–5, **Baton Rouge ARC Hamfest & Computer Show, ARRL State Convention**, Baker Municipal Auditorium, Baker, Louisiana. Contact Herb Ramey, W5LSU, P.O. Box 68, Greenwell Springs, LA 70739 (225-654-6087; 1-800-256-FEST; <w5lsu@att.net>). (Talk-in 146.19/79; exams Sat. 8:30 AM)

May 5, **Big Sandy ARC Hamfest**, Louisa Middle School, Louisa, Kentucky. Contact Fred, 606-638-9049, <wa4swf@arrl.net>, <http://www.bsarc.org>. (Talk-in 147.390+ PL127.3)

May 5, **Wexaukee ARC Amateur Radio & Computer Swapmeet**, Cadillac Junior High School, Cadillac, Michigan. Contact Wexaukee ARC, P.O. Box 163, Cadillac, MI 49601. (Talk-in 146.980/K8CAD-R; exams 10:30 AM, must preregister with Alton, NU8L, 231-862-3774, <amcconnell3@hotmail.com>)

May 12, **Old Time Hamfest**, National Guard Armory, Mountain City, Tennessee. Contact John Hillsman, K9HE, 423-727-4889, <grhackle@preferred. com>.

May 12, **Reno Spring Ham Swap**, KNPB Television Station, campus of University of Reno, Nevada. Contact Glen Haggard, KK7IH, 775-673-6401, <kk7ih@nvrams.org>, <http://www.nvrams.org/downloads/2001.pdf>. (Talk-in 147.060+ [123]; exams Dan Freeman, W7FD, 775-851-1176, <dfree1@worldnet.att.net>)

May 12, **Lake Eufaula Hamfest**, Eufaula Community Center, Eufaula, Oklahoma. Contact N5PNE, 918-689-5366, e-mail: <markm@lakewebs.net>, <go.to\eufaulahamfest>.

May 12, **Orange County ARC Hamfest**, Temple Hill Academy, Newburgh, New York. Contact Ed Moskowitz, N2XJI, 123 Harold Avenue, Cornwall, NY 12518-1701, 845-534-3492 after 7:30 PM, e-mail: <emoskowitz@bear.com>. (Talk-in 146.16 [100 Hz PL])

May 18–20, **Dayton HamVention®**, Hara Arena, Dayton, Ohio. *(See their ad on p. 55 in this issue of* CQ, *and* ***visit CQ at Booths #579–581****—ed.)*

May 19, **RI Amateur FM Repeater Service '76 Auction & Fleamarket**, VFW Post 6342, Forestdale, Rhode Island. Contact Rick Fairweather, K1KYI, 106 Chaplin St., Pawtucket, RI 02861, 401-725-7507 (7–8 PM),<k1kyi@arrl.net>.

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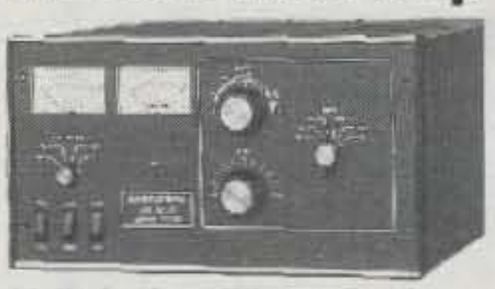

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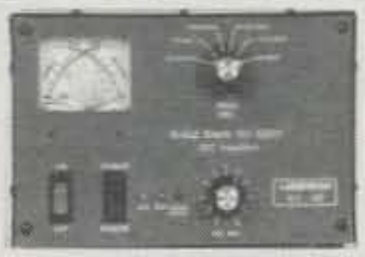

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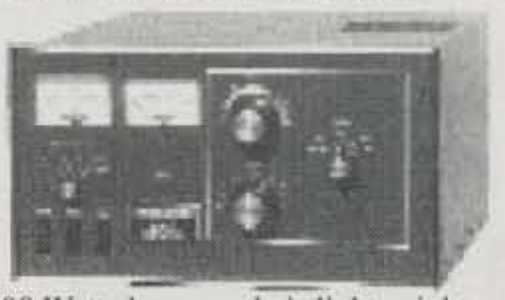

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From $89 to $499, there are more than 30 handhelds to choose from in today's ham radio marketplace. Contributing Editor WB6NOA helps you through the pricing and features.

CQ Market Survey:

VHF/UHF Handhelds

BY GORDON WEST,* WB6NOA

If you are shopping for a new single-band or dual-band VHF/UHF handheld transceiver (HT), it is important to understand the relationship between new equipment pricing and the many features that your new HT may offer. It is equally important to realize that each ham radio operator may place significant importance on *some* features, yet may have no interest in other specific features that may drive the price of the equipment *up*.

"The best handheld for me is a dual-bander with extraordinary audio output," comments Hal Puritz, KF6WQS, a volunteer emergency communicator for his local city's ham radio response team.

"When working an emergency response, I need plenty of audio from my HT to be heard over all of the noises at the scene," adds Puritz, also insisting on the importance of any HT that has a back-lit keypad for nighttime operation, plus waterproof capabilities. Hal proudly displays the Mil Spec Yaesu VX-5R triband HT.

"It's got to be small—*real* small," comments Paula Grams, KF6WRJ. She regularly is seen jogging at the beach with her credit-card-size, dual-band Alinco DJ-C5T, the micro-lite HT weighing in at only 85 grams.

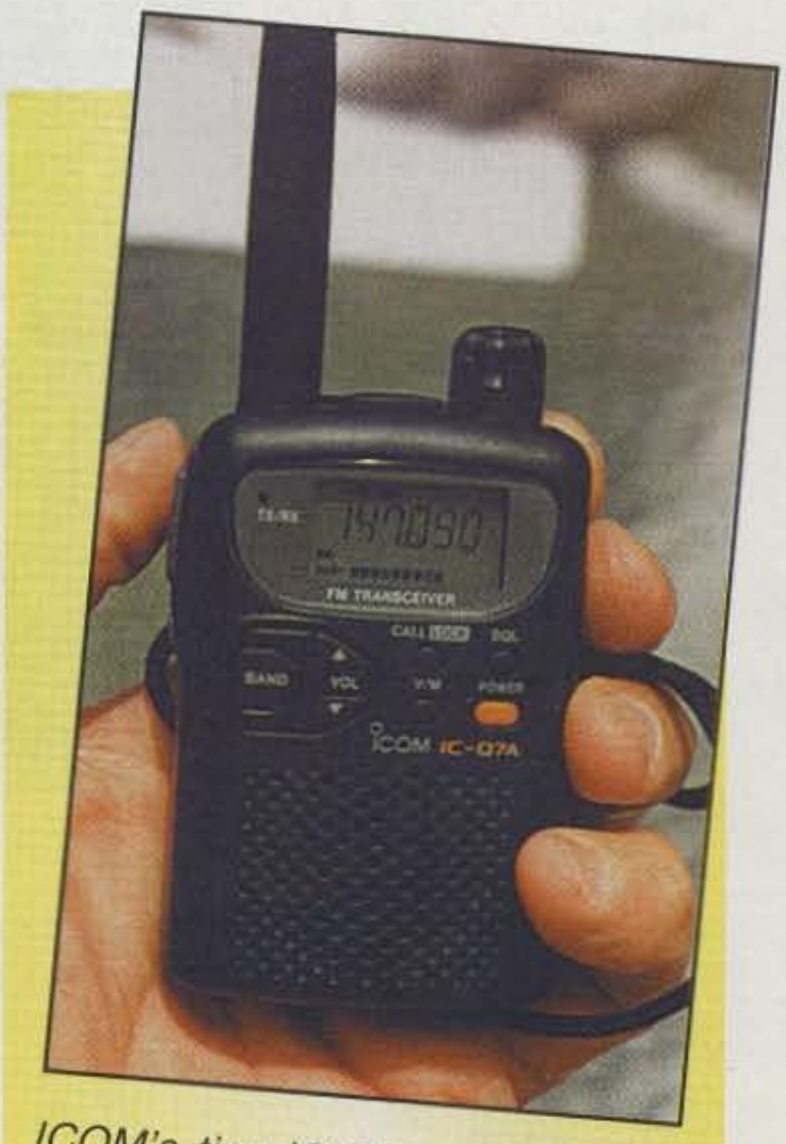
Too many keyboard features could be confusing to your brand-new ham better-half, so the simplicity of the ICOM IC-Q7A or Kenwood TH-22AT could still offer plenty of features, but minimal keyboard programming frustrations. Also, now that most handhelds can be cloned (quickly loaded up with memory channels from another radio) at the dealer or at your next club meeting, this could be an important feature to look for if everyone else has that brand-new handheld loaded with 200 of their favorite frequencies!

It has been a year since we last published our first *CQ* handheld buyer's guide, and there are only a few additions and deletions to the VHF/UHF HT line-up. However, over this past year several handhelds have turned out to be red-hot sellers at extremely low prices, and we see a definite trend in sorting through the over 33 models with great features and some very friendly "street pricing." In response to reader feedback, this year's market survey will break down radios by price class.

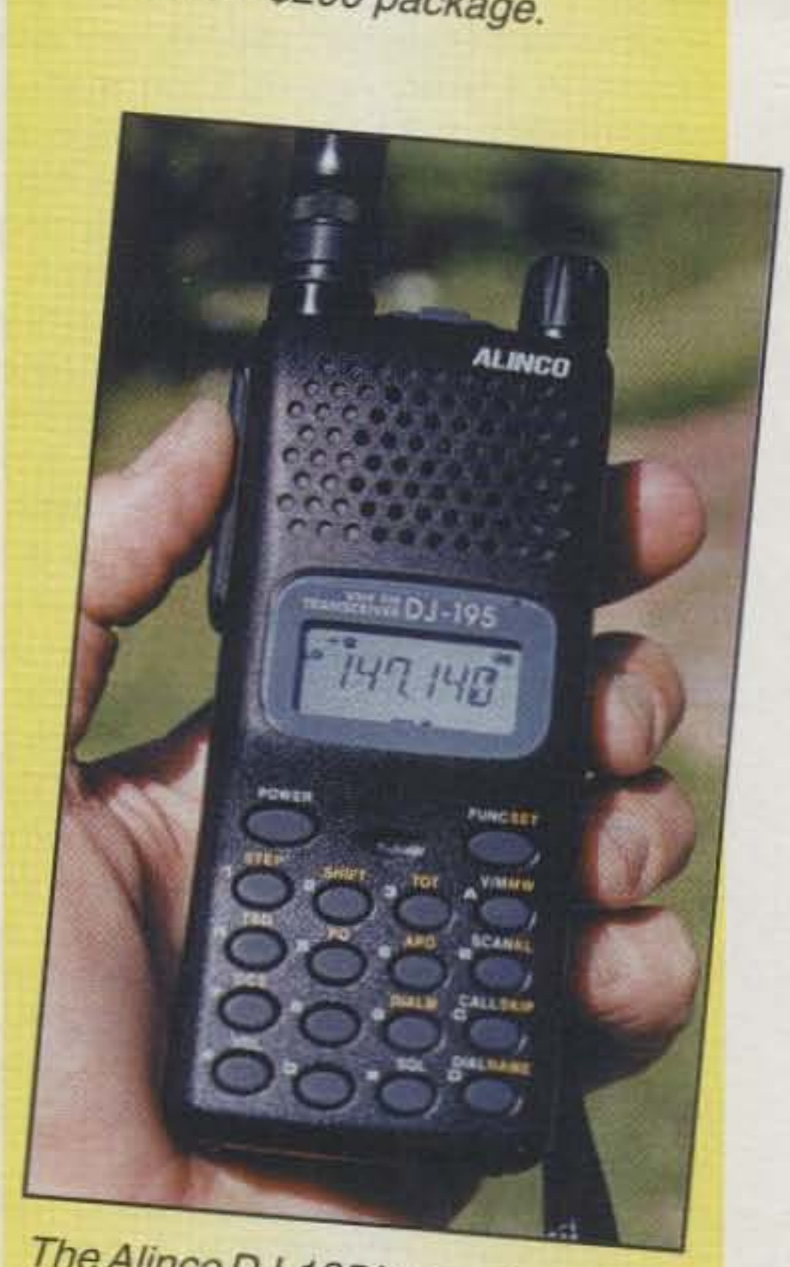
Under $99

A pair of single-banders, your choice of 2 meters or 440 MHz, is offered by Alinco dealers and seen selling for $84.95 each—the DJ-S41T (440), or the DJ-S11T (2 meters), compact, Family Radio Service (FRS)-size HTs that put out about a half watt of power. These two little handhelds could be great "starter rigs" for young hams, because they are rugged and are from the same "mold" as tough FRS walkie-talkies. In fact, just like FRS equipment, the antennas pivot up (they cannot be detached), and each set works for about a day on three AA batteries or an optional NiCad battery pack.

The shirt-pocket-size single-banders from Alinco each hold 20 memories plus a call channel, and full capabilities for simplex or repeater operation, including CTCSS tone encode. The LCD display is back-lit for nighttime operation, and a variety of accessories is available as well, including several battery-charger options, headsets with VOX, tie-pin



ICOM's tiny IC-Q7A packs a big handful of features into a very small, under-$200 package.



The Alinco DJ-195 is a no-frills handheld (except for the theft alarm!), sharing many features in common with the newer DJ-196 and DJ-496.

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Another radio that packs lots of value into a small, under-$200 package is Yaesu's VX-1. Its features include a wideband receiver that tunes all the way up to 999 MHz (minus cellular).

microphone with earphone, speaker mic with volume control, and even a soft case to keep your inexpensive handheld protected.

$100–$200

When we enter the price range of around $150, single-band handhelds may offer up to 5 watts of power output plus a host of advanced features to satisfy any ham wanting just a single band of operation. Around $150, manufacturers may offer you a handheld with 2 bands of operation, one band at a time, plus plenty of expanded receive range, too.

For those of you dedicated to a single band, Cherokee, a big name in personal communications equipment, offers the AH-50, 6 meter, FM handheld with 5 watts of power output. It can hold up to 5 channels of repeater memory, and works well into an external antenna from its BNC jack on the top. Around $199, you can come up on 6 meters with the heavy-duty ADI/Pryme PR-52 handheld with 5 watts of power output and 40 memories. The PR-52 is a favorite among Red Cross workers, because it can also receive American Red Cross frequencies from 40 MHz on up. It is one tough little handheld, and ADI/Pryme has dozens of accessories that will fit this hard-working HT which is part of the ADI/Pryme "family" that includes 220 MHz, GMRS (General Mobile Radio Service), and commercial equipment all looking exactly the same. Keep in mind that the more a manufacturer can reuse the design of a handheld, the more features and the more accessories that handheld will have.

Besides Pryme with its PR-222 handheld for 222 MHz (priced around $300), Alinco, for under $200, offers its DJ-280, 5 watt, 10-memory-channel HT; and Yaesu has its FT-33R "classic"- design 222 MHz HT, still sporting our lost 220–222 MHz portion of the band (*keep in mind that hams are no longer authorized to transmit in this band segment, even though the radio is capable of doing so.*—*ed.*).

Under $200, 2-meter single-banders and 440 MHz single-banders are available from all of the manufacturers, each single-bander with its own long list of features found in our comparison tables. In the same price range, though, you can

Under $200 Handhelds

	Yaesu VX-1	Yaesu VX-110	Yaesu VX-150	Alinco C5T	Alinco S11	Alinco S41	Alinco 195	Alinco 191	Alinco 280	Alinco DJ-196	Alinco DJ-496	ICOM T2H	ICOM Q7A	Kenwood TH22	RadioShack 200	RadioShack 400	Cherokee AH-50
Ham Bands	2m/440	2m	2m	2m/440	2m	440	2m	2m	222	2m	440	2m	2m/440	2m	2m	440	6m
Output Power	1/2W	5W	5W	1/2W	1/2W	1/2W	5W	5W	4W	5W	5W	6W	1/2W	5W	2W	1W	5W
RX Coverage (MHz) (cellular blocked)	76/999	140-174	140-174	108-174 420-479	Ham	Ham	Ham + wide FM	135-173	210-240	130-147	420-450	136-174	30-1300	135-174	136-174	420-470	Ham
Air Receive	Yes	No	No	Yes	No	No	No	No	No	No		No	Yes	No	No	No	No
Memories	291	209	209	50	21	21	40	40	10	41	41	40	200	40	30	30	5
Alphanumerics	Yes	Yes	Yes	No	No	No	Yes	No	No	Yes	Yes	Yes	No	No	No	No	No
Dual RX	No	No	No	No	No	No	No	No	No	No	No	No	No	No	—	—	No
Dual Knobs	No	No	No	No	No	No	No	No	No	No	No	No	No	No	—	—	No
Auto Rptr Shift	Yes	Yes	Yes	No	No	No	Yes	No	No	No	No	Yes	Yes	Yes	No	No	No
Tone Scan	Yes	Yes	Yes	No	No	No	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	No
Backlit Keypad	Yes	Yes	Yes	Yes	No	No	No	Yes	No	No	No	No	No	Glows	No	No	No
Cloning	Yes	Yes	Yes	No	No	No	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No	No
Computer Prog.	Yes	Yes	Yes	No	Yes	Yes	—	No	No	Yes	Yes	Yes	No	No	No	No	No
Ant. Connector	SMA	SMA	SMA	Fixed ant.	Fixed ant.	Fixed ant.	BNC	BNC	BNC	BNC	BNC	BNC	SMA	BNC	SMA	SMA	BNC
12 VDC Operation	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	9V	9V	Yes
CTCSS Encode	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CTCSS Decode	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DCS Tone	Yes	Yes	Yes	No	No	No	Yes	No	No	Yes	Yes	No	No	No	No	No	No
Power Levels	2	3	3	2	2	2	3	3	2	2	2	3	—	3	2	2	2
Audio Output	1/4W	1/2W	1/2W	1/3W	1/4W	1/4W	1/2W	1/2W	1/2W	1/3W	1/3W	2/3W	1/2W	1/4W	1/2W	1/2W	1/2W
Power Saver	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DTMF Slots	8	9	9	—	—	—	8	9	—	8	8	5	—	—	1	1	—
Seen Selling $$	$169	$159	$169	$155	$88	$88	$175	$175	$199	$189	$199	$159	$134	$199	$179	$199	$150

$200–$300 Handhelds

	Kenwood G71	ADI Pryme 222	ADI 52	ADI 401	ADI 201	ICOM T7H	ICOM G2XAT	ICOM W32	ICOM T22A	Alinco G5	Alinco DJ-V5	Yaesu 23R	Yaesu 33R
Ham Bands	2m/440	222	6m	440	2m	2m/440	2m/440	2m	2m	2m/440	2m/440	2m	222
Output Power	6W	5W	5W	5W	5W	5W	7W	5W	5W	5W	5W	5W	5W
RX Coverage (MHz)	118-174	216-229	40-54	400-480	130-179	118-174	118-174	136-174	420-470	108-173	76/999	Ham	Ham
(cellular blocked)	400-480					400-470				420-480			
Air Receive	Yes	No	No	No	No	Yes	No	Yes	Yes	Yes	Yes	No	No
Memories	200	41	41	40	40	70	40	200	80	200	200	10	10
Alphanumerics	Yes	No	No	No	No	No	No	Yes	Yes	No	Yes	No	No
Dual RX	No	No	No	No	No	No	No	Yes	No	Yes	No	No	No
Dual Knobs	No	No	No	No	No	No	No	Yes	No	No	No	No	No
Auto Rptr Shift	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No
Tone Scan	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No
Backlit Keypad	Yes	Partial	Partial	—	—	Yes	No	Yes	No	Yes	Yes	No	No
Cloning	Yes	Yes	Yes	—	Yes	Yes	No	Yes	No	No	Yes	No	No
Computer Prog.	No	Yes	Yes	—	No	Yes	No	Yes	No	No	Yes	No	No
Ant. Connector	SMA	BNC	BNC	BNC	BNC	BNC	BNC	BNC	BNC	BNC	SMA	BNC	BNC
12 VDC Operation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CTCSS Encode	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
CTCSS Decode	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
DCS Tone	No	No	No	No	No	No	No	No	No	No	No	No	No
Power Levels	3	2	2	2	2	3	3	3	3	3	3	2	2
Audio Output	3/4W	3/4W	3/4W	1/3W	1/2W	1/2W	1/2W	1/2W	1/2W	3/4W	1/2W	1/2W	1/2W
Power Saver	Yes	Yes	Yes	Yes	—	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DTMF Slots	10	—	—	—	—	9	5	5	5	20	8	No	No
Seen Selling $$	$249	$299	$299	$200	$200	$229	$200	$295	$225	$280	$239	$300	$270

also buy both the 2 meter band and the 440 MHz band in a single handheld, one band showing at a time (as opposed to a dual-band handheld that would show both bands at the same time). Most impressive is the ICOM IC-Q7A, seen selling for under $140 and offering 2 meters and 440 operation with a wide-band receiver capable of tuning 30 MHz to 1300 MHz, including AM aircraft, wide-band FM music band, and TV audio (but not cell-phone/PCS frequencies, as is the case with all current gear), tone encode/decode, and 200 memories, all running on two AA or rechargeable batteries. The only down side to this multi-feature, twin-band HT is only one-third watt output, just adequate to bring up most local repeaters but great for short-range simplex.

Yaesu offers a twin-band, 2-meter/440, under-$150 transceiver, the VX-1R, with a half watt of power output and 1 watt with the optional DC power cable. It, too, features extended receive, covering 76 MHz to 999 MHz, with 291 memories with 6-digit alphanumeric display. Both encode and decode tone squelch are built in, and it offers superb wide FM for the reception of music and TV signals.

Another twin-band, half-watt, hard-working transceiver is the compact, credit-card-size Alinco DJ-C5T, also seen selling for under $150. It can pick up AM air-band receive, and works quite nicely on its lithium battery on both the 2 meter and 440 MHz bands. To appreciate the little Alinco, however, you must see its credit-card-thin size with its little built-in speaker. Alinco also offers the single-band DJ-195 and DJ-196 for 2 meters, and the DJ-496 for 440. The new 196 and 496 feature selectable tone bursts for international operation.

If you don't have a ham radio dealer near you but you want to see what some of these single-banders look like, sound like, and feel like, visit any RadioShack store and ask to see their HTX-200 2 meter single-bander, or the HTX-400 UHF transceiver, and maybe get a sneak preview of a new, small dual-band transceiver which may be in the stores by the time you read this.

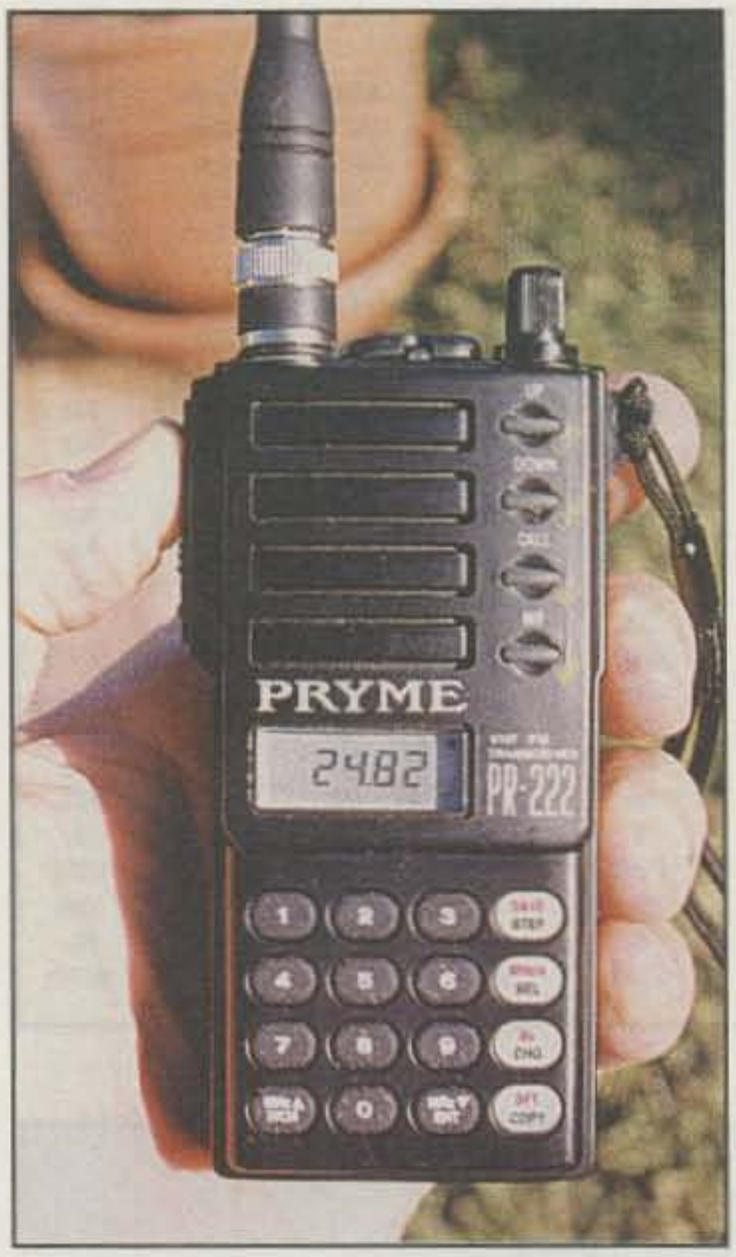
Finally in the under-$200 category, Yaesu has two brand-new handhelds, the commercial-quality, single-band VX-110 and VX-150. These are industrial-strength 2 meter handhelds devoid of fancy features, but crammed with advanced operating modes. First of all, the receiver is almost industrially immune to intermod, and while the display isn't large, it is angled at a position where you can read it when it is still on your belt. The little Yaesus offer 5 watts with three selectable power levels, direct keypad frequency entry, 209 memory channels, both CTCSS and DSC, 7-character alphanumeric display, and an optional Windows PC programming kit. Built to Military Specification 810D/E, and with the back-lit keypad, you would think they'd sell *above* $200, but you can buy them at many dealers for *below* $169!

Alinco's DJ-G5 is typical of what you can expect to find in the $200–$300 range—dual-band coverage on 2 meters and 70 centimeters with simultaneous reception, plus a host of other features.

$200–300

The price tag of $250 is the overall average of today's handheld, whether it be single band or dual band. For $250, the single band would be loaded with plenty of features, and the dual band would be the base price for the beginning of simultaneous two-band operation.

The ADI/Pryme AT-600 was a good example of one of the least expensive dual-band handhelds. The equipment is



If you enjoy operating on 222 MHz (and if you haven't tried it, you ought to), your only choices in handhelds are single-band units, such as this Pryme PR-222. Alinco and Yaesu also offer models for this band.

Kenwood's main entry in the $200–$300 field is its popular and hardy TH-G71, which offers both 2 meters and 70 centimeters (one at a time), along with extended receive range and other features.

no longer being imported by ADI/Pryme, but you may still find a few of these units, brand new in the box, on a small dealer's shelf. The going price is an incredible $199. In fact, there are several models which have been discontinued by their manufacturers but which may still be found—brand new—on dealers' shelves. Be sure to ask; you may find yourself a bargain. (Due to space limitations, these discontinued models are not included in our comparison tables.)

Back to current models, Alinco offers the popular, compact dual-band handheld, the DJ-V5, featuring 200 alphanumeric memories, wide-band FM entertainment reception, extended receive from 76 MHz to 1000 MHz, and for about $50 more it may be ordered *transparent!* This is a short, stubby handheld, where the battery snaps in the back and the keypad is down low on the front. Audio output is excellent, so you need to hear one to appreciate it! Alinco also offers the DJ-G5TH; this is a larger, more traditional handheld, but it has a good feel and plenty of very loud audio output.

ICOM America has plenty to offer for under $300, most notably its IC-T81A quad-band; that's right, folks, four bands—handheld. The IC-T81 offers 6 meters, 2 meters, 440 MHz, and 1200 MHz, one band at a time. It has a multi-function "joystick," allowing quick and easy band changes and other functions. This joystick idea was first seen on the Kenwood TH-D7A, and ICOM has taken advantage of this recessed single keypad with multiple capabilities—including the capability of frustrating you if you don't push it *just right* to get it to do what you want it to do! Stick with it, though, and after a while you'll get the hang of it to whiz between any one of the four bands. ICOM uses this same joystick idea on its relatively new IC-R3 receiver/TV monitor, and the recessed joystick really seems to work well.

ICOM America continues to sell thousands of its IC-W32A dual-band handhelds with two running receivers and two displays, plus 200 programmable memories. For under $270, the IC-W32A offers VHF-VHF/UHF-UHF/VHF-UHF band combinations, with simultaneous reception on two frequencies within the same band or on different bands, separate CTCSS tones for TX and RX, weather channels, back-lit keypad, 8-character alphanumeric display, extended VHF/UHF receive, cross-band repeater if you're brave enough to subject a handheld to prolonged transmit periods, and a miniature on-screen help menu. ICOM also offers the twin-band IC-T7H for around $200, featuring 70 memories, 9 DTMF auto-dial memories, wide-band receive, and battery compatibility with the T22A, W31A, and Z1A accessories.

Kenwood offers its TH-G71A, 6 watt, high-power twin-bander—one band at a time—for around $269 at the dealer level. The Kenwood G71 is PC-programmable with 200 memory channels, back-lit keypad, good loud audio, and wide frequency coverage, including aircraft. I have a G71 myself, and one of the best features of this handheld is its relatively simple operation, and no need to read the instruction book each time you plan to program in new channels.

Yaesu has plenty of handhelds in the $200–$300 range that will certainly grab your interest.

The very popular and often styling-imitated Yaesu FT-50RDHP sells for around $250, and offers wide-band receive from the aircraft band all the way up to 999 MHz, with wide FM filters included for listening to your favorite TV station or FM rock-and-roll station. Digital-coded squelch as well as conventional CTCSS is part of the Yaesu 50R, and there are 112 memory channels and a host of other features and configuration options that allow you to tailor your FT-50R just the way you want it. You can even get a rubberized protective rim guard that makes this radio look as tough as it really is on the inside.

For around $299 you can also get the Yaesu VX-5R, that incredible 2 meter, 70 cm, and 6 meter triband FM transceiver with one band at a time. Most amazing is its shortwave receiver from 500 kHz to 16 MHz, AM (no SSB); plus 48 MHz through 999 MHz, including wide-band capabilities for AM and FM reception, high-frequency AM shortwave filters, VHF and UHF TV, AM aircraft, and capabilities for both types of tone squelch systems. You can even buy an optional barometric sensor in case you're interested in what's happening with your altitude or weather. The VX-5R also has a band scope display, 220 memories, 16-digit/9-memory DTMF auto-dial channels, and with all this, you can bet that it is PC-programmable.

$300-Plus

Now if you are an *extra serious* ham radio operator, chances are you are going to want a "do everything" radio.

Over $300 Handhelds

	Kenwood D7A	Kenwood TH79	ICOM T81A	ICOM IC-T82A	Yaesu VX5R	Yaesu 50
Ham Bands	2m/440	2m/440	2m, 6m, 440, 1270	6m, 2m, 400	2m, 6m, 440	2m/440
Output Power	5W	5W	5W	5W	5W	5W
RX Coverage (MHz)	118-136, 136-174	118-174	6m, 74-170 + wide FM,	.5-1314	.5-16, 48-999	76-200
(cellular blocked)	400-480	300-470	400-470, 1.2 Ham		+ wide FM	300-999
Air Receive	Yes	Yes	Yes	Yes	Yes	Yes
Memories	200	82	124	500	220	112
Alphanumerics	Yes	Yes	Yes	Yes	Yes	Yes
Dual RX	Yes	Yes	No	No	No	No
Dual Knobs	No	Yes	No	No	No	No
Auto Rptr Shift	Yes (2m)	Yes	Yes	Yes	Yes	Yes
Tone Scan	Yes	No	Yes	Yes	Yes	Yes
Backlit Keypad	No	No	No	Yes	Yes	No
Cloning	Yes	Yes	Yes	Yes	Yes	Yes
Computer Prog.	Yes	No	Yes	Yes	Yes	Yes
Ant. Connector	SMA	BNC	SMA	SMA	SMA	SMA
12 VDC Operation	Yes	Yes	Yes	Yes	Yes	Yes
CTCSS Encode	Yes	Yes	Yes	Yes	Yes	Yes
CTCSS Decode	Yes	Yes	Yes	Yes	Yes	Yes
DCS Tone	No	No	No	Yes	Yes	Yes
Power Levels	3	3	3	3	3	3
Audio Output	1/2W	3/4W	1/2W	1/3	3/4W	1/2W
Power Saver	Yes	Yes	Yes	Yes	Yes	Yes
DTMF Slots	10	10	9	8	9	—
Seen Selling $$	$399	$369	$350	?	$350	$430

Any handheld seen selling for over $300 most certainly has what you might be looking for when it comes to "do everything" capabilities.

The new ICOM IC-T82A is a handful of radio and receiver, offering wideband reception from 500 kHz *continuous* through 1320 MHz (except cellular, of course). On the transmit side, it covers four amateur bands, with up to five watts out on 6 meters, 2 meters, and 70 centimeters, plus 100 milliwatts out on 222 MHz! *(Finally, a multiband HT that transmits on 222! Even if it's only 100 mw.—ed.)* If you plan to take it out in bad weather, it will run all day on a lithium ion battery, and the IC-T82A is water-resistant to Japanese Industry Standard 4. While it is not submersible, it can withstand continuous rain. The IC-T82A includes 500 alphanumeric memory channels, which you can arrange into 18 banks of 2 to 99 channels. This, coupled with ICOM's new "Dynamic Memory Scan" system, which lets you "tag" any memory channel for any bank, allows tremendous flexibility in scanning. The keypad is back-lit, and everything seems functionally laid out at the bottom of the transceiver to make it one heck of a fistful of radio with all of the features you would expect when paying more than $300.

Another ICOM offering, while technically not a handheld *transceiver*, is the IC-R3 handheld scanner which includes a miniature TV screen that will let you tune in amateur as well as commercial television. Coverage extends from 500 kHz to 2450 MHz, including four ATV bands and a variety of amateur satellite downlinks. Of course, it will also tune in voice, music, and digital signals over its wide frequency range.

Kenwood continues to offer two handheld dual-band transceivers with simultaneous dual-band reception in the over-

ICOM's brand-new T-82 handheld offers continuous receive coverage from 500 kHz to beyond 1.3 GHz, as well as transmit on 6 meters, 2 meters, 222 MHz (100 mw), and 440 MHz. It's water-resistant and full of other cool features (see text). The price hadn't been announced at press time. Watch for it at Dayton.

Yaesu's VX-5 handheld covers three ham bands on transmit, plus a shortwave receiver, VHF/UHF receive coverage to 999 MHz, a band scope, and more. (See text for details.)

A built-in packet controller and software for APRS are the big features of Kenwood's TH-D7A. You can read short packet messages right on the screen, including downlinks from some amateur satellites. Hook up a GPS receiver and transmit your location wherever you are.

MOBILE DX MASTER

Since its introduction over a year ago, Yaesu's FT-100 HF/VHF/UHF Transceiver has been widely acclaimed for its outstanding performance and flexibility. Now the FT-100D builds on this success story, adding the convenience of factory-installed modules for today's Ham on the go!

FT-100D HIGHLIGHTS

The FT-100D 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. Known for its outstanding receiver performance, the FT-100D's easy-to-access DSP system is the cornerstone of the outstanding receiver capability. Providing Noise Reduction, Auto-Notch, and Narrow-Bandwidth Filter selection, the DSP system also includes a Microphone Equalizer for the transmit side.

The new and enlarged speaker of the FT-100D (ϕ66 mm) provides spectacularly clean audio output, to help you dig out those weak signals.

Whether at home or away, the fantastic new FT-100D is The Choice of the World's Top DX'ers. Step up to the FT-100D, and enjoy the thrill of the sunspot peak in style!

MICRO MOBILE

FT-100D

Ultra-Compact HF/VHF/UHF Transceiver

YAESU
Choice of the World's top DX'ers

For the latest news, hottest products:
Visit us on the Internet! http://www.yaesu.com

Real Performance for the Real World!

Today's elite-class operators demand the best RF weaponry available. Yaesu's exciting new MARK-V FT-1000MP answers the call, with an expanded array of receiver filtering, 200 Watts of power output, and Class-A SSB operation capability for the cleanest signal on the band. Enhanced front-panel ergonomics on the front panel save you seconds in a pile-up or a contest "run," and Yaesu's HF design and manufacturing know-how ensures that no short-cuts have been taken in our effort to bring you the best HF transceiver money can buy. For more QSOs in your log, and more awards on your wall, there is only one choice: the MARK-V FT-1000MP from Yaesu!

I. Interlocked Digital Bandwidth Tracking System (IDBT)

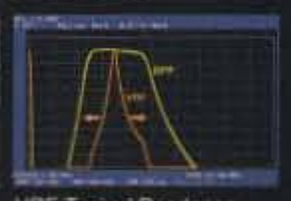
The IDBT feature greatly simplifies SSB operation by matching the bandwidth of the DSP (Digital Signal Processing) system to the net bandwidth of the 8.2 MHz and 455 kHz IF stages. The IDBT system accounts for the settings of the IF WIDTH and SHIFT controls, and automatically sets a DSP bandwidth which matches the analog IF bandwidth.

IDBT: A Breakthrough in Selectivity!

II. Variable RF Front-End Filter (VRF)

Protecting the MARK-V's receiver components from strong out-of-band signals, the VRF system acts as a high-Q "Preselector," located between the antenna and the main bandpass filter networks, providing additional RF selectivity on the 160-20 meter Amateur bands for multi-operator contest teams, DX-peditions, or for operation near MW/SW broadcast stations.

VRF Features Large, High-Q Coils and High-Quality Relays



VRF Typical Bandpass Response (3.5 MHz)

III. 200 Watts of Transmitter Power Output

Utilizing two Philips® BLF147 Power MOSFETs in a 30-Volt, push-pull configuration, the MARK-V's transmitter puts out up to 200 Watts of clean output power, thanks to the conservative design of the PA section.

T-Configuration Heat Sink

IV. Class-A SSB Operation

Exclusively available on the MARK-V FT-1000MP, a press of a front-panel button engages Class-A SSB operation of the transmitter, at a power output level of 75 Watts. Class-A operation produces incredibly clean signal quality, with 3rd-order IMD typically suppressed 50 dB or more, and 5th- and higher-order products typically down 80 dB or more!

Class A 75 W PEP IMD

V. Multi-Function Shuttle Jog Tuning/ Control Ring

The immensely-popular Shuttle Jog tuning ring, which is concentric with the Main Tuning Knob, has a new look in the MARK-V: it now includes the activation switches for the VRF (left side) and IDBT (right side) features, so you don't have to move your hand position to activate these important circuits during contest or pile-up situations!

Access VRF and IDBT Features via Shuttle Jog Dial

Features

■Frequency Coverage: (RX) 100 kHz–30 MHz; (TX)160–10 m Amateur Bands ■Dual In-band Receive w/Separate "S" Meters ■Ten Pole Collins® Mechanical Filter Built-in ■RX DSP Noise Reduction and CW Peaking Filter ■High-speed Automatic Antenna Tuner ■Two TX/RX Antenna Jacks plus RX-only Jack ■TX Microphone Equalizer ■RF Speech Processor ■Direct Digital Synthesis ■CW Spot and Two Key Jacks ■Two Headphone Jacks (1/4" and 3.5 mm) ■Low-Level Transverter RF Drive Jack ■Separate FP-29 Power Supply (30 V/13.8 V DC Output)

Photo shows optional MD-100A8X Deluxe Desk Microphone

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$300 range. The Kenwood TH-79KSS is the company's top-of-the-line dual-bander, featuring a sharp dot-matrix LCD display and menu system, supporting full alphanumeric functions and settings. There are 82 non-volatile memory channels, with alphanumeric ID, and a high-efficiency, field-effect-transistor power module that keeps the unit running cool even during prolonged low-power, cross-band repeater operation.

The granddaddy of them all, however, is from Kenwood— the $469 TH-D7AG, capable of packet operations with its *built-in* 1200/9600-baud terminal node controller (TNC) and programmed for dealing with data formats supported by APRS, the Automatic Position Reporting System. Its display shows information each time a correct APRS data is received, so you don't need to tie your set into a computer. It will tie in nicely to a little GPS (Global Positioning System) receiver, and it will automatically squawk your GPS position on APRS transmissions. If you're interested in what's happening on the local high-frequency-band packet cluster, any 2 meter or 440 MHz packet cluster can be read on the TH-D7A screen without the need to hook the set into an external computer.

Over at Yaesu, even though it's not an HT in the strictest sense, we certainly want to mention the new portable FT-817, seen selling for around $750, but offering multi-mode transmit and receive ham-band capabilities from 160 meters all the way up to 450 MHz. This is a 5 watt, backpack, HF/VHF/UHF, multi-mode transceiver that will play for several hours on its built-in nickel-cadmium battery pack, eight AA alkaline batteries, or eight separately-charged nickel-cadmium batteries. (*See our full review in the April issue of* CQ*—ed.)*

Although you wouldn't think that 5 watts output on the worldwide bands would do much to get you thousands of miles of range, 5 watts of single sideband is plenty! I usually work stations thousands of miles away with just 5 watts of power. Yaesu's Chip Margelli, K7JA, reports working 90 countries on 10 meters the first weekend in March using his FT-817 at just 5 watts.

On 6 meters, 2 meters, and 430 MHz, the weak-signal portion of the band supporting SSB operation easily hears a 5 watt USB signal. You can also plug into memory FM repeater modes, splits, sub-audible tones, and in an emergency, a slight change in diode programming allows this to work on just about any frequency to call out for help. This radio is going to be a very special one among hikers and backpackers, campers, and mariners.

About the only thing that the FT-817 does not have is a size so small it would fit into your shirt pocket. It sure won't, but it hangs over your shoulder with no problem and could easily work strapped into a fanny pack. The receiver tunes up to 154 MHz on the VHF side, just shy of 156 MHz marine and 162 MHz weather reception. Diddling with diodes won't increase the stop band beyond 154 MHz, but I am told that the reason behind this in order to provide ultra-selectivity on the 2 meter ham bands, especially when working multi-mode. I am an avid 2 meter and 432 MHz single-sideband operator, and this set works terrific—including semi-satellite, split-band operation when working some of our low-earth-orbit birds.

In The Real World

Here's what they might not tell you in the ads: For one, don't expect that a little handheld with a little antenna is going to pick up much on the 6 meter band. If you're planning on working 6 meter repeaters, that little rubber-duck antenna—even with its extension—is hard-pressed to get a signal out more than 5 or 10 miles. Unless your 6 meter repeater is just around the corner, you just won't have much success until you hook up to an external antenna or your home beam.

None of the sets with wide-band receive will pick up analog cellular. The FCC would not approve them if they had this capability, and diode diddling won't pull in analog cellular either. It is illegal to monitor cellular, and most cell systems are going digital anyway.

Wide-band operation on receive does not necessarily give you transmit capability on 222 MHz. While several of the handhelds will *receive* the 222 MHz band, only the ICOM IC-T82 and the single-band 222 MHz transceivers are designed to transmit a clean signal on this band. (While it might be possible to reprogram some other rigs to transmit on 222, the signals will not be "clean" and you likely will be transmitting spurious signals that can cause interference to a variety of radio services. Don't try it.)

Wide-band shortwave reception is relegated to AM receive only, except for the Yaesu FT-817. Sorry, no tiny handheld with SSB shortwave receive capabilities. And don't expect any kind of decent shortwave reception until you hook up to some sort of a bigger external antenna system. Also, don't get *too big* with your shortwave antenna on that little handheld because they are prone to overload when powerful shortwave stations come booming in.

This year I will repeat my request about how these handhelds are sold at the dealer level: *Dealers, clone them up with your popular local frequencies!* For brand new hams, buying one of these handhelds and having it come up on 146.000 MHz and 440.000 MHz won't pull in much reception out of the box. I agree that all new hams should learn how to program their handhelds, but dealers, why not give them ten popular, local open-repeater channels on 2 meters, some popular open-repeater channels on 440 MHz, three or four local weather channels, and some other interesting VHF and UHF stuff to hear as soon as the batteries are charged up. Dealers, why not charge up the batteries ahead of time, too?

Finally, congratulations and thank you to all of the manufacturers who continue to offer us powerful handhelds that would cost three times as much if they were offered for commercial uses. What we can buy for $200–$400 is just incredible, so check out the specs, and pick the one handheld that is going to best meet your needs. ■

Looking Ahead in CQ

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

- *VHF/UHF Special* in June *CQ!*
- "Fun in the Sun, and Power From It," by K8WPI
- "Electricity Everywhere," by W6BNB
- "Ham History Web Server," by N8PB

Plus:

- "Add Scanning to Converted CB Rigs," by WB9YBM
- "The Station Controller," by AF1US
- "Contesting from A61AJ," by K2RED
- "The Aviator's Solution to Shack Noise," by KF2LF

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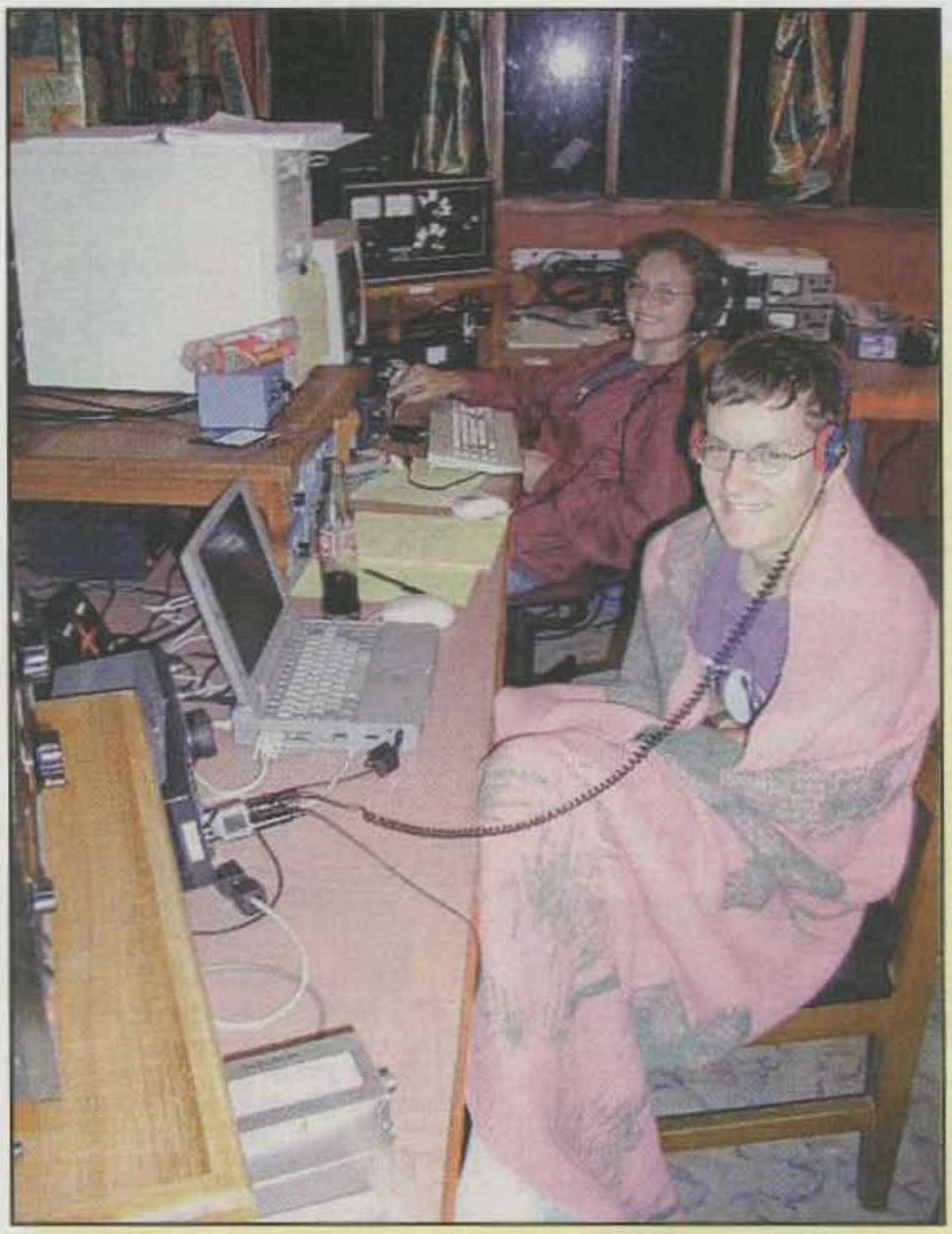
Results of the 2000 CQ/RJ WW RTTY DX Contest

BY GLENN VINSON, W6OTC,* AND EDDIE SCHNEIDER, GØAZT**

The 14th Annual CQWW RTTY Contest, sponsored by *CQ* and *The New RTTY Journal,* was held September 23–24, 2000 at or near the peak of solar Cycle 23. Geomagnetic conditions were near-perfect for most of the contest period with solar flux remaining above 200 and *A* and *K* indices low throughout the contest. With this excellent worldwide propagation, RTTY contesters competed in record numbers, with more than 700 logs submitted. As a result, competition was fierce and new world records were achieved in Sngle Op High Power (SOH), Single Op Assisted (SOA), Single Op 10 meters (SO10), and Multi-Op High Power (MOH) categories. Outside of Europe, 10 meters was the band of choice, particularly on Saturday, with activity extending from 28.060 MHz to 28.140 MHz. Twenty and 15 meters were about equal to each other in performance, and a few records were set on each band. However, 80 and 40 meters were generally noisy with no new records set. Notwithstanding the relatively poor performance of the low bands, the number of record scores overall exceeded even the extraordinary results of the 1999 contest.



NØMAJ (left) and NØMJ at HC8N looking for mults at 3 AM.

Single Operator

Single Operator, High Power (SOH). For the first time in a RTTY contest the EA8BH super-station was activated, with the highly experienced contester and DXer, Tim, N4GN, at the helm. Exceeding by almost 50% last year's world record SOH score by P43P, Tim blew away the competition, scoring an awesome 5 million points (2485 QSOs, 673 multipliers), a score higher than that achieved in any class, including the multi-operator classes, prior to 1999. This new SOH World Record will likely be very difficult to beat in this solar cycle. Second in the world and repeating as Europe winner was EMØI (op Nick, UT2IZ), scoring 3.2 million points, but not breaking his own 1999 Europe SOH record. Third was the big contest station at A61AJ (operated by well-known DXer Walter, DJ6QT). Walter set a new Asia record in any SO class with an impressive score of approximately 3 million points (2167 QSOs, 480 mults).

Single Operator, Assisted (SOA). After seeing all records in SOA, except South America, broken in 1999, Jacky, P43P, moved to SOA class, setting a new South America record and just missing a new world record. This year P43P scored 3.48 million points, almost the same as his SOH score in 1999, but leaving in place UXØB's 1999 world record of 3.57 million points. John, ON4UN, won Europe with 3.3 million points. Masa, JH4UYB, came in third in the world, first in Asia, with a great score of 2.5 million points, beating JS3CTQ's 1999 Asia SOA record of 2.1 million points.

Single Operator, Low Power (SOL). As usual, this class produced the most entries and the closest competition on all continents. Although WF1B's 1997 world record of almost 3.3 million points from P40TT was unchallenged, veteran contester Barry, W2UP, operating for the first time in SOL rather than SOH, won the SO Low Power World plaque with the second highest SOL score of all time—almost 2.5 million points (1635 QSOs, 599 mults)—and demolished AA5AU's 1999 North America record of 1.7 million points. Don, AA5AU, was not napping. He was second in the world, and exceeded his own North America record (and won the SOL North America plaque) by scoring around 2 million points (1588 QSOs, 574 mults). World third was VP5JM with a score of 1.6 million points. Showing how tight the competition was, the South America winner, ZX2B, scored 1,537,350 points for fourth in the world, just edging out the Europe winner, RU3QW, who scored 1,476,127 points. VA3DX set a new VE SOL record with 1.4 million points, pushing past VO2WL's 1999 record of 1.2 million points.

Single Operator, Single Band 28 MHz (28). Ten meters was *the* band for big QSO runs, particularly on Saturday. Chris, ZS6EZ, proved this point by scoring more points than any other SO single band entry (World and Africa record) in CQ WW RTTY history: 692,346 points (1339 QSOs, 173 mults), handily exceeding the 1999 8P9Z 21 MHz record of 598,987 points, let alone the 1999 PY2KC 28 MHz world record of 369,562 points. Also easily exceeding the previous SO 28 world record while setting a new SO 28 South America record was Ernest, ON4CFD, operating as PJ2I (1136 QSOs, 161 mults) with a score of 543,375

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T-2X, $619.95. *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 1/16D in.

CD-45II, $369.95. *Medium duty antenna rotator.* Handles antenna arrays up to 8.5 square feet windload area when mounted in-tower, or 5 square feet when mast mounted with supplied lower support. Dual 48 ball bearing race, disc brake system. Control Box has an illuminated directional indicator with North or South center of rotation scale, separate snap-action brake and rotation control switches with disc brake release. Accepts mast sizes up to 2 1/8 diameter. Includes light duty lower mast support, Rotator size is 17 3/8Hx8 D inches.

AR-40, $269.95. *Lightweight antenna rotator.* Handles smaller ham antennas and large TV/FM antennas up to 3.0 square feet windload area when mounted in-tower, or 1.5 square feet when mast mounted using the supplied lower support bracket. Dual 12 ball bearing race, disc brake system. Silent, automatic control box -- just dial and touch for desired direction. Accepts mast sizes up to 2 1/8 diameter. Includes light duty mast support. Rotator size is 17 3/8Hx8D inches.

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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
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points. In another close race, LU8EKC won world third, with a score of 335,104, while W5KFT (Op. Jay, WS7I) finished fourth in the world with a new North America record score of 326,680 points, far exceeding the old 1992 record of AB8K, who also exceeded his old record with a solid 226,738 points. Brett, VR2BG, set a new Asia 28 MHz record of 307,192 points, overwhelming the previous Asia record by 9K2HM in 1998 of 161,816 points. Only the old 1990 Europe record of 4U1ITU (236,842) and the even older 1989 Oceania record of KX6OI (49,572) were not exceeded. Surely some intrepid operators will attack these records next year while 10 meters is still hot!

Single Operator, Single Band 21 MHz (21). Perhaps influenced by 1999's big activity on 15 meters, there were many SO 21 entries. Nickola, 9A5W, was again first in the world, scoring 455,396 points. World second was VE6JY, who scored 439,280 points, a new VE record for SO 21. PY2KC moved from 28 MHz in 1999 to 21 MHz this year, and placed third in the world with a score of 428,763.

Single Operator, Single Band 14 MHz (14). While the number of SO 14 entries was less than for 10 or 15 meters, 1997 winner Zele, 9A2DQ, repeated as world and Europe champion with a score of 451,178. Second in the world was UY5QQ, scoring 235,248 points, and third was IT9STX, with a score of 212,976. Look for new records on this band in a few years as the solar flux declines.

Single Operator, Single Band 7 MHz (7). Forty meters is a difficult band for RTTY because the RTTY sub-bands vary dramatically around the world, ranging from a low of 7.025 MHz in Japan to a high of 7.1 MHz in the US, with lots of conflicting uses throughout. In addition, the peak of a solar cycle does not produce the finest conditions on this band. Nevertheless, we received many entries, with Europeans dominating the competition. First in the world was the aptly-named 9AY2K club station (Op. Emil, 9A9A), scoring 125,000 points (425 QSOs, 125 mults), followed by SV/OK1YM with 82,712 points and UX6F with 47,393 points.

Single Operator, Single Band 3.5 MHz (3.5). Like 40 meters, 80 meters was a tough band this year for SO. S51DX won with a score of 47,952 points (315 QSOs, 74 mults), with EO6F second at 42,529 points and UR6QA third with 26,544 points. These results will certainly improve a few years from now as solar activity declines.

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World: Sponsored by Nick Smith, W4GKM. Winner: **EA8BH (Op: Tim Totten, N4GN).**
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S.A.: Sponsored by Glenn Vinson, W6OTC. Winner: **Mario Munevar, HK3WGQ.**
Oceania: Sponsored by HamStuff (by W7NN). Winner: **Ron Stewart, ZL2AMI.**
Africa: Sponsored by Doug Faunt, N6TQS. Winner: **5R8GQ (Op: Ken Pendarvis, AD6KA).**
Europe: Sponsored by Hal Communications Corp. Winner: **EMØI (Op: Nick Nikitjuk, UT2IZ).**
Asia: Sponsored by Don Busick, K5AAD. Winner: **A61AJ (Op: Walter Skudlarek, DJ6QT).**

Single Operator Low Power

World: Sponsored by *Amateur Radio Trader* (by W4GKM). Winner: **Barry Kutner, W2UP.**
N.A.: Sponsored by *The New RTTY Journal.* Winner: **Don Hill, AA5AU.**
USA: Sponsored by *The New RTTY Journal.* Winner: **Jon Severt, WB8YJF.**
S.A.: Sponsored by Doug Faunt, N6TQS. Winner: **ZX2B (Op: W. F. Gomez, PY2MNL).**
Oceania: Sponsored by Dave Barr, N2YG. Winner: **Hidetoshi Tsutsumi, KHØ/JH8KYU.**
Africa: Sponsored by Billy Gallier, W4WX. Winner: **Pedro M. Armas Martin, EC8AUZ.**
Europe: Sponsored by Don Hill, AA5AU. Winner: **Yuri Rogachov, RU3QW.**
Asia: Sponsored by Bruce D. Lee, KD6WW. Winner: **Dimitriy Borzenko, 4Z5CP.**

Single Operator Assisted

World: Sponsored by CQ Magazine. Winner: **Jacobo Oduber, P43P.**
N.A.: Sponsored by Barry Kutner, W2UP. Winner: **Jerry Jankowitz, NO2T.**
USA: Sponsored by RTTY by WF1B. Winner: **Joe Shuey, NE3H.**
S. A.: Sponsored by Great Lakes DX & Contest Club. Winner: **Daniel Neves, CX9AU.**
Oceania: *Open*
Africa: *Open*
Europe: Sponsored by *The New RTTY Journal.* Winner: **John Devoldere, ON4UN.**
Asia: Sponsored by ICDXA-ICOM DX Association. Winner: **Masaki Okano, JH4UYB.**

Multi-Op Single Transmitter High Power

World: Sponsored by *Amateur Radio Trader.* Winner: **HC8N**
N.A.: Sponsored by WriteLog for Windows (by K5DJ): Winner: **HO1A**
USA: Sponsored by Society of Midwest Contesters: Winner: **WØSD.**
S.A.: Sponsored by The Florida Boys. Winner: *No entry.*
Oceania: *Open*
Africa: *Open*
Europe: Sponsored by Rodrigo Isola Tarikian, PY2KC/PW2C. Winner: **RU1A.**
Asia: Sponsored by Tom Moore, WA8RPK. Winner: **P3A.**

Multi-Op Single Transmitter Low Power

World: Sponsored by Hal Communications Corp. Winner: **Z30M**
N.A.: Sponsored by Tom Morton, K6CT. Winner: **KP2D**
USA: Sponsored by Platinum Coast Amateur Radio Society. Winner: **WT4I**
S.A.: *Open*
Europe: Sponsored by Euraf Communications, Benin (by TY1PS). Winner: **YU7AL.**
Oceania: Sponsored by Glenn Vinson, W6OTC. Winner: **AH6OZ.**
Africa: *Open*
Asia: *Open*

Multi-Op Multi-Transmitter

World: Sponsored by *CQ* Magazine. Winner: **RW2F.**
Europe: Sponsored by W3LPL RTTY Contest Group. Winner: **HG3DX.**
Asia: Sponsored by *The New RTTY Journal.* Winner: **RKØAXX.**

Single Band

World, 28 MHz: Sponsored by N1JJ, Johnson Joules Contest Club. Winner: **Chris Burger, ZS6EZ.**
World, 21 MHz: Sponsored by Denis, W4DC, and Mike, KA4RRU. Winner: **Nikola Percin, 9A5W.**
World, 14 MHz: Sponsored by Kunihiko Fujii, JH1QDB, Winner: **Zelimir Klasan, 9A2DQ.**
World, 7.0 MHz: Sponsored by Tri-County DX Association. Winner: **9AY2K (Op: Zdravko Banen [Emil], 9A9A)**
World, 3.5 MHz: Sponsored by Neal Campbell, K3NC. Winner: **Janez Celarc, S51DX.**

Multi-Operator

Multi-Op Multi-Transmitter (MOM). After 1999's record-breaking performances in world, South America, Europe, Asia, and North America competition, the number of entries in this class were somewhat reduced this year, although scores remained high. HC8N and P3A moved to MOH class and W3LPL took a breather for the year, but the powerful RW2F team (Ops. RA2FA, RA4LW, RN2FA, UA2FB, UA2FF, UA2FM, UA2FZ) came back to win the world with a near-record Europe score of 5.6 million points (3032 QSOs, 729 mults). Second was HG3DX (Ops: HA1YA, HA1WD, HA1TJ, HA1DAC, HA1DAE, HA3UU, HA3LI), scoring almost 4.7 million points (2745 QSOs, 680 mults). Winning Asia with 3 million points was RKØAXX (Ops: RAØAM, RAØALM,

RU0AB, RU0AM, RU0AT, RU0AFT, RU0AFA, RU0AR, RU0AU, RU0AX, UA0ANW), while VE5RI (Ops: VE5FA, VE5FF, VE5FN, VA5ROB, VE6EZ, VE6REE) won the VE MOM title from an area other than VE7 for the first time in CQWW RTTY history, setting a new VE MOM record with 1.5 million points (1280 QSOs, 467 mults).

Multi-Operator Single Transmitter, High Power (MOH). The most intense multi-operator competition took place in MOH, with significant new records being established for the world (and South America), Asia, and North America. HC8N (Ops. N5KO, W6OTC, K6AW, W0GJ, N0MJ, N0MAJ) established a new world record with a score of almost 6.6 million points (3031 QSOs, 708 mults). Particularly significant in this effort were 14-year-old Mark Johnson, N0MJ, and 16-year-old Melissa Johnson, N0MAJ, both first licensed at age 7 and now Extra Class ops, who not only shared run-station duties, but also scoured the bands for elusive multipliers in the wee hours of both nights in the contest. Watch for these young Minnesota contesters (perhaps with the participation of their dad, W0GJ, aka A52GJ) to activate a rare state/multiplier within an hour's drive from their home in the 2001 contest.

The highly competitive P3A team (Ops. UA9CDV, UA9CGA, UA9CKP, RW9CF) placed second in the world from the far-west Asian island of Cyprus with a score of approximately 5.3 million points (2656 QSOs, 684 mults), overwhelming the 1999 RY9C Asia MOH record of 3.1 million points. World third place was won by a mostly German team operating as HO1A from Contadora Island off the coast of Panama. This group (Ops. DK1BT, DJ7AA, HP1XVH) demolished the 1999 VY2SS North America MOH record of 3.7million points, scoring approximately 4.4 million points (2532 QSOs, 660 mults). All of these scores exceeded the 1998 HC8N MOH world record of 4.4 million points. Only the 1999 KH7R Oceania (2.6million points) and 1996 TY1RY Africa (2.7 million points) MOH records survived the competition this year. Will someone break these records in 2001 before the solar flux begins its long decline?

Multi-Operator Single Transmitter, Low Power (MOL). In the MOL category the 1999 European champion and record holder, Z30M (Ops: Z31DX, Z32PT, Z31JA), won the world with 2 million points (1510 QSOs, 539 mults). KP2D (Ops: NP2E, NP2W, KP2N, NP2BT, NP2DJ, NP2DZ) was second with 1.9 million points. Third were the "Florida Boys" (Ops. WO4D, WO4Z, AF4Z, W2DTJ, WB4EQS, KE4MMI, KC4HW, K4PX, NR4E, KF4AKN, WT4I) operating as WT4I, scoring almost 1.5 million points. The only new record in MOL was achieved for Oceania by AH6OZ (Ops: AH6OZ, AH7R, KH6ND), with a solid score of almost 1 million points, tripling the old 1993 record of 3D2YS.

Summary

This was a great and highly competitive contest. Worldwide propagation was the best in a decade. Participation reached record levels, with new entries from both young contesters and veterans of other modes, all resulting in very spirited competition in many categories as well as many new record scores. To check the all-time CQ WW RTTY Records, look at <www.rttyjournal.com/records/cqww.html> maintained by G0AZT. Given the continuing increase in RTTY contesting, CQ WW 2001 promises to produce more new records worldwide for those who are well prepared.

Approximately 90% of all logs (and almost 100% of competitive logs) were submitted via e-mail or with diskettes via snail mail. All e-logs and those snail-mail logs with diskettes enclosed were converted to Cabrillo format and checked with the WT4I Log Checker. They were then checked against a master call file built by the log checkers from the submitted logs for the 2000 contest. As in prior years, snail-mail logs without diskettes were checked manually. While logging accuracy continues to improve, much more care needs to be taken by participants, particularly in recording states and zones actually used during the contest. Usually, although not always, top-scoring logs are also the most accurate overall.

As in the CQ WW CW and SSB DX contests, all significant logs in CQ WW RTTY are re-scored based on what log-checkers determine to be the facts during each contest. Accordingly, some of you may find that your scores vary significantly from the scores you originally claimed. Lower scores most often are the result of entering an invalid callsign (*not* merely a unique callsign) or an erroneous zone for a particular callsign; higher scores most often are the result of ignoring the scoring rules, particularly failing to count each zone or each US/VE as a separate multiplier. These latter errors are often caused by using pre-printed forms which inaccurately show the scoring process. In any event, please read the rules, and submit your log electronically if at all possible.

TOP SCORES

Single Op High Power

EA8BH (Op: N4GN)	5,012,504	S58T	2,991,138
EM0I (Op: UT2IZ)	3,172,897	UP5P (Op: UN5PR)	2,631,213
A61AJ (Op: DJ6QT)	3,018,240		

Single Op Low Power

W2UP	2,457,697	ZX2B (Op: PY2MNL)	1,537,350
AA5AU	2,017,036	RU3QW	1,476,127
VP5JM	1,648,279		

Single Op Assisted

P43P	3,480,192	NO2T	1,629,706
ON4UN	3,320,672	OK2FD	1,486,752
JH4UYB	2,509,657		

Multi-Op Single Transmitter High Power

HC8N	6,383,328	RU1A	3,533,380
P3A	5,257,224	VY2SS	3,327,688
HO1A	4,411,440		

Multi-Op Single Transmitter Low Power

Z30M	2,011,009	YU7AL	1,095,540
KP2D	1,741,123	AH6OZ	992,250
WT4I	1,464,256		

Multi-Op Multi-Transmitter

RW2F	5,551,335	RK0AXX	3,003,579
HG3DX	4,749,800	VE5RI	1,504,674

Single Op

3.5 MHz

S51DX	47,952	YL2PM	17,760
EO6F (Op: UX0FF)	42,529	RK6BZ	12,452
UR6QA	26,544		

7.0 MHz

9AY2K (Op: 9A9A)	125,000	OH2BP	39,270
SV/OK1YM	82,712	S54A	31,955
UX6F (Op: US-7-027)	47,393		

14 MHz

9A2DQ	451,178	J41OG (Op: SV1QN)	182,298
UY5QQ	235,248	DH6LS	163,050
IT9STX	212,976		

21 MHz

9A5W	455,396	K1AM	426,474
VE6JY	439,280	S57AW	425,420
PY2KC	428,753		

28 MHz

ZS6EZ	692,346	W5KFT (Op: WS7I)	326,688
PJ2I (Op: ON4CFD)	543,375	LW7EIC	318,396
LU8EKC	335,104		

Eddie, W6/GØAZT, was the principal checker of computer logs (whether submitted by e-mail or snail-mail). Glenn, W6OTC, checked the paper logs and assembled the results for publication. The prevalence of computer logs and the use of log-checking software made log-checking more accurate and much faster, resulting in publication of these results in a more timely fashion than in recent years.

Common Log Problems. Please *read* the rules for the contest. We continue to receive logs, particularly from Europe, that do not list multipliers separately by category (zones, DX, US/VE), that do not count US/VE at all, and even several that use the WPX rules for logging and scoring. Some of these logs end up in the check-log category. Unless your log is submitted electronically, and preferably in Cabrillo format, re-scoring a hand log submitted as a WPX log instead of a CQ WW log, even assuming the proper information is submitted, is simply too time-consuming for the log checkers to undertake.

Rule Comments and Changes for the 2001 CQ WW RTTY Contest. The 15th Annual CQWW RTTY Contest will be run on September 29–30, 2001 and will have a few significant rule changes. First, the popular **Multi-Two** class (contacts from each transmitter must be clearly indicated) will be added for the first time in any CQ WW contest. Second, the venerable 10-minute rule will be replaced by the more easily policed **6-band-changes per hour** rule. Third, to conform to a 1999 change in the basic CQ WW CW/SSB rules, only one log may be submitted under any callsign. Most important, **Cabrillo**-format logs will be *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 200 contacts must be submitted via e-mail* or on a *3.5 inch diskette* via snail mail. For those who submit diskettes, please remember to send the diskettes in a protective envelope. We continue to receive mail-damaged diskettes each year. E-mail is clearly the most reliable and easiest method for log submissions, but we welcome all logs, including (subject to the restrictions described above) hand-logs, no matter how they may be sent. Finally, the **deadline** for log submissions will be advanced by approximately 2 weeks from December 1, 2001 to **November 15, 2001**, in line with the other CQ WW contests, which provide a period of approximately six weeks following a contest to submit logs.

The full text of the 2001 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 <cqwwrtty@kkn.net>. Also, be advised that beginning with the 2001 contest, QSOs in all high-scoring logs will be automatically cross-checked with all other submitted logs for callsign/band accuracy.

73, Glenn, W6OTC, and Eddie, GØAZT

Soapbox

AA5AU...The best contest of the year on any mode. *W2UP*...Was great not to have any inter-station interference (SO2R) running reduced power. *N4GN (EA8BH)* ...Special thanks to OH2BH and OH1RY for all the support, and for allowing me to operate from such an FB QTH! *P43P*... Sure had fun. Congrats to EA8BH with new record. See you next year. *ON4UN*... It's been a few years since my last RTTY Contest; what a tremendous amount of activity! *N2FF*...It was a real thrill to get called by VU2JSV, VK6HD, and 4W6MM while running. *DJ1OJ*...Enjoyed nice contacts, at least three new ones: EY-A6-VU. *JH4UYB*...I finally broke the old Asian record in SOA category! *LU5VV*...It was nice to work an average of 30 QSOs per hour. *RW2F*...Missed W3LPL crew this year. *WS7I* ...CQ WW always opens 10 and it was wide open. Thanks to W5KFT for the use of the ranch and his call. *Z30M*...Unbelievable weather first day with storms. However, we enjoyed the contest. *WK6I*...First time I ever blew out a balun! First time operating RTTY ever – fun stuff! *SV2AVL*...Thanks to *CQ* magazine for my first RTTY contest. CU next year. *UXØFF*...80 meters is very problematic. I hope when the sun activity goes down it will be much better. *WØMA*... Started the contest with the Henry 4K at 1500 watts. Saturday morning it gave up. Worked rest of the contest with 100 watts but it didn't seem to make much difference. *S58T*...Super band conditions, great activity, and a lot of eminent contesters on the air.

Station Operators

4U1UN: OM1AM. **9AY2K:** 9A9A. **9M6US:** YBØUS. **A61AJ:** DJ6QT. **AE9D:** AE9D, Nick (son of AE9D). **AH6OZ:** AHØOZ, AH7R, KH6ND. **DFØCG:** DF8FQ. **EA8BH:** N4GN; **EMØI:** UT2IZ. **EO6F:** UXØFF. **F5KQN:** F5PFT, F8BOD, F5SNZ, F5PGO, F1PUF, F4BWC. **GM5V:** GM3UTQ, GM4FDM. **GW8K:** GW4KHQ, GW4SKA, MWØDHF, MWØCWF, GWØANA, GWØPUP. **HA1DX:** HA1YA, HA1WD, HA1TJ, HA1DAC, HA1DAE, HA3UU, HA3LI. **HC8N:** N5KO, W6OTC, K6AW, WØGJ, NØMJ, NØMAJ. **HG5C:** HA/WØYR, HA/N9NC, HA5LV, HA5MA, HA5WE. **HO1A:** HP1XVH, DJ7AA, DK1BT. **J41OG:** SV1QN. **KJ7TH:** KJ7TH, KW7N. **KP2D:** NP2E, NP2W, KP2N, NP2BT, NP2EJ, NP2DZ. **LZ2K:** LZ2ARM, LZ2MP, LZ2NP, L2YO, LZ4AE, LZ4UG. **OHØHEY:** OH3TY. **OL5Q:** OK1HRA, OK1VSL, OK1ING, OK1FFU. **P3A:** UA9CDV, UA9CGA, UA9CKP, RW9CF. **PJ2I:** ON4CFD. **PW2A:** PT2BW. **RK3RWL:** RN3RC, RN3RX, RU3RQ, RK3RX. **RK9CZO:** RX9CAZ, RX9CGR, RA9CDF, Igor Fedjanin. **RU1A:** RW1AC, RV1AW, RA1ACJ, RN1AM, Alex, Yuri. **RW2F:** RA2FA, RA2LW, RN2FA, UA2FB, UA2FF, UA2FM, UA2FZ. **SV1DPI:** SV1CIB, SV1DPI. **UT9F:** UT9FJ, UR5FEO, UT4FJ, UR5FEL, UR5FGN, UT7FO, US-F-55, Ruslan, Mihail, Nikolaj, Eugen. **UX6F:** UXØFF. **VE3FJB:** VE3FJB, VE3VSM, VE3IJM, VA3CW, VA3EWC, VE3ABG. **VE5RI:** VE5FA, VE5FF, VE5FN, VA5ROB, VE6EZ, VE6REE, Mason (son of VE5FF). **VY2SS:** VY2SS, VY2LI, VE1ASJ, VE9DSO, VE9WH, VE9DX. **WT4I:** WT4I, WO4D, WO4Z, AF4Z, W2DTJ, KE4MMI, KC4HW, K4PX, PF4AKN, NR4E, WB4EQS. **W5KFT:** WS7I. **WØMA:** KØBX, KEØLY, WBØEE, KCØEYF, NØAJ, NØPNQ, WØGOM, NØZP, WB8EJN. **WØSD:** WØSD, NØABE, WØDB, WØOE. **YL4U:** YL2KL, YL2KF, YL2KA, YL2MD, YL2GQT, YL3DW, YL3GDJ. **YU7AL:** YU7AL, YZ7EM, 4N7RGH. **ZX2B:** PY2MNL. **Z30M:** Z31GX, Z32PT, Z31JA.

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MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-10	7	10	1⅛ x 6 x 9	3.2
SS-12	10	12	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 9⅜	4.2
SS-30	25	30	3¾ x 7 x 9⅜	5.0

MODEL SS-25M

DESKTOP SWITCHING POWER SUPPLIES WITH VOLT AND AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-25M*	20	25	2⅞ x 7 x 9⅜	4.2
SS-30M*	25	30	3¾ x 7 x 9⅜	5.0

MODEL SRM-30

RACKMOUNT SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25	20	25	3½ x 19 x 9⅜	6.5
SRM-30	25	30	3½ x 19 x 9⅜	7.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M	20	25	3½ x 19 x 9⅜	6.5
SRM-30M	25	30	3½ x 19 x 9⅜	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 9⅜	10.5
SRM-30-2	25	30	3½ x 19 x 9⅜	11.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M-2	20	25	3½ x 19 x 9⅜	10.5
SRM-30M-2	25	30	3½ x 19 x 9⅜	11.0

MODEL SS-12SM/GTX

MODEL SS-10EFJ-98

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EF JOHNSON AVENGER GX-MC42
EF JOHNSON GT-ML81
EF JOHNSON GT-ML83
EF JOHNSON 9800 SERIES
GE MARC SERIES
GE MONOGRAM SERIES & MAXON SM-4000 SERIES
ICOM IC-F11020 & IC-F2020
KENWOOD TK760, 762, 840, 860, 940, 941
KENWOOD TK760H, 762H
MOTOROLA LOW POWER SM50, SM120, & GTX
MOTOROLA HIGH POWER SM50, SM120, & GTX
MOTOROLA RADIUS & GM 300
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UNIDEN SMH1525, SMU4525
VERTEX — FTL-1011, FT-1011, FT-2011, FT-7011

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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

*ICS – Intermittent Communication Service

Number groups after call letters denote following: Final Score, Number of QSOs, Zones, Countries, States/Provinces. Boldface denotes certificate winner.

2000 RTTY RESULTS

SINGLE OPERATOR
ALL BAND HIGH POWER

EA8BH	**5,012,504**	**2485**	**115**	**349**	**209**
EMØI	**3,172,897**	**2030**	**114**	**356**	**167**
A61AJ	**3,018,240**	**2167**	**79**	**260**	**141**
S58T	2,991,380	1843	116	347	181
UP5P	2,631,213	1662	111	329	119
S50U	2,463,384	1581	107	318	177
HK3WGQ	**2,392,185**	**1598**	**89**	**235**	**181**
DL4MCF	2,152,795	1440	110	307	172
RX3DCX	1,979,692	1420	107	319	146
UA4LCQ	1,918,322	1561	99	295	127
W1GF	**1,842,876**	**1482**	**87**	**264**	**146**
LV5V	1,686,326	1286	79	218	149
SM5FUG	1,622,915	1273	95	291	135
I1COB	1,522,908	1233	85	230	163
UF3CWR	1,376,208	1306	84	268	104
W1ZT	1,372,986	1159	94	238	166
W3FV	1,346,686	1132	83	240	128
RM4W	1,270,528	1156	86	239	123
W7TI	1,217,680	1167	98	216	177
S53MJ	1,154,128	1085	80	220	124
N2FF	1,152,816	1061	86	223	129
K5ZD	1,150,090	984	82	237	151
RD4M	1,134,539	1159	83	241	103
RA3WA	1,090,894	997	93	278	98
F5QE	1,063,896	928	78	240	139
LZ2WF	971,242	935	80	223	116
JA1BWA	905,079	810	92	212	89
ZL2AMI	**893,295**	**858**	**70**	**154**	**127**
OK2MR	870,309	781	93	235	119
OM3IAG	819,625	788	81	226	108
5B4AGE	804,540	851	75	188	67
W1RY	782,000	792	73	205	113
SM6WQB	769,519	773	81	216	104
T88SW	753,350	835	71	148	86
OH7A	745,200	884	64	191	90
KK5OQ	736,568	915	73	183	136
LA7CL	711,480	762	83	215	87
OK1KSL	711,417	738	80	225	94
VE5CPU	696,055	782	69	159	137
KG9X	693,808	726	84	205	123
RV9BB	603,120	596	80	245	34
YS1RR	593,600	709	66	142	112
NN6XX	589,125	747	75	168	132
VE7BTO	588,590	688	70	144	141
SM6FUD	579,984	690	72	180	92
EA3RH	574,126	733	60	153	109
RZ1AZ	571,158	658	86	222	70
PA3EMN	554,282	601	80	219	83
RA9MY	521,950	638	57	174	55
W2JGR/0	519,675	692	66	160	99
RA9MY	502,600	622	56	171	53
KE6YTT	475,972	748	64	130	162
EU1SA	467,180	586	72	198	59
W8KEN	464,062	560	67	175	89
K3DUG	462,855	590	58	168	69
HB9DCM	457,938	515	71	176	95
TK/F6FGY	456,960	575	67	198	71
WT6P	454,475	678	71	135	137
SP6CZ	427,344	501	78	202	68
KL7AC	426,426	602	54	116	103
AA9RR	423,384	543	65	168	121
RU3AT	366,873	556	71	183	45
SV1DKR	358,974	590	54	140	65
9M6US	341,448	470	61	106	79
WØHW	328,482	489	63	141	93
OK2BXW	324,416	415	68	136	92
W5BBR	316,720	445	70	146	80
WA8RPK	311,918	497	55	145	63
4W6MM	305,691	601	56	117	0
RV1CC	295,000	439	72	177	46
DL7CX	287,028	377	71	152	83
KD5M	266,409	373	75	151	73
N5RXF	259,826	516	54	110	113
OK2VP	250,738	376	67		
F2AR	245,976	365	64	154	59
N2ED	240,750	430	45	113	56
K6HGF	233,220	467	52	108	100
AE9B	226,098	383	55	122	60
JA2AXB	225,250	312	62	128	60
DK8EY	212,796	330	59	135	63
DLØDX	207,966	328	62	135	56
UV5U	194,142	338	63	151	33
NX4W	192,139	322	58	126	87
DL4NN	191,100	305	62	146	52
VE6YR	180,540	304	58	92	105
VE5SF	159,712	266	55	98	95
5R8GQ	146,671	304	35	100	26
FY5FU	137,441	276	30	54	83
WAØSXV	136,560	255	57	115	68
W6JOX	133,176	250	64	102	82
W6KNB	132,297	281	50	87	74
N9QQK	131,502	247	48	122	32
NW6S/4	131,222	263	46	115	21
JA2ZJW	115,238	260	44	75	38
HB2HQX	111,447	280	47	133	3
W8OSE	103,785	192	54	123	10
RV1AQ	100,812	233	53	124	9
4U1WB	85,116	243	38	66	69
JA7IC	59,305	139	41	88	16
NWØL	46,475	142	35	69	39
WØDET	42,504	139	36	64	38
KC7V	21,836	77	35	59	12
EA4ZB	14,276	64	26	38	22
MØCFV	9,860	57	19	34	15

SINGLE OPERATOR
ALL BAND LOW POWER

W2UP	**2,457,697**	**1635**	**103**	**313**	**183**
AA5AU	2,017,036	1588	100	264	210
VP5JM	1,648,279	1420	76	199	174
ZX2B	**1,537,350**	**1396**	**64**	**181**	**125**
RU3QW	**1,476,127**	**1225**	**101**	**329**	**97**
ER6A	1,463,007	1235	82	267	134
VA3DX	1,406,174	1055	89	249	168
DA2OOO	1,300,432	1170	84	261	131
KHØ/JH8KYU	**1,295,464**	**1306**	**67**	**182**	**83**
LTØH	1,257,202	1097	70	186	130
4Z5CP	**1,246,482**	**1177**	**81**	**222**	**66**
EU1DX	1,239,056	1034	96	263	122
F6AUS	1,227,660	1042	91	248	135
WB8YJF	1,155,603	1053	84	228	141
EY8MM	1,057,266	1011	87	251	40
N2KI	1,049,334	1088	73	204	152
LX1NO	1,044,351	999	77	221	113
EA1CRB	1,019,616	944	85	247	124
UF3CWR	1,012,704	999	77	221	113
OK2VWB	1,005,290	841	90	265	126
CO8LY	959,035	1005	67	170	148
KI6DY	854,506	945	74	183	141
EI4DW	847,104	872	65	198	121
IV3ARJ	845,616	757	84	234	128
W4/KL7Q	821,152	903	69	196	118
S51MM	810,759	823	75	196	122
WA1EHK	760,932	730	84	212	118
S56A	720,645	644	90	246	113
YO3JF	667,665	798	64	171	98
CX7BF	664,720	799	52	119	109
N6OJ	652,482	836	71	154	162
8P6SH	647,964	669	71	187	111
YB5QZ	636,957	770	75	170	34
SM7BHM	632,592	726	75	210	83
OK2PMS	629,625	727	76	213	86
HA4YF	622,683	665	79	221	87
JK1IQK	574,896	591	85	184	79
RV3QX	571,144	668	76	224	76
DJ3NG	561,444	654	71	204	91
SM5UFB	552,735	639	76	191	88
SP2EWQ	525,492	524	88	213	95
YV5AAX	513,629	593	53	146	94
JL6HKJ	512,798	551	70	187	69
EC8AUZ	507,760	771	36	95	89
W3MEL	505,280	659	57	158	105
OK2WY	505,165	564	73	192	90
DK3VN	500,180	569	73	194	89
K1RO	492,842	604	69	171	89
DL7VOG	488,556	552	79	201	89
LU8HWD	459,040	518	66	138	98
WB2UEF/4	458,802	545	73	182	104
DL9NDS	458,796	556	69	191	86
4X6UU	450,384	584	60	157	47
UA1AJW	430,424	515	76	201	69
SM4GVR	401,632	536	66	168	74
FR5GS	**383,508**	**637**	**37**	**99**	**65**
IV3KAS	372,735	560	65	174	58
SM6BSK	364,861	445	66	184	79
OH4BB	362,004	489	71	192	48
UAØAGI	352,800	434	74	190	36
N3UN	349,875	434	68	172	71
RA9XF	335,317	493	57	165	17
LZ2PI	331,080	434	70	158	82
RA4CTR	330,876	518	65	161	47
UA9CDC	324,300	474	46	167	22
DX1S	323,796	455	70	158	14
DM5GI	315,792	450	67	192	47
WA3KPP	308,728	426	63	154	79
GUØSUP	307,685	429	64	157	74
9A6ACY	303,210	464	55	148	67
VE1AOE	300,696	562	36	99	69
K2YG	299,970	417	64	157	82
VE3RZ	299,592	411	65	143	84
K5IID	296,100	418	67	151	82
YL2GC	292,166	426	63	165	59
UR5MID	280,780	420	64	170	44
I1BAY	279,825	434	63	175	49
NØHR	279,664	419	69	148	91
IV3IIM	276,466	420	57	144	73
SP4MPH	275,942	390	67	147	67
GØURR	272,480	448	57	160	45
OK1LL	266,490	400	61	139	70
SP6DNZ	266,104	357	68	166	62
W8KX	261,000	361	66	158	66
OK1FJD	255,750	376	58	141	76
K4FPF	250,512	361	59	154	59
DL5PW	248,940	356	61	127	82
KE5K	247,428	359	61	151	66
F8PMO	245,532	355	56	114	89
VE2AXO	245,204	390	56	117	63
KE5K	242,328	355	61	149	66
DJ1OJ	235,092	356	71	159	44
KA2D	227,214	366	54	135	45
W8EB	226,044	348	63	134	79
LZ2UF	224,143	374	58	135	58
IT9NVA	204,906	416	43	120	50
YO3APJ	203,136	285	67	145	64
EI6FR	203,105	340	55	127	63
F5TEF	200,364	352	49	122	65
RA3BB	200,146	352	55	116	58
NQ3N	189,816	328	53	126	85
UY2ZA	188,370	343	57	143	34
UT5JDS	187,452	326	58	151	37
S57U	185,962	284	58	130	71
DF1ZN	183,675	296	59	113	65
KF2XF	179,307	313	54	133	42
DL2AL	174,375	333	53	130	42
YL2NN	173,250	324	50	139	42
LA5TFA	171,264	400	35	110	47
UT5UML	169,984	267	66	144	46
HB2AWS	169,002	309	52	131	46
N8YYS	167,348	295	52	123	39
USØYA	164,970	298	54	142	39
UT4EO	160,716	311	56	152	19
SM7ATL	153,624	273	55	109	58
W4PJW	151,110	317	45	107	78
XE1YJS	147,630	269	45	92	85
ON4BG	147,626	268	51	118	54
I2KFW	146,041	268	46	102	69
DL4TL	138,528	246	54	117	51
UU9JQ	136,821	340	36	107	34
OZ5MJ	134,976	232	65	114	43
VU2SJV	134,442	247	53	126	15
HB9CAL	133,280	258	48	92	56
IK1ZOE	132,600	256	45	96	59
DL8SDC	131,800	241	48	90	62
DM3HZN	121,250	252	50	97	47
OK1KTS	118,574	230	51	106	45
DL1EJD	117,648	259	40	76	55
N3NZ	112,480	259	46	99	45
F5YJ	110,670	219	54	116	40
UA3TN	109,021	244	47	117	23
KC4SAW	107,944	244	50	97	59
K1US	103,024	215	42	108	38
UA3SAQ	100,902	333	26	74	34
KF9YR	100,667	219	49	101	47
IK2WYI	98,820	209	43	78	59
OK1FJD	96,968	233	49	134	1
UA9AX	96,015	201	45	121	7
DK4IO	94,000	205	46	97	45
JH3CUL	93,912	187	54	115	13
W1CSM	93,704	195	57	100	55
DL8NFU	93,513	201	46	88	49
WR2V	92,232	208	46	94	43
UA6ADC	91,443	213	50	122	15
KL7WP	90,965	223	42	67	52
OK2BMC	90,585	250	37	103	25
SV3AEL	86,152	198	44	94	40
K6BIR	85,696	220	51	66	91
IK2WFN	83,732	201	50	92	31
DL1SAN	82,422	196	49	87	35
NØIBT	81,180	209	41	77	62
DK3WW	79,476	174	48	94	37
IV3KSE	76,386	180	48	94	32
IK2NCF	75,432	186	45	86	37
DL5ZB	74,740	134	71	102	29
KSØM	72,625	190	41	85	49
VA3SWG	71,936	207	32	66	30
PAØEHF	68,058	142	52	78	41
W6FFH	67,230	188	45	67	54
N2LEB	63,783	151	44	91	36
AA5VN	63,357	203	37	69	41
N5BA	62,208	158	52	75	65
N1UVA	61,178	153	45	85	39
UR5FD	60,720	185	31	72	29
W6FFH	58,982	178	42	60	52
SN6U	58,504	153	37	60	45
WK6I	57,436	160	48	72	53
I2HWI	56,240	144	45	79	28
PA7RCE	52,500	176	22	69	34
WB9BSH	51,528	145	40	73	39
W8IDM	51,305	143	40	82	33
VE6RDD	50,320	159	35	39	74
NN5T	48,931	128	55	75	37
HB2DOD	47,320	132	40	68	32
DL2ZAV	46,440	161	40	78	17
LZ2MP	46,332	153	40	90	2
W3FQE	44,407	135	31	72	18
WA6BOB	43,472	154	42	46	64
WA3GPP	42,180	129	42	70	36
KØBJ	41,262	115	39	77	22

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XE1YYD	38,634	110	38	62	37
W9IXX	36,504	120	32	67	18
K9BJM	35,991	124	38	64	27
K8CV	32,535	113	35	56	44
OH1UP	31,857	109	29	78	16
ND8L	29,380	97	34	63	16
UX3MR	28,840	122	24	66	13
Z31JA	28,197	87	34	49	34
OH2OM	27,528	100	32	61	18
JH5OXF	27,352	94	33	59	12
OK2WH	27,063	121	17	42	34
WD9EWK/7	21,460	91	33	42	41
XE1ZVO	19,296	89	22	28	46
CU7BC	18,762	71	30	52	24
AB1BX	16,740	93	19	37	37
F6FTB	16,380	92	24	43	24
UA6LP	15,886	67	34	53	7
OK1DOL	11,956	77	17	28	16
EA7/OH2GI/P	10,270	69	16	35	14
VE2FFE	10,150	55	20	35	15
JA8GTO	9,855	47	26	40	7
K6RFM	8,640	59	26	24	30
IKØSTM	8,064	41	28	36	8
F5PVJ	7,878	37	37	34	7
LZ5AZ	6,500	49	17	29	6
W2LE	5,593	43	12	30	5
JG1OWV	4,876	32	20	26	7
IK2REA	2,765	27	12	12	11
UR5FCM	2,584	35	9	24	1
W5WZ	2,193	29	12	12	19
9A3CY	1,904	33	8	20	0
N2ALE	1,140	25	10	9	19
UA2CZ	546	15	8	13	0
SP6NVK	150	5	5	5	0
RU6CT	16	2	2	2	0

SINGLE OPERATOR 10 METERS

ZS6EZ	**692,346**	**1339**	**30**	**88**	**55**
PJ2I	**543,375**	**1136**	**24**	**81**	**56**
LU8EKC	335,104	738	25	77	52
W5KFT	**326,688**	**774**	**28**	**91**	**47**
LW7EIC	318,396	688	26	82	49
HC1JQ	307,365	670	25	79	51
VR2BG	**307,192**	**715**	**29**	**82**	**41**
5B4/GØDEZ	305,946	766	26	72	40
PW2A	262,848	603	25	74	49
PJ2MI	248,442	596	23	68	50
AB8K	226,738	594	28	82	36
K7WM	206,856	559	26	85	45
EA7FTR	**202,623**	**571**	**22**	**68**	**47**
N2WK	200,160	546	25	81	33
PP5JD	199,290	517	21	63	46
S54E	195,840	468	26	79	48
4X1RF	171,323	454	23	67	37
LT5F	165,710	387	25	71	50
I2ZZZ	155,648	370	27	77	48
F5NZO	121,726	359	25	49	47
F5JKK	117,800	344	25	55	44
LU7DAC	114,030	310	21	59	46
DL1LH	112,941	295	27	71	43
ND5S	108,336	352	22	70	30
DJ6TK	107,210	273	28	71	43
W6/GØAZT	93,665	342	25	67	39
JA6WJL	66,462	202	27	63	24
JA1SJV	65,291	210	25	58	26
4X6UO	63,519	230	21	49	23
OHØHEY	61,525	202	26	62	27
SP2EWQ	53,590	168	25	55	35
OK1MP	50,560	146	27	70	31
DJ2YE	48,100	172	23	44	33
EA1CXH	36,670	150	20	48	27
RV3APM	29,986	117	23	44	27
OK1DCP	25,029	109	20	35	26
IZ1ASN	24,734	104	21	36	26
F6IRG	23,484	110	21	26	29
LW5DR	20,900	94	17	41	18
KG5RM	14,552	83	20	39	9
BV2WM/4	11,484	77	18	39	1
IV3HAX	11,352	59	18	24	24
HAØGK	10,773	60	18	24	21
UX1IL	10,117	58	20	33	14
UT1IA	6,480	46	19	32	3
DJ3EF	4,134	36	15	17	7
LZ2JA	2,204	27	11	13	5
SP6OPE	135	5	4	5	0

SINGLE OPERATOR 15 METERS

9A5W	**455,396**	**955**	**33**	**96**	**52**
VE6JY	**439,280**	**985**	**29**	**90**	**51**
PY2KC	**428,753**	**852**	**29**	**88**	**52**
K1AM	426,474	981	30	94	50
S57AW	425,420	906	33	91	54
G5G	418,488	928	29	85	54
HA9RU	411,163	871	32	93	54
VA3MM	374,003	856	28	86	47
K3GP	327,344	765	31	90	43
K5DJ	309,101	830	26	89	54
DFØCG	269,406	619	28	81	53
RDØC	**263,550**	**624**	**25**	**76**	**49**
T94MZ	255,486	631	25	78	51
JA1KQX	249,240	554	27	79	49
LZ/OK1DF	227,374	584	26	74	49
PA3EWP	225,120	537	28	81	51
IK1HXN	207,348	530	25	69	54
US9QA	204,480	577	26	75	43
CT1AOZ	192,423	526	26	70	51
JH6ETS	166,056	402	29	75	44
KTØDX	162,208	488	27	76	45
UA4CJJ	162,144	487	25	73	46
4F3XX	**161,650**	**449**	**23**	**61**	**38**
CN8NK	**148,800**	**414**	**17**	**56**	**47**
4U1ITU	133,000	407	24	59	42
JG1GGU	132,096	363	23	61	45
EC2ADR	131,393	410	23	64	44
ON7NQ	120,149	325	24	63	50
AG4W	118,745	377	23	69	35
JA3EVZ	111,800	298	25	61	44
K5ZQ	104,192	328	23	69	36
RA1AW	102,339	302	26	63	48
HA1RB	76,672	232	20	62	46
W6IWO	72,688	287	21	51	46
F6IFY	71,628	220	22	65	40
JR3RIY	49,800	176	21	51	28
OM7PY	27,835	113	21	46	25
IK2UHU	27,621	133	16	36	29
JK3GWT	26,160	116	20	48	12
IK2DHU	24,102	120	16	35	27
JR1KSK	23,970	97	21	42	22
W9ILY	21,060	115	19	42	20
S57IIO	17,760	119	17	34	9
SP5RH	12,972	74	17	34	18
JA6AQV	10,726	61	12	36	14
RAØANO	8,550	55	16	25	16
UA4RC	7,682	77	11	29	6
RA9FRD	5,336	41	21	11	2
JO6EDD	100	5	5	5	0

SINGLE OPERATOR 20 METERS

9A2DQ	**451,178**	**967**	**31**	**94**	**57**
UY5QQ	235,248	622	29	89	38
IT9STX	212,976	595	24	67	53
J41OG	182,298	553	25	75	38
DH6LS	163,050	436	25	79	46
EU1MM	136,708	412	27	83	33
EA1BD	99,944	333	21	65	38
YL3FW	96,255	378	23	69	23
EA2AKP	94,361	317	22	74	31
PB5KT	90,916	308	22	59	38
DL9MBZ	80,764	286	21	67	34
YU7NW	79,581	272	22	69	32
7K4QOK	**64,400**	**205**	**23**	**67**	**22**
HI8ROX	**51,876**	**206**	**23**	**71**	**38**
US7IS	36,125	187	17	56	12
OZ6EI	33,264	167	18	49	17
ON4VV	31,668	155	17	50	20
VE3BUC	28,120	119	20	45	30
DF3IAL	23,994	110	17	47	22
I4DOO	23,738	116	17	47	19
UT2AU	22,952	131	18	52	6
UR8QR	20,876	142	14	50	4
SV9/DJ9XB	14,250	110	13	35	9
RA4LTA	13,671	101	13	42	8
UT5DL	13,130	91	15	41	9
UA3LPF	11,270	112	8	40	1
JH2OMM	8,112	61	14	29	5
YO5TP	6,837	45	17	24	12
DL9GMC	3,237	58	9	24	6
YU7AE	700	17	5	15	0
PY4CEL	405	10	6	9	0

SINGLE OPERATOR 40 METERS

9AY2K	**125,000**	**423**	**22**	**69**	**34**
SV/OK1YM	82,712	382	16	61	21
UX6F	47,393	268	16	55	12
OH2BP	39,270	208	19	56	10
S54A	31,955	176	17	52	14
Z31GB	21,328	160	12	46	4
LY2FN	16,038	137	12	40	2
JE2UFF	12,096	84	16	34	4
HA9OA	8,164	64	10	29	13
YO3III	5,364	70	6	30	0
UR5FCM	1,650	31	5	20	0

SINGLE OPERATOR 80 METERS

S51DX	**47,952**	**315**	**14**	**50**	**10**
EO6F	42,529	291	12	53	6
UR6QA	26,544	234	10	46	0
YL2PM	17,760	180	9	39	0
RK6BZ	12,452	144	9	35	0
UR5FFC	11,718	140	7	35	0
OK2SG	6,355	80	9	31	1
S57IIO	702	19	5	12	1

MULTI-OPERATOR SINGLE TRANSMITTER HIGH POWER

HC8N	**6,383,328**	**3031**	**120**	**362**	**226**
P3A	**5,257,224**	**2656**	**120**	**377**	**187**
HO1A	**4,411,440**	**2532**	**118**	**326**	**216**
RU1A	**3,533,380**	**2016**	**123**	**380**	**192**
VY2SS	3,327,688	1992	107	328	202
YL4U	3,101,490	1989	114	344	172
UT9F	2,248,470	1523	112	341	149
OL5Q	2,207,795	1544	102	283	160
GW8K	1,940,373	1501	87	248	166
GM5V	1,811,850	1441	99	281	134
WØSD	1,795,164	1529	95	243	178
HG5C	1,752,663	1308	93	272	154
LZ2K	1,685,716	1332	92	275	135
OM7M	1,399,640	1286	82	238	120
RK3RWL	992,375	1014	87	248	90
AE9D	988,505	1031	77	196	154
VE3FJB	946,051	908	76	187	134
KJ7TH	940,909	1091	81	174	178
GW5NF	485,875	610	59	155	111
WØMA	389,570	496	73	175	78

MULTI-OPERATOR SINGLE TRANSMITTER LOW POWER

Z30M	**2,011,009**	**1510**	**101**	**282**	**156**
KP2D	**1,742,123**	**1442**	**84**	**221**	**174**
WT4I	**1,464,256**	**1182**	**97**	**265**	**186**
YU7AL	1,095,540	944	88	258	119
AH6OZ	**992,250**	**892**	**79**	**136**	**160**
RK9CZO	**685,904**	**738**	**68**	**200**	**58**
F5KQN	318,610	415	69	151	82
SV1DPI	237,600	457	45	111	64
WB2KHO	203,520	305	61	142	53
W4PJW	140,904	295	44	103	81
LW8EXF	8,722	62	12	14	23

MULTI-OPERATOR MULTI-TRANSMITTER

RW2F	**5,551,335**	**3032**	**130**	**401**	**198**
HG3DX	4,749,800	2745	121	356	203
RKØAXX	**3,003,579**	**1916**	**110**	**325**	**114**
VE5RI	**1,504,674**	**1280**	**83**	**211**	**173**

SINGLE OPERATOR ASSISTED

P43P	**3,480,192**	**2031**	**98**	**290**	**188**
ON4UN	**3,320,672**	**1908**	**115**	**339**	**202**
JH4UYB	**2,509,657**	**1675**	**104**	**275**	**142**
NO2T	**1,629,706**	**1352**	**86**	**245**	**163**
OK2FD	1,486,752	1079	102	290	152
RN3QO	1,441,488	1177	98	277	134
I2UIY	1,370,655	1185	82	198	149
NE3H	1,269,324	1138	84	221	133
K3KO	1,000,119	963	77	225	87
VE4COZ	979,110	940	78	190	146
SN7N	928,315	816	97	279	87
W4PK	866,526	803	85	230	102
K9JY	748,374	781	79	197	98
UT2IO	718,166	732	88	252	79
K4WW	691,824	796	69	178	101
WF5T	619,008	680	76	189	119
OH2LU	618,695	679	78	216	91
K2QMF	616,948	663	74	195	87
I2SVA	524,433	560	63	164	130
RK9CWP	508,389	589	65	177	59
UT5UGR	497,202	616	78	213	55
K1NU	490,510	553	76	196	90
WØETC	471,408	620	70	158	94
N9CK	401,812	523	70	161	80
K5PI	382,109	555	72	153	98
7L4IOU	348,975	421	76	156	65
DL1YFF	338,624	449	57	128	101
S57XX	325,760	414	71	174	75
SP2UUU	257,333	402	69	171	37
DL3NM	239,088	327	68	160	65
K5AM	211,761	379	63	118	98
K5NZ	196,100	339	67	115	83
NM1W	165,044	283	57	123	62
AC5AA	133,715	256	60	104	71
W1CC	124,830	268	40	105	26
JS3CTQ	115,995	223	48	112	25
OK1AXB	111,858	207	55	100	51
CX9AU	99,369	193	46	78	57
GØMTN	54,285	148	34	76	31
SP7GAQ	21,364	75	38	66	5
VU2RMF	20,604	75	55	47	0

CHECKLOGS

4X1RF, DL1GGT, DL1LSZ, DL2FAG, DL4MFP, DL7CA, EA3AQL, GW4KHQ, GW4SKA, I4DZ, IT9NVA, KØSQ, KB4LGJ, KC6GR, KC7WUE, KF4SIR, LA9GJ, LU6AM, LX1JH, N5DUW, OK2BHD, OK2CJM, OZ6TL, PA3HGF, PR7AR, SM6LJP, SP7ICE, UA3AD, UA3NFG, UA9JMS, VE3RFD, VK3EBP, W4ZGR/1, W6/GØAZT, WB4DAH, YO6AJI.

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The Bearcat 895XLT is superb for intercepting trunked communications transmissions with features like TurboScan™ to search VHF channels at 100 steps per second. This base and mobile scanner is also ideal for intelligence professionals because it has a Signal Strength Meter, RS232C Port to allow computer-control of your scanner via optional hardware and 30 trunking channel indicator annunciators to show you real-time trunking activity for an entire trunking system. Other features include Auto Store - Automatically stores all active frequencies within the specified bank(s). Auto Recording - Lets you record channel activity from the scanner onto a tape recorder. CTCSS Tone Board (Continuous Tone Control Squelch System) allows the squelch to be broken during scanning only when a correct CTCSS tone is received. For maximum scanning enjoyment, order the following optional accessories: PS001 Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter $14.95; PS002 DC power cord - enables permanent operation from your vehicle's fuse box $14.95; MB001 Mobile mounting bracket $14.95; EX711 External speaker with mounting bracket & 10 feet of cable with plug attached $19.95. The BC895XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO, EDACS, ESAS or LTR systems.

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300 Channels • 10 banks • Trunk Scan and Scan Lists
Trunk Lockout • Trunk Delay • Cloning Capability
10 Priority Channels • Programmed Service Search
Size: 2½" Wide x 1¾" Deep x 6" High

Frequency Coverage:
29.000-54,000 MHz., 108-174 MHz., 406-512 MHz., 806-823.995 MHz., 849.0125-868.995 MHz., 894.0125-956.000 MHz.

Our Bearcat TrunkTracker BC245XLT, is the world's first scanner designed to track Motorola Type I, Type II, Hybrid, SMARTNET, PRIVACY PLUS and EDACS® analog trunking systems on any band. Now, follow UHF High Band, UHF 800/900 MHz trunked public safety and public service systems just as if conventional two-way communications were used. Our scanner offers many new benefits such as Multi-Track - Track more than one trunking system at a time and scan conventional and trunked systems at the same time. 300 Channels - Program one frequency into each channel. 12 Bands, 10 Banks - Includes 12 bands, with Aircraft and 800 MHz. 10 banks with 30 channels each are useful for storing similar frequencies to maintain faster scanning cycles or for storing all the frequencies of a trunked system. Smart Scanner - Automatically program your BC245XLT with all the frequencies and trunking talk groups for your local area by accessing the Bearcat national database with your PC. If you do not have a PC simply use an external modem. Turbo Search - Increases the search speed to 300 steps per second when monitoring frequency bands with 5 KHz. steps. 10 Priority Channels - You can assign one priority channel in each bank. Assigning a priority channel allows you to keep track of activity on your most important channels while monitoring other channels for transmissions. Preprogrammed Service (SVC) Search - Allows you to toggle through preprogrammed police, fire/emergency, railroad, aircraft, marine, and weather frequencies. Unique Data Skip - Allows your scanner to skip unwanted data transmissions and reduces unwanted birdies. Memory Backup - If the battery completely discharges or if power is disconnected, the frequencies programmed in your scanner are retained in memory. Manual Channel Access - Go directly to any channel. LCD Back Light - An LCD light remains on for 15 seconds when the back light key is pressed. Autolight - Automatically turns the backlight on when your scanner stops on a transmission. Battery Save - In manual mode, the BC245XLT automatically reduces its power requirements to extend the battery's charge. Attenuator - Reduces the signal strength to help prevent signal overload. The BC245XLT also works as a conventional scanner. Now it's easy to continuously monitor many radio conversations even though the message is switching frequencies. The BC245XLT comes with AC adapter, one rechargeable long life ni-cad battery pack, belt clip, flexible rubber antenna, earphone, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO, ESAS or LTR systems. Hear more action on your radio scanner today. Order on-line at www.usascan.com for quick delivery.

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Frequency step programmable in multiples of 50 Hz.
Size: 2½" Wide x 1⅜" Deep x 6⅛" High

Frequency Coverage:
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(Full coverage receivers available for export and FCC approved users.)

The AOR AR8200 Mark IIB is the ideal handheld radio scanner for communications professionals. It features all mode receive: WFM, NFM, SFM (Super Narrow FM), WAM, AM, NAM (wide, standard, narrow AM), USB, LSB & CW. Super narrow FM plus Wide and Narrow AM in addition to the standard modes. The AR8200 also has a versatile multi-function band scope with save trace facility, twin frequency readout with bar signal meter, battery save feature with battery low legend, separate controls for volume and squelch, arrow four way side rocker with separate main tuning dial, configuarable keypad beep/illumination and LCD contrast, write protect and keypad lock, programmable scan and search including LINK, FREE, DELAY, AUDIO, LEVEL, MODE, computer socket fitted for control, clone and record, Flash-ROM no battery required memory, true carrier re-insertion in SSB modes, RF preselection of mid VHF bands, Detachable MW bar aerial. Tuning steps are programmable in multiples of 50 Hz in all modes, 8.33 KHz airband step correctly supported, Step-adjust, frequency offset, AFC, Noise limited & attenuator, Wide and Narrow AM in addition to the standard modes. For maximum scanning pleasure, you can add one of the following optional slot cards to this scanner: CT8200 CTCSS squelch & search decoder $89.95; EM8200 External 4,000 channel backup memory, 160 search banks. $69.95; RU8200 about 20 seconds chip based recording and playback $69.95; TE8200 256 step tone eliminator $59.95. In addition, two leads are available for use with the option socket. CC8200 PC control lead with CD Rom programming software $109.95; CR8200 tape recording lead $59.95. Includes 4 1,000 mAh AA ni-cad batteries, charger, cigar lead, whip aerial, MW bar antenna, belt hook, strap and one year limited AOR warranty. Enter your order now at http://www.usascan.com.

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In cars or on foot, hidden transmitter hunts are exciting ham radio adventures. Give it a try this spring, and maybe you'll become a champion at what may be the most unusual of ham radio competitions!

Announcing:

The 4th Annual CQ National Foxhunting Weekend

May 12–13, 2001

Plus

Results of the 2000 National Foxhunting Weekend

BY JOE MOELL,* KØOV

Now that the snow is gone and temperatures are going up, what are hams thinking of? Hamfests, cookouts, and Field Day, right? Another outdoor ham activity is gaining popularity, too—hidden transmitter hunting, also known as foxhunting, T-hunting, bunny-hunting, and ARDF, or amateur radio direction-finding.

For the fourth year, *CQ* is promoting this activity by encouraging hams all over the country, beginners and experts alike, to do it at the same time during the National Foxhunting Weekend (NFW), May 12 and 13, 2001. This may be ham radio's most unusual form of contesting. Most of the participants don't transmit, the rules are different from place to place, and nobody worries about signal reports, sections, or zones.

The idea is simple: Find the transmitter (or transmitters) that your fellow ham (or hams) has put on the air. Depending on the participants' preferences, the hunt can be in daytime or darkness, on foot or in cars, covering a small park or a big state. Rather than try to list all the possibilities, let's look back at NFW 2000 and some of the unique ways hams had fun with radio direction finding (RDF).

Photo A– The Kankakee Area Radio Society had a good turnout for its National Foxhunting Weekend hunt. (Photo courtesy of Clay Melhorn, N9IO)

Drive to the Fox

Mobile hidden transmitter hunts first became popular about 50 years ago on the 80 and 10 meter bands. Nowadays, almost all of them are on 2 meters. Some clubs have these hunts one or more times each month.

Clay Melhorn, N9IO, Foxhunt Chair for the Kankakee Area Radio Society (KARS) of Illinois, reported that the April club meeting's program on foxhunting brought out a record eight teams to the KARS NFW mobile hunt (photo A). Hider John Arrington, WD9AYI, found an old cemetery along the Kankakee River and introduced it to the group by luring them there with his hidden signal. The end of the hunt looked just like a funeral pro-

**ARRL ARDF Coordinator, P.O. Box 2508, Fullerton, CA 92837*
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Operate 10 bands: 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters with one antenna Separate full size radiators . . . End loading . . . Elevated top feed . . . Low Radiation Angle . . . Very wide bandwidth . . . Highest performance no ground vertical ever . . .

Operate 10 bands -- 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters with this MFJ-1798 vertical antenna and get *full size performance* with no ground or radials!

Full size performance gives high efficiency for more power radiated. Results? Stronger signals and more Q-5 QSOs.

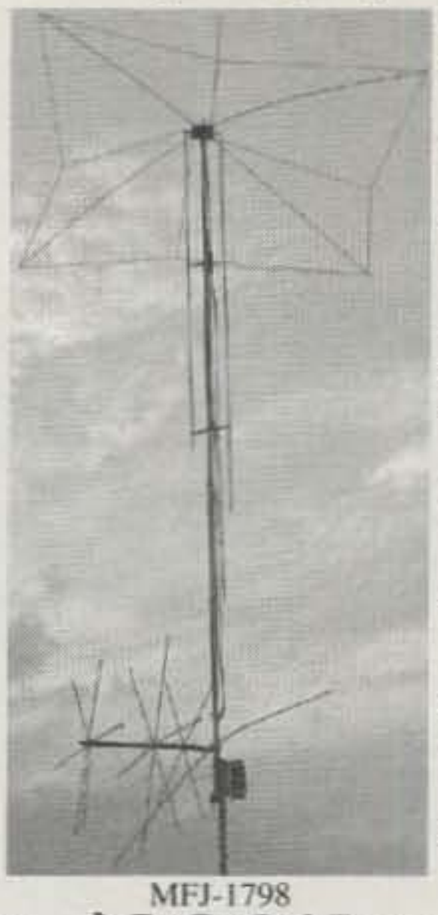
Full size performance also gives you exceptionally wide bandwidths so you can use more of your hard earned frequencies.

Full size performance is achieved using separate full size radiators for 2-20 Meters and highly efficient end loading for 30, 40, 75/80 Meters.

Get very low radiation angle for exciting DX, automatic bandswitching, omni-directional coverage, low SWR. Handles 1500 Watts PEP SSB.

MFJ's unique *Elevated Top Feed*™ elevates the feedpoint *all the way to the top* of the antenna. It puts the maximum radiation point high up in the clear where it does the most good -- your signal gets out even if you're ground mounted.

It's easy to tune because adjusting one band has minimum effect on the resonant frequencies of other bands.



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Self-supporting and just 20 feet tall, the MFJ-1798 mounts easily from ground level to tower top -- small lots, backyards, apartments, condos, roofs, tower mounts.

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Separate *full size* quarter wave radiators are used on 20, 17, 15, 12, 10 and 2 Meters. On 6 Meters, the 17 Meter radiator becomes a 3/4 wave radiator.

The active radiator works as a stub to decouple everything beyond it. *In phase* antenna current flows in all parallel radiators.

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End Loading

On 30, 40, 75/80 Meters, end loading -- the most efficient form of loading -- gives you highly efficient performance, excellent bandwidth, low angle radiation and automatic bandswitching.

MFJ's unique *Frequency Adaptive L-Network*™ provides automatic impedance matching for lowest SWR on these low bands.

Tuning to your favorite part of these bands is simple and is done at the *bottom* of the antenna.

No Ground or Radials Needed

You don't need a ground or radials because an effective counterpoise that's 12 feet across gives you *excellent* ground isolation.

You can mount it from ground level to roof top and get awesome performance.

No Feedline Radiation to Waste Power

The feedline is decoupled and isolated from the antenna with MFJ's exclusive *AirCore*™ high power current balun. It's wound with *Teflon*® coax and can't saturate, no matter how high your power.

Built to Last

Incredibly strong solid fiberglass rod and large diameter 6061 T-6 aircraft strength aluminum tubing is in the main structure.

Efficient high-Q coils are wound on tough *low loss* fiberglass forms using highly weather resistant *Teflon*® covered wire.

MFJ's Super High-Q Loop™ Antennas

MFJ-1786
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MFJ's *tiny* 36 inch diameter loop antenna lets you operate 10 through 30 MHz *continuously* -- including the WARC bands!

Ideal for limited space -- apartments, small lots, motor homes, attics, or mobile homes.

Enjoy both DX and local contacts mounted vertically. Get both low angle radiation for excellent DX and high angle radiation for local, close-in contacts. Handles 150 watts.

Super easy-to-use! Only MFJ's super remote control has *Auto Band Selection*™. It auto-tunes to desired band, then beeps to let you know. No control cable is needed.

Fast/slow tune buttons and built-in two range Cross-Needle SWR/Wattmeter lets you quickly tune to your exact frequency.

All welded construction, no mechanical joints, welded butterfly capacitor with no rotating contacts, large 1.050 inch diameter round radiator -- not a lossy thin flat-strip -- *gives you highest possible efficiency.*

Each plate in MFJ's tuning capacitor is welded for low loss and polished to prevent high voltage arcing, welded to the radiator, has nylon bearing, anti-backlash mechanism, limit switches, continuous no-step DC motor -- gives smooth precision tuning.

Heavy duty thick ABS plastic housing has ultraviolet inhibitor protection.

NEW! **MFJ-1788, $429.95.** Same as MFJ-1786 but covers 40 Meters-15 Meters continuous. Includes super remote control.

MFJ-1782, $339.95. Like MFJ-1786 but control has only fast/slow tune buttons.

MFJ-1780, $249.95. *Box Fan* Portable Loop is about the same size (2x2 foot) as a box fan, complete with handle. Covers 14-30 MHz. Control has fast/slow tunes.

MFJ Portable Antenna

MFJ-1621 **$89.95** Ship Code A

MFJ-1621 lets you operate in most any electrically free area -- apartment, campsite, hotel, the beach, etc. DXCC, WAZ, WAC, WAS have been won with MFJ-1621! Work 40, 30, 20, 17, 15, 12 and 10 Meters with a telescopic whip that extends to 54 inches. Mounted on a sturdy 6x3x6 inch cabinet. Built-in antenna tuner, field strength meter, and 50 feet of RG-58 coax cable. Handles 200 Watts.

MFJ's G5RV Antenna

$39.95
MFJ-1778, Ship Code A

Covers all bands, 160-10 Meters with antenna tuner. 102 feet long, shorter than 80 Meter dipole. Use as inverted vee or sloper to be more compact. Use on 160 Meters as Marconi with tuner and ground. Handles full legal limit power. Add coax feedline and some rope or other nonconductor and you're *on the air!*

MFJ halfwave vertical

6 bands: 40, 20, 15, 10, 6, 2 Meters . . . No radials or ground needed

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Only 12 feet high and has a tiny 24 inch footprint! Mount anywhere -- ground level to tower top -- apartments,small lots, trailers. Perfect for vacations, field day, DXpedition, camping.

Efficient end-loading, no lossy traps. Entire length is always radiating. Full size halfwave on 2/6 Meters. High power *air-wound* choke balun eliminates feedline radiation. Adjusting 1 band has minimum effect on others.

MFJ-1792, $169.95. Full size 1/4 wave radiator for 40 Meters. 33 feet, handles 1500 Watts PEP. Requires guying and radials.

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Photo B– When Paul Shinn's Doppler RDF set can't hear the fox's signal, he gets up in the back of his pickup and uses a hand-held beam antenna to get bearings. (Photo by Joe Moell, KØOV)

cession, except for the funny-looking antennas on all the vehicles.

For clubs in places where T-hunting is a regular activity, NFW 2000 events usually followed familiar rules and formats. The Fullerton Radio Club of California has been doing it monthly for over 25 years. This time, hiders Steve Wallis, WA6PYE, and Vince Stagnaro, WA6DLQ, found an obscure country road not far from a new tollway that most hunters hadn't encountered before. Not much power is needed on this hunt, even if you're trying to bounce a signal off the San Bernardino Mountains, as they were. Southern California hunters' 2 meter setups are very sensitive, usually employing 4-element Yagis or quads. Thus, all Vince and Steve needed was 5 milliwatts into a 4-element beam.

Weather was the biggest hazard for participants in the April OH-KY-IN club foxhunt in Cincinnati. Hider Ernie Howard, W8EH, of Middletown, Ohio wrote: "The temperature was at freezing with rain followed by snow. Heavy rain the previous day had created lots of mud. There were five fox transmitters. Number one was located at a friend's house in Western Hills, hidden in a van parked in front with a bright red ribbon on the antenna. The residents had fun watching hunters run up the street on foot.

"Transmitters two through five were in the woods to the rear of North Fairmont Elementary School," W8EH continued. "This area forms sort of a canyon, and the surrounding hills kept the hunters from getting a direct signal until they got real close. The difficult part turned out to be the on-foot sniffing. They had to contend with the muddy hills from the rain and the many reflections bouncing around the canyon behind the school."

An excellent turnout of nine teams gathered in Pleasanton, California for the designated National Foxhunting Weekend T-hunt. There is a very active group of RDF enthusiasts in the area that stretches from south San Francisco on the peninsula to Stockton and Lodi in the Central Valley. Jim Sakane, KD6DX, posts results, photos, narratives, and "lessons learned" for almost every hunt on his website. Here are some excerpts from his NFW report:

"Our foxes, Paul Shinn (photo B) and Ned Zoller, N6RDX, set up two transmitters somewhere in California, one considered 'hard' on a frequency of 146.555 MHz and a second, which was supposed to be 'easy,' on 147.460. Total mileage to both transmitters determined the winner. Both signals could be heard at the start point, telling me that they were probably in the Livermore Valley and not in the Central Valley. Easy Fox, being quite strong, suggested it could be really close.

"Paul said he would be barbecuing hotdogs at Easy Fox, so choosing which to hunt first wasn't much of a problem. If I could find Hard Fox and then get to Easy Fox first, I could eat early (or possibly eat even more hotdogs). I headed east on Interstate 580, switching between Hard and Easy Fox frequencies. My Doppler, not changing much in direction, indicated that Easy Fox was not as close as I thought. The Hard Fox signal was still very weak."

Jim went on to describe his route to Hard Fox, which led him into mountainous back country. "Thanks to the Garmin Color StreetPilot with detailed street-level mapping, I was able to see all the possible trails," he wrote. He found N6RDX manning the hidden transmitter at the entrance gate to Indian Springs Ranch, using a 3-element beam to squirt the signal to the starting point. Then Jim went after Easy Fox, which was in a tree near Highway 84 (photos C and D). He got there first, but took second place in the hunt results

because Rich Harrington, KN6FW, drove fewer miles.

Foxes Outfox Themselves

Frequent surprises keep foxhunters coming back month after month and year after year. Y2K's biggest foxhunt surprise for the Southeastern Massachusetts Amateur Radio Association happened to Bob Metivier, N1XZJ, and Henry Blanchett, W1GYL. Bill Miller, K1IBR, sent in the official report from "Zero Beat," the club newsletter:

"Bob and Henry decided to hide in the sewage treatment facility at Fort Rodman. However, in their haste, they failed to notice several signs on a gate they went through. These signs clearly indicated that beyond the gate was not a public access area as the foxhunt rules require. They also didn't know that the gate is padlocked shut at about 8 PM each night.

"Before too long, all the hunters were roaming around the plant looking for the fox. All readings indicated the fox was in the immediate area. By now the hiders were so confident no one would find them that they taunted the hunters,

RDF Resources

Elementary radio-direction-finding techniques are discussed in the "Basics" section of the January 1998 issue of *CQ VHF* magazine, page 81. Technical information about VHF RDF is in the "Repeaters, Satellites, EME and Direction Finding" chapter of *The ARRL Handbook.* The most comprehensive book for hams on this subject is *Transmitter Hunting—Radio Direction Finding Simplified,* by KØOV and WB6UZZ (TAB/McGraw -Hill #2701). It has 323 pages and 235 illustrations of RDF techniques, projects, and equipment reviews for all bands from HF through UHF.

Mobile T-hunting was detailed in "Foxes, Hounds, and Hams—-An Introduction to Fox Hunting" by KB8TEP on page 12 of the September 1996 issue of *CQ VHF.* International-style foxtailing was described in "World-Class Fox Hunting Comes to America" by KØOV on page 16 of the October 1996 issue of *CQ VHF.* This article includes many ideas for putting on such events in your town. Some back issues of *CQ VHF* are available from the CQ offices.

The first foxhunting stop for internet surfers should be the author's website: <http://www.homingin.com>. At this URL you will find 30 articles on hidden transmitter hunting, a bibliography of 150 more articles, information on 50 RDF equipment suppliers, and 170 RDF-related web links and local foxhunting e-mail contacts.

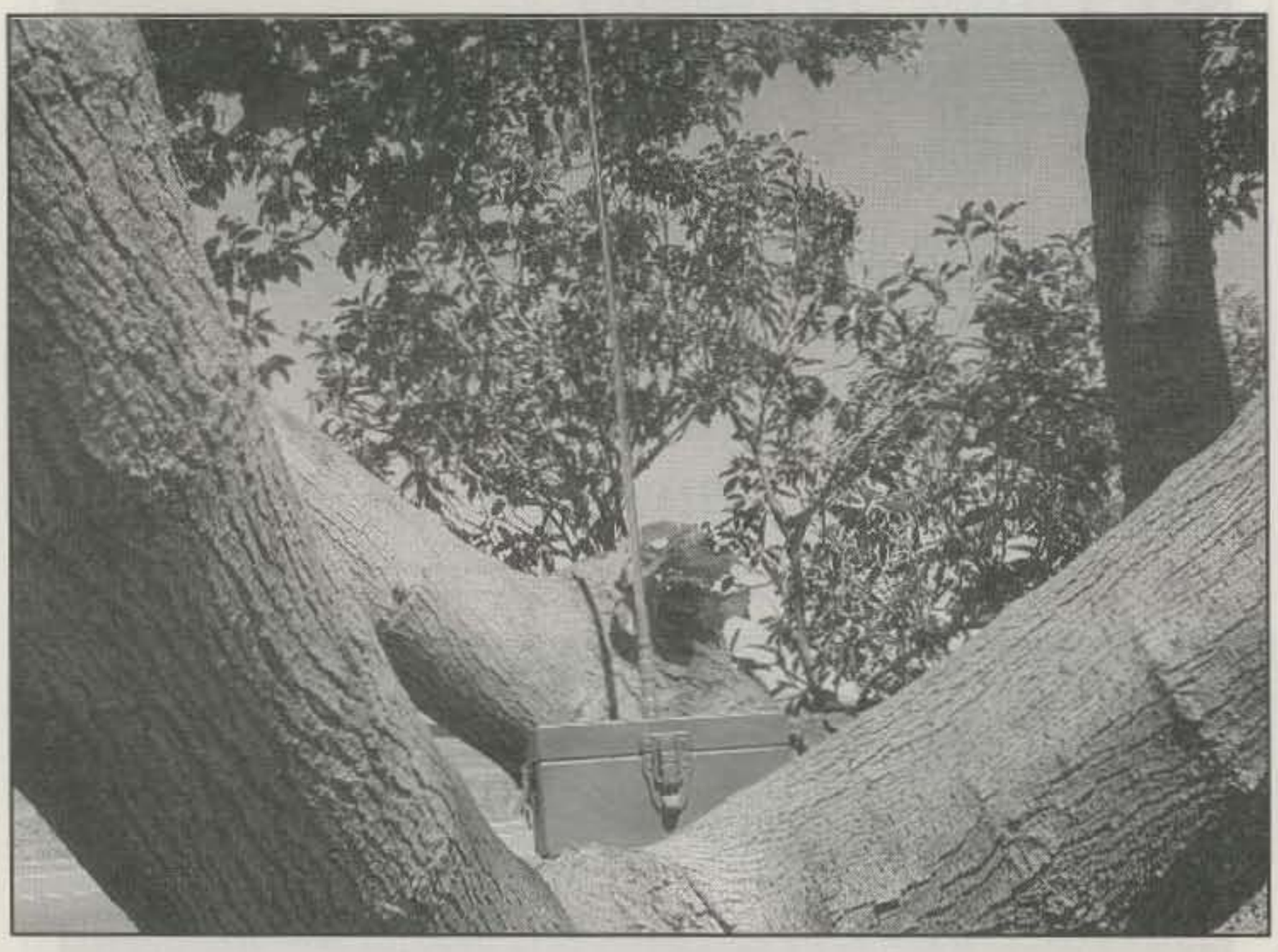

Photo C– The Pleasanton Hunt "easy fox" was up in this tree. Automatic foxboxes such as this one by Henry Schroeder, KF6PCE, are used for both mobile T-hunts and on-foot radio-orienteering events. (Photo by Jim Sakane, KD6DX)

chiding them when they went away from the location, reporting when they stopped or turned. Hunters were frustrated because they knew the foxes could see them but they couldn't seem to locate them in the part of the facility open to the public.

"In due time, it became obvious that the transmitter was in the main part of the plant, where only authorized vehicles are allowed. The hunters informed Bob and Henry that they were locked in! Trapped!

"They didn't believe it at first. When reality finally set in, it was quickly followed by sheer panic. After letting the foxes get their due (profuse sweating), the hunters got the night-shift workers to open the gate and free them. When the workers mentioned that they had called police because of all the suspicious activity, the foxes and hunters quickly departed the area. Everyone went to a restaurant ... to review the evening's events and for a bite to eat. The foxes, of course, ate crow."

So who won? Bill's report concluded: "The general consensus of the hunters was to declare the hunt invalid and draw straws to determine who shall hide next month. Hopefully, the next fox won't be blind as a bat!"

Foxhunts in Boston are very informal, and the participants aren't necessarily all hunting at the same time. The Minute Man Repeater Association foxbox is put out by the hider, then announcements are made on the air and via e-mail that the box is on the air and can be heard in a certain general area. The frequency and transmission rate is also given, as well as the deadline for finding it. Then it's up to the hunters to find a convenient time, go out and track it down, then sign in on the sheet at the foxbox. On April 11 the MMRA box went on the air near Acton, Massachusetts and remained on through the National Foxhunting Weekend.

This "low-key" type of foxhunting might be a good way to introduce the sport in your area. Byon Garrabrant, N6BG, a former southern California hunter who is trying to get the activity going around his new home in Las Vegas, wrote: "I hid a transmitter that ran for 6 days straight, 12 seconds on every 90 seconds, running 10 milliwatts from a hilltop. Not many came out, but I was found by KK7BW, N7TTE, and two non-hams. Now some more hunts are being planned."

Finding Foxes in the Woods

In a sizable percentage of mobile hunts the transmitter isn't in plain sight next to the road. "Sniffing" on foot is part of the end game in these cases. It's such fun that some clubs' hunts are sniffing-only. No cars are involved.

On-foot hunts are a perfect activity for hamfests and Scout get-togethers. They range from simple city-park events to multi-national championships under an internationally-recognized set of rules.[1] Names for it include foxhunting, foxtailing, radio-orienteering, and ARDF.

NFW 2000's on-foot hunts were mostly promotion and training sessions for development of potential Team USA competitors. The simplest was in Portland, Oregon, where a group gathered at Hoyt Arboretum in Washington Park. Dale Hunt, WB6BYU, brought four synchronized 2 meter foxboxes, each of which transmitted in sequence on the same frequency, just as in international championships. The boxes were given to four different hunters, who hid them. Then everyone hunted the boxes that they hadn't hidden.

"The day started with a few sprinkles of rain; then we had mostly sunny weather until we were just packing up," Dale wrote. "With the trees and flowers in bloom and the grassy hills, it was a wonderful day to be outside." WB6BYU was one of a dozen US hams who traveled to the ARDF World Championships in Nanjing, China in October 2000.

From Chapel Hill, North Carolina, Charles Scharlau, NZØI, wrote: "We set a record for the number of transmitters in a North Carolina transmitter hunt. William B. Umstead State Park, between Raleigh and Durham, was the site for this Raleigh Amateur Radio Society event marking National Foxhunting Weekend. The park is large enough to host a genuine ARDF championship, but this time the hunt area was restricted to a region roughly 500 meters in diameter. All the transmitters were placed within 20 meters of a footpath so that no serious off-trail hiking was required. (That is not to say that some hunters didn't indeed take some serious off-trail hikes!)

"The six transmitters were divided evenly between two different frequencies, 146.565 MHz and 146.500 MHz," NZØI continued. "A 30-second transmit period was used so that hunters needed to wait only one minute for a transmitter to come back on the air after completing its transmission. For beginners, two of the transmitters were placed within 150 feet of the starting point. To make things interesting, a dozen decoy 'foxboxes' were spread out between those two transmitters. Each transmitter and each decoy had a 3 × 5 card with a unique two-letter 'control mark' identifi-

cation printed on it. Participants were awarded a point for each transmitter's control mark they recorded on their score card (photo E). A point was deducted for any decoy control marks recorded.

"The remaining four transmitters were in separate wooded areas within the park, between 200 and 400 meters from the starting point (photo F). Many participants experienced their first on-foot transmitter hunting, and everyone had a taste of victory over at least one transmitter."

Pleasant weather and a site with lots of deceptive signal reflections combined to create an enjoyable but challenging on-foot foxhunt on the Caltech campus in Pasadena, California (photo G). The event was sponsored by the Caltech Orienteering Club, which provided maps and handled the competitor timing duties. Many newcomers tried radio-orienteering for the first time and were pleased by their success. The goal was to have two of the six 2 meter fox transmitters be easy to find, two very difficult, and two in between. Also, there was an optional hidden transmitter on 80 meters. Separate 80 meter events are a part of international championships.

A total of 22 persons took to the course, 17 of whom were first-timers. They ranged in age from 14 to 54. Seven found all six 2 meter fox transmitters. A Caltech orienteer was overall winner, finding them all in a blazing 54 minutes. After finding the 2 meter foxes, several people borrowed my receiver to track down the 80 meter transmitter.

Find Your Own Foxes

Now that you know the general theme and some variations, start talking up foxhunting around your club and repeater ragchews, and plan your own local NFW event. It should be appropriate for the skill level of the members, be they experts or total beginners. Make sure it's well promoted, fun, and fair for all. Above all, make it as safe for everyone as possible.

Afterwards, write up the results and send them to me so I can share them with *CQ* readers. Tell me when the hunt was (date), what kind of hunt (mobile or on foot), number and frequency of transmitters, how the hunt was scored to determine the winners, plus the callsigns of the hiders and the winners. Don't forget to include the name of your club and the city or area it serves. Readers also want to know what was unique about your hunt and what lessons (positive and negative) you learned from it.

The list of items to report is posted at my website <http://www.homingin.com>, so you can copy it into your word processor and insert the information if that's convenient. If the report that is printed in your club's newsletter includes all the information, you can just send me a copy by electronic or postal mail.

All of last year's NFW hunts were on 2 meters, but you're not confined to that band or to the FM mode. International ARDF competitions include an 80 meter hunt with CW transmitters. The 6 meter, 10 meter, and 70 centimeter bands are sometimes used for mobile hunts, with each band's special short-range propagation characteristics adding to the fun.

If an all-on-foot hunt is your club's choice, be sure that the kids, grandkids, nieces, and nephews of all the members are invited. They don't need driver's licenses or ham licenses to receive and hunt. It's a great way to show them that ham radio is more than just yakking into a microphone.

Photo D– Inside KF6PCE's foxbox is a synthesized transmitter, battery, and controller that starts transmissions at hunt time and continues them at regular intervals through the hunt. (Photo by Jim Sakane, KD6DX)

Photo F– John Swartz, KB1DLB, and James Heinis, WA4RCU, take bearings at Umstead State Park with a steel-tape beam and active attenuator. (Photo by Gary Pearce, KN4AQ)

Photo E– Chris Petrich writes down a fox "control mark" number at Umstead Park in North Carolina. Let's hope this was an actual transmitter and not a decoy. (Photo by Gary Pearce, KN4AQ)

The First US ARDF Championships

In some towns National Foxhunting Weekend marks the start of the on-foot foxtailing season, which continues until the weather turns cold again. This year is a very special one for radio-orienteering fans, because it includes the first-ever USA ARDF Championships. The Albuquerque Amateur Radio Club (AARC) will host three days of training and competition, with participants expected from all over the US plus several European and Asian countries. Hunters will gather on July 31 and return home August 4, 2001.

These Albuquerque hunts are open to anyone, at any ARDF skill level. If you're a champion, here's your chance to prove it. If you're a near-beginner, it's a great opportunity to learn from the world's best. Room and board will be available on the campus of the University of New Mexico, the headquarters and training site. If you prefer, you can make your own arrangements for accommodations and food. Find out all the details by checking the Championships website <http://www.egroups.com/files/abqardf/web/index.html> or contacting AARC.

Reports and photos of several clubs' NFW 2000 hunts are still on the web. You'll find links to them at my website <www.homingin.com>. There you'll also find suggestions for simple RDF equipment to get you and your club started. Happy Hunting!

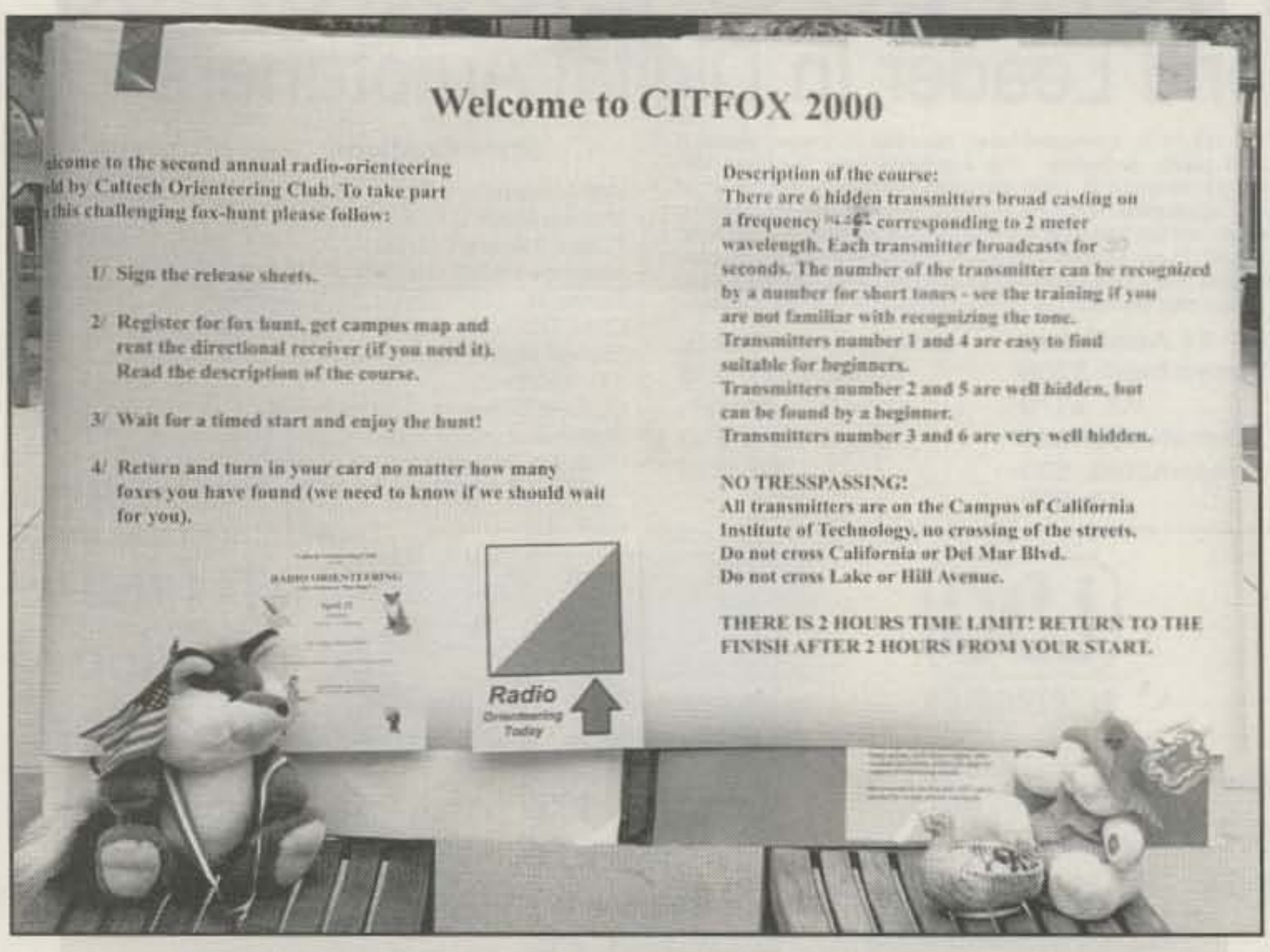

Photo G– Caltech Orienteering Club members promoted radio-orienteering on the campus by putting on CITFOX 2000 in conjunction with National Foxhunting Weekend. The club also built several 2 meter tape-measure RDF beams and ARDF receivers for loan to beginners. (Photo by Joe Moell, KØOV)

Reference

1. Moell, "The USA Takes on the World Foxhunting Championships," *CQ VHF* magazine, March 1999, p. 12.

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The Patcomm PC-500 is a hot new radio that should be able the meet the needs of many radio amateurs, with the added good news that it won't cost a lot, either!

CQ Reviews:

The Patcomm PC-500 Dual-Band Transceiver

BY KEN NEUBECK,* WB2AMU

Patcomm's new PC-500 is a rugged, compact dual-band transceiver that comes equipped with any two amateur radio bands requested (at time of order) between 160 and 6 meters. What is particularly nice is that since each band can be selected by plugging in individual band modules, you have the option of purchasing additional modules that can be used as needed.

Basic Description and Features

The PC-500 covers all of the SSB and CW portions of the HF bands from 12 meters down to 160 meters. On the 10 meter band the radio covers from 28.0 to 29.0 MHz, and on 6 meters it covers from 50.0 through 50.4 MHz.

The PC-500 measures 8"W × 2.75"H × 7.5"L and weighs 3.5 pounds. The compact size allows it to be used mobile or portable, as well as in a base-station setup. The radio has a maximum power output of 15 watts and is adjustable down to 1 watt output through the use of a power tuning knob on the front panel. The power consumption is .75 amps during receive. During transmit the PC-500 draws 2 amps at 5 watts output and up to 5 amps at 15 watts output. (If you want even less power consumption on receive, the backlight to the LCD and the S-meter can be disconnected to reduce the current draw by 150 mA.)

The PC-500 has a nice, easy-to-read, yellow LCD display that is situated in the middle of the radio. There is a decent-size S-meter on the left, and on the right is the main tuning knob with a finger indentation for ease of tuning. Two lines are displayed—the receive frequency on the bottom line and the transmit frequency on the top line. In addition, the mode and memory are displayed on these lines. This is good for running split-mode operations. The top line may also display other information, such as key speed, when certain modes are used. Pushbutton switches for various selections are on the front panel. There is a 1/4 inch headphone jack on the front panel that accepts mono headphones.

Front panel view of the PC-500 dual-band transceiver. There is a large S-meter panel on the left and a main LCD display for showing two lines of frequency, one for the receive mode and the other for the transmit mode.

The back panel is very simple and includes the antenna input, keyboard input, power-supply jack, and key input. There is no external heat sink or fan required because the radio runs cool. It requires a power supply between 11.5 and 14.5 volts DC.

The key input is the miniature size. For straight-key input, the dash side must be grounded when operating in the manual key mode from the menu. The type of key can be selected on the front panel (keyer or manual) by following the instructions in selecting the key-speed switch and lock switch to toggle manual mode on or off.

As spelled out in the radio's specifications, the basic electronics of the radio is a combination of DDS (direct digital synthesis) and crystal mixing techniques used to generate a very stable, low phase-noise synthesized signal. A crystal frequency standard is used as the reference for drift-free operation. The receiver is a single conversion design that uses a high dynamic range preamp and a double-balanced mixer to achieve strong signal-handling characteristics. In the SSB mode the transmitter uses a combination of RF clipping and VOGAD (Voice Operated Gain Adjusting Device, a type of automatic gain control that maintains 100% modulation even when the speaker's voice varies widely in amplitude) to achieve excellent audio quality and punch without distortion.

**Contributing Editor, CQ, 1 Valley Road, Patchogue, NY 11772*
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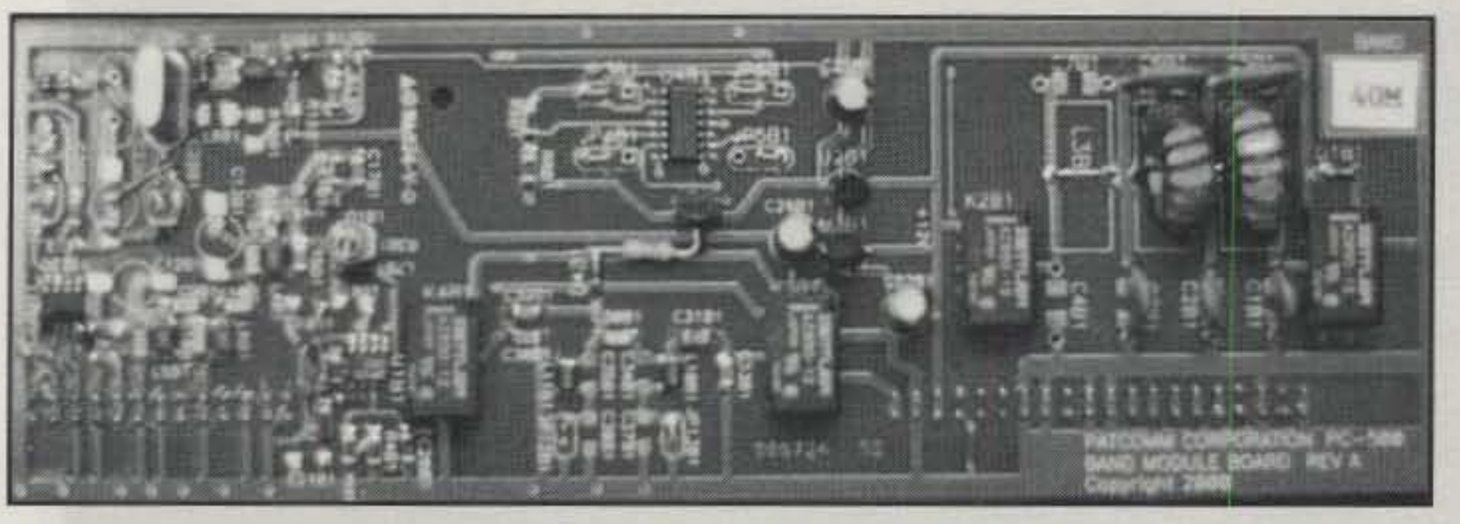


This is an individual band module, which happens to be for 40 meters (see the identification at the top right-hand corner). The radio comes equipped with two bands of your choice when you order it; each additional band module costs $35.

The PC-500 can store up to four memory positions for each band which may be read from the LCD display.

Now let's look at what makes this radio particularly special with respect to other radios out there.

Special Features

The following features of the PC-500 are standard and worth noting, given that you won't find some of them on other radios:

• Two modes of tuning: Variable Speed Tuning (VST), which changes the tuning rate based on the speed with which you turn the dial, and standard tuning in 10 Hz tuning steps.

• Digital Variable Filter (DVF), which has a continuously adjustable bandwidth between 600 and 2700 Hz. This allows you to tune away stations adjacent to the one you want to hear. I found this feature works very well during contests when QRM is present. Patcomm points out that the DVF is inside the AGC loop. This is important, as it means that filtered signals do not cause pumping of the AGC, which in turn could cause desensing of the receiver, making it difficult to hear weak signals. This is a major feature that is unique to Patcomm radios.

• Built-in iambic CW keyer, which allows the use of any standard paddle.

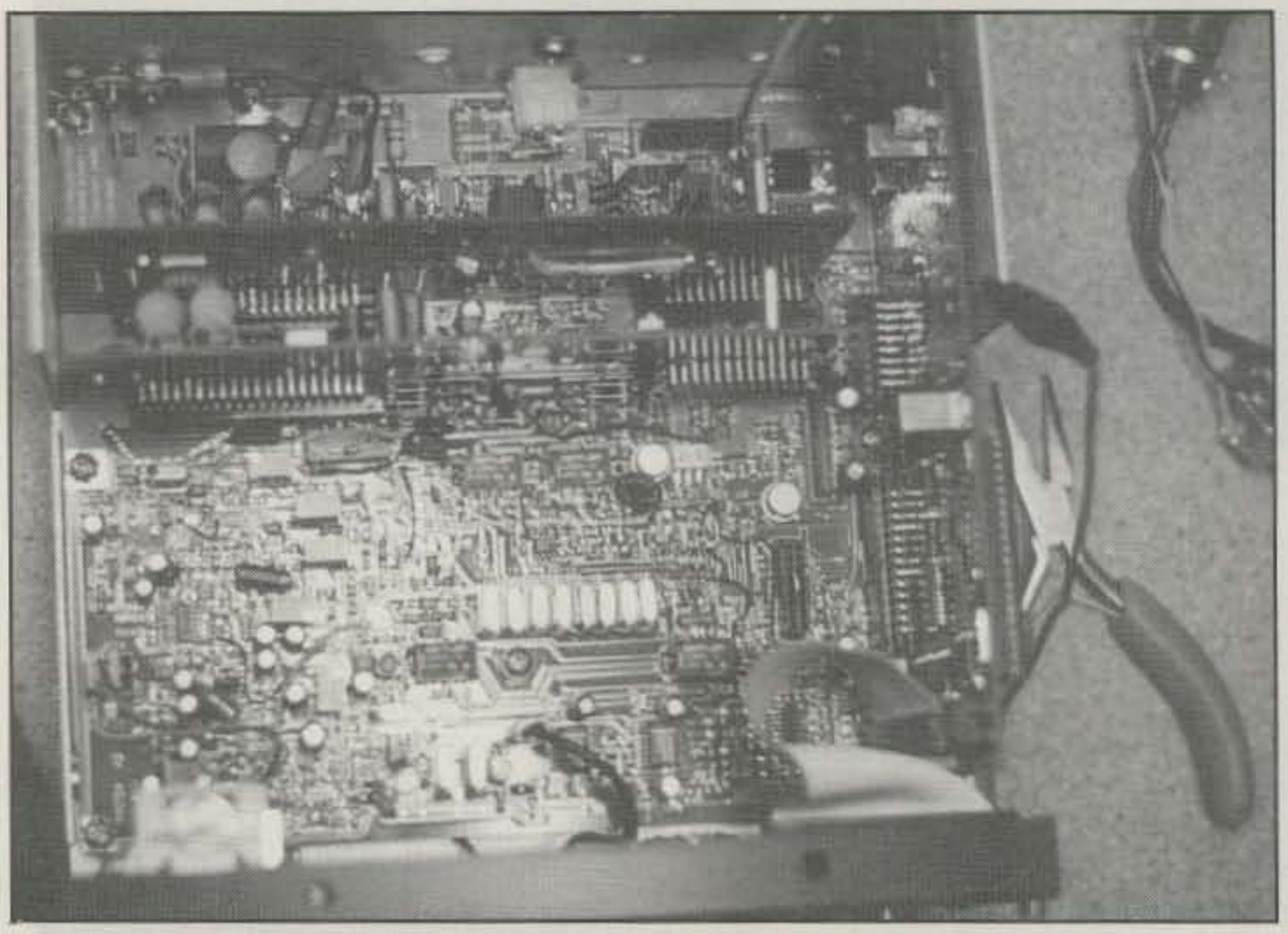
• Keyboard interface, which enables sending CW using an AT-style computer keyboard. Also, the frequency can be entered and the memory accessed by the keyboard through the use of the LCD display.

• Easy-to-remove band modules. The PC-500 can hold two different bands at the same time. Changing the band requires removal of the cover (four screws) and simply unplugging one band module and replacing it with another.

There is significant use of surface-mount components in the PC-500. Examination of the circuit boards and the components used in the radio shows very good quality work throughout as evidenced by the even layout and distribution of components on the circuit board as well as the overall durability of the unit.

Performance

I was able to try out an early production version of the PC-500 during the January VHF contest weekend. On the first day of the contest I operated on 6 meters at 10 watts output for the single-opera-



The cover of the PC-500 comes off after removing four screws. Under the cover is the main motherboard with two band modules plugged in. Most of the components on the circuit board are surface-mount technology.

tor portable mode and made a handful of contacts running from the battery in the car. Even with strong signals coming in from some local stations, I found no evidence of front-end overload.

Later, at night, I got on the air on 40 meter CW with the PC-500 and a switching power supply, running 15 watts output. I came upon a contest going on in eastern Europe. I was surprised by how well I was able to make contacts with low power. I answered various CQs from stations in Hungary and elsewhere in eastern Europe with excellent signal reports. The receiver is very good, and in this contest situation I particularly liked the ability of the DVF to filter out adjacent QRM.

I had a chance to fire up a PC-500 in the PSK-31 mode on 20 meters using

This is the PC-500 with a computer keyboard plugged into it along with a laptop computer that is hooked up through the microphone jack of the radio for operation in the PSK-31 mode. An optional cable is used to connect the computer to the radio, along with the optional VOX board which can be bought for running the PC-500 in the PSK-31 mode.

a laptop computer. PSK-31 is done in the SSB mode on the PC-500. I was able to make a contact using 15 watts on 20 meters with Ken, K8CHE, in Ohio. This was my first PSK-31 QSO. As the duty cycle was much higher in this mode, the radio was warmer but still performed fine.

There is a slight bit of tuning noise that can be heard when moving the dial on 50 MHz. This is a function of the LCD frequency display but has no impact on hearing any radio signals on the band and is not present when the dial is stopped on one frequency. As far as birdies go, I only found one way up the 6 meter band—well away from the calling frequency and the lower part of the band, where most activity takes place. (As an aside, virtually all of the new radios from Japan have birdies showing up on the 6 meter band). Patcomm uses a design that does not use any negative-voltage power supplies and this helps keep down the number of birdies. There was no synthesizer-generated noise heard when moving the tuning dial of the PC-500. By the way, the manual was excellent in explaining the features of the radio.

Summary

The list price of the PC-500 is only $395, and this includes any two bands of your choice when you order the radio. The price is a real bargain considering all of the features that come with it.

This is a hot radio and ideal for either the beginner or the experienced ham who enjoys working a preferred group of ham bands. As discussed earlier, the PC-500 can be used either as a base station or in a mobile or portable setting. It will be interesting to see how the other companies respond to the features and performance Patcomm has presented.

Each additional band module is only $35 and is packed in an ESD (electrostatic discharge) bag; it's easy to add more of your favorite bands with minimal cost. The microphone is $25, and if you have a standard Yaesu microphone it should fit into the jack. PSK-31 capability is added through the use of a VOX board ($25) and a PC interface cable ($20). An optional noise blanker for eliminating ignition noise and other power-line noise sells for $35. The mobile bracket is $40.

Hams looking for more information may contact Patcomm by telephone at 631-862-6511, fax 631-862-6529, or by visiting their website at: <http://www.patcommradio.com>. ■

Reader Survey
May 2001

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 adjacent survey card and mailing it back to us. If the card is missing, just write your response numbers and the date of this issue on a postcard and mail it to CQ Reader Survey, 25 Newbridge Road, Hicksville, NY 11801. We'll pick one respondent to each survey for a complimentary one-year *CQ* subscription (or renewal).

This month, we've got some questions about hamfests.

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

1. Have you ever attended a hamfest, convention, or similar ham radio gathering (not including operating events or club meetings)?
- Yes 1
- No 2

2. Please indicate which of the following you have attended at least once (circle all that apply):
- Local club hamfest / swap meet 3
- Regional hamfest 4
- ARRL section, state, or division convention 5
- ARRL national convention 6
- The Dayton Hamvention™? 7
- Other regional or national conference or convention (e.g., AMSAT or Visalia DX) 8
- None 9

3. Please indicate which of the following you attend *regularly* (circle all that apply):
- Local club hamfest / swap-meet 10
- Regional hamfest 11
- ARRL section, state, or division convention 12
- ARRL national convention 13
- The Dayton Hamvention™? 14
- Other regional or national conference or convention (e.g., AMSAT or Visalia DX) 15
- None 16

4. Please indicate your usual reason(s) for attending hamfests (circle all that apply):
- To shop for equipment and accessories 17
- To sell equipment and accessories 18
- To attend forums and talks 19
- As a social event 20
- To help as a volunteer 21
- Do not attend hamfests 22

5. Please indicate which *one* statement below best reflects your feelings:
- "I go to hamfests to browse, even if there's nothing particular that I need." 23
- "I go to hamfests to buy; I know what I want and go home if I don't find it." 24
- "I go to hamfests to sell, and might bring something new home with me as well." 25
- "I go to hamfests to socialize, and if I happen to see something I like, I'll buy it." 26
- "I go to hamfests mostly for the forums; I'm not really interested in buying or selling." 27
- "I don't go to hamfests." 28

6. Please indicate how you've felt after leaving the hamfests you've attended recently.
- Generally exceed expectations 29
- Generally meet expectations 30
- Generally do not meet expectations 31

Thank you for your responses. We'll have more questions for you in our next reader survey.

What You've Told Us...

In our March survey, we asked about your perceptions of the on-air behavior problems described in three of our columns in that issue. Our first question asked whether you'd already been aware of these problems, and 90% of you said yes. We then asked if you'd encountered certain types of on-air behavior first hand. Seventy-eight percent of you said you'd encountered inconsiderate operators, followed by 69% reporting on-air obscenities, 64% "other inappropriate on-air behavior," 40% on-air bigotry, and 15% hate nets. Only 12% said you had no first-hand experiences with these problems. Nearly two thirds of you (64%) said this type of behavior has affected your enjoyment of ham radio or its perception by visitors to your station.

Not surprisingly, the vast majority of you (95%) said you personally have never engaged in such behavior on the air. The only real surprise is that 2% of you said yes, and another 2% said, "I plead the Fifth."

Opinions were split on the severity and extent of the problem of inappropriate behavior. Just over one quarter of you (28%) said it is "moderate and limited," while another 24% said "severe but limited in extent." The next biggest group—20%—said the problem is "moderate but widespread," followed by 9% who said "severe and widespread." Another 9% said the problem is "benign and limited," while 3% said "benign but widespread," and 6% checked off "no opinion."

Very few of you agree with AA6JR's opinion that the best way to deal with misbehaving operators is to confront them, either on or off the air. Half of you (50%) said the best approach is to ignore their behavior, while 26% feel it is best to report illegal behavior to the FCC, followed by 19% who prefer to just change frequency or shut off their rigs. Only 6% feel off-air confrontation is the best approach, while 3% prefer on-air confrontation, and another 2% had no opinion. Finally, no one said it's best to respond in kind by jamming, cursing, etc. (Thank you.)

This month's winner of a free one-year subscription to *CQ* is Harold Heath, KG8YG, of Midland, Michigan. As always, thank you to all who responded to our survey.

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- Accepts optional EJ-41U 1200/9600 internal TNC

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It's hamfest season, and many a new hamfest chairperson is trying to reinvent the wheel and worrying if all the bases are covered. Here are tips from some of the nation's most successful hamfest planners for making your show one to remember.

Wouldn't you love the fleamarket at YOUR hamfest to look like this? Well, it's only a partial view—one-sixth at most—of the fleamarket at the Dayton Hamvention®. There's only one Dayton, but the tips in this article can help your hamfest be as successful as possible. (Photos by the author)

Another partial view of the Dayton fleamarket. Every successful hamfest, large or small, shares common elements, such as good advance planning and publicity, that we share in this article.

Hamfest Success: The "Secret Formula"

BY JOHN WOOD*, WV5J

Thinking about putting on a hamfest this year? If you're an expert and know all about putting on a hamfest, great. It should be a snap. Just gather about a hundred of your best friends, talk them into helping with the project, and then just pick a weekend.

Uh huh. Wait a minute. If your internal warning sensors are going off and telling you it might not be that easy, you might want to pay attention to them.

Yes, it sounds like a great idea—hold a hamfest, make some money, give the club bank account a big boost. The truth is that putting on a hamfest may be a good idea, but since you have little or no experience, it would be a big help if you could spend a few hours picking the brains of 20 to 30 hams who, as they say, have been there, done that. They have experience as hamfest chairmen. You don't have the time or the money to drive around the country talking to all of those people? Relax. We've already done that part of the job for you.

We recently polled a random sample of hamfest chairmen (both male and female) from across the United States who have served or are serving as event chairs of large, medium, and small hamfests and asked them to share their Top 10 Lessons Learned From Putting On A Hamfest. What did

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these hamfest leaders consider the top, most important things to remember to do? Read on.

The Date

It depends on whether you are planning your first hamfest or another hamfest. If it's your first event, the first thing you should do is *pick a date*. This is not as easy as it may sound, but it is something that one person can handle, assuming that person does enough research. The goal is to select a date for the event that does not conflict with any holidays, other hamfests, or any large community events being held nearby. A quick look at the ARRL Hamfest and Convention Calendar is a good start toward seeing what is going on in the amateur radio world around the first date you select. Don't expect your first selection to end up as the final one. However, if you check and double check the ARRL Calendar, then check to see if there are any local conflicts, you should be able to decide on a perfect or near-perfect weekend.

Once you have a solid date, it's an easy matter to register your event with the ARRL and get official sanctioning. The only requirement is to have your event approved by your Division Director, and the form for this is available in Adobe Acrobat (.PDF) format by e-mailing your request to <hamfests@arrl.org> or by calling 1-860-594-0262.

The Location

Again, we have to address a slightly different agenda for the first-time organizers and remind them here that they need to *find a suitable location* to host their hamfest. With limited selection, limited availability, and limited financial resources, this can be a very difficult task and one where the help of two or three others can be very beneficial to the cause.

Prior to deciding on a location, you need to consider a few important points. Is it convenient to most of those who might attend? Does it offer sufficient indoor and outdoor space for all of your planned activities such as fleamarket, parking, tailgating, VE testing, and forums? Are tailgating or other outdoor events permitted? Will they allow you to provide concessions? Do they offer tables, utilities, and security? Most important, is it affordable? These are questions you will be forced to answer, and if you are a homeowner, they are not unlike the ones you might have asked prior to buying your first home and acquiring your first mortgage. Therefore, take some time and answer

Idea: The 10% Table

One idea that I threw out for development at this year's Dixiefest hamfest held every February in Memphis, Tennessee, was for a 10% Table. This would be in the fleamarket and would be made available by the Dixiefest organizing committee for attendees who might have only one or two radios that they would like to sell but don't want to spend all day behind a fleamarket table.

Anyone having a rig to sell would take it to the 10% Table, sign a two-part ownership tag (one part to stay with the radio and one for the seller to keep), which would include an agreed-upon sale price for the rig the seller wishes to sell. This frees up the rig's owner to look over the fleamarket rather than having to stand watch over a table with only one or two radios on it. If the unit sells for the agreed-upon price while the owner is browsing the fleamarket, the money is held until the retailer returns. When that happens, the owner receives the full proceeds from the sale minus 10% of the sale price, a seller's fee which is retained by the hamfest committee.

(Since this was my idea, other hamfests are free to pick up on it, use it, or adapt it to their respective events.—WV5J)

the necessary questions now to avoid location problems later. After all, you might want to have another hamfest again next year at the same location.

The Plan

Now that all of you potential hamfest organizers have at least a solid date, a location, and maybe the experience of one hamfest under your belt, your attention and concentration can now turn to what most experienced chairmen felt was the most important thing to do next and that is to *plan.*

Start six to eight months ahead of your show date and develop a detailed plan for your event, making sure it includes everything that needs to be done and specifies when the tasks are to be started and should be completed.

On that plan, the first thing to do is *gather your volunteers.* Spread the story about how holding a hamfest would be a great thing to do to benefit your club and help draw local attention to you and your fellow amateur radio operators and their great public-service-oriented hobby. Just make sure you get good people to serve in their various capacities. In this situation "good people" can be defined as volunteers who have a desire to do the job assigned *and* a desire to do the job well. If this is your second or third hamfest, you have the previous year's performance of your volunteers to help determine if your committee people are to be asked to perform their same function again for the upcoming event. For those of you just starting out, however, you'll just have to rely on your instincts and any chance, previous experience you have in working with your people in making the best selections. Scotty Neustadter, W4WW, chairman of the Huntsville (Alabama) Hamfest, said it best when he told me, "Put good people in important positions, then let them do their jobs."

What jobs do you need to assign to the committees? The answer to that question varies with the size of the show, its theme, and its attractions. Despite the possible variations, you will definitely need someone to handle the fleamarket and your non-professional sellers, someone to handle your professional sellers who are often called *vendors,* and someone to keep up with the money and ticket printing and sales. In addition, you will need to consider having someone to handle concessions; forums; prizes; QSL card checking; flyer design, printing, and mailing;

parking; security; electrical and engineering services; VE testing; the talk-in service; setting up and removal of tables and chairs; ticket collection for the drawings (if any); post-event clean-up; and someone to handle the public-address service and make announcements to your crowd.

Now too that the internet is something that cannot be denied, you might want to designate a member of the board to be in charge of web-page design. If you have not utilized the internet for this purpose previously, you might be surprised what a fantastically effective method this is to publicize your event to your fellow hams, especially those from out of town and out of state.

Also, you need to have someone serve as liaison with one or more local hotels. Pick one of the hotels and designate it as "The Official Hotel of the Hamfest," and then see what awarding the hotel this singular honor can get you in return. At the least, you might get discounted rooms for out-of-town attendees, while at the most, you might get a free room that can serve as your event's hospitality room. Work with them and I'm sure they will work with you.

The Publicity

Once you have your people in place and your plan firmly in mind, the next thing you want to do is actually three things: PUBLICIZE, PUBLICIZE, and then PUBLICIZE some more. While you have your volunteers together and start handing out their assignments, don't forget that the only way people will attend your event is by knowing when it will be held so they can plan ahead. You don't necessarily have to go to the trouble to get the governor of your state and the mayor of your city to declare your hamfest date as "Amateur Radio Day" (like they do for the Dayton Hamvention®) but then again, it couldn't hurt!

So many of the organizers who responded eagerly to our questionnaire put down either *publicity* or *advertising* as one of the key jobs in making a hamfest a success. At the risk of sounding crass, yes, you want to have fun, but you also want to make money. After all, that was your primary reason for starting this venture in the first place, remember? The idea was to financially help the club bank account. Let's not lose sight of the goal. Providing a talk-in service is nice, but talk-in is not going to directly influence your bottom line. *Publicity* and *advertising* are the two best ways to get amateurs and non-amateurs to attend your event and part with their hard-earned $5 (or whatever your group has decided to charge) in exchange for an admission ticket.

The Attractions

The other key to getting people to attend is to offer them the attractions they desire and are willing to pay the admission price to see. The attraction that will bring one ham in might not appeal to the next one, so you have to offer a number of items of interest to attract as many amateurs and non-amateurs as possible. Some hams will be focused on having their QSL cards checked for awards and certificates, while others will just attend hoping to win a door prize or simply to browse the fleamarket. Still others will be happy to shell out the price of an admission ticket if they can just get to see and visit with their fellow local

The View from Behind the Table

Commercial exhibitors are a hamfest's lifeblood. If you're able to bring in one or more dealers, manufacturers, etc., then you'll also bring in more hams. For this reason, it's very important to treat your commercial exhibitors with a little bit of extra TLC. CQ exhibits at a variety of hamfests each year, and we hear the complaints and compliments of other commercial exhibitors. Here are some tips on keeping these vital vendors happy.—W2VU

• Make it easy for them to unload and set up. They've got a lot of stuff and may have traveled much farther than your fleamarket vendors. Make check-in as easy as possible. These folks are here to work—for your benefit as well as theirs. Exhibitors also should be given preferential parking. The guy who's coming in to work at your show for 8–10 hours isn't going to start out happy if he has to park a half-mile away and/or wait in line to get in.

• Give them visible locations. If you get a manufacturer or dealer to come and them put him in an out-of-the-way location, he might not be back next year.

• Give them secure locations. A dealer who brings tens of thousands of dollars worth of equipment to your show shouldn't have to worry about people sneaking into the back of the booth and sneaking off with products. Ask retailers what they need in terms of a secure location and do your best to provide it. Uniformed security during the show is essential for larger shows, and if exhibitors will be leaving goods in the building overnight, then overnight security is essential as well.

• Don't put competitors right next to each other, or even within sight of each other, if possible. It's not that they hate each other (most don't), but they want your customers' undivided attention while they're visiting their booth. If you have two dealers at your show, keep them as far apart as possible without putting one in a more advantageous position than another.

• Don't play favorites. If you have two competitors among your exhibitors, do your best to make sure they're treated equally in terms of location, etc. Of course, there should be benefits to longevity; the guy who's been there for 25 years will expect some "perks" over the newcomer. On the other hand, the newcomer may need extra incentives! If you do a special promotion with one, be sure to offer it to the other as well. It's a balancing act, and the successful commercial exhibits manager learns to walk the tightrope.

• Make life easy for your exhibitors. At a minimum, provide free coffee and doughnuts during setup time. Many larger shows include free lunch for exhibitors as part of the booth price. Some even sign up young people (Scouts, CAP cadets, etc.) to deliver food to exhibitors, a tremendous convenience for the one-person booth in particular. It should be easy for vendors to contact your commercial exhibits manager or hamfest chairman in case questions or problems arise. Your commercial exhibits manager should be a people-person with excellent problem-solving skills.

• No surprises. Be sure the material you send out beforehand to exhibitors includes all the important information they'll need to have when they arrive, such as maps, location of the exhibitors' entrance, show hours, setup hours, parking passes, etc.

and regional ham friends face-to-face for a change instead of just talking to them over a radio.

Besides the obvious reasons hams attend a hamfest (the fleamarket, forums, and VE testing), sometimes it's the obscure offerings that draw the hams out of their warm, cozy shacks. It could be anything from packet radio and APRS to PSK-31 and 20 meter DX that gets them motivated to attend. You just have to make sure you offer as many different things as possible to attract the maximum number of hams. That is one reason the crowd totals have historically been near the 30,000 mark each year at the Dayton Hamvention®. There are a seemingly unlimited number of things to do and see when you attend. No, you don't have to try to put on a Hamvention®-size event in your city or town, but just realize the Hamvention® organizers go to a lot of trouble to offer interesting and diverse attractions to draw their crowds. If you can offer a unique and pleasurable experience to your potential attendees, you can have a positive effect on your attendance totals and as a result your bottom line.

If you like analogies, let's look at the situation this way. It's like going fishing. The more baited hooks you have in the water, the better chance you have of attracting the maximum number of fish and being successful in your endeavor. Hams are a lot like the fish—the more attractions you can offer the amateur radio community, the more hams you'll have attend your event. Then all you need to do is publicize your attractions. Drawing a large crowd is one sure way to help make sure your event is declared a success in the on-air discussions on the local repeater during the week following your hamfest.

The Calm Before the Show

Now that you have your volunteers together and the committees have been formed and given their assignments, take a short break and keep reminding yourself to let your good people do their jobs. Support them, check with them and see if they are experiencing any problems you might help resolve, and at the very least, keep in touch just to let them know you care and you are available if they need you.

Plan regular meetings so all committee members can be informed as to how the hamfest process is developing and to make sure that each committee is working towards its assigned goals. You might want to schedule the organizational meetings on a monthly basis until you are four to six weeks away from your event and then shift into high gear

and begin holding weekly meetings so you can react and handle any quickly changing circumstances.

If you have planned well and then follow your plan, I can almost guarantee you'll have a successful hamfest.

The Tips

Those are the primary lessons learned and passed along by our sample of experienced hamfest organizers. However, we also received a few tips that were less general in their appeal and while helpful, might be of interest to a smaller group of event organizers. They are as follows:

- Secure doors not only with locks, but also with people.
- Create a budget, then stick with it.
- Make sure flyers include easy-to-read maps, directions, and talk-in frequencies.
- Have a backup talk-in repeater or frequency ready for use and be sure to publicize it.
- Be sure to have tables and chairs set up as designated rest areas. After their first tour through the fleamarket, most folks will welcome a chance to rest and then they will make a second sweep. If they have no place to sit down, the only option the tired attendees have is to go to the car or go home. They can't spend their dollars with your vendors or fleamarket traders if they go home, now can they?
- Offer interesting door prizes and consider making sure everyone knows your event organizers are excluded from participating in the drawing. It doesn't look good to your patrons, and they will stay home in substantial numbers in following years when event organizers and volunteer workers win the prizes.
- Handle complaints. Listen to the person with the problem and try to be helpful. You can't solve every person's problems (sometimes they do need a professional), but always get the person's name, address, phone number, and callsign. Try everything you can to do correct the situation.
- If you can, meet all deadlines earlier than expected, especially the deadlines of the magazines *(minimum three months' lead time—ed.)*.

* Expect some dealers to arrive wanting to set up at least five hours before scheduled dealer setup time.

In Closing . . .

I offer some words of wisdom from someone who has more experience with putting on hamfests than he likes to admit. John Grody, WB8TEK, is a two-year former director of the granddaddy hamfest of them all, the Dayton Hamvention® and also served nine years as Director of Outdoor Activities, a fancy title for fleamarket director. He and his wife, Cathy, are also the best friends I have in amateur radio. Grody was responsible for the Hamvention®'s outdoor activities during the days when the world-famous fleamarket was going through some of its greatest growing pains. It was Grody who revamped and modernized the fleamarket and numbered the spaces so they could be assigned prior to the event and the obsolete first-come, first-served policy (that forced people to waste their time waiting in line three and four days before the Hamvention® opened so they could get a space) could be eliminated.

Grody advises: "Don't forget the guests who come to the hamfest, because they *make* the hamfest. Treat your attendees like guests in your home, because if they don't attend, you don't have a hamfest. I think that is the key to putting on a successful hamfest, whether it be a small, one-day event or the Dayton Hamvention®. The quicker any organizer or group of organizers learns to take care of the folks who attend their event, the better off they will be and the more successful their hamfest will be."

One last reminder: Be sure to make the coffee at least an hour early (You'll find out what I mean if you don't do it.) and finally ... pray for good weather and a successful event during the last week. As Bob Hightower, NK7M, reminds us, "Murphy is alive and well and ready to create chaos!"

Acknowledgements

I would like to thank the following hamfest organizers and others for sharing their experience and expertise with their fellow hams:

Scotty Neustadter, W4WW; Steve Hopkins, K5RS; Neil Rapp, WB9VPG; Bob Hightower, NK7M; Fred Hendershot, N3BUL; J. R. Sonny Harris, K4JRH; Earl Spencer, K4FQU; Andrew Slaugh, KB2LUV; Royce Taylor, KA5OHJ; Eddie Martin, KI4ZJ; Bill Borstel, KB5SKW; John Herman, WB5OOL; Ron Brown, AB5WF; Ken Christenson, AF4ZI; Luke Calianno, N2GDU; Peter Glenn, KC2KI; John Grody, WB8TEKand wife Cathy; and my lovely wife Marie Wood, WA4WFX.

If you smile and nod when you see someone wearing a "Real Radios Glow in the Dark" T-shirt, you'll want to read this review ... and probably get this book.

CQ *Book Review:*

TUBE LORE, A Reference for Users and Collectors — *By Ludwell Sibley*

BY BRECKINRIDGE S. SMITH*, K4CHE

I first ran across this book while searching for information on subminiature tubes utilized by one of my spy radios in my military equipment collection. Since the subminiature tubes 5899 and 5518 were not listed in my trusty 1971 *ARRL Handbook* or any of my *RCA Tube Handbooks*, I thought I was in trouble until I saw Mr. Sibley's advertisement for his book, *Tube Lore*. Just the sound of the title got my attention, reminding me of my beginning days of amateur radio and the "lore" and excitement of it all.

A week later as I sat in the kitchen unwrapping the book, my wife carefully eyed the process and commented, "I see you have another radio book."

"It's not a radio book; it's a tube reference manual," I explained.

"You have a lot of books. What's a tube?" She moved closer. "Vacuum tubes. They are used in my older radio gear," I replied. I held up the book so she could see the pictures.

"Why do you like all the old stuff?"

"It's simple," I answered. "The new stuff is not as good."

Mr. Sibley's 186-page softbound reference manual is published in an 8 1/2 by 11 inch format. This first edition came with the latest supplement which contained minor corrections and lots of additions.

"I Found My Tubes..."

The first task and test of the book while I was sitting at the kitchen table was to look up my subminiature spy radio tubes. I quickly found them, and now I had information on voltages and base diagrams so I could troubleshoot the spy radio receiver. I decided to make another quick check. I looked up the 2E22 transmitting tube that is used in older military equipment. Ahh . . . there it was, and the listing even included a sentence mentioning the BC-1306 and GRC-9 radios that utilized the tube in the transmitter. I quickly looked up the 5894 and noted that the famous Motorola 80D vehicle trunk-mounted FM receiver/transmitter was mentioned. Mr. Sibley obviously has acquired a lot of hands-on experience and has done his homework.

I was happy with the book, and my wife picked up on this . . . "What's happening now?" she asked.

"I found my tubes." I slowly closed the book and placed it on the table.

"I guess you will be disappearing down into the shop." She turned her back, signaling the end of the interrogation. I love my wife. She is always one step ahead of the process.

The book now occupied a spot on one of my shop workbenches. It stared at me, and the problem was that every time I passed the table I had to pick up the book. Thumbing through history, a lot of my own personal history and memories were linked to the tube listings and to the tube "lore." I marveled at the organization and the massive collection of information that had been accomplished by Mr. Sibley and other tube expert contributors mentioned in the book's Forward section. *Tube Lore* not only provides a technical

*104 Brookfield Drive, Dover, DE 19901

reference, it yields a history of our vacuum-tube electronics industry, both civilian and military.

The book is organized into unique chapters such as "Special Purpose," "Military," "Prehistory," and "User." The "Trends in Tube Design" section explains the many different types of construction of tubes and why some of the processes developed, and explains the massive manufacturing process this country developed as we became the world leader in the electronics industry. If you have been in radio for a while, you will recognize names such as Bendix, Raytheon, Westinghouse, DuMont, Sylvania, Tung-Sol, Western Electric, and RCA. The TV sweep-tube information in the "RF and Audio Use" section is very complete and even lists the amateur radio transmitters that utilized these tubes: Remember Drake, Gonset, Heathkit, Johnson, Lafayette, SBE, and WRL?

If you are interested in troubleshooting equipment, each tube listing has a base diagram showing the connections or pinouts of the tubes. You will need to have a copy of a tube handbook or an ARRL *Radio Amateurs Handbook* up to the 1978 edition. The base diagrams are listed in alphanumeric order in the back of the *ARRL Handbook*.

Beyond Pinouts

As I checked several internet sites, I found that there are hundreds of tube collectors out there. A week later I began to think about my small tube collection, trying to figure out how to organize it. I e-mailed Mr. Sibley and asked him where I could purchase the small boxes for the tubes so I could organize my collection. He promptly replied with the information. However, as I continued reading through his book, I found the answer was already there, in the "Tube User" chapter, a listing for sources of new white storage boxes. The "User" chapter contains information on testing, troubleshooting, repairing, and even a paragraph on "Eye Tubes."

All I can say is if you want to learn more about vacuum tubes and have a complete reference for troubleshooting or collecting, then this book is for you. The manual may be purchased directly from the author at 102 McDonough Road, Gold Hill, OR 97525, or from Antique Electronic Supply, 6221 S. Maple Avenue, Tempe, AZ 85283, <http://www.tubesandmore.com>. The price is $19.95. Another good resource if you are interested in vacuum tubes is the Tube Collectors Organization website at <http://www.tubecollectors.org>.

Math's Notes

What's New And How To Use It

BY IRWIN MATH, WA2NDM

Optical Isolation—Part I

When the ultimate isolation from input to output in any transmission scheme is required, it is hard to beat a fiber-optic link. As those of you who have been reading this column for the past year or so have learned, the use of a beam of light traveling through a glass fiber totally isolates one end of the link from the other. The glass and plastic that fiber-optic cable is made of is an excellent insulator and offers thousands of volts (per inch) of isolation. "Fine," you say, "but what if one needs isolation but cannot afford the cost or space required by such a link? Or what if the space required is simply not there?" The answer is the optical isolator, and we will devote this month and next to investigating a few of the many applications of this low-cost alternative.

The basic optical isolator, like a fiber-optic system, consists of a light source and a detector. Both are in the same small IC package, however, and are electrically isolated from one another. The only "connection" is not a fiber, but a short space between them that allows light from the LED to reach the photosensitive area of the detector. Fig. 1 shows the construction of a typical optical isolator, or "opto-isolator," as they are sometimes called.

The LED used is very similar to a standard LED indicator, but this one usual-

c/o CQ magazine

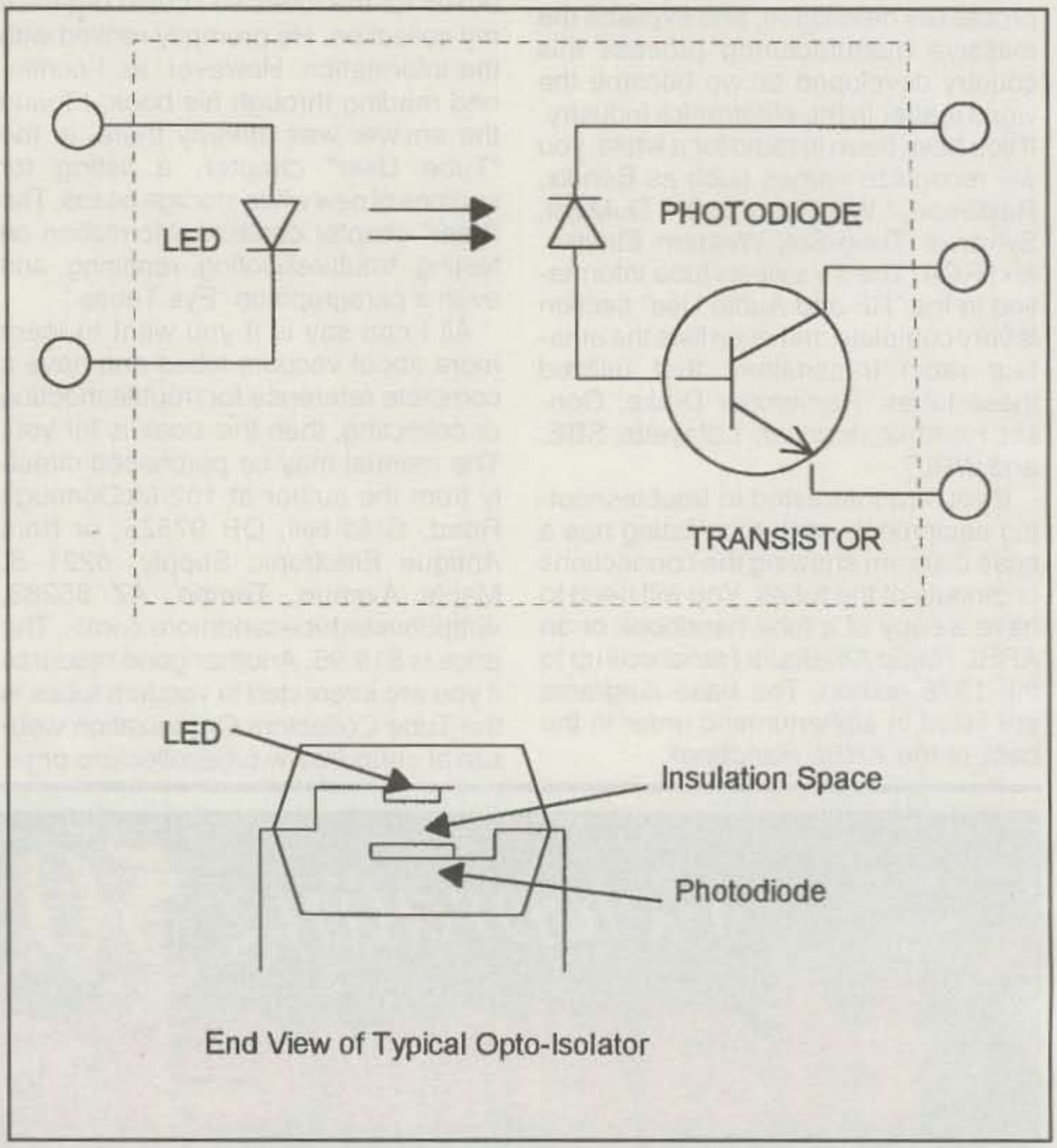

Fig. 1– Construction of a typical opto-isolator.

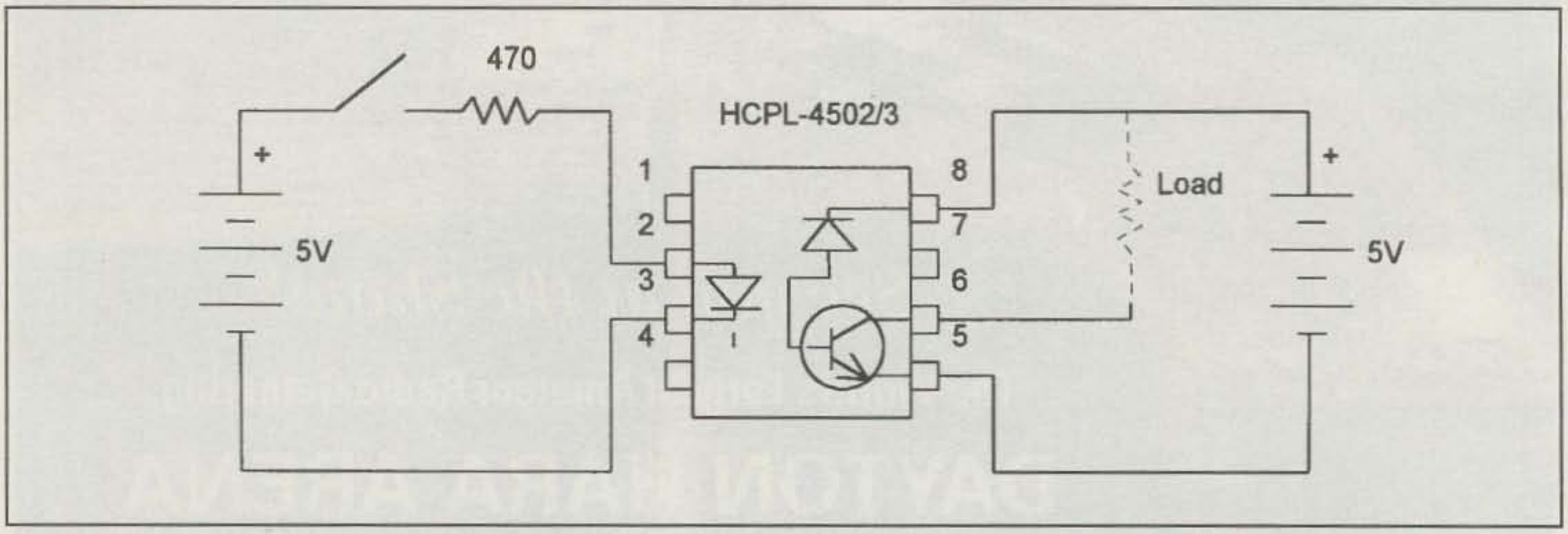

Fig. 2– Opto-isolator used as a switch.

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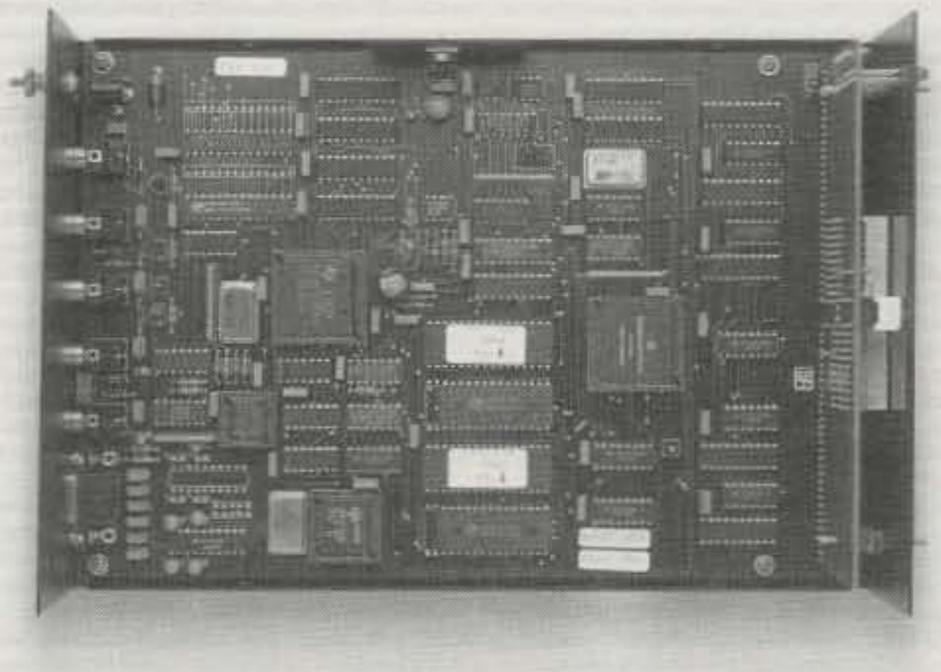

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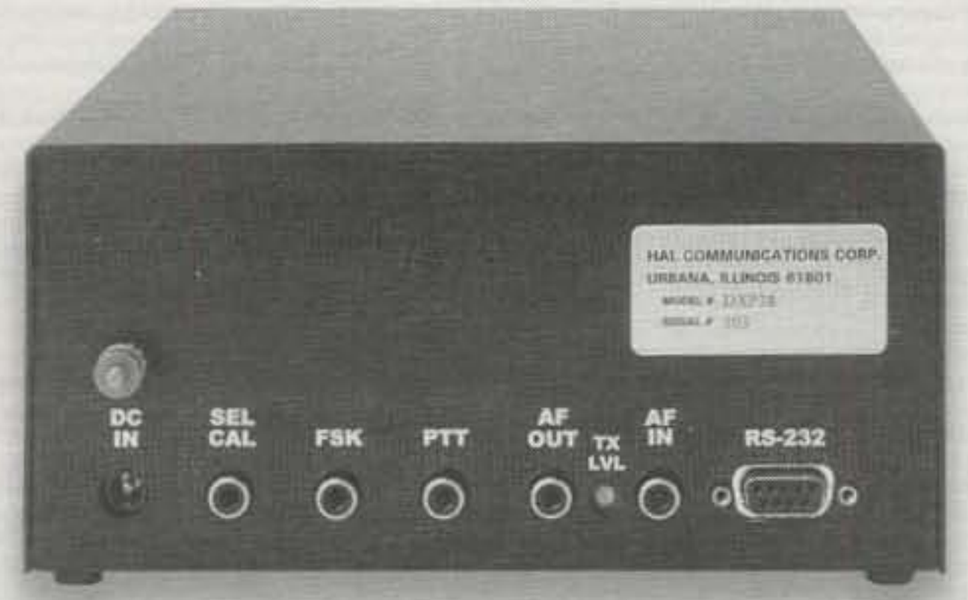

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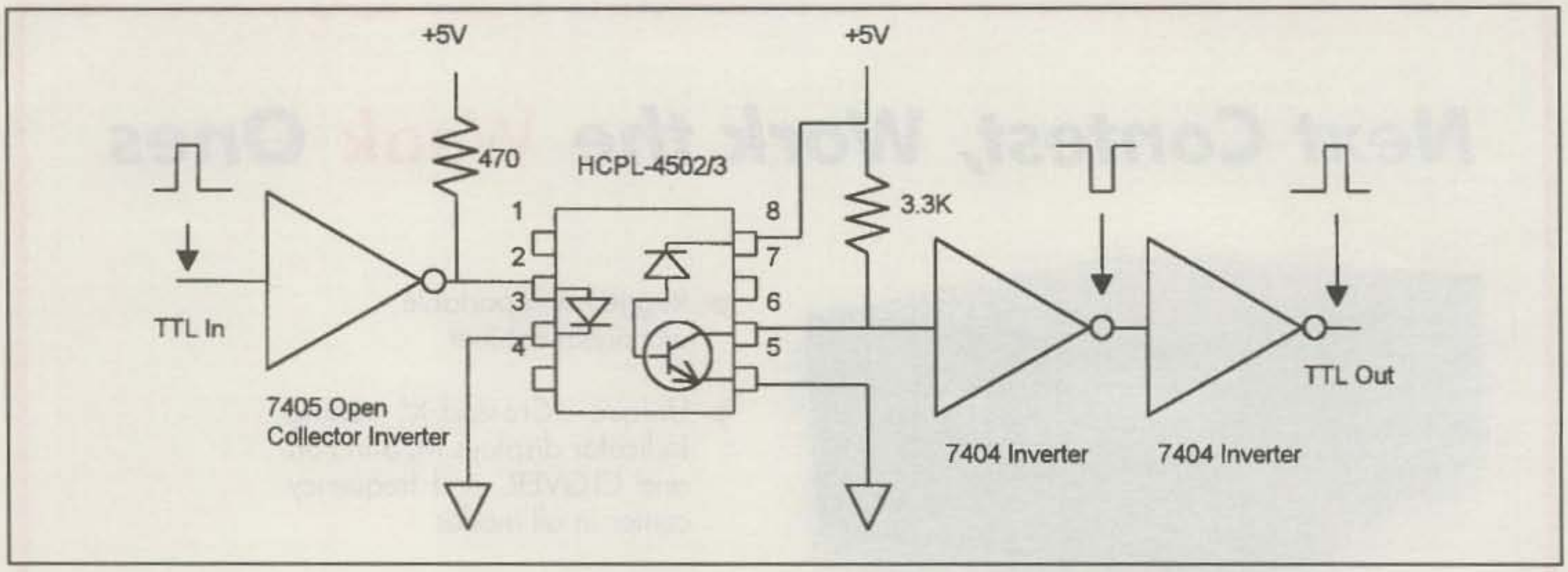


Fig. 3– Simple TTL isolation system.

ly operates in the infra-red portion of the spectrum, as that is where the photodiode is most sensitive. The photodiode is also conventional and almost always is teamed with another device to amplify its feeble current. Our example shows a transistor, but opto-isolators are available with Darlington configurations for higher current, logic gates for various digital interfaces and even SCRs and triacs for AC line switching purposes. Even the so-called "solid-state relay" is just an opto-isolator with a power MOSFET output stage.

As we have already said, what is really important, however, is that there is no electrical connection between the LED and the rest of the circuit. This is where the isolation comes in. In fact, the breakdown voltage between the LED and the rest of the circuit is on the order of 1500 to 2500 volts for general-purpose devices to as high as 5000 volts for premium units.

Interfacing to LEDs is not that difficult. If you are using the unit as a simple switch, for example, the circuit of fig. 2 will suffice. Here we have used the Hewlett Packard HCPL 4502/3, although a host of others will do as well. Closing the switch allows roughly 8 ma to flow through the LED. This is enough to allow the photodiode to pass enough current to saturate the output transistor and allow maximum current to flow through the load. For larger input voltages, simply increase the value of the 470 ohm resistor accordingly. LED current, however, should be limited to a maximum of 15 ma or so to prevent damage. For the HCPL 4502/3, the maximum current safely allowed by the output transistor is 8 ma, so be sure not to exceed this value. If you must switch higher current, you will have to choose a different opto-isolator.

Fig. 3 is a circuit that allows conventional TTL signals to be isolated from one another. Although not the absolute simplest circuit, it is adequate to illustrate how this type of interface can be configured. Operation is as follows:

A TTL low input causes the 7405 output collector not to conduct. This allows the 470 ohm resistor to pass enough current to light the LED in the opto-isolator. The opto-isolator output transistor now conducts, producing a "logic 0" input to the 7404 inverter. This forces its output high, which in turn forces the output of the second stage low. When the input goes high, everything reverses. Remember, the 5 volt supplies on either side of the opto-isolator need not be the same nor connected to one another. The two 7404 inverters are used to produce

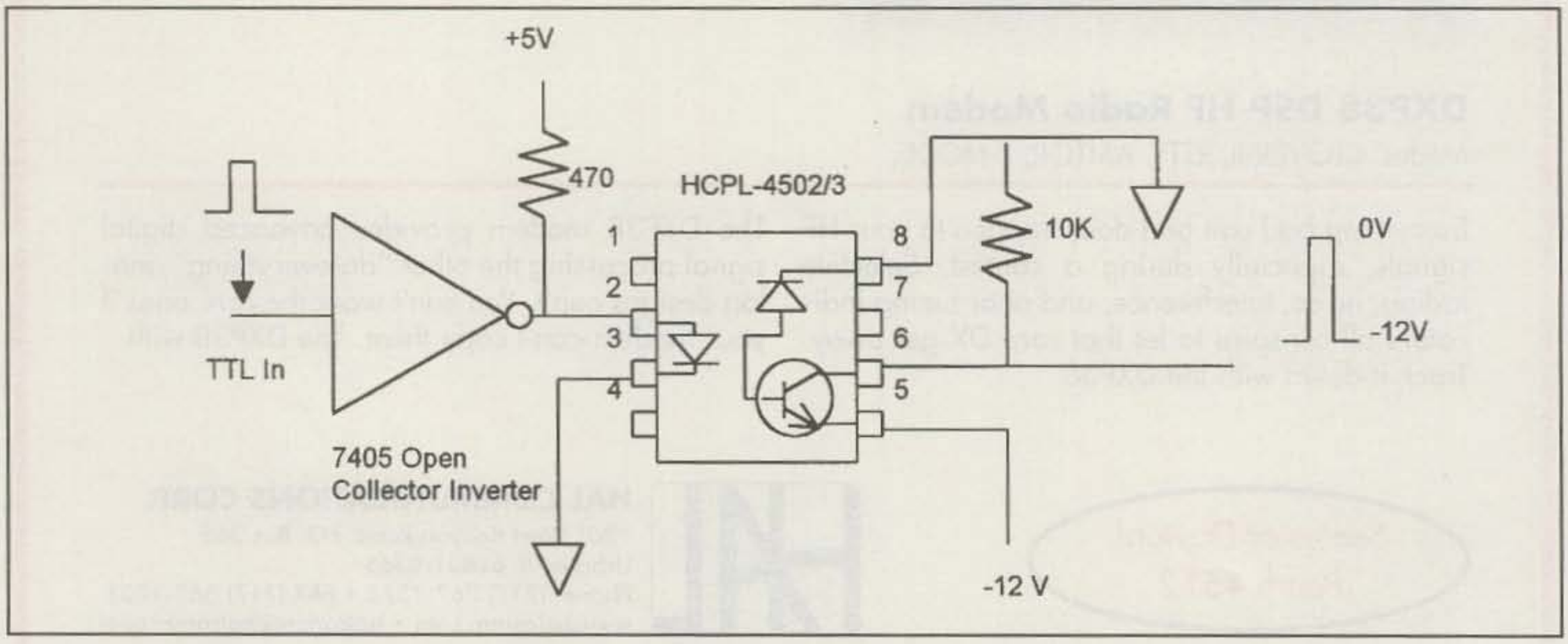


Fig. 4– Simple level-shifted and isolated system.

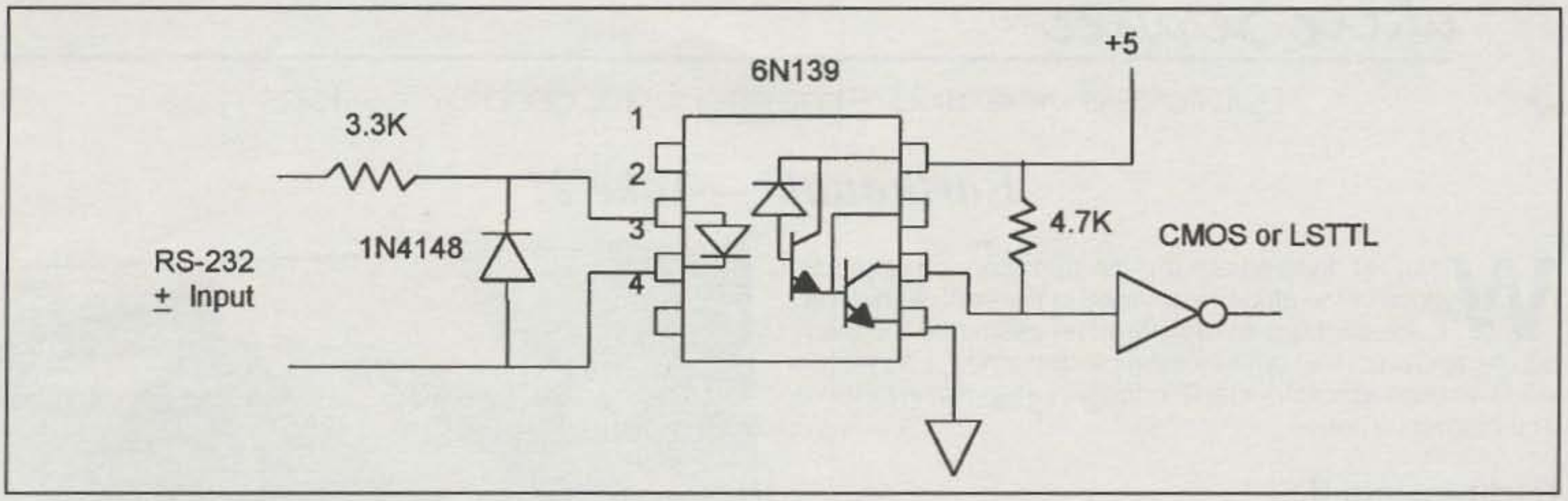


Fig. 5– Isolated RS-232 input circuit.

true TTL signals in phase with the input. You should notice, however, that the direct output of the opto-isolator is also of the correct phase and "practically TTL" as well. For those who plan to actually build this circuit, maximum speed will be in the neighborhood of 500 kHz (1 Mb/s). For higher speeds you will need a different opto-isolator.

Fig. 4 shows a way to level shift a TTL signal when something other than 0 and 5 volts is required. In this circuit the opto-isolator output transistor is used as a "pass device," and negative 12 volt pulses result as shown. Almost any desired output level, positive or negative, can be obtained with this scheme by proper orientation of the component values and voltages.

Our final circuit this month is one which should be of interest to many experimenters. It is a way to isolate a typical RS-232 data signal while converting it to TTL for further processing. Fig. 5 shows this circuit. Here a small signal diode is connected across the RS-232 input to block the negative excursion of the RS-232 input. Otherwise, operation is the same as in the prior examples. The use of the 6N139 allows proper operation over the entire ±3 volt to ±25 volt range of conventional RS-232.

Next month we will continue with some not-so-obvious applications of the opto-isolator.

73, Irwin, WA2NDM

Public Service

BY BOB JOSUWEIT, WA3PZO

Public Service and Emergency Communications

Earthquake—Take 2!

Within 30 days amateur radio operators on opposite sides of the globe responded to the earth's shaking. Each earthquake registered an estimated 6.8 magnitude, and each had entirely different outcomes. This month we take a look at amateur radio operators stepping in to serve at a moment's notice.

Northwestern U.S.

In late February an earthquake struck about 25 miles southeast of Seattle, Washington. The earthquake was felt as far away as Idaho, Oregon, and Utah. It was the strongest earthquake to hit the northwest since a 5.6 tremor occurred in March 1993 about 35 miles south of Portland, Oregon, causing $30 million in damage.

The ARRL reported that Washington State RACES officer Jim Sutton, WA7PHD, served as the Net Control Station on the Washington State Emergency Net while operating from the State Emergency Operations Center at Camp Murray. According to state officials, the EOC is housed in the former Puget Power facility. It was gutted and reinforced to withstand events such as earthquakes. The foundation is set on springs, computers are anchored to desks, and the floor is dotted with phone and plug outlets for makeshift work stations. Authorities credited advance preparation for keeping the damage and number of injuries to a minimum.

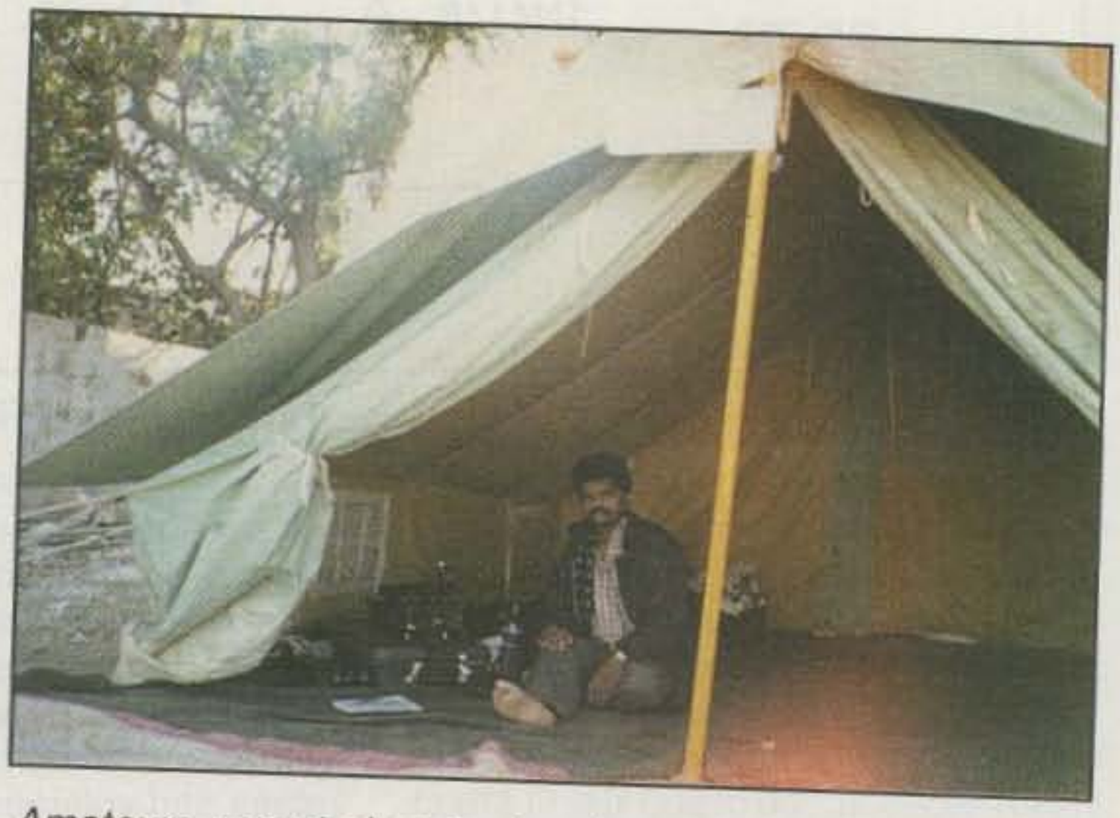
Several western Washington voice HF nets were activated along with several county ARES nets. In addition to providing communications for the counties, local amateurs assisted the Red Cross with damage assessment.

Within minutes of the earthquake John Hirsh, W7RFM, and Anna, KD7ITT, began operating from the Federal Way EOC. They gathered reports from amateurs in the field on the condition of schools, businesses, and health-care facilities to ensure that communications would be available. This was of vital importance, as numerous power, cell phone, and regular telephone outages occurred. In some cases, amateurs provided the first source of information from many areas. According to reports posted on the Federal Way Amateur Radio Club website (<http://www.fwarc.org/>), the Federal Way Emergency Response Team functioned exactly as they had practiced, planned, and promised during the emergency.

Should've, Could've—*I Will!*

How many of us put something off until tomorrow? You'll take care of it later. Sometimes you just don't know how important a particular decision could be until it's too late. Mitchell Gill, KD7LZR, posted a story on <QRZ.com>. Gill had recently gotten his license but hadn't made a trip to the local amateur radio store to pick out his first ham rig. Then the earth shook.

"The cell phone was dead, telephones were dead, electricity was out, and my wife and mother-in-law were 30 miles closer to the earthquake's epicenter on the top floor of a four-story building. It took four hours for me to find out they were okay. I was not happy," said Mike. "After hearing that they were okay, I immediately went to the local ham store and purchased a 2 meter handheld. It was a difficult drive as the traffic was bad, due to a landslide that had backed up the river and having to avoiding the bridges as they had not been checked, but we made it. Tyler and I then attempted to assist some of the neighbors who could not contact family or friends, and we monitored the devastation in the worst hit areas. Tyler, who was going to take his Tech that night, was even more upset over not having the ability to contact his mom than because he would have to wait a few weeks to take the test. When Mom came home, after we swapped stories, Tyler immediately started trying to convince her to get a license. I think he may have succeeded."



Amateurs operated under harsh conditions in the disaster area in India.(Photo courtesy VU2ZAP)

More from India

As our print deadline passed last month, ham radio operators were responding to another 6.7 magnitude earthquake in northwestern India. It was a holiday in India. Local hams were chatting on 2 meters when the earth shook at 8:45 AM. They turned on their HF rigs to hear hams from across the country describe their experience.

Knowing that their help probably would be needed, nine members of the Mumbai Amateur Radio Society's Disaster Communication Team began to get ready. Three hours later they found out that Bhuj was at the epicenter of the disaster. They traveled to the Mumbai Central (train) Station at 4 PM. The train station master made arrangements for the team to be on the next train heading toward the disaster area; it was scheduled to leave about one hour later. Early the next morning the team was met in Ahmedabad by Prem, VU2XMX, and Pravin, VU2CPV. The group met with government officials to map out plans and strategies. Two jeeps were provided by the Gujrat government. The Mumbai team headed for the disaster area in Bhuj, while Prem and Pravin set up a station at the Gandhinagar government headquarters in Mantralaya.

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

The team stopped about 100 km from Bhuj. They made their first HF contact with Adolf Shepherd, VU2AF, in Mumbai. They described what they saw as shocking. All of the villages they had passed were totally devastated. People were moving out as the team headed in.

After a 20 hour drive over treacherous roads, they reached Bhuj. Here they met with Jagdish Pandya, VU2JGI, who was working for the government, and discussed their plan. Stations were set up in three locations: Bhuj, Bachau, and Pankaj. Officials were extremely happy to see the hams, since all other forms of communications had failed.

As soon as the stations were set up, important government messages were passed, as were hundreds of messages from local residents to their relatives informing them that all was well. Eventually, a dedicated station was set up to handle government messages.

Medical Nets Set Up

As more hams came into the disaster area, links were set up between Bachau and Mumbai to handle medical information. The teams worked every day for six days from 6 AM to 1 AM in harsh living conditions. They slept in the Jeep in Bachau and in make-do tents in Anjar and Bhuj. They were out in extremely cold weather, and their meals were limited to biscuits and water. Finally, satellite and cellular networks were restored in Bhuj, Anjar, and Bachau. It was time to head home. The team reunited in Bhuj and was flown by the Indian Air Force to Mumbai.

Another Perspective

National Institute of Amateur Radio (NIAR) member Ram Mohan, VU2MYH, flew into Ahmedabad with his team of operators. Once they were there, arrangements were made to get K. Ravi, VU3RBN, and Ram, along with the Chief Minister's convoy, to Bhuj. Mohan described what he saw from a helicopter as they traveled to Bhuj:

"We could see the horrifying scenes of devastation caused by the earthquake. Some villages were completely razed to ground; destruction was near 90%. We could hardly see any activity in villages or movement of the people. In several areas we spotted deep cracks on the surface. It is very hard to describe nature's fury, which simply wiped these villages off the map."

Mohan wasted no time unpacking and setting up the station. "Anyone on the frequency? This is VU2MYH—

India amateurs worked in teams to supply vital communication links to the rest of the country. (Photo courtesy NIAR)

VU2MYH calling from Bhuj Collectorate." There was a spontaneous reply from Gandhinagar: "VU2MYH, this is VU2LIC from Gandhinagar. What is the first report from Bhuj?"

"VU2MYH, this is VU2NRO. There is severe damage in five *taluks* of Bhuj, Anjar, Bachau, Gandhidham, Rapar. Damage to property and loss of life is expected to be very high. We were looking for report to come in from other areas. We need immediate relief, tents, doctors, medicines. Food and water are immediately required."

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Unsecured office equipment can become a real mess following an earthquake. (Photo courtesy Washington State Emergency Management Agency)

Many more hams from around the country were ready to join the work in Gujarat. Some of them lacked financial resources to travel by air. According to Mohan, Gundu Raja Kartikeya, a student member of NIAR who was already in Ahmedabad at the time of earthquake, joined the NIAR team at Gandhinagar. He was instrumental in working with Swiss rescue teams and saving lives. Karthikeya received laurels for his work from the Swiss and Pakistan ambassadors and was also honored by the Swiss team.

As least 65 amateur radio operators were working in Gujarat. According to Mohan, all of the hams who came to work with the earthquake relief operation showed commitment, dedication, and zeal despite the fact that they were working under extreme weather conditions.

"In the first two days water was hard to find." They ate "whatever was served in the relief camps and some biscuits," he said. "Night temperatures were very low and we had to sleep under open sky without any shelter. Even three or four blankets could not help us fight the cold. Many of us did not have a bath for at least six days until we reached our base camp in Gandhinagar."

Personal Loss

Mohan said every building in Bhuj had developed cracks and was considered unsafe. After the earthquake residents were sleeping outside their houses in fear of tremors. Some of the after- shocks in the days following the earthquake caused a deep-rooted sense of fear in the public and for those who did not directly witness the quake.

"No four-wall structures are considered safe in Bhuj and other areas," Mohan said. "Everyone who saved their life after the quake has a sad story to share. Even the richest of the rich to the poorest of the poor has either lost a family member, a friend or relative, a house or business. There were several stories ringing in the air that some people who were dwelling in rich became paupers with a single shake of the earth under their feet."

The Chief Minister of Gujarat, Mr. Keshubhai Patel, spoke via ham radio to Mr. S.Suri, VU2MY, NIAR founder and Executive Vice-Chairman and Director, on February 7 and complimented the hams' efforts in providing emergency communications. He later wrote a letter to Suri thanking NIAR for "enabling the state government to extend timely and effective relief to the earthquake affected persons by providing essential line of communications through ham radio in the affected areas."

The timely deployment of hams to different villages "helped the state administration to take quick and timely action during the rescue and relief operations. The ham radio network which worked around the clock linking Sachivalaya with the Bhuj, Anjar, Bachau, Rapar, Lilpar Gandhidham, Indian Institute of Management, Civil Hospital, Ahmedabad, Patan Civil Hospital, and also at the Central Relief Commissioner's office, at Krishi Bhavan, New Delhi proved to be very effective and helpful. It would not have been possible to communicate with the above affected places but for the ham radio communications."

Are We Ready?

On the days the ground shook in India and Washington there was no advance notice. No cloud cover. No long-range weather forecast. In India it was a holiday. In Washington, a work day. Are you ready to respond at a moment's notice?

Massachusetts amateurs tested their preparedness to respond to an earthquake last November. "In any type of emergency situation, but especially in an earthquake, we lose telephone land lines, and when they go down, cell-phone traffic increases so you can't get through," Peter Judge, spokesman for the Massachusetts Emergency Management Agency, told the *Providence Journal*. Every year New England gets from three to six earthquakes that can be felt.

Repeater and Structure Survival

Buildings may collapse in earthquakes. One goal of the drill was not to use any repeater that possibly would not be avail-

able during an earthquake due to unsound building construction. Teams and clubs were asked to qualify their repeaters, repeater sites, and emergency operating positions as able to withstand an earthquake, or work around them.

According to information that is supplied on the eastern Massachusetts ARES website (<http://www.emaares.com/QuakeSET2000.html>), structures other than wood-frame, built before 1973 are quite suspect; after 1981 they are expected to survive. It turns out that wood structures tend to withstand earthquakes better. Unfortunately, they have a bad habit of catching fire. Natural-gas lines tend to break during earthquakes, so make sure the wood structure is not near a gas line. Also check to see if the structure is within a dam's flood area.

Repeater racks should be cross-braced with separate cavities for the power source and transmitting or communication electronics. Power supplies and batteries should be at the base of the rack. All materials and components should be 94-0 volts rated for fire resistance with automatic power disconnect in the event of more serious shaking. All covers should be tool accessible or secured with short cables to prevent projectile damage. Use of motion dampers within the rack that secures the electronic equipment is advisable. Also, circuit boards in card-cage or mother-board sockets should be restrained by a restraining strap.

In a seismic-code-compliant reinforced concrete building, the rack should be securely fastened to the wall and floor with concrete anchors capable of withholding three to five times the weight in the rack in both the horizontal and vertical direction during a 6.0 earthquake (this requires calculations for mass inertia of load with induced energy). If the building is not reinforced concrete meeting the latest seismic codes or is a wood structure, the anchors should penetrate both the walls and floor with metal back plates to prevent the anchors from ripping out.

That's certainly a lot to think about when you consider how much we rely on repeaters for emergency communications. It's something you may want to check out before severe weather strikes.

As always, amateurs have once again proven that they are always ready to serve whenever the need arises. Do you have a story to tell of your group serving in the public interest? Drop us a line. Until next time...

73, Bob, WA3PZO

Digital Wireless

BY STEVE STROH, N8GNJ

Packet Radio and Beyond

Seattle Earthquake Shakes Things Up

The most recent earthquake in the Pacific Northwest struck at approximately 10:55 AM Pacific time on Wednesday, February 28th. Being a resident of the area, it brought home to me not only the need for communications in an emergency, but also for prompt, accurate information. Area hams responded promptly, but weren't always accurate in their understanding of the communications infrastructure of which they are a part. I'd like to use this month's column to explain some of the lesser-known details of accessing the internet, especially during an emergency.

I'm not part of any organized emergency communications group, and as such, did not participate nor monitor much of the emergency communications that occurred during the quake. I do, however, have some general observations that I think readers will find instructive and illuminating.

Misleading News Coverage

One surprising observation (to me) was that generally, damage was amazingly light, but watching local and national television news coverage, you didn't have any idea that the vast majority of the buildings and people were hardly affected at all. Instead, the television coverage focused on the areas that *were damaged*, and they continued this focus for hours after the quake. There was very little mention that "overall, things are pretty good."

Watching television coverage exclusively gave a badly distorted view of what exactly was happening. One friend remarked that he saw the television coverage and basically felt as if the entire city had been severely damaged. Being a former resident of the Seattle area, he remembered that there is an extensive network of "traffic cams" set up by the Washington Department of Transportation for monitoring traffic flows and that the images from these cameras are accessible on the web. Thus, he found the relevant page and was amazed that, according to the views from these cameras, everything looked pretty much okay.

Of course, the usual "congestion in an emergency syndrome" caused the phone network, both landline and cellular/PCS, to be largely unavailable for hours after the quake.

Of interest, and especially instructive for emergency communications, is that internet communications were not noticeably affected by the quake nor by the intensive use afterwards as residents sought to reassure loved ones outside the area that they were okay, and worried relatives and friends in the rest of the country and world tried to contact those in the quake area. Packet-based networks such as the internet have specific mechanisms to handle congestion, and degrade gracefully. A friend passed along a surprising statement from an amateur radio emergency communicator: "...during an emergency we don't use the internet because doing so ties up even more phone lines." Oops...bad information on that communicator's part, because there are numerous ways to access the Internet without "tying up a phone line."

As an example, an internet user with a Digital Subscriber Line (DSL) does not use any of the "voice" facilities in a central office. When the copper pair used for DSL comes into the Central Office, it's immediately routed over to a Digital Subscriber Line Access Multiplexer (DSLAM). There is also a type of DSL that "piggybacks" the DSL signal onto a phone line that's simultaneously carrying voice, and again, the DSL data and voice signals are separate, and the use of DSL has no impact on the congestion of the voice network.

Assuming that you could get onto the internet, which was the case with me, it was easy to fire off e-mail to worried relatives. One very popular way to connect with people proved to be Instant Messaging, such as Yahoo! Chat, AOL Instant Messenger, ICQ, etc. From all accounts, use of IM spiked significantly in the hours after the quake, as long distance circuits, both inbound and outbound, were still jammed. I was told several times that those using Voice Over Internet (VOI) systems were able to bypass the congestion in the conventional phone network and able to "dial out" with few problems.

Another popular way to access the internet in the Seattle area is Metricom's Ricochet network, whose infrastructure largely consists of small "mesh network" nodes positioned on street lights. Although Ricochet nodes are not "hardened," for example not having backup power, the Ricochet Wired Access Points (WAP), where the wireless network transitions to the wired network, does have backup power, and if users are within range of a WAP, they're able to use their Ricochet modems with their laptops, again without tying up telephone lines.

Another surprising story told to me was that a fellow ham was out of his office traveling on the day of the quake. In the minutes immediately after the quake, he tried using his cellular phone to connect to his corporate network to send some e-mail, and to his delight, he was able to connect. He was using a relatively new method to do so—using his phone not as a modem, but as an "Internet Protocol node," and his PC connected to it as if it were a network connection rather than dial-up modem. My friend did this "test" a number of times in the hours after the quake, and in each case he was able to connect immediately. Apparently, the "IP mode" that he was using is implemented in such a way that it's not subject to the congestion problems.

Lessons Learned

Nothing "wakes you up" like a near-miss, and I was no exception. Like most families in the Pacific Northwest, our family has an earthquake kit, but we weren't exactly diligent about maintaining it nor about conducting family earthquake drills. That changed.

The most precious commodity in an emergency is information, and probably the most useful way to get it is broadcast radio stations. The "neighbor to neighbor" format that many radio stations used in the hours after the quake was very effective. Of course, radio receivers need power, and batteries are the most common way to power a radio. One of the tenets of earthquake planning is to assume no outside help for 72 hours, and it follows to have enough batteries for 72 hours of listening—or buy a radio that doesn't need batteries. You've probably heard about the Freeplay radios, made in South Africa,

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that have a crank and a tiny generator to power them for 30 minutes or more after a minute or so of cranking. I'll tell you that radio would have been very welcome in this instance if you only had a few batteries and only needed to listen for a short time. More information on the Freeplay radios is available at <http://www.freeplay.net>.

The second most precious commodity in an emergency is water. I was not prepared for this, not having maintained our water supply. Fortunately, there was no loss of water in the Seattle area, as the engineers have done a great job of designing the water system. The Seattle area is particularly vulnerable to water problems, because its primary water supply originates in the Cascade Mountains and comes to Seattle through a single, long pipeline. One source of good, sturdy, and inexpensive potable water containers is boating supply stores, and I stocked up (after the fact).

I haven't yet invested in a generator, but since I now make my living by writing, I previously had invested in a large Uninterruptible Power Supply (UPS) that powers my main writing computer, monitor, ink-jet printer, and peripherals. The UPS was able to carry the entire load for several hours (I bought the biggest UPS I could reasonably afford.) and consider that money well spent. The big UPS "loafed along," supporting my system at a small percentage of its capacity. Had I bought a smaller UPS, it would have been working much harder to support my load.

I found a great compromise between being able to power small appliances such as a TV, and not having the expense and maintenance headache of a generator in an integrated battery/inverter system called xPower that I found at a boating supply store. It's a handheld unit containing a 21 amp/hour battery and an integral 300 watt inverter. The xPower 300 has a number of accessories such as jump-start cables and a fluorescent light and can be recharged from a vehicle or AC. I found out later that there's a larger version, called the xPower 600, which uses a 40 amp/hour battery and a 600 watt inverter. Mercifully, it comes with wheels and a small cart! More information on the xPower appliances can be found on the manufacturer's web page: <http://www.statpower.com>.

Web Pages of The Month

<www.freeplay.net>: As techies, we're "ingrained" to thinking of electrical power in terms of batteries, wall current, generators, and even solar power. It would never had occurred to me to try to harness a wind-up mechanism to generate just enough electricity to power a radio. However, the Freeplay hand-cranked radios are a true revolution in lesser-developed countries, and are yet another shining example that sometimes the simplest ideas are the most powerful.

<www.ccrane.com>: The C. Crane company is a really interesting place to check out. In addition to the Freeplay radios mentioned above, they carry an interesting mix of scientific and technical items, some of which I've never seen elsewhere.

<www.statpower.com>: The xPower products mentioned are only one part of Statpower's product line, which includes *really* big inverters through their other corporate divisions.

As always, comments and questions on these and other topics are welcomed.

73, Steve, N8GNJ

Amateur Satellites

BY PHILIP CHIEN, KC4YER

Ham Radio in Space

Space Station Update and "P3D Lite"

As we go to press, the members of the second space station crew have moved in to their new home in space. The Expedition 1 crew of Bill Shepherd, KD5GSL; Sergei Krikalev, U5MIR; and Yuri Gidzenko is returning home after a highly successful 140 days in space. On the ham radio front, though, the mission was a mixed performance.

It must always be remembered that the Expedition 1 crew was sent into space to build a space station; they were not sent on a long-duration DX-pedition. They did a fantastic job of installing new components, fixing systems, and assisting in the overall construction of space station Alpha. Commander Bill Shepherd did use the ham rig several times for school contacts and on many passes over Houston, Texas to talk to his family, friends, and colleagues. However, random contacts with hams around the world were incredibly rare, to the disappointment of the thousands of hams who worked on the project and contributed the funds and time that made it possible for the ham rig to be there. Before the mission Sergei Krikalev had indicated that he was interested in re-establishing contact with hams he had gotten to know during his long-duration Mir missions a decade earlier, so it was extremely surprising not to hear him on the radio.

Official ISS Expedition 2 Crew Preflight Photo. Mission commander Cosmonaut Yury V. Usachev, UA9AD/R3MIR (center), is flanked by astronauts James S. Voss (no amateur callsign) and Susan J. Helms,. KC7NHZ. The crew began its stay aboard Space Station Alpha in March. (NASA photo)

There *Was* Some Free Time

Contrary to popular myth, the space station astronauts were not worked every single day. Weekend days normally were reserved for the crew members to do whatever they wanted to do, and among other activities, they watched movies, read books, and just spent time looking out of the window. It therefore is surprising that virtually none of their time was spent using the ham rig. Certainly one of the factors contributing to the lack of ham activities had to be the location of the rig in the Russian FGB (Functional Cargo Block, from its Russian initials) module. The FGB doesn't have any windows, and looking at the Earth is high on the list of leisure-time activities for most space travelers.

Crew work-load issues and personal preferences aside, the ARISS hardware could have been used in an automated packet mode where it just would digipeat packets. If nothing else, at least hams could use the space station to DX their callsigns and earn QSOs. The packet rig needed a computer for setup but could operate on its own after that. Automated packet operations had been anticipated in early January but never started. The ARISS hardware team believes that the off-the-shelf lithium battery used to store the packet TNC's parameters has shorted, erasing the settings for the automatic packet mode. However, the battery is only required to store the parameters when power is removed. Requests were made for an astronaut to temporarily hook up one of the laptop computers to the packet module to reset the parameters, but for some reason that never happened.

Thus, overall, Expedition 1 was a disappointment to much of the amateur radio community, including many of the volunteers who helped make it possible for ham radio to be aboard the space station.

The new crew consists of Russian commander Yury Usachev, UA9AD/R3MIR, and American astronauts Susan Helms, KC7NHZ, and Jim Voss. They've been in training together for several years and have formed very close bonds. When the three flew on a short trip to the space station last year, they were literally their own crew within the larger STS-101 crew.

Commander Yury Usachev used ham radio from space on his two long-duration flights aboard Mir as a flight engineer. His second flight on Mir included four months with American astronaut Shannon Lucid. His English is quite good, although he occasionally needs help with a difficult word. Usachev said, "We use any possibility to contact everybody, school and family and friends. For long-duration flight it's very important to have more contact, more than just three voices on orbit."

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Astronaut Jim Voss, a veteran of four shuttle missions, has not used ham radio on any of his previous spaceflights. He said, "I do plan to do some school contacts. I have some friends who work with schools who want to set those up and are doing that. And I expect to talk to friends and families occasionally using the ham radio as well."

Astronaut Susan Helms, KC7NHZ, has flown on four previous shuttle flights, including two on which she used the SAREX ham radio rig. She said, "When I flew on STS-64 I did a lot of QSOs up there with Dick Richards' help, and that was a lot of fun. You never knew what somebody was going to say; it was like having a conversation with someone you never met but you're still communicating about space. So it was really neat. I'll probably do some QSOs while I'm on station. I know that's not part of the [flight] plan, but all I have to do is turn the radio on if we're over land and start to talk and I'm certain somebody will answer."

For STS-64, Helms used commander Dick Richards, KB5SIW, as her control operator. Once hams on the ground heard a female voice coming from the shuttle, she quickly became the most popular person on orbit, and her fellow crewmates kidded her about getting 50 boyfriends from that mission. Helms enjoyed using the ham radio enough to get her own license before she flew on the STS-78 SAREX mission.

The Job Ahead

In many ways, the Expedition 2 crew has a more challenging job than the Expedition 1 crew. Expedition 2 has a wider variety of tasks to accomplish. The space station's robot arm, which will be used for many later assembly tasks, will arrive in April. The first spacewalk from the station, using Russian spacesuits, is scheduled. The first major science experiments will be performed.

Partially in response to the heavy workloads on the first Expedition, crew managers are using a different crew scheduling technique, called a "task jar." Mission control will send up a list of tasks for the crew to accomplish, and the crew will decide for themselves when to do each task and check it off their list. The exception will be tasks that have to be performed at a certain time (for example, ham radio school contacts have to be timed for when the station flies over the ground station) or in concert with the ground controllers. The disadvantage of this approach is that most astronauts are rather gung-ho about trying to do as much work as possible and may actually work longer hours to try to complete everything in the task jar.

There's practically no way Expedition 2 could make fewer QSOs with the general ham community than Expedition 1. How much activity there is will depend on the mood of the crew members and what time they have available. Hopefully, by the time you read this article there will be reports of the Expedition 2 crew actually talking to hams on a regular basis. (Watch the *CQ* website news page for up-to-date reports.)

AMSAT Looks Ahead

In other news, the AMSAT Board of Directors met in Orlando, Florida to discuss future projects, since AO-40 has been completed. However, the satellite they selected only addresses the desires of those who already have sophisticated OSCAR-class stations—not new hams interested in getting involved in satellite operations or ones with less sophisticated setups. Richard W. L. Limebear, G3RWL, a board member for AMSAT-UK (which wasn't invited to the

meeting), noted, "And a vote *against* 'beginners' satellites. A sad day; no more recruits—downhill from here onwards."

It's also important to note that AO-40 was far over its anticipated budget and is still in the red and those bills need to be paid. Whether or not now is the time to discuss another extremely costly project is questionable.

The first project approved by the board is a Phase 3-class satellite with VHF, UHF, and microwave capabilities. The specs call for a 100 kg spin-stabilized spacecraft generating about 100 watts in a geosynchronous transfer orbit (GTO). It could almost be called "Phase 3-D lite." The GTO is an extremely popular orbit used to launch almost all commercial communication satellites, so there are plenty of opportunities to hitch rides. By remaining in GTO, there is no need for an additional rocket engine, reducing the cost and complexity of the satellite and eliminating many potential failure points. The disadvantage is that it isn't an optimum orbit. A GTO has an inclination which is a function of the launch site. Geostationary comsats want as little inclination as possible, but launch-vehicle constraints can result in anywhere from 5 to 28 degrees inclination. For a GTO ham radio satellite to reach as much of the world as possible, it's desirable to have a higher inclination, which typically would mean a launch on a U.S. or Chinese launch vehicle. All previous Phase 3 satellites have launched on Ariane vehicles from the European Space Agency's near-the-equator launch site in South America, which results in a fairly low inclination.

The second and third projects approved by the board improve technology. The Integrated Housekeeping Unit (IHU) computer on AO-40 is based on the 1970s-era 8-bit RCA 1802 microprocessor. While extremely reliable and radiation resistant, it isn't very powerful. Many satellites now use radiation hardened versions of the 386 and 486 microprocessor, and some smaller satellites use off-the-shelf consumer (non-radiation hardened) processors.

The final project is to develop a new mode using digital modulation techniques, another change far overdue. AO-40 is wonderful for backwards compatibility—2 meters SSB with a 400 bps PSK beacon. However, with extremely sophisticated and inexpensive digital encoding techniques in cellular phones and other consumer electronics devices, hams need to catch up with technology. A more robust forward error correction scheme for AO-40's beacon would have resulted in far more telemetry data being decoded successfully than the present setup.

A postscript: This author has volunteered on many satellite projects, including some of the ones mentioned in this column. No proprietary information obtained while working as a team member has ever appeared or will ever appear in any of these columns. However, this author is also dedicated to telling the truth—however rotten it may be. My loyalty will always be first to my integrity and the honesty of my work. If I come across information which is important for you, the reader, to know, I will inform you—no matter whose feelings may be hurt. If the truth hurts, then so be it. I am not a "puppet" or "P.R. flak" working for the AMSAT Board of Directors or any other organization. This all should be obvious, but unfortunately it isn't to some.

73, Phil, KC4YER

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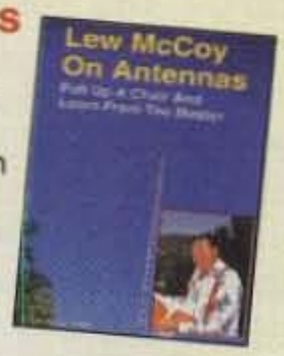

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World Of Ideas

BY DAVE INGRAM, K4TWJ

A Look At The World Around Us

Mobiling—and Much More!

If last month's column piqued your interest in first-class mobiling and high-style hamming, check out our featured views this time. As promised, a captivating array of new goodies you can enjoy both in the car and in the home or portable station are lined up to share with you. Yes, and they are all real gems with affordable price tags! Stick with us, friends, and we will get you sounding great and having more fun on the air than ever before! We have some exciting ground to cover, so take a quick look at the photos (which probably caught your attention faster than our opening words), and let's get rolling!

New Multi-Purpose Antenna Tuner/Coupler

Recently emerging from SGC's ham headquarters in Bellevue, Washington is a new automatic-tuning antenna coupler with high appeal to mobileers, RVers, boating enthusiasts, and amateurs with all interests—the SG-237 (photo A).

This little gem matches vertical whips and wire antennas of various types and sizes to almost any HF transceiver, and as shown in fig. 1, hookup is a two-cable cinch. You just connect it at the feedpoint of your antenna and supply 12 volts DC at 300 ma to the unit, and it handles resonating and impedance matching in a totally hands-free manner. When you shift frequency ranges or bands, the coupler automatically senses the resultant change in impedance and SWR. The next time you transmit even a 2 watt signal, the SG-237 retunes in less than a second. In other words, you just dial up a desired frequency and start transmitting, and the coupler automatically follows your lead. Cool!

An extra wire included in the SG-237's DC power cable can be connected to an optional monitor LED installed near your transceiver, if desired. The LED will blink when the coupler is tuning and stays illuminated when it has achieved a good match/low SWR and is ready for operation. A second extra wire is also included in the DC cable. It connects to an optional "hold your setting" or "tune at will" switch. The switch may not be necessary in a fixed-station setup where SWR usually remains steady after tuning, but it is quite beneficial when mobiling in traffic or amidst 18-wheelers.

The SG-237 coupler covers or tunes from 1.8 to 60 MHz and is rated to handle 100 watts SSB or 40 watts CW. Its most familiar application is tuning a plain, thin 7 or 9 foot stainless steel whip for operation on 160 through 6 meters, but its additional capabilities are equally attractive. When mounted at a feed point, it will tune dipoles and loops from 2 to 10 feet in diameter plus random wires 23 feet and longer.

Are those creative ideas flowing yet, gang? The coupler can be used with your own non-resonant whip (or SGC's mating whip) for all-band mobiling or boating, plus you can adapt it to work with some experimental antennas when you are stopped or operating from home. I have been trying to pursue that idea, but as of writing this column, harsh winter weather has hampered my outdoor plans.

Some of my "anxious to try and destined to be a winner" ideas are shown in fig. 2. Maybe you would like to try one of them. The full-wave Zepp in particular promises to be a killer. If the coupler is mounted right outside a shack's window and each 1/2-wave wire just droops down to it "rabbit-ears fashion," the thing should be easy to install and yet exhibit fair gain. Insulated wires for each half of the antenna could also be hidden under house eaves or laid flat on the roof to produce an "invisible" antenna for restricted areas. As an alternative, the cou-

Photo A– This new SG-237 automatic tuning antenna coupler from SGC lets you operate 160 through 6 meters in a quite effective and hands-free manner. The little unit measures only 1.8"H × 7"W × 9"D and works with a 7 or 9 foot whip for mobiling, or with numerous wire antennas for home use.

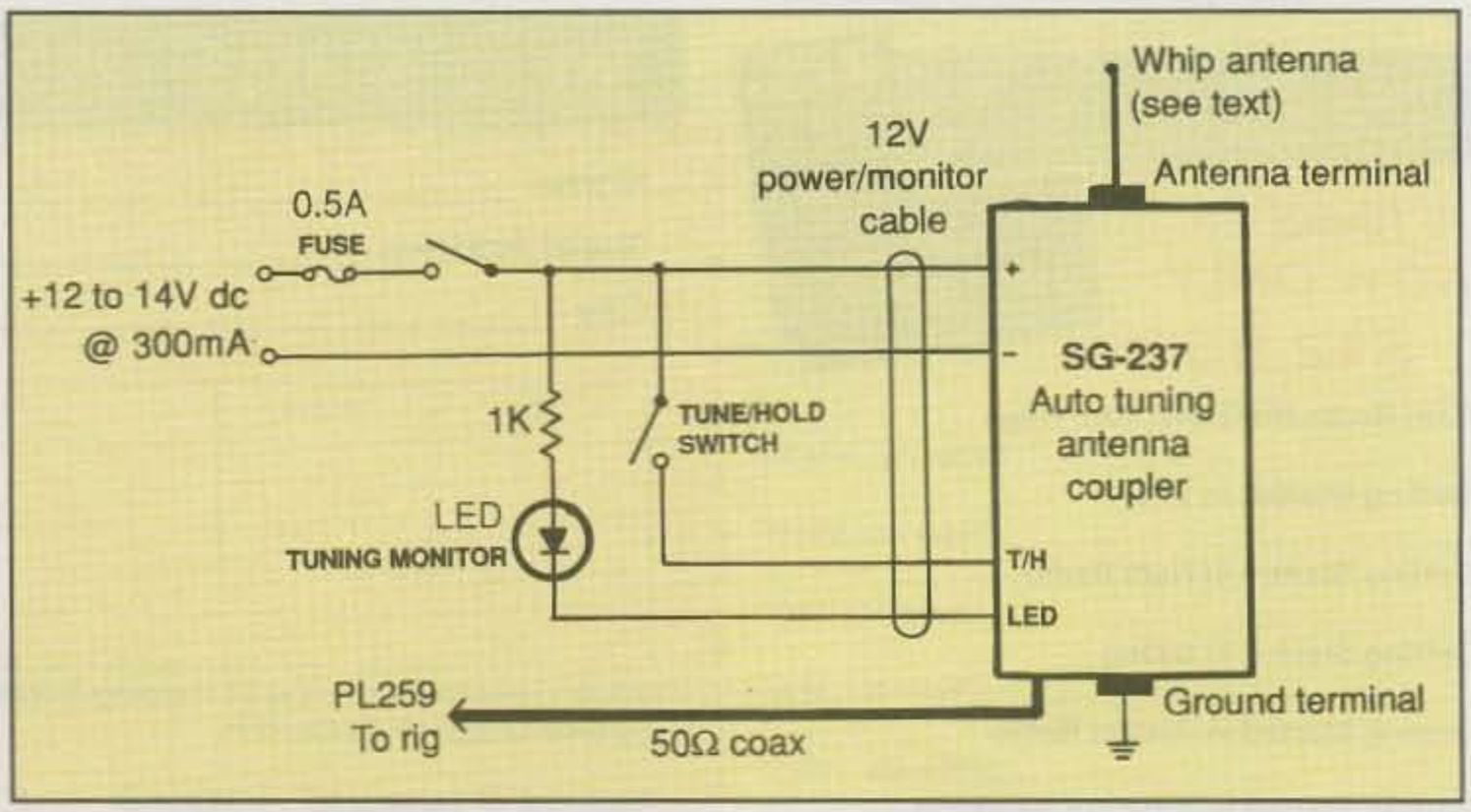

Fig. 1– Outline of wiring interconnections for the SG-237 automatic antenna coupler. Hookup is simplified to two cables and the coupler works with almost any HF transceiver.

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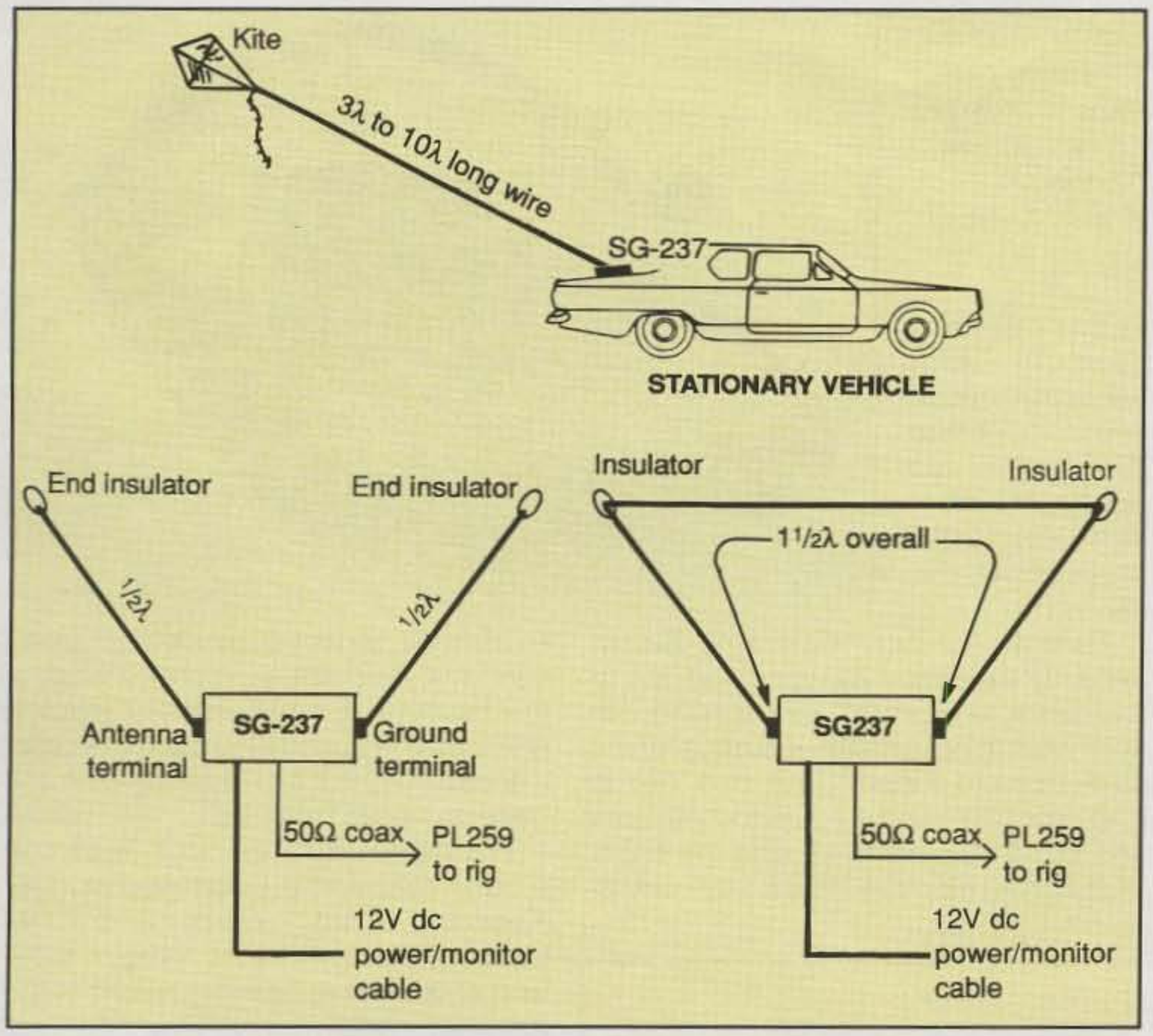


Fig. 2– As shown by this trio of experimental skywires, the SG-237 automatic-tuning antenna coupler also does a good job of tuning/coupling various wire antennas for both home and portable operation.

pler could be mated with a small home-brewed loop antenna in the attic or a large gain-type loop outdoors. It self-configures its tuning circuit to match high or low feedpoint impedances.

Some folks may be asking what the difference is between an antenna coupler and an antenna tuner, so here is a quick and simple explanation. Circuit-wise, they are quite similar. Application-wise, a tuner usually connects at a transceiver's output, whereas a coupler usually connects at an antenna's base. The SG-237 (and other SGC couplers) consist of a Pi-net-type L/C circuit with selection of coil and capacitor values determined by a microprocessor evaluating impedance and SWR-sensed values—simple yet effective.

Although the SG-237 is a new addition to SGC's fine product line, it is only one of several auto-tuning couplers and antenna systems for first-class mobiling, and it can also be tailored to fit individual needs. If you prefer building the SG-237 into your homebrewed stealth antenna's base or into a backpack for camping, for example, it is available in PC-board-only form. The board-only idea could also produce a no-fumbles multiband bicycle mobile setup beyond compare. Just dial a frequency and transmit. Neat!

SGC also produces 150 watt, 200 watt, and 500 watt automatic tuning couplers, comparable power-level whips, and "full package" systems that quickly mount to almost any vehicle. One such package is shown in photo B. Here a new SG-237 is retained in a QMS 37 mounting box which supports a 7 foot helically wound SG-307 fiberglass whip. One might assume the box could scratch the BMW's finish, but no; integral industrial-grade suction cups (big dudes!) and high-strength straps secure everything with no problems. Want to set up your own auto-tuning all-band antenna system? Give the folks at SGC a call, tell them what you have in mind, and let them suggest the best items to fit your needs. You can reach SGC at 1-800-259-7331, on the web at <www.sgcworld.com>, or by mail at 13737 S.E. 26th St., P.O. Box 3526, Bellevue, WA 98009. Tell them you read about it in *CQ*.

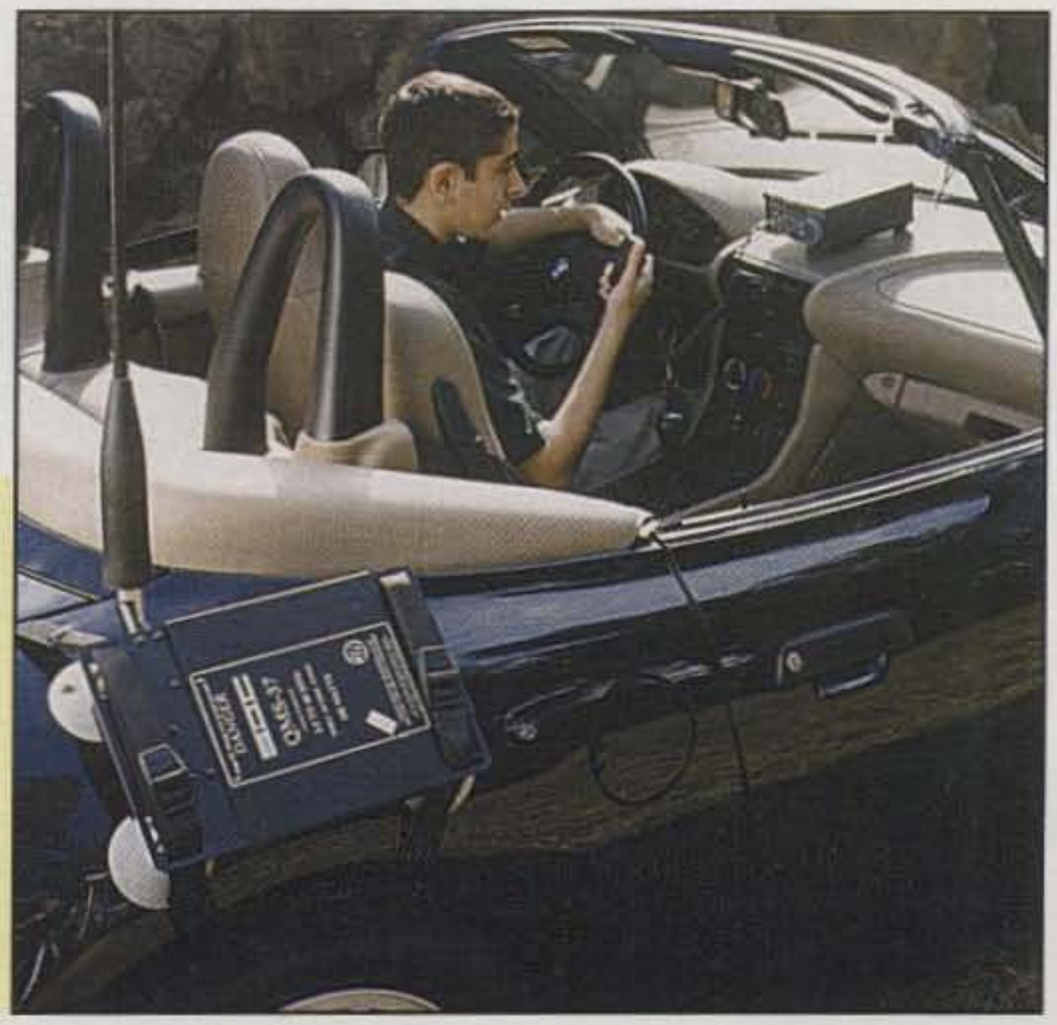


Photo B– As illustrated in this BMW setup, the complete SG-237/QMS-37/SG-307 automatic antenna system can be installed quickly on almost any vehicle without holes, screws, or marring the finish. (Photo courtesy SGC)

Marvelous-Sounding Audio

Want to really go first class on the open road (or any other spot you favor for good-time hamming)? Complement your multiband, auto-tuning setup with one of the new Heil microphones shown in photos C, D, E, or F, and enjoy pumping out one of the best-sounding signals on the air. What is so special about Heil microphones, you ask? First and foremost is the custom-tailored frequency response of their internal element or cartridge—the little device that converts sounds into tiny voltage equivalents for your transceiver to process. Next are their cases, which are both rugged and stylish. Finally, they have pre-assembled cables that make them plug-in compatible with various models and brands of transceivers.

Probably the best-known Heil cartridge is the HC-4 "DX element," which exhibits a crisp, highly articulate audio response of 600 to 2800 Hz that cuts through QRM like crazy. Next is the more mellow-sounding HC-5 element, which has an audio response of 300 to 4000 Hz for rich, full-bodied audio that

Photo C– Heil Sound's new HMM dual-function hand mic features a crisp, clean-sounding HC-4 DX element plus a full-bodied HC-5 element to produce the most impressive mobile signal on the air. Mic sports a rear switch for element selection, a noise-canceling port, and may be ordered with a pre-installed plug to fit a Kenwood, Yaesu, ICOM, or Alinco transceiver.

is ideal for casual QSOs. A third element called the "Goldline" (which is only available as a complete "Goldline" mic) was also included in the Heil Sound collection a year ago. The Goldline has an audio response of 50 to 16,000 Hz and produces studio-grade audio that sounds absolutely terrific on SSB, FM, or even AM. This microphone (which looks like the HM-I, shown in photo E) is particularly attractive when used with a transmit DSP-equipped transceiver, as your transmitted signal can be adjusted to produce million-dollar-sounding audio. A special high-impedance version Goldline, incidentally, is also available for classic vacuum-tube transceivers *(see the complete review of the Goldline GM-V by Joe Veras, N4QB, in the May 2000 issue of CQ on p. 52—ed.)*.

Here is the big news: Heil Sound recently expanded its esteemed line to include a new "HMM" model hand mic for mobiling or portable operating, and it is a blowout winner! The new mic is shown in photo C. It is equipped with both the HC-4 "DX element" and the HC-5 "full-bodied element" plus a rear-mounted slide switch for instant element selection to fit your operating preferences of the moment. A small noise- canceling grill is also included atop the mic's case; it does a superb job of reducing wind and general mobile "rumble."

The new Heil hand mic is fitted with a curly cord and pre-installed plug for Kenwood, Alinco, Yaesu, and ICOM transceivers for instant "plug 'n play" operation. I have been using one of the new Heil hand mics with my little Kenwood TS-50 (and with XYL WB4OEE's TS-570), and I must say it sounds fantastic! The full-range HC-5 element produces the atmosphere of a rolling broadcast studio, and the HC-4 element projects what I would call a bright gospel-type sound that blows you away with its glamour (just don't expect this kind of super audio quality from a mobile station).

Another new Heil item owners of the popular ICOM IC-706 mobile transceiver will like is the HS-706 single headset with adjustable boom mic (photo D). This gem is fitted with a high- gain, highly articulate mic element designed expressly for the IC-706, and it opens a completely new dimension in great-sounding audio for the little rig. To my ears, it changes the IC-706 from "wallflower" to Wow!" You say wearing a single earphone while driving is unsafe or illegal in your area? No problem. Just slip the headband down around your shirt collar and let it support the boom mic like a chest mount, clip the in-line

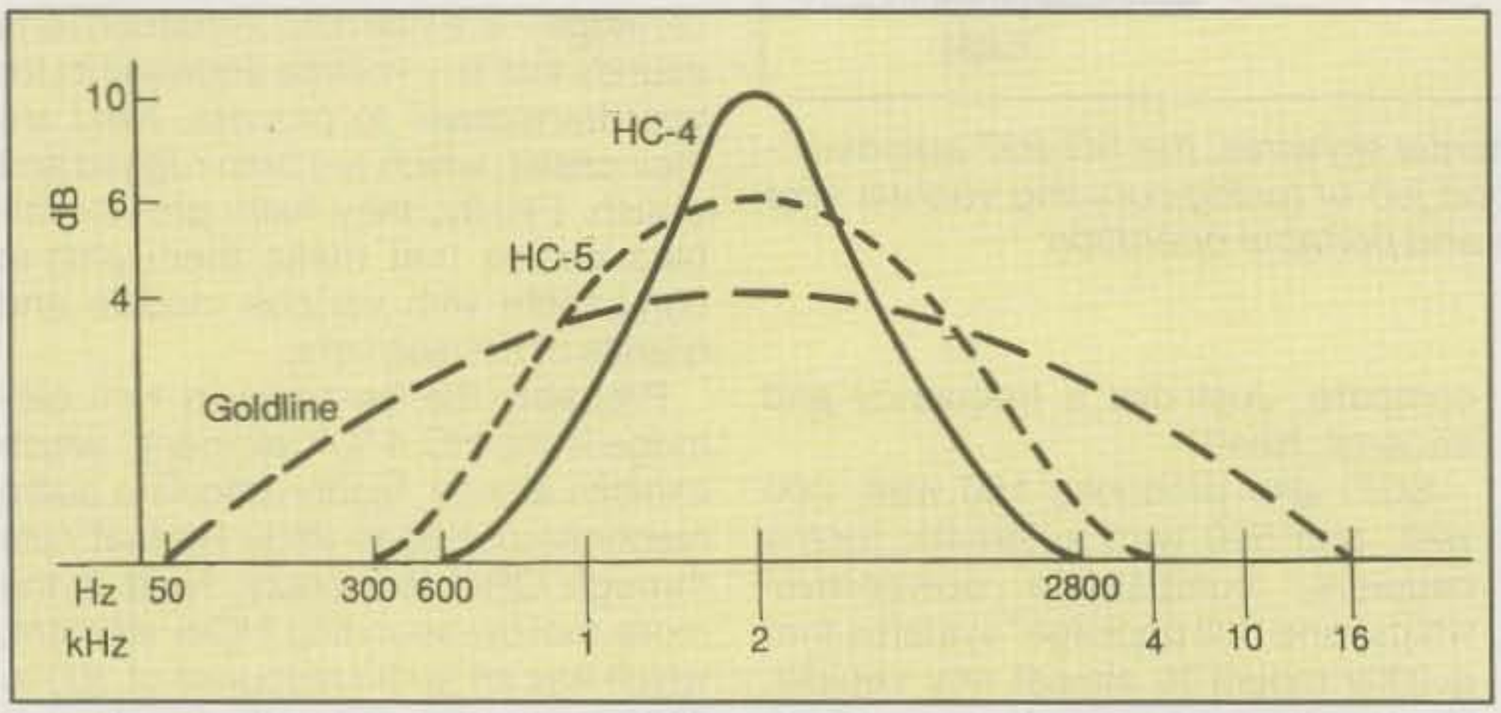
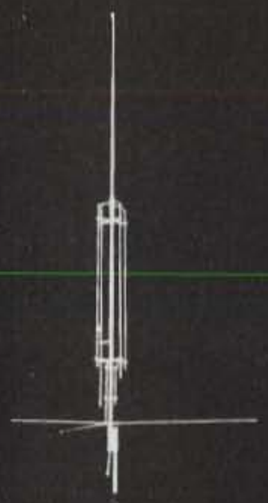


Fig. 3– Comparison of Heil Sound's HC-4, HC-5, and Goldline microphone elements. (Discussion in text)

Photo D– Another new item from Heil Sound is this neat HS-706 headset with boom mic. It is made exclusively for the ICOM IC-706, has a new electret condenser element designed expressly for the IC-706, and really improves the transmitted audio from this popular mobile rig.

GAP: The Perfect Antenna

We at GAP realize there isn't a perfect antenna. No singular antenna will scream DX on 80 and be the best for local nets on 10. If anyone tells you there is, beware! The perfect antenna does not exist, but the right one for you may. If you want something to bust the pile on the low bands, then consider the Voyager. Just starting out in ham radio and need a great general coverage antenna, the Challenger is easy to assemble and for little effort will yield superior performance, especially on DX. Maybe you knowingly or unknowingly moved into one of those "restricted areas" where the Eagle's limited visibility, but unlimited ability is desired.



Eagle DX

Challenger DX

Voyager DX

This chart helps you select the right GAP antenna. When comparing GAPs, bandwidth is not a concern. With few exceptions, a GAP yields continuous coverage under 2:1 for the **ENTIRE BAND**.

All antennas utilize a GAP elevated asymmetric feed. A major benefit is the virtual elimination of the earth loss, so more RF radiates into the air instead of the ground. This feed is why a GAP requires **NO RADIALS**. Just as elevating a GAP offers no significant improvement to its performance, adding radials won't either, making set up a breeze.

A GAP antenna has no traps, coils or transformers. This is important. The greatest sources of failure in multiband antennas are these devices. Perhaps you heard someone discuss a trap that had melted, arced or became full of water. Improvements to these inherent problems are the focus of the antenna manufacturer, while the basic design of the antenna remains unchanged. **GAP improved the trap by eliminating it!** Removing these devices means they don't have to be tuned and, more importantly, won't be detuned by the first ice or rain. The absence of these devices improves antenna reliability, stability and increases bandwidth.

Another major advantage to a GAP antenna is its NO tune feature. Screws are simply inserted into predrilled holes with a supplied nutdriver.

The secret is out and people in the know say:

CQ–"The GAP consistently outperformed base-fed antennas. ..and was quieter."

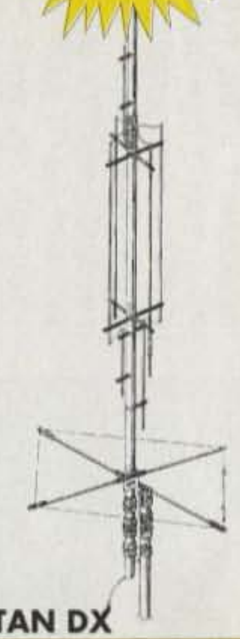
73–"This is a real DX antenna, much quieter than other verticals."

RF–"To say this antenna is effective would be a real understatement. Switching back and forth on 40m between another multiband HF vertical and the GAP, there was no comparison. Signals were always stronger on the GAP, sometimes by S units, not just DB's."

Worldradio – "These guys have solved the problem associated with verticals. That is, an awful lot of RF is wallowing around and dropping into the dirt instead of going outward bound. A half-wave vertical does need radials if it is end fed (at the bottom). But the same half-wave vertical does not (as much, hardly at all) if is fed in the center."

IEEE–"Near field and power density analyses show another advantage of this antenna (asymmetric vertical dipole): it decreases the power density close to the ground, and so avoids power dissipation in the soil below it. The input impedance is very stable and almost independent of ground conductivity. This antenna can operate with high radiation efficiency in the MF AM standard broadcast band, without the classical buried ground plane, so as to yield easier installation and maintenance."

Since 1989



TITAN DX

This all purpose antenna is designed to operate 10m-80m, WARC bands included. It sits on a 1-1/4" pipe and can be mounted close to the ground or up on a roof. Its bandwidth and no tune feature make it an ideal antenna for the limited space environment as well as a terrific addition to the antenna farm.

MODEL	BANDS OF OPERATION											HT	WT	MOUNT	COUNTER-POISE	COST
	2m	6m	10m	12m	15m	17m	20m	30m	40m	80m	160m					
Challenger DX	■	■	■	■	■		■		■	■		31.5'	21 lbs	Drop In Ground Mount	3 Wires @ 25'	$299
Eagle DX			■	■	■	■	■		■			21.5'	19 lbs	1-1/4" pipe	80" Rigid	$309
Titan DX			■	■	■	■	■	■	■	■		25'	25 lbs	1-1/4" pipe	80" Rigid	$339
Voyager DX							■		■	■	■	45'	39 lbs	Hinged Base	3 Wires @ 57'	$419

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Photo E– This new HM-I Heil mic is made exclusively for older model ICOMs. It contains a special highly articulate condenser element plus a built-in wide/narrow-range equalizer and sounds great!

PTT switch to your shirt, and roll out in style.

Although more of a home microphone than a mobile mic, Heil Sound's new HM-i (photo E) also warrants brief mention at this point. This mic sports a brand-new studio-grade electret condenser element designed only for ICOM rigs with 8-pin mic sockets. The new HM-i has a built-in wide-narrow audio response equalizer (plus a great- feeling PTT switch), and the improved sound quality compared to a stock/supplied ICOM hand mic is amazing.

Finally, Heil's famous BM-10 headset with adjustable boom mic, which top contesters and DXers used for great-sounding audio and hands-free operation during the 1980s, is back in production (photo F). It is available with the HC-4 DX element, the HC-5 full-bodied element, or the new ICOM HM-I element, plus it too can be worn around the neck as a chest-mount mic. The BM-10's cable system has also been updated with plug-in adapters that let you choose and swap the headset among Kenwood, Alinco, Yaesu, and Ten-Tec transceivers in the field. The BM-10 shown with a new modular adapter in photo F is configured for operation with Yaesu's new FT-817 backpack mini-rig *(see last's month's CQ for a complete review of the FT-817—ed.).*

You can get more information and order Heil mics and accessories right from Bob and his crew at Heil Sound, 5800 North Illinois, Fairview Heights, IL 62208, telephone 618-257-3000, or on the web at <www.heilsound.com>. If you want to stand above the crowd with beautiful-sounding audio, Bob Heil is the person who can make it happen!

Conclusion

Our news and views on mobiling 2001 could continue several more pages, but once again it is time to sign off for another month. Thanks to everyone for riding along with us, and for all the kind words and comments passed along during our on-the-air QSOs. Keep on hamming, listen for me around 14.200 to 14.228 MHz Sundays between 2130 and 2230 UTC (listen carefully, as I may be running an FT-817 mobile with SGC tuner and Heil mic), and may the force of good signals be with you!

73, Dave, K4TWJ

Photo F– Also back in the line for 2001 is a re-tooled, updated version of the famous Heil BM-10 boom headset used by contesters and DXers in the 1980s. Unit shown is equipped with adapter for the new Yaesu FT-817 backpack/QRP transceiver and will probably become the year's hottest QRP accessory.

Radio Classics

BY JOE VERAS, N4QB

Vintage Gear and Its History

The National Company

"National was a remarkable company staffed by remarkable people." The words of Vinnie Messina characterize The National Company with an economy of language difficult to improve upon, even if volumes more were written. What's more, it is a sentiment heard paraphrased over and over again when talking to others who worked there. In an old-fashioned way, the people at National *were* the company. National's assets must be extended beyond bricks, mortar, and manufacturing equipment. The people who came to work everyday and played some part in supplying equipment to the amateur, government, and commercial markets need to be included on the balance sheet.

This "Radio Classics" differs from preceding columns in that it is a collaborative effort. Although the byline is mine, this column draws heavily upon the friendship, research, and hard work of George Maier, K1GXT. George has delved into and written about National's history. He has also lovingly restored some of the company's ham products and added them to his boatanchor collection. Most important of all, for the past decade George has attended an annual gathering of former National employees, talking face-to-face with many of the people who made things happen there.

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This past October another such gathering was held at a steakhouse in Saugus, Massachusetts. George was kind enough to extend an invitation to your columnist, an invitation that left me glowing with anticipation weeks before the luncheon date arrived. I certainly didn't come away from the experience disappointed.

In conversations around the table that day, and in interviews conducted since, I discovered a workplace camaraderie uncommon in general experience. I'm not talking about having lunch with a couple of guys from the office, or maybe going out for a beer after work, or doing something on the weekend. I discovered relationships formed at National lasting years beyond the retirement or employment change of those involved. They continue to endure decades after the company itself passed from existence. Many of the relationships have matured beyond mere acquaintance to become caring friendships. It is comment enough that The National Company of days gone by seems so out of step with the modern-day workplace.

Even the history of the annual alumni gathering has deep roots. In the mid-1930s, it began as an in-house Christmas party. In the interest of . . . oh, let's say ensuring all the HROs that left the factory at the time would be in correct alignment . . . the party was soon moved off-premises. During the war years, the sensitive nature of the work going on at National made the location less party friendly.

In the post-war years, National was as subject to the changing business climate as any other American company. Addressing these changes inevitably resulted in many employees moving on to other, if not greener, pastures. For many old-timers, National was not the same company it had been, but the person-to-person camaraderie remained in the face of job and geographical changes. In this way, National's annual gathering evolved into a meeting of alumni, as well as current employees.

The party of 1953 must have been a good one. By universal acclaim, Vinnie Messina was appointed to organize the 1954 event, a duty he has performed each year since. Messina holds the call W1HRW, an alphanumeric sequence that will ring a bell with National historians. James Millen, who was the company's chief engineer and who had such an influence on its pre-war products, was W1HR*X*.

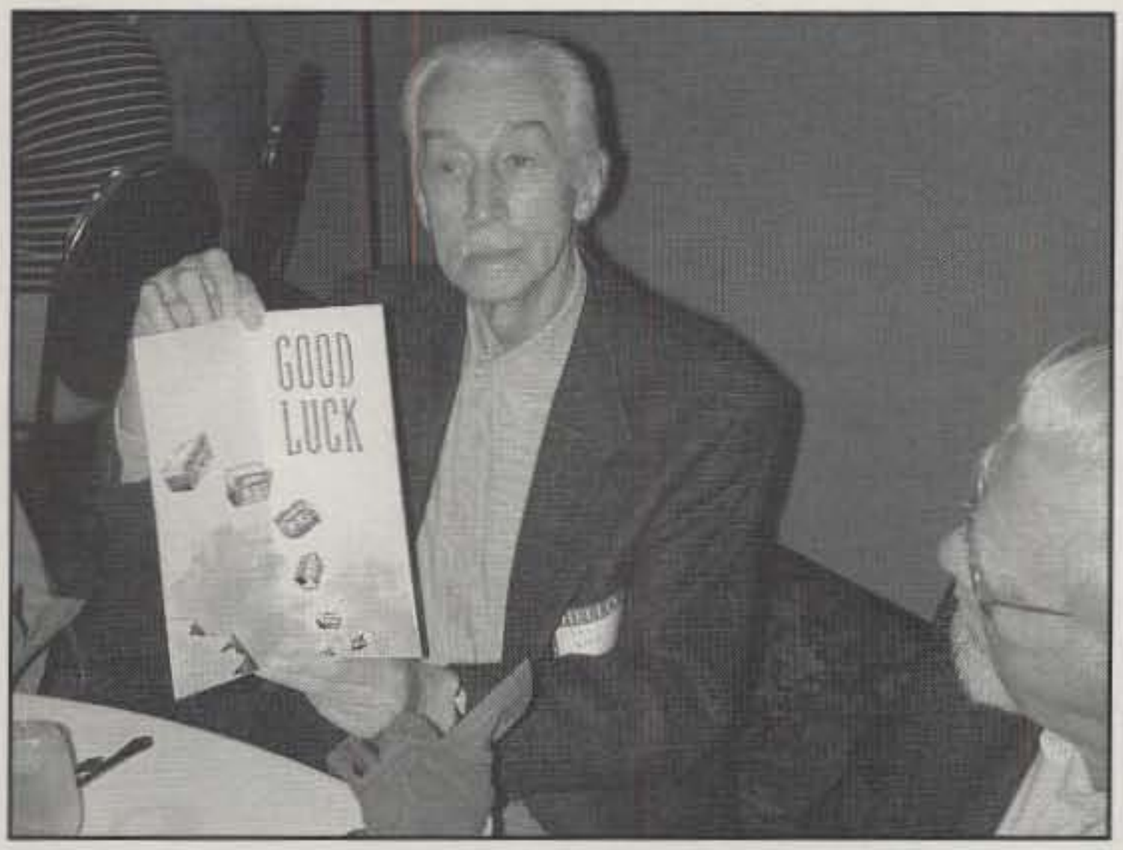
Incidentally, Millen, as a subject, receives scant and occasionally less-than-positive comment at these alumni gatherings. The viewpoints range from

The National Company management gathered for a meeting in Cambridge, Massachusetts on June 8, 1953. (Photo courtesy The National Company/George Maier, K1GXT)

National officers and employees at a banquet held in Malden, Massachusetts on September 14, 1943 to mark the occasion of the company's Army-Navy "E" award. (Photo courtesy The National Company/George Maier, K1GXT)

"He never did much" to "Millen lived off the labor and ideas of others." Factually, James Millen left The National Company in 1939, forming the firm bearing his own name (The James Millen Company) in the process. The things leading to the rift vary according to the source. Millen historians mention behind-the-scenes business machinations involving the desire of those leading The National Company to downplay amateur and commercial gear to concentrate more on the consumer and entertainment markets. There are tales of attempts by National's principals to inflate its value, enhancing their personal gain if the company were sold. Another view of the cause of the rift is that Millen misrepresented his authority at National during a meeting in Washington, D.C., and then paid the price when he returned to his unhappy superiors in Malden.

While George and I were discussing this era in National's history, George put it in perspective, without assigning blame. He pointed out that things we associate with National might



John Walsh, the mechanical designer on the NC-300 project, shows off the card presented to him upon retiring from National. Ed Harrington, W1JEL, the NC-300's electrical designer, edges into the frame at the right. (All photos by Joe Veras, N4QB, unless otherwise noted.)

Max Fuchs, WA1NJG (left), was part of the team that marketed the Vomax multi-band speech processor designed by Walter Schreuer, K1YZW. Tom Potts, W1NRY (right), was project manager for the SR-19, a military HF receiver.

…t in 1940.
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…HRO-600 project with George Maier, K1GXT (right).

…ong-time organizer and keeper-of-the-flame for the annual National get-together.

John Walsh, who designed the mechanical aspect of the NC-300, was seated at my table during the October 2000 gathering. Ed Harrington's presence at the same table made this spot hallowed ground for any boatanchor fan. Although not an amateur himself, Walsh's work has been admired by many in the ham fraternity.

Walter Schreuer was first licensed as G3DCU in his native England and also signed VK2AWU while working in Australia. He has been K1YZW since 1962. Although Walt's tenure at National was a short one in the mid-1960s, he still attends the alumni meetings and has a connection to National and other amateur products. A speech processor he designed was the basis for a unit produced by Comdel, the company owned by former National employee Ted Johnson. Walt's homebrew linear served as the inspiration for National's NCL-2000. Upon seeing the amp in Walt's shack, the company's president, Mike Ferber, W1GKX, decided it would make a good addition to the National product line. Producing the amplifier within the constraints of a competitive marketplace resulted in compromises of which Schreuer is critical. It is a shame that more, and more carefully executed, products didn't find their way to market from the K1YZW shack. I have seen a marvelous SSB transmitter he made, now in use at K1GXT. George says one day it will be joined on the air by its companion homebrew receiver.

Dick Thurston, W1MFZ (left), worked on the AN/FRR receiver. John Walsh (right) was the mechanical designer for the NC-300 receiver.

Max Fuchs, WA1NJG, not only made his mark at National, but also on the product line of another company familiar to hams, Vomax. His duties at National were mainly in the area of military marketing. Max teamed with Walter Schreuer to market a multi-band speech processor that Walt designed. The unit, known as the Vomax, was a popular, effective accessory in the days before transceivers came already equipped with processing.

If any of you are watching TV on the tiny, black-and-white screen of a National television, or listening to music on a National hi-fi, you are familiar with the work of Dick Thurston, W1MFZ. He was involved in those projects in the early 1950s. Thurston's resumé also includes work on the AN/FRR receiver.

Tom Potts, W1NRY, was project manager for the SR-19, a military HF receiver designed to withstand electro-magnetic pulse damage. Used during the H-bomb tests in the Pacific, it could absorb the EMP overload and keep on ticking, or receiving. Don't try that with your FT or TS-Whatever.

Presiding over the creation of the last of National's great HRO line, Wayne Ledder, W1EWL, was project engineer for the HRO-600. Its predecessor, the 500, chalked up a significant number of "firsts," although it was also plagued with a few faults. Wayne, who spent most of his time in the military product group, was in charge of addressing these shortcomings. The result of his effort was a great, although rare, receiver.

If the people I met at last year's National alumni luncheon are any indication, the company indeed was staffed with remarkable people. Those introduced here, and others not mentioned, generously shared their time and personal recollections with me. I owe them a debt of gratitude. Thanks also to my collaborator, George Maier. His invitation gave me a rare glimpse into one of amateur radio's signature companies. Best of all, he bought lunch.

73, Joe, N4QB

Washington Readout

Regulatory News In The World Of Amateur Radio

BY FREDERICK O. MAIA, W5YI

The Federal Communications Commission

How it came into being, what it is, how it operates

Last month we talked about the international aspects of ham radio. This month let's focus on telecommunications regulation in the US.

The Radio Act of 1912, the first law for the domestic control of radio communication, required the Secretary of Commerce to issue licenses when an operation might interfere with those of other stations. It did not, however, authorize frequencies, power levels, hours of operation, or a term length of any license issued.

During the World War I period, the federal government exercised control over wireline and radio communications as a war measure. During the war, governments began using radiotelegraph to keep abreast of events and to direct the movement of troops and supplies. It was not until after the war ended that regular broadcasting began. Pittsburgh's 8XK, an amateur radiotelephone station set up in 1916 by Westinghouse engineer Dr. Frank Conrad, became KDKA, the nation's first commercial broadcast station. It signed on the air on election night, November 2, 1920, and today is the oldest broadcast radio station still in operation.

In 1922 the 360 meter wavelength (about 830 kHz) was assigned by the Department of Commerce for the transmission of "...important news items, entertainment, lectures, sermons, and similar matter." Within three years there were many broadcast stations. All of these stations operated on the same band, interfering with one another and causing bedlam on the air.

The 1920s brought forth a virtual explosion of growth in the broadcasting industry. Most stations were operated by radio manufacturers, dealers, and department stores selling receivers. To be heard, some stations operated outside of their frequency with increased power and operating time. Beginning in 1923, Secretary of Commerce Herbert Hoover (an engineer and later President) convened annual radio conferences in an effort to restore order to broadcasting. In 1926 President Coolidge urged Congress to step in and remedy matters.

The Radio Act of 1927 marked the beginning of modern telecommunications regulation in the United States. It also ended the principle that access to the airwaves was a basic right of every American citizen limited only by the availability of spectrum. The act created a five-member Federal Radio Commission with regulatory powers, including the issuance of station licenses, the allocation of frequency bands to various services, assignment of specified frequencies to individual stations, and control of station power. The act delegated to the Secretary of Commerce authority to inspect radio stations, examine and license radio operators, and assign radio call signals.

The Federal Radio Commission started to function on March 15, 1927. Much of its early activity was devoted to resolving the chaotic problem in the broadcast band. However, the Radio Act of 1927 did not give the Federal Radio Commission jurisdiction over telegraph and telephone carriers which were regulated by the combined activity of the Post Office Department, the Interstate Commerce Commission, and the Department of State. The divided and overlapping authority caused much confusion.

In 1933, at the request of President Franklin D. Roosevelt, the Secretary of Commerce appointed an interdepartmental committee to study the situation. The committee reported that "...the communications service as far as Congressional action is involved should be regulated by a single body." It recommended the establishment of a new agency that would regulate all interstate and foreign communication by wire and radio, including telegraph, telephone, and broadcast.

The Federal Communications Commission is Born

On February 26, 1934 the President sent a special message to Congress urging creation of the *Federal Communications Commission* for that purpose. Congress responded with The Communications Act of 1934, which was signed by President Roosevelt on June 19, 1934. The law created the FCC as an independent US agency answering directly to Congress.

The stated purpose of the act: "...regulating interstate and foreign commerce in communication by wire and radio so as to make available, so far as possible, to all the people of the United States a rapid, efficient, nation-wide and world-wide wire and radio communication service...."

It applies "...to all interstate and foreign communication by wire or radio and all interstate and foreign transmission of energy by radio, which originates and/or is received within the United States, and to all persons engaged within the United States in such communication or such transmission of energy by radio, and the licensing and regulating of all radio stations...."

The Federal Communications Commission began to function on July 11, 1934. It originally was composed of seven Commissioners appointed by the President, later reduced by Congress to five. Each Commissioner must be confirmed by the Senate. The President designates one of the Commissioners to serve as Chairman.

As the chief executive officer of the Commission, the Chairman delegates management and administrative responsibility to the Managing Director. The Commissioners supervise all FCC activities, delegating responsibilities to staff units and Bureaus. Only three Commissioners may be members of the same political party. None of them may have a financial interest in any Commission-related business.

Historically, to facilitate party goals, the Chairman is usually a member of the same party as the President. The normal term of a Commissioner is five years (it originally was seven), except when filling an unexpired term. The FCC's most important responsibility is the fostering of competition in all sectors of the communications industry as well as protecting the interests of the public.

The authority of the Commission extends to the 50 states, the District of

National Volunteer Examiner Coordinator, P.O. Box 565101, Dallas, TX 75356-5101 (telephone 817-461-6443)
e-mail: <w5yi@cq-amateur-radio.com>

Columbia, Guam, Puerto Rico, the Virgin Islands, and certain other US island possessions. The FCC does not regulate Federal Government radio operation, which is overseen by the NTIA, the National Telecommunication and Information Administration.

The act requires the Commission to study new uses for radio and to encourage its development and stresses the use of radio to protect life and property. To realize these objectives, the Commission has authorized many uses for radio. Under the1934 Act the FCC's initial regulatory powers fell into three major areas:

Common Carrier regulation covering interstate and foreign communications services that are sold or hired. Purely intrastate communication is not subject to FCC jurisdiction, instead coming under the authority of state utility commissions.

Broadcast regulation covering assignment of frequencies, power, and operating time...and consideration of applications to build and operate stations which broadcast to the public.

Non-broadcast regulation covering all radio communications that are neither broadcast nor open for hire to the general public. This category has been called by different names over the years, including the Safety and Special Services Bureau and the Private Radio Bureau. It is currently called the Wireless Telecommunications Bureau (WTB).

The act has been amended many times over the years. Television, satellite, and cable regulation were added to FCC responsibilities as the technologies became available in the 1950s and '60s. In February 1996 the Telecommunications Act of 1996 was signed into law, representing the first major overhaul of our nation's telecommunications policies in over 60 years.

There are currently seven FCC bureaus in operation:

Cable Services Bureau—serves as the single point of contact for consumers, community officials, and the industry for cable–related issues.

Common Carrier Bureau—responsible for rules and policies concerning telephone companies that provide interstate, and under a certain few circumstances intrastate, telecommunications services to the public through the use of wire-based transmission facilities (i.e., corded/cordless telephones).

Consumer Information Bureau—communicates information to the public regarding Commission policies, programs, and activities. This bureau is also charged with overseeing disability mandates.

Enforcement Bureau—enforces the Communications Act, as well as the Commission's rules, orders, and authorizations.

International Bureau—represents the Commission in satellite and international matters.

Mass Media Bureau—regulates AM, FM radio, and television broadcast stations, as well as Multipoint Distribution (i.e., cable and satellite) and Instructional Television Fixed Services.

Wireless Telecommunications Bureau—oversees cellular and PCS phones, pagers, and two-way radios.

Although not a bureau, the **Office of Engineering and Technology**—allocates spectrum for non-government use and provides expert advice on technical issues before the Commission.

It is anticipated that some of these bureaus shortly will be streamlined or merged along functional lines rather than categories, since the activities of the telecommunication industry are converging. For example, you can get internet service through cable, telephone, satellite, and wireless access, which makes any internet regulation cumbersome and repetitious if performed by separate bureaus.

Additional information on the FCC organizational structure, as well as its regulatory rulings, can be found on its website at: <www.fcc.gov>.

The Wireless Telecommunications Bureau

WTB regulates the commercial, industrial, and public-safety use of two-way radio. In addition to cellular and pager radio, WTB oversees the radio needs of people at work—for example, emergency services (such as police and fire radio), local government, farmers, forestry, highway and factory workers, drivers of trucks and taxicabs, engineers of trains, pilots of ships and planes...and dispatchers of all kinds.

WTB also oversees non-commercial personal and recreational uses of radio such as GMRS (General Mobile Radio Service), Radio-Control Service (R/C), Citizens Band (CB), and Amateur Radio.

Station callsigns are also assigned by the Commission. International agreement provides for national identification of a station by the first letter or first two

letters of its callsign, and for this purpose apportions the alphabet among the various nations of the world. The United States uses the initial letters K, N, and W exclusively and part of the "A" series (callsign prefixes AA through AL).

Commercial broadcast station callsigns begin with the letters K and W. Although there are some exceptions, broadcast calls prefixed by K generally identify stations located west of the Mississippi River, while W is used east of this river.

Amateur Radio Service

The FCC regulates the wireless radio services by making rules, issuing licenses, and enforcing proper operation. The Amateur Radio Service is covered by rules listed in Part 97 of Title 47 (Telecommunication) of the Code of Federal Regulations. The Commission is empowered to grant, revoke, renew, and modify telecommunications licenses and to assign radio frequencies to various services, including the Amateur Radio Service. These allocations must coincide with spectrum-use agreements developed at the international level.

Since the demand for spectrum far exceeds availability, most users must share their frequencies with other users in the same service. Where interference at a given transmitter location becomes a problem (such as with repeater systems), users must follow recommendations from recognized frequency-coordinating committees. These frequency coordinators usually are part of representative user groups who keep track of all frequency assignments in a particular radio service.

The Amateur Radio Service is defined in the FCC rules as a voluntary, disciplined communications service guided by five traditional objectives:

1. to provide emergency or public-service communications when normal communications are disrupted;
2. to advance the state of the radio art;
3. to improve individual skills in radio operation;
4. to provide a reserve pool of qualified radio operators and technicians; and
5. to promote international goodwill.

An application of the first principle is the Radio Amateur Civil Emergency Service (RACES), which provides for Amateur Radio operation for civil defense purposes.

Anyone, regardless of age, can qualify for an amateur radio license by passing any of three progressive levels of achievement: Technician, General, and Amateur Extra. These licenses are conferred by passing up to four different examinations on an applicant's understanding of the technical and practical aspects of the Amateur Radio Service as well as skill in Morse code telegraphy. The higher the class, the harder the exams—and the greater the privileges of the license.

Amateur radio began with a few experimenters in the early 1900s. It has since grown to about 700,000 FCC-licensed operators in the US Amateur

On The Cover:

Ray Balch, K6VX, has been a ham and a DXer since 1947. "DX, DX entirely," he says when asked about his ham radio interests. "I'm missing only one zone for 5-band WAZ – Zone 34 on 80 meters – and I hope to get that next winter," says Ray, who lives in Macdoel, California.

He's certainly got the antenna farm to reach his goal. On top of the 160-foot tower in the center of our photo is a full-size 3-element 40-meter Yagi, an antenna which has so far netted him 320 countries on that band. In our photo, Ray is making some adjustments to his 160-meter four-square, supported by the green-and-white poles. The orange-and-white poles support his 80-meter four-square. Plus, there's a 160-meter sloping vertical coming down from the top of the tower, and five Beverage receiving antennas for 80 and 160, one each aimed at Japan, the South Pacific, South America, the Caribbean, and Europe. And in case you think he's only interested in the low bands, Ray also has a 5-band, 4-element quad at 75 feet on another tower for the upper HF bands, plus a 3-element Yagi on six meters.

A retired aerospace engineer, building contractor and real estate agent, Ray says he never gets tired of the thrill of DXing, even after more than a half century on the air. "I just enjoy it," he says. "The fun of it. The spirit of it. It's just a good challenge. It's a lot of fun!" (Cover photo by Larry Mulvehill, WB2ZPI)

How It Works

BY DAVE INGRAM, K4TWJ

Theory 'n Practice

Tuning Pretuned Antennas

Have you ever assembled a commercially-produced beam, vertical, or mobile antenna and discovered its resonant frequency, point-of-lowest SWR, or overall bandwidth differed from expected values or advertised specs? Don't feel alone; we all have experienced a similar dilemma at some time in our radio life—and survived—and emerged slightly more knowledgeable as a result.

What causes such entanglements and how are they cured? Good questions! You may have assembled the antenna improperly, or it may have a defective trap or loading section; the latter possibility always exists, but don't jump to premature conclusions before considering all angles. If you have successfully assembled similar antennas and understand their basic concept of operation and/or if the antenna has been on the market long enough for others to have used it without difficulty, the "problem" may be the antenna simply needs fine-tuning. Why?

Every antenna location and installation has its own variations. These unique "unknowns" include the antenna's height above ground, its proximity to nearby wires and metal objects, or even influence from an automobile within a half-wavelength distance of the antenna. Generally speaking, SWR measurements are a good guide here. If an SWR is 3:1 or higher across a whole band, for example, improper assembly or defective components is a logical assumption. If an SWR is around 1.2:1 or 1.3:1 at some seldom-used point and higher around favorite-band areas, a minor readjustment may be all that's needed for happy hamming. Precisely why, when, and how such tuning is accomplished is the focus of this month's column, and I feel sure you will find our information useful for many years.

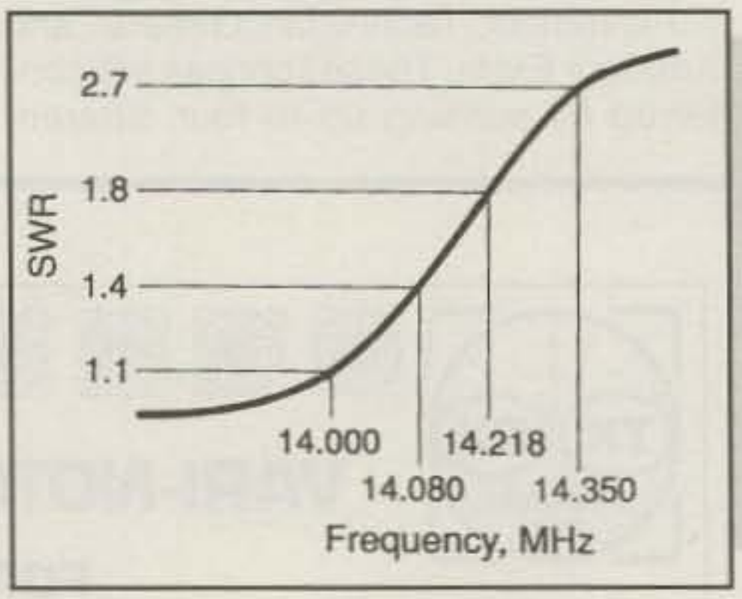

Fig. 1– Graphing or plotting your antenna's SWR gives you a visual indication of its resonant frequency and bandwidth. Here you can see my portable vertical antenna is tuned for the CW portion of 20 meters, and I am preparing to retune it for a lower SWR in the SSB range of 20 meters as discussed in the text.

To Tune or Not to Tune

Some of the most controversial and challenging questions a newer amateur might ask are why, when, and how does fine-tuning or adjusting an antenna make a difference in overall station performance. Does adjusting an antenna's element length or stubs offer any advantage or benefit over just punching on a transceiver's built-in automatic antenna tuner? Are the results worth the invested time and effort? Is there any special magic in an SWR of 1:1? I say yes, indeed, to all three questions, but that is only my opinion, and it is probably influenced by my success and confidence in using an optimized antenna system.

Understand that antennas are one of the most argument-producing subjects in amateur radio. Everyone has a different opinion, and almost everyone is, in some sense, an authority on them. I do not profess to be an authority on antennas, nor do I wish to pursue antenna arguments. I simply want to help newer amateurs understand some antenna basics so they can interpret theoretical explanations and enjoy great hamming. Let's thus begin by considering the previously mentioned "why, when, and how" questions in an unbiased manner, and let you draw your own conclusions. Then we will take a closer look at popular methods of antenna tuning. Fair enough?

Why Tune?

As you learned in studying the theory for license exams, matching impedances is necessary for maximum transfer of energy between a generator (your transceiver) and its load (your antenna). You also learned a mismatch of impedance causes some of your transceiver's output power to be reflected back from the antenna to the transceiver, and that the difference between forward and reverse power is called *SWR* (standing-wave ratio). When the impedance of a transceiver and antenna are both close to 50 ohms, an SWR near 1.0:1 results. However, that (ideal) condition only holds true for 25 or 30 kHz. When you tune frequencies outside that range, the "transceiver-felt" SWR rises to 1.5:1. As you tune further, the SWR rises to 2:1 and higher.

Your transceiver's high SWR protection circuitry usually jumps in and reduces output when the SWR approaches 2:1, true, but relying on that protection and sacrificing output power on a daily basis is poor logic. By simply retuning your antenna so its range of lowest SWR coincides with your most-often-used frequency ranges, you ensure maximum station efficiency, a strong signal, and a cool-running transceiver. If you later add a high-power linear amplifier to your setup, the low SWR also ensures safe "plug 'n play" operations without a major station rebuild.

What about using an automatic antenna tuner, you ask? Sure. It works great in most cases (especially if you operate both CW and SSB ends of bands), but remember that any in-shack tuner only matches a coax-end impedance to your transceiver. It does not lower an antenna system's SWR. Also, a low-power or in-rig tuner cannot be used with a linear amplifier. You will still need to add a high-power antenna tuner to the amplifier's output to avoid high-SWR consequences.

When to Tune

The question of when to adjust your antenna system for lowest SWR is slightly more challenging to answer. If you

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Photo A– The MFJ 259B Antenna Analyzer is an easy-to-use, self-contained unit that is ideal for checking SWRs, bandwidths, and coax cables; presetting a manual tuner's controls; and much more. Here it is checking the in-shack or "rig end of coax" SWR of a five-band vertical antenna as discussed in the text. Prior to adjusting the antenna's top length, SWR is 1.8:1 at 14.218 MHz.

Photo B– To facilitate easy, on-the-spot tuning and checking, I compare the antenna's at-base SWR with its in-shack-measured SWR. Due to feedline interaction, all SWR measurements are shifted up-frequency by 80 to 100 kHz. The SWR is now 1.4:1 at 14.218 MHz.

live in the northern U.S., just start around the first freeze and stop when the ground thaws in spring. If you live in the deep south, wait until the temperature hits 100°F with the humidity above 90% and go for it! Seriously, however, the best time to tune an antenna is when it is new and you are enthusiastic about getting it perking at top efficiency—but you knew that, right?

Most amateurs invest some amount of effort in tweaking their antennas; the big question is just how much and when to stop (perfection is nice, but achieving it in real life is not always possible). Some folks are content with an SWR of 1.5:1 around their usual operating frequencies. Others feel uncomfortable any time their antenna's SWR rises above 1.2:1. Some folks spend more time fine-tuning their antennas than operating. The "bottom line" thus is one of personal preference. I hope you will try fine-tuning an antenna at least once in your radio life, however, so you can experience the joys of pursuing perfection right in your own shack.

CQ Sneak Previews on "Spectrum"

Tune into a sneak preview of each upcoming issue of CQ, with Editor Rich Moseson, W2VU, the fourth weekend of each month on the "Spectrum" radio program, broadcast worldwide on shortwave over WWCR Radio, 5.070 MHz, Saturdays at 11:00 PM Eastern time.

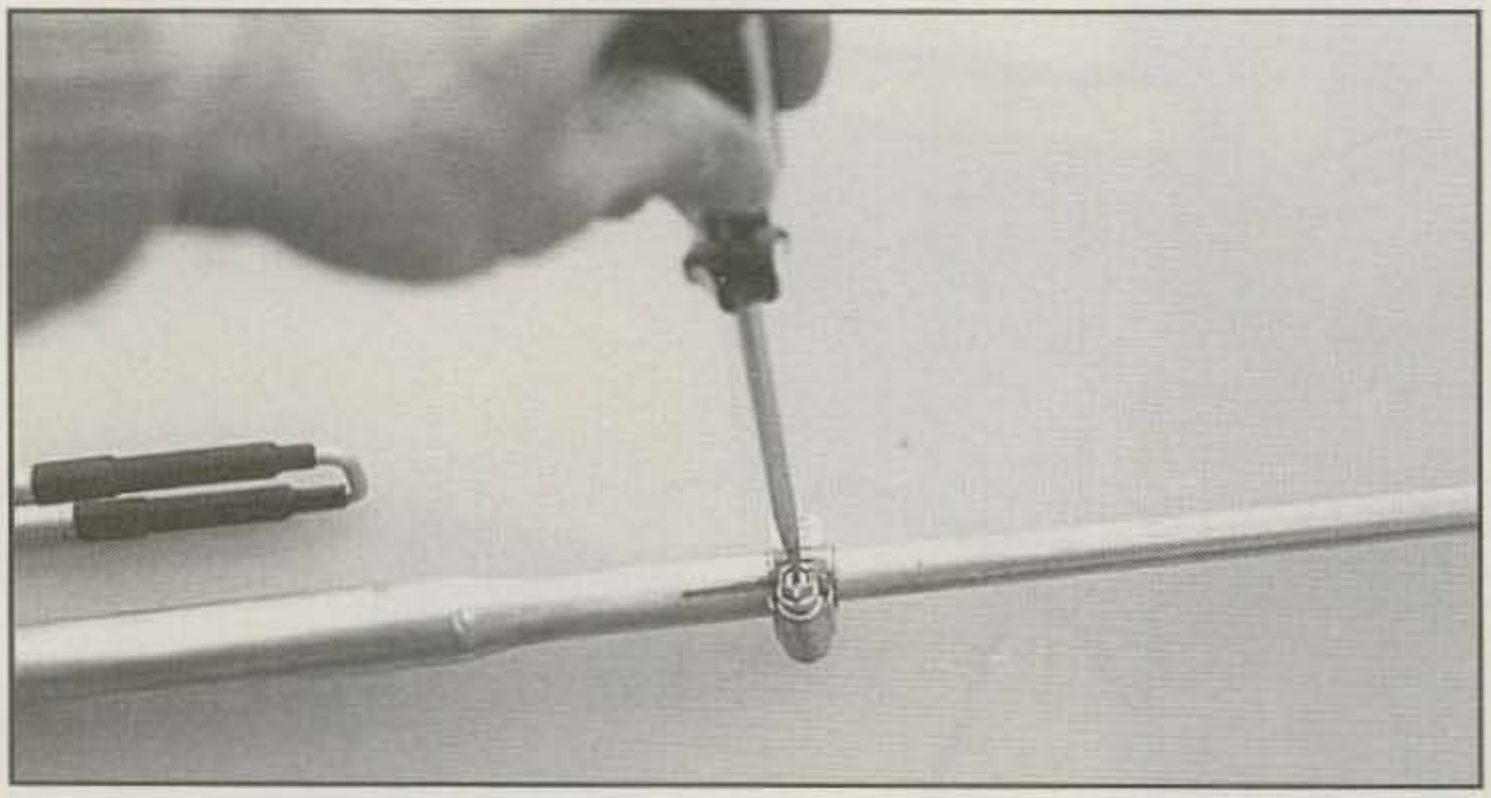


Photo C– After loosening the element's compression clamp, I slide the top section into its mating lower section 1/2 inch and re-tighten the clamp. I then raise the antenna back into position and recheck its at-base/in-yard SWR with the MFJ259B analyzer. It shows the 14.218 MHz SWR s now 1.1:1, indicating an approximate 100 kHz shift.

Photo D– Confidently returning to the shack, I recheck the antenna's "rig end of coax" SWR. It now shows 1.4:1 at 14.193 MHz. (Sorry—I did not aim for 14.218 exactly before taking the photo. Also, pardon the flash reflection from the camera.) The retuning was a rollicking success!

The questions "why" and "when" have been considered. Now let's look at the "how" of antenna tuning.

Checking and Tuning

Generally speaking, the concept of fine-tuning antennas consists of checking SWR across a band or bands of use, adjusting element lengths, rechecking SWR and readjusting lengths, etc., until you go blind or achieve personally acceptable results. *A classic rule of thumb to guide your adjustments is lengthening an element will lower its resonant frequency or point of lowest SWR, while shortening an element will raise its frequency or point of lowest SWR.* Begin by making adjustments in 1/4 to 1/2 inch steps for short antennas or mobile whips and in 1/2 to 1 inch steps for larger antennas. The process can be altered, naturally, once you "get the feel" of tuning.

Be sure to write down your SWR readings across the full range of all bands you use—preferably graphing them as illustrated in fig. 1—for tuning guidance and future reference and/or comparison. Including those records in your station's logbook is a good idea if you have difficulty keeping up with notes. Earmarking them in color also helps.

Now here are some additional tuning tips and suggestions applicable to HF, VHF, and mobile antennas alike.

If you need to shift an antenna's resonant frequency or point of lowest SWR more than 150 kHz to reduce SWR, resetting an element's length may not be the correct answer. Recheck the antenna's assembly instructions and reconsider your overall installation. Did you overlook nearby metal objects or forget to install a decoupling stub?

When making SWR measurements, strive to choose a time of low on-air activity or below-average band conditions to avoid QRMing other stations. Use low power and short transmit times with frequent breaks or "rest periods" to avoid overtaxing or overheating your transceiver. Check your antenna's SWR often—for example, at the start of a day's operation. It takes less than a minute, and it alerts you to unexpected changes. If all bands are affected by higher-than-normal SWR, moisture may have seeped into the antenna's feedline or base matching box through a lawnmower-nicked coax jacket, a sun-cracked matching box, or a poorly weatherproofed connector. If the high SWR problem occurs only during rain, moisture on nearby trees or wood structures may be the cause. If only one band is affected, check for a bent/broken element, burned out loading coil, or maybe a wet leaf acting as a short circuit.

Now let's briefly look at a neat "quick and easy" method of antenna tuning worth considering.

A Better Way

Say measuring SWRs with your transceiver and checking antenna lengths seems like a time-consuming process? Don't fret: A good multi-purpose antenna SWR analyzer such as the MFJ 259B shown in photo A can cut the endeavor down to size. Yes, and it also has dozens of additional applications you will find useful at home, in the mobile, at Field Day—everywhere! The analyzer is completely self-contained and covers 160 through 2 meters (a similar model MFJ 269 also covers UHF bands). Your transceiver need not be nearby or even switched on to use the analyzer, and it does not generate QRM

Oops...

The table in the March issue's "*CQ* Market Survey" of HF transceivers (p. 25) shows the JRC JST-245 transceiver as being DC-powered. It isn't. It runs on direct AC power. *(Tnx KO4KL)*

Also in the March issue, reader Bill Hellman, NA2M, points out that the photo caption on page 111 suggests that former *CQ* Editor Gene Black, W2ESO/W2LL, is still alive. Gene became a Silent Key in 1997.

George Murphy, VE3ERP, passes along a typo picked up by reader SM6ENG in Murph's "Square Conductor Transmission Line" article in the November 2000, issue of *CQ*. The equation that reads A = D/S should actually be A = S/D.

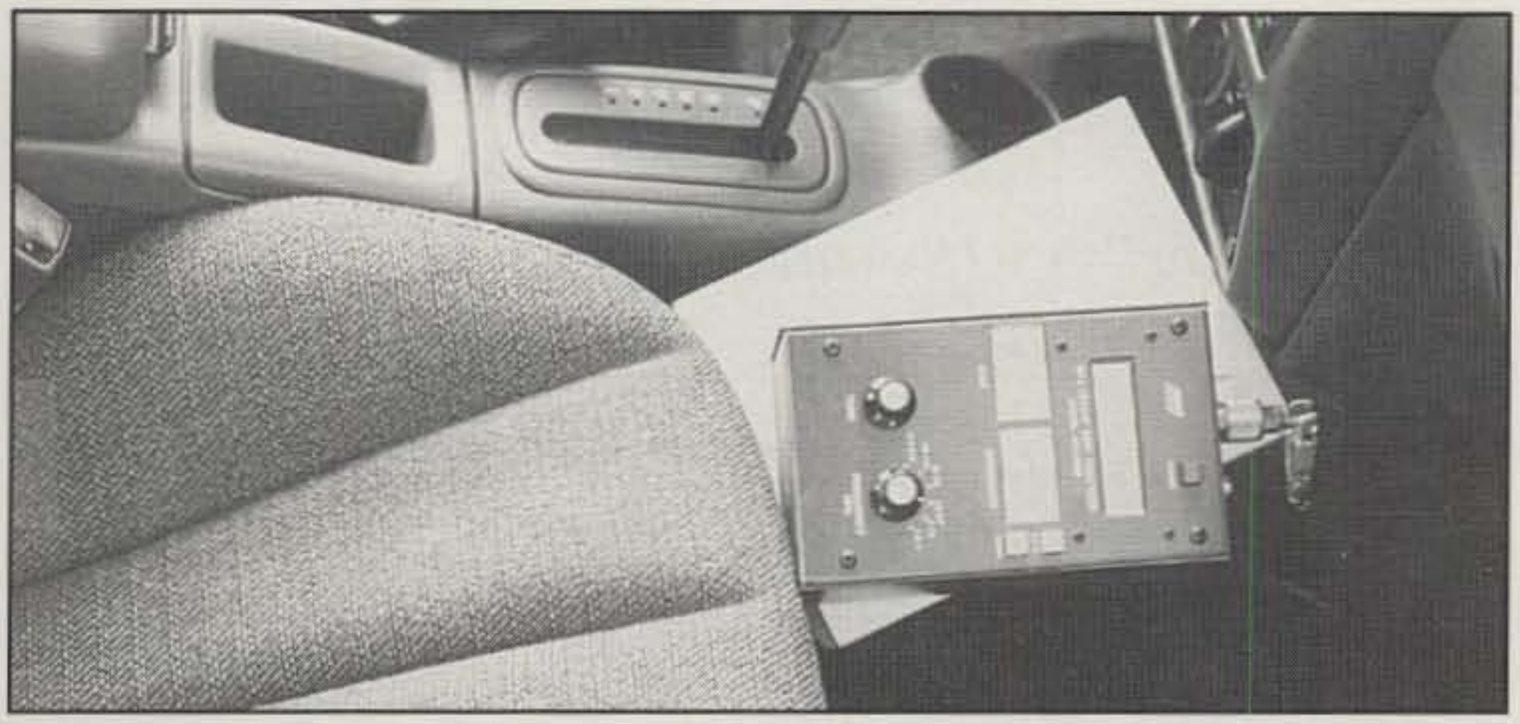


Photo E– The MFJ259B also works great for setting frequencies and adjusting impedance matching coils on mobile antennas—and you need not even put your transceiver in the vehicle until the antenna is perfectly set.

to annoy others. You just tune through a preferred range and read exact dialed-up frequencies plus associated SWRs and antenna impedance right on the analyzer's meters and digital readout. You can then make adjustments to your antenna and check results on the spot in record time. It's that easy!

A visual story of this quick and easy tuning process is shown in photos A, B, C, and D, and a brief "what's happening" description of each follows. We begin by in-shack plotting the SWR across all five bands of (in my case) a short multiband vertical used in portable operations. The antenna exhibits low SWR and good bandwidth on 10 through 17 meters, but its 20 meter SWR is around 1.1:1 on 14.0 MHz, 1.4:1 on 14.080 MHz, 1.8:1 on 14.218 MHz, and 2.7:1 on 14.350 MHz (fig. 1). We are fortunate here, as 20 meters is the antenna's lowest band of operation. Shortening only the top/20 meter section's length slightly should thus raise its resonant frequency/point of lowest SWR without affecting other bands. As previously mentioned, adjustments should be limited to short lengths and no more than 100 kHz.

Before lowering the vertical antenna so we can reset its top section, we recheck the SWR right at its base (photo B). This "right at base" SWR should be the same as the "in shack" SWR if the feedline/coax cable is properly matched and decoupled from the antenna. However, few of us live in a perfect world. Here I find all SWRs are shifted up approximately 80 kHz. In other words, the 14.080 MHz SWR is around 1.1:1. I then readjust the top section (photo C), raise the antenna back up, and recheck the antenna analyzer's at-base readings. Now it reads around 1.1:1 at 14.2 MHz, which indicates the in-shack-measured SWR should be 1.1:1 around 14.080 MHz (remember it was 1.4:1 on 14.080 MHz before tuning).

After raising the antenna back into position and reconnecting its coax cable, I make an overall check of all bands in the shack (photo D). Although my camera's flash produced a slight reflection in the MFJ antenna analyzer's display, you can still clearly see the SWR is now down to 1.4:1 at 14.193 MHz. The SWR has also dropped to 1.8:1 at 14.345 MHz, allowing full SSB coverage with an SWR below 2:1. Total measuring and re-tuning time was 35 well-spent minutes—not bad at all, and there are even more applications for the analyzer.

If you use a G5RV or random wire and antenna tuner, you just replace your transceiver with the analyzer, set it to your desired frequency, then adjust the tuner until the analyzer's SWR meter reads 1:1. Need to measure coax loss, length, capacitance; adjust a linear's input coils; or check resonance of a tank circuit? An MFJ 259B analyzer will do that too—and more. The little critter can even be used in the car for quick-tuning mobile whips (photo E). It is a terrific aid with dozens of uses!

Conclusions

The closing wire once again approaches, but I sense a few folks are still saying just punch on a rig's automatic antenna tuner and forget the tweaks (especially during super-cold weather!). Bearing that thought in mind, our next column will focus on automatic antenna tuners and couplers—and how they work. Stay tuned!

73, Dave, K4TWJ

Antennas

BY ARNIE CORO, CO2KK

Connecting Your Station To The World

Build A "Cloud Warmer" NVIS Antenna System

Gale-force winds had already started and our hurricane emergency communications net was in full swing. Radar data was coming in, pinpointing the eye of the storm and the track it was following.

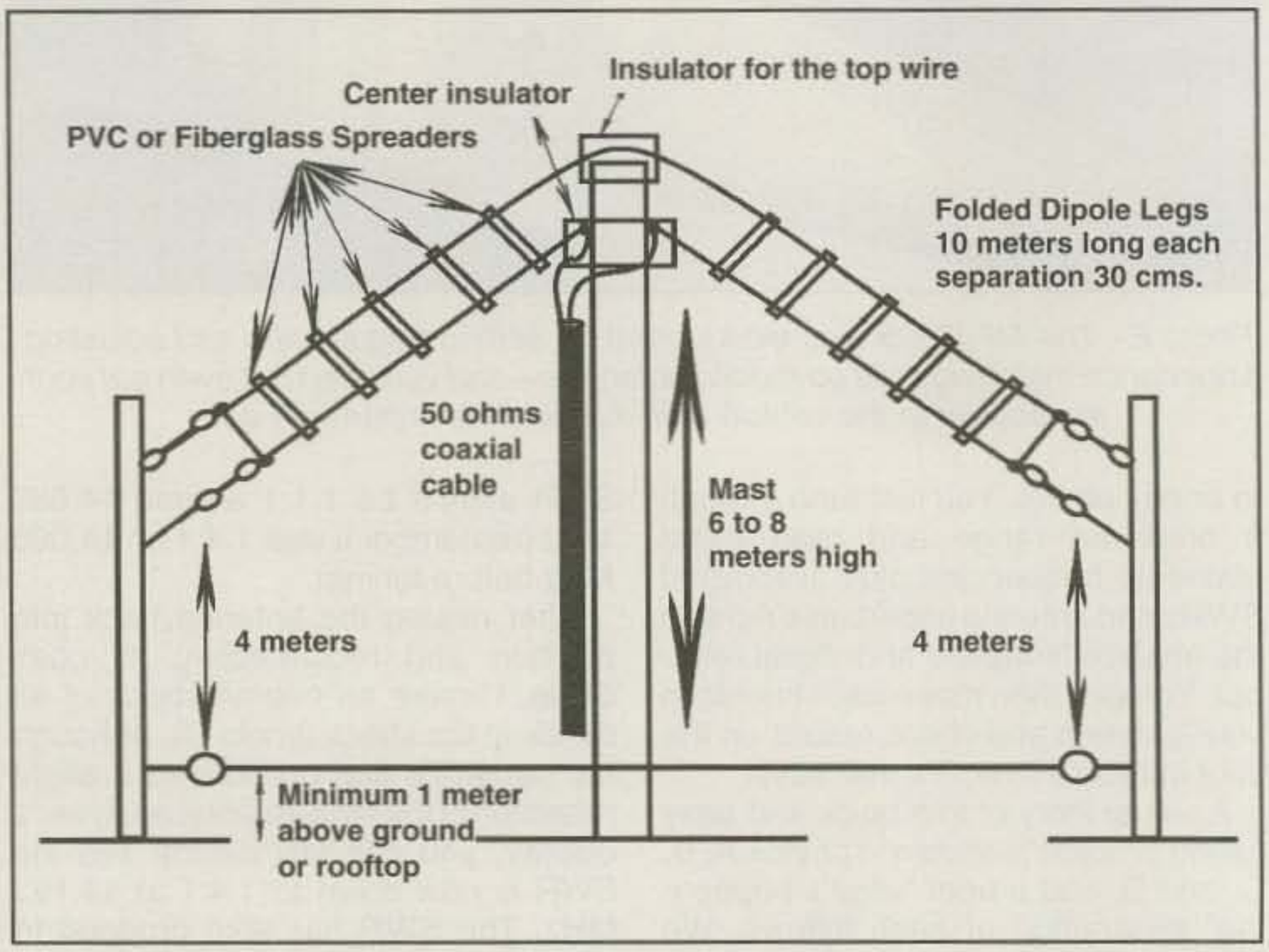
Signals from the portable station at the radar site were difficult to copy for almost every station participating in the net, except two who had installed permanent Near Vertical Incidence Skywave (NVIS) antenna systems just a few days before the official June 1st beginning of the hurricane season.

The portable station was also using an NVIS system of sorts, because Crescencio, CO4BM, had decided to place the half-wave 40 meter dipole really close to the ground, as the weather station personnel had told him that it was very likely that the Punta del Este site would receive the full blast of the hurricane that was rapidly approaching.

After the storm was over, many amateurs started to ask me questions about why the NVIS systems had performed so well, delivering really strong signals, plus another very desirable characteristic for emergency communications: much less QSB (fading) at around sunrise and sunset, as one would get with standard half-wave dipoles installed at the typical 10 to 15 meters (30 to 45 feet) above ground.

First used by broadcasters in the tropics, the NVIS antenna has now become a standard for close-range communications via the ionosphere. Because it points your signal nearly straight up (note the "near vertical" in the name), this type of antenna has become affectionately known as a "cloud warmer." It is an ideal system for emergency communications on the 80 and 40 meter bands, and will provide regular net control stations with an outstanding signal.

Interest generated by the effectiveness of the NVIS system during hurricane emergencies led to the design of the antenna shown in fig. 1, which may be installed using a single mast or tower, as the two legs of the folded dipole slope gently at a not-too-critical angle, so the long Dacron™ rope insulators can be tied to short masts or the side of a building or maybe a conveniently located fence.



CO2KK's folded-dipole Near Vertical Incidence Skywave (NVIS), or "Cloud Warmer," antenna for 40 meters. The horizontal line near the bottom (1 meter off the ground) is the reflector. If fed with open-wire line, the same antenna is usable on 30 meters, and a similar antenna can be built for 80 meters. It is excellent for short-range communications, as in emergency or traffic nets. (Illustration by Olga Dalmau)

CO2KK's NVIS Folded-Dipole *Plus* Reflector System

At first glance, looking at fig. 1, you may ask, "Why use a folded dipole?"

The answer is very easy to explain. The CO2KK NVIS system uses a closely spaced tuned-reflector element, which considerably reduces the feedpoint impedance of the radiating element.

If you use a standard single-wire half-wave dipole, the typical feedpoint impedance will go as low as 10 ohms, and usually around 12 to 15 ohms, depending on the local objects within the antenna's near field. By using a *folded dipole* element , the 10 to 15 ohms impedance is quadrupled to between 40 and 60 ohms, a very convenient value for using the antenna with a 1:1 balun and a 50 - ohm coaxial line. The use of the 1:1 balun is very important, as you don't want feedline radiation to spoil your radiation pattern!

The CO2KK NVIS antenna can be built for permanent use by using fiberglass spreaders conveniently placed to keep the two wires that form the folded dipole at a constant spacing, and the 1:1 balun must be rated according to the power used by your station. I strongly recommend using an *air-core* balun, which can be homebrewed easily and will not saturate when running high power, as ferrite core ones tend to do.

Keep in mind that base stations operating during emergencies normally run near maximum legal power, even when using generators, as communications officials tend to agree that running the net control station at high power levels keeps the operating channel clear, something that is quite logical, to say the least.

Reports received over the past three years during which the antenna has been in operation show that the NVIS

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Tuning the Reflector Element

In a typical CO2KK type Folded Dipole + Reflector NVIS system, the reflector wire is placed at not less than 1 meter (39 inches) above the ground, with 2 meters (78 inches) preferred.

The close proximity of the ground to the reflector element, together with the close asymmetrical proximity of the inverted-V shaped folded dipole, make it necessary to *tune the reflector to resonance,* using a lightly coupled grid-dip meter. *(See Feb. 2000 CQ for "The Grid Dip Oscillator," p. 22, and "How to Build an LED Indicating Dipmeter," p. 26.—ed.)*

If you plan to operate the NVIS antenna on the 40 meter band, select the segment that is most likely to be used during either your regular net operations or during emergencies. In my case the antenna's reflector was tuned for maximum gain at 7.1 MHz, which was almost perfectly achieved by tuning it to a frequency 5 percent lower than 7.1 MHz (6.745 MHz).

The length of the very close to the ground reflector element will depend on so many variables that my advice is for you to deal with each antenna as a special case, and tune the reflector to a frequency 5 percent lower than the resonant frequency of the folded-dipole element.

system antenna delivers a very strong signal during local daylight hours in the range from about 30 to 500 kilometers (20 to 300 miles), while its behavior during the ionospheric transitions that occur around sunrise and sunset make it particularly useful to keep communications running during emergencies.

No attempt was ever made to measure actual antenna gain, although the fact that it is a 2-element Yagi array with a closely spaced reflector could lead us to think that the NVIS Folded Dipole + Reflector should provide no less than 4 dB gain over a standard half-wave dipole installed at between 10 and 15 meters above ground level.

Additional Advantages

The NVIS system has other advantages, too. Among them, there is one which is also particularly convenient for emergency communications systems, and it is the fact that signals coming in at low-incidence angles above the horizon are attenuated to an extent that makes reception of the desired high-angle signals much better—in other words, there is a definite advantage to installing the NVIS system, as the signals from nearby stations coming in at high-incidence angles are much stronger than those coming from DX stations.

In addition, the 7 MHz band system, using a folded-dipole radiator, can provide service on the 10.1 MHz band (30 meters), if the antenna is fed using open-wire line, something that might be useful for running a digital communications net on that band during the hours when NVIS signals are available on 30 meters.

You can also build a similar system for 80 meters, but this would require a much higher mast, which could be difficult to keep up in the middle of a hurricane, although the NVIS 3.5 to 4.0 MHz folded-dipole antenna would be ideal for Net Control Stations that operate systems handling regular (non-emergency) traffic.

What About Higher Frequencies?

NVIS systems are limited to operation at 10 MHz or below due to the fact that even a very highly ionized ionosphere will not support Near Vertical Incidence Skywave on higher frequencies. Very intense type-L sporadic-*E* layers sometimes send back to Earth signals on frequencies as high as 20 MHz, when the oblique incidence signals may propagate for brief periods on frequencies up to or even above 100 MHz. However, these do not occur often enough for the antennas to be reliable above 10 MHz.

Overall, the NVIS antenna should be strongly considered for any operator—such as an active traffic-handler or emergency communicator—who needs strong signals and reliable communications on 80, 40, or 30 meters with nearby stations within a range of 200 miles.

73, Arnie, CO2KK

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What About a 3-Element NVIS Beam?

Why not use the parasitic element as a *director* instead of a reflector? And...why not make the NVIS system a 3-element beam shooting straight up?

The first question is not too difficult to answer: A reflector mounted close to the ground is easier to deal with, will provide the required gain and bandwidth, and can be more easily accessible for tuning than a director mounted above the driven element!

Making the NVIS system a 3-element parasitic array will reduce the area of the ionosphere illuminated by the radiation pattern, something that is not desirable, as it will also reduce the effective service area of the antenna.

Beginner's Corner

BY PETER O'DELL, WB2D

For the Newcomer to Ham Radio

Towers

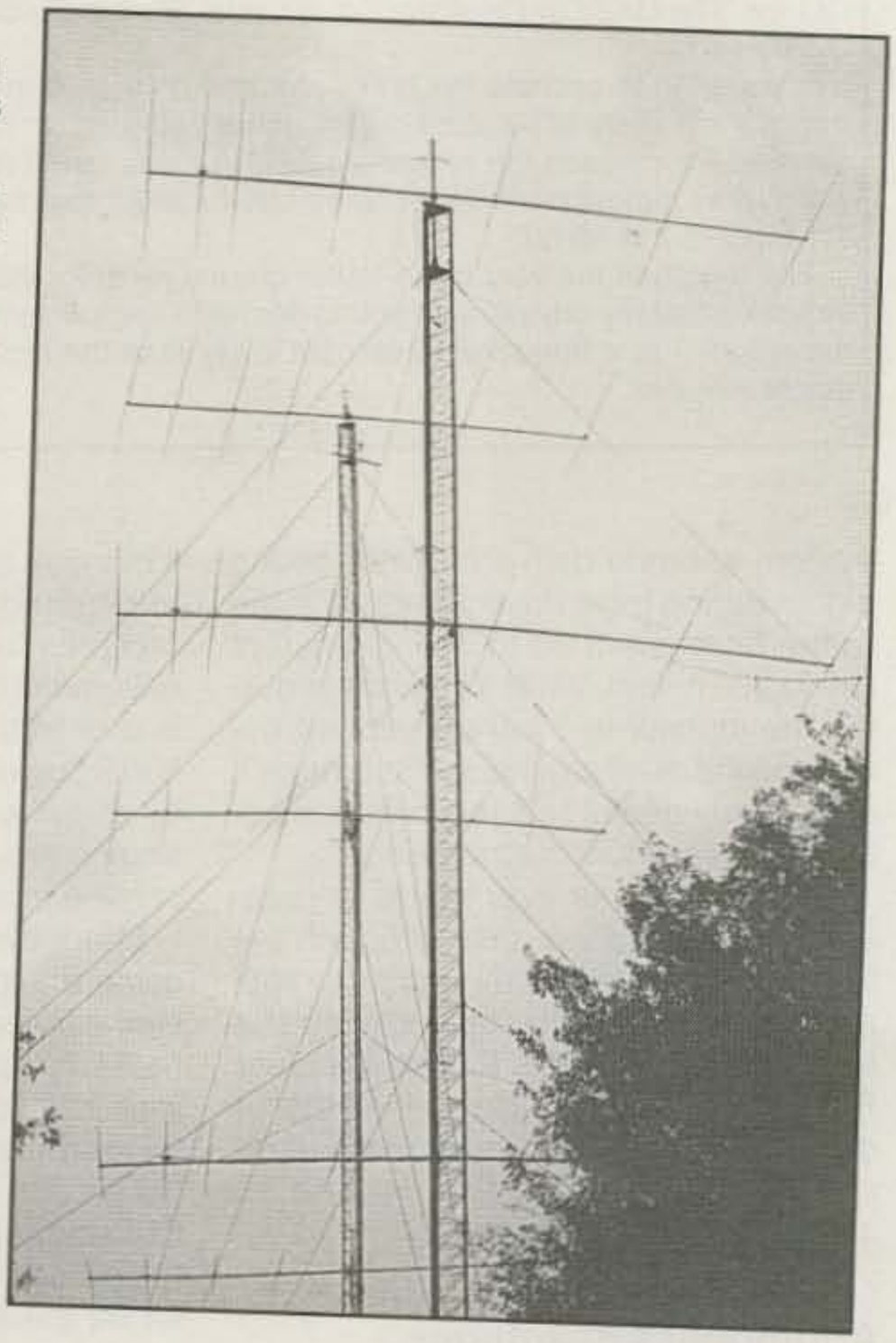
Towers epitomize the old saw "Beauty is in the eye of the beholder." Nectar of the gods or concentrated rat poison—there just is no in between.

Why do we want to put up towers? What is the big benefit that outweighs the price we pay? They anger neighbors who talk about the presumed negative impact on property values. This has proven over and over again not to be accurate, but it frequently comes up. Even your spouse may find reason to complain. This is not even talking about building inspectors, council members, zoning boards, home-owners associations, and all those other bureaucrats duly appointed or self-appointed to protect society from the likes of you.

Simple. HF beam antennas work better when mounted higher above ground. In general, the higher the antenna, the better it works. Of course, there is a height limitation where this is no longer true, but chances are remote that you can afford a tower that will go that high. Thus, higher is better. What we are talking about here is a lower take-off angle, which translates more of your signal going into a longer hop. Better DX. Also, some beams lose their directivity when mounted too close to the ground.

When talking about VHF/UHF line-of-sight communications, height means increased range and coverage. Think about all the SAREX missions on the space shuttle. They were running a 5 watt FM radio into an indoor antenna. That is not the best radiator that one can imagine. However, you could hear them with nothing more than another hand-held with a rubber-duckie antenna. When W5LFL took the first ham radio into space, we really had no idea how it would work. Owen made his first transmissions coming down the West Coast of the US. Roy Neal, K6DUE, was in his room on the sixth floor of the Hilton Hotel in Houston, when he heard that first transmission from 1700 miles away. At that minute, we knew for sure we had a winner. Just think of the Shuttle as a 200-mile high tower. That is why height is important.

Not only does a tower give an antenna height, it gets the antenna away from objects that might distort its radiation pattern. Plus, for those bands that might be involved in TVI, it gets the antenna farther away from house wiring and other unintentional RF paths. All that said, a tower may or may not be worth it, depending upon your particular circumstances.



Notice that the guy wires come away from these towers at a moderate angle. Guy wires are usually attached to large steel rods imbedded in concrete blocks (or earth anchors, if the situation permits them). (K2RED photo)

Rules of the Road

Most of us live within the limits of some municipality, which means that we have to contend with zoning rules and regulations. You could simply ignore the authorities and their rules, but I would not advise that course of action. What are the local zoning rules for your community? It may be that your community has some reasonable rules on the books. Dale Clift, NA1L, is an attorney and expert on zoning issues. He advises that you always get a complete copy of your town's zoning rules. It will probably cost you $10 to $25, but starting with the complete book could save you a lot of time and trouble later on. If you simply go into your local city hall, the clerk may offer to photocopy the pages that apply to towers for a few cents per page. This may sound like a bargain compared to buying the entire book, but beware that there are often other sections of the rules that modify or contradict specific rules on "antenna support structures," aka towers.

You may have to apply for a zoning variance, and that will take a little time and money, but it is not something to be afraid of. It is more a nuisance than anything else. I went through this process about ten years ago when I lived on Long Island. The city would have permitted me a modest tower with nothing more than a building permit if I had wanted to attach it to the house. However, I had a very large backyard that would allow a tower to be located away from the wiring inside the house and the utility cables coming into the house. The zoning board members asked a lot of questions, and a couple of neighbors complained, but a few weeks later I had my permit.

Circumstances vary too much from one situation to another to make any blanket pronouncements. You may or may not need an attorney to help you secure a variance. The best place to start is to contact the ARRL and ask for their kit of information on towers and zoning issues. By the way, someone will probably tell you that the FCC

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through PRB-1 has preempted local governments ability to deny you a permit. Not so. PRB-1 is a great help to the ham looking to challenge overly restrictive ordinances, but it is not a panacea. There is no way around it; you are going to have to do your homework.

Still interested in putting up a tower? I know—just testing. There are basically two general types of tower: guyed and self-supporting systems. Which one is better? That depends. Each has its advantages and disadvantages. Guyed systems tend to support more antenna (wind-loading) for a given size tower, while self-supporting systems tend to look a lot cleaner, present less problems for lawn care, and require less maintenance. At one time in my life, I wanted to hang as much aluminum as possible in the air. I see things differently now, so my personal preference for an antenna support system has changed. I'd take the self-supporter. It is really a matter of balancing need and personal taste.

We just mentioned wind loading a minute ago. The two types of towers are very different in how they handle the wind loading. Think of a guyed tower. The antenna on top of the tower is functioning like a sail on a ship. If you've never actually been on a sailing vessel, it can surprise you just how much force the wind can have and how strongly it will blow a boat along. Great for sailing, but lousy for radio towers. Think of the antenna as a sail, and the tower as a boat that is anchored firmly into the ground.

What happens to the force of the wind as it blows against the tower and antenna? The guy wires prevent the tower from moving, which causes the horizontal force of the wind to be converted into a downward pressure passing through the tower into the concrete base. The net effect is that the wind is literally trying to push the tower down into the ground. Incidentally, if you have ever seen a guyed tower that has come down, it is pretty common for the sections to collapse like an accordion instead of falling out in a straight line. That is why tower manufacturers specify so many sets of guy wires for a given tower height. The higher the tower, the more sets of guy wires you will need. By the way, use the size guy wire that the manufacturer recommends. This is not the place to "go cheap."

On the other hand, the self-supporter handles the wind energy in a completely different way. Here the tower is acting more like a lever with the base being a pivot that does not move. The wind is attempting to "rotate" the antenna around a point in the base—sort of like a giant clock hand. The tower is also storing some of the energy of the wind. As it flexes back and forth, it releases the stored energy. Waving back and forth is really a pretty good thing for the self-supporter. However, if you see a guyed tower waving back and forth, run! It is probably going to come down real soon.

In either case, the base is a very important part of the tower. I've known a number of hams who took the attitude "I'll just throw a couple of bags of ready-mix concrete in a hole and set the base on it." Not smart, particularly if your soil is at all loose or sandy. When you buy your tower, the manufacturer provides you with drawings for the size and shape of the base. The taller the tower, the bigger the base, too. There are sound engineering reasons for the these specifications. You'd be wise to follow them pretty closely. If you have to get a permit to put up your tower, do not be surprised if the city inspects the hole for your base before allowing you to pour the concrete. They compared the pit I had dug with the manufacturer's plans and specifications.

There are two other variations of towers that probably should be mentioned here. I don't care for either one, so let me be honest up front. First, there is the roof-top-mounted tower. It can be either a self-supporting or guyed structure. It's cheaper than a full-blown tower, and some cities will allow you to put up one with few restrictions (I could have had one on Long Island with nothing more than a routine building permit). That is all well and good, but just keep this in mind: Your roof has now become your base. Every time the wind blows, your antenna is either trying to shove the tower down through the top of your house or twist your roof off, depending on which style it is. Those thoughts just never appealed to me.

A roof tower is an acceptable compromise when circumstances dictate its use. A major drawback is that it brings the antenna in close proximity to the house wiring located just beneath the roof.

If you are going to go with a roof-top installation, make sure that your roof is sturdy and that it is not already overloaded with a second or third layer of roofing material. It was funny at my zoning hearing, because one board member suggested I was wasting their time, since I could put up a roof tower with only a building permit. The town engineer was there, so I asked him if they had an ordinance prohibiting more than two layers of roofing material on a house. He acknowledged that they did, because they did not want the roof to collapse from the excess weight of the material, particularly with the potential for heavy snow storms. I pointed out how a guyed tower worked and asked him if he thought there was a potential for high winds along with a heavy snow storm. After that, there was no more mention of roof towers.

Another compromise form of tower is the crank-up, or telescoping, tower. This mechanical marvel uses steel cables and pulleys to raise and lower the antenna. In many ways, crank-up towers are a good idea. You can keep the antenna retracted most of the time and only raise it when you are going to use it. It may be a way of getting a tower in a neighborhood that otherwise would not permit one. Those are the good points.

There are two major drawbacks to them, as far as I am concerned. First, crank-up towers tend to be really expensive. They may cost three or four times as much as a fixed-height tower. However, what bothers me more is that from time to time cables and pulleys have been known to break. Are they likely to break when the tower is retracted? Probably not. No, it would probably happen when the tower is fully extended. Frequent inspection and proper maintenance are absolutely essential for these marvels. I would not go near a crank-up except when it is fully retracted, and I especially would not put a hand or foot on one that was at all extended. I'd like to keep the toes and fingers that I have.

If you are going to climb a tower, you need a good safety belt. You can get one from vendors advertising in *CQ*, or you can buy one locally from an industrial supply company. Check the yellow pages. It does not really matter all that much what style you buy, but you would be absolutely crazy to climb without one. I have a ham friend who didn't bother with the belt because he was only going up about 10 feet—and just for a minute. He slipped and fell. Broke his back in two places. Fortunately, the doctors were able to patch him up, but he walks with a limp now and will never climb another tower, nor play sports, not do a lot of other things. The doctors did tell him that if he had been another two or three feet higher, it wouldn't have been a problem for him. He would have been dead. Use a belt, macho man.

Reader Feedback

"I enjoyed your article on 'garage sales' in *CQ (March issue—ed.)*. As one of the three organizers of the Hosstraders, aka 'Deerfield' (by the way, we're moving to Hopkinton, New Hampshire; see us at <www.qrz.com/k1rqg>), you got me chuckling at your comments about hamfests starting too early and organizers being 'torturers from the middle ages.' Over a quarter century ago when Joe, Bob, and I started Hosstraders, 8 AM was just fine! Then people started wanting to get there early. Some of it I could understand: The W2 and W3 guys had a long way to drive, and some of them wanted to get there the night before and catch a good night's sleep before the hamfest. And some of the RV and camping types started wanting to get there the night before for some fellowship around the campfire (or maybe the Coleman lantern). Then the greed kicked in. People assumed that all sorts of mysteriously good 'deals' were being consummated before the non-cognoscenti showed up. They had to get there first.

In response to public demand, we allowed a 6 PM Friday move-in time. That, over the years ratcheted back to 4 PM to 3 PM and now to 9 AM on Friday for our Saturday event! And there are people who regularly line up on the road starting Thursday afternoon. Some of these early birds live within 50 miles of the site. Heck, I'd be in my own warm cozy bed rather than sleeping in an overloaded car. I'm not sure I understand entirely what would cause a man to leave hearth and home to sleep in conditions that most of us consider 'homelessness.' But again, I'm afraid it's just plain old greed—the fear that someone else will get to that mystical 'real good deal' too soon.

"We have been running Hosstraders for 27 years now, and have sent almost a million dollars to Shriners Hospitals. I wouldn't trade that satisfaction for anything! But one of my most cherished pleasures is going to somebody *else's* hamfest, and strolling in about 9 AM."

Norm, WA1IVB

Call for Photos and Stories

We'd like to hear from you about your experiences as a newcomer. If you have questions, we'll try to incorporate them into future columns. If you have photos (color prints or slides okay) of your station or antennas, please send them along and we'll publish the best ones. If you have a solution to a common problem that new hams experience, we'd like to hear about it so we can pass it along. You can contact me at <wb2d@cq-amateur-radio.com> or Peter O'Dell, WB2D, Beginner's Corner, 123 NW 13th St., Suite 313, Boca Raton, FL 33432.

VHF Plus

BY JOE LYNCH, N6CL

All About The World Above HF

First 24 GHz EME Echoes

Al Ward, W5LUA, heard his earth-moon-earth echoes on 24192.1 MHz at 0816 GMT on March 7, 2001, thus becoming the first amateur to verify that his 24 GHz signal had been reflected by the moon. Here is Al's account:

On the evening of March 6 local time I had just installed my elevation rotator, which allowed me to remote operate the dish from the hamshack. Previous attempts at echoes were with all equipment mounted in a shed near the dish. I had tried for echoes prior to zenith, but only thought I had heard echoes. Some clouds were beginning to cover the moon so I decided to set my alarm clock for about 2 AM and give it a shot on the setting moon.

First discernable echoes were heard at 0816 GMT with the moon at an azimuth of 268.8 degrees and an elevation of 38.8 degrees. The doppler shift at this time was a negative 45.3 kHz. Echoes peaked very well at 0848 GMT where the elevation was down to 31.5 degrees and the doppler shift was a negative 49.1 kHz. At this point, I ran out of azimuth control with my present setup.

My lunar echoes peaked Q5 (M copy) in a 2 kHz bandwidth and were easily identifiable on AF9Y's DSP software. This triumphant event came after several years of optimizing the system and many failed attempts at achieving lunar echoes. I was rather surprised to find that the echoes did not seem to be much broader than my 10 GHz echoes, maybe due to the 0.3 degree beam-width of my dish.

Just about three days later at about 04:30 UTC, March 10, Barry, VE4MA, along with Al, copied Al's signals during another one of Al's tests. Barry reported that Al's signal was T-M copy.

Barry used an 8 foot offset (14/12 GHz) dish with a "large"-diameter W2IMU feed into a DB6NT preamp at 1.55 dB NF (noise figure). He saw 15 dB of Sun noise and 2.3 dB of moon noise. He reported that he had no visual moon because of clouds, but this did not appear to have affected the moon noise. Additionally, he stated that the beamwidth of the antenna appeared to be slightly less critical with clouds than with clear sky.

At Al's end of the circuit, he reported that his antenna is a 3 meter Andrews prime focus dish. Al stated that according to Andrews, the 3 meter dish is rated to 30 GHz with proper back structuring to optimize the dish's surface.

Al indicated that the dish really began to perform when he added a back structure that looks like a tic-tac-toe board mounted to the backside of the dish. The eight points of the back structure allowed him to optimize the dish's surface by pushing or pulling on the back of the dish to enhance the accuracy of the dish's surface. The end result of this pushing and pulling was improved sun and moon noise.

Al reported that presently he receives 12.5 dB of sun noise and 1.3 dB of moon noise. His feed is a scalar feed optimized per the *W1GHZ On-Line Antenna Handbook* and his dish has an F/D of 0.3.

Al's LNA (low noise amplifier) is a two-stage W5LUA homebrew design using a pair of Agilent Technologies PHEMT devices that provide a 2.25 dB system noise figure. His basic transverter is built around surplus 23 GHz modules that down-convert to a 2304 MHz IF, which is then down-converted to a 144 MHz IF with a Down East Microwave transverter to an ICOM IC-271 transceiver.

Al ran about 20 watts at 24192 MHz by retuning a Varian VTU-6191 14.5 GHz TWT (traveling wave tube) that he had been using on 10 GHz EME at about 80 watts output. Retuning consisted of lowering the Helix voltage and doing some tuning in the output waveguide section.

Al used the Realtrak EME and satellite software produced by Michael Owen under his Northern Lights company name to track the moon. His was concerned about the accuracy of the Doppler calculation of the various moon-tracking programs that he had used in the past.

Because of the expected Doppler shift of up to 50 kHz, there is not a lot of margin for error when tuning for echoes. By running echo tests on 10368 MHz, he came to the conclusion that Owen's soft-

VHF Plus Calendar

May 6	Moderate EME conditions. Microwave Spring Sprint contest. (See text for details.)
May 7	Full Moon.
May 11	Lowest Moon declination.
May 12–13	50 MHz Spring Sprint contest. (See text for details.)
May 13	Poor EME conditions.
May 14	Moon apogee.
May 15	Last quarter Moon.
May 20	Moderate EME conditions.
May 22	New Moon.
May 25	Highest Moon declination.
May 26	Moon perigee.
May 27	Very good EME conditions.
May 29	First quarter Moon.

—EME conditions courtesy W5LUU

The first 6 Meter WAZ recipients. At the Charlotte (North Carolina) Hamfest in March, CQ Editor Rich Moseson, W2VU (left), congratulates the first two amateurs to qualify for CQ's new 6 Meter Worked All Zones award, Herman Cone, N4CH (#1, center), and John Kanode, N4MM (#2, right). (Photo courtesy Joe Wittmer, KB9SIZ, HAL Communications)

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ware was the most accurate at 10368 MHz. From that observation Al extrapolated that Owen's software would perform the best at 24 GHz. He was not disappointed because based on the Doppler shift of the received echoes, Al observed that Owen's software predicted the returns within a few hundred Hz.

More information, including the AF9Y .gif files, have been posted on the North Texas Microwave Society web page at <www.ntms.org>.

Considering the success that Al has had to date, both with his own echoes and with Barry's reception report, it is possible that the first two-way QSO may take place as early as this year. In an e-mail to me Al commented, "I am working with VE4MA and WA7CJO on trying a QSO. It may take a while to get everything just right!" Watch for news of a QSO in this column.

Lowest Power 1296 MHz EME QSO Claimed

On 25 February 2001 Ernie, W7LHL, and Larry, W7SZ, were successful with a PUA43-mode QSO on 1296 MHz EME. They used a QRP power level of 5 watts and backyard TVRO dishes of 10 and 12 feet.

They were using a 28-character setting on PUA43 (see below for more information on the PUA43 mode). The extra characters were being used for redundancy in portions of the message. The message would begin to appear in a few minutes, but Q5 copy was taking roughly 15 to 30 minutes per message. They exchanged callsigns, grid squares, and confirmations both ways. Copy at W7LHL was not quite as good as for the other direction, but both stations received a complete message in the 28 characters. This was their first attempt at using the 5 watt level for a QSO. Earlier, in January, they were successful at higher power.

Neither Ernie nor Larry is aware of any previous 5 watt 1296 MHz EME QSOs. It is possible that someone may have done so using larger antennas. They would appreciate any information on this.

The PUA43 mode described below is ideal for this type of work. The limits of signal strength have yet to be fully explored. Both Ernie and Larry reported that they were kept busy with antenna pointing and playing screen "anagrams," so they were not sure what their patience level might have been if the power kept dropping. The nature of the mode is to trade off time for increased sensitivity.

The PUA-43 Mode uses a 43- tone FSK with adaptable "very long-term integration." This mode provides automated transmit and receive for communication by terrestrial or EME paths, allowing an extreme ability to trade-off data rate against signal strength.

"Message Estimation" is used to show the most-likely message along with a second alternative. For more information on this unique mode of communications visit the website of <http://www.proaxis.com/~boblark/dsp10.htm>.

New 76 GHz Distance Record

According to the North Texas Microwave Society web page, a new 76 GHz DX record was set by Will, WØEOM/6 and Bob, KF6KVG/6, on 1 February at 12.20 local time. Bob was near Loma Prieta Mountain, at the QTH of Dave, W6NL, grid square CM97BC. Bob used a 12 inch dish with 1 mw. Will was on Mt. Vaca, grid CM88WJ, accompanied by Gary, AD6FP. Will had an 18 inch dish, 5 mw power. The weather was calm, mild, and hazy. Margins were one to two S-units with fades. Mid-grid to mid-grid distance between the two of them is was 45 km.

EME, Weak-Signal DXpedition To Rhodes Announced

Chris, PE1LWT, and Jurgen, PA2CHR, will be active on 2 meters with EME, M.S, tropo and Es (we hope). Possible operation also might be on 6 meters and satellites. With the great help of local hams such as SV5BYR and members of the SV5RDS club station, they can use the shack and some of the equipment and hardware of the club.

The QTH is the northernmost part of the island, near the city of Rhodes, grid location KM46CF. The special call J45M will be used for the operation.

EME QRG: 144.062 MHz with J45M transmitting always the first 1 minute period. On the other end, 144.063 MHz will be the sked stations' transmit frequency and 144.062 MHz ±500 Hz will be the random stations' transmit frequency. For meteor scatter, QRG: 144.191; mode: HSCW. For tropo and sporadic-*E*, QRG: 144.291 MHz; mode SSB and CW. They have access to a DX-cluster for up-to-date sporadic-*E* information and internet possibilities. EME skeds can be made via Lionel, VE7BQH: <ve7bqh@wimsey.com>. They will run EME between May 25 and June 3. Meteor-scatter skeds (up to 2200 km) can be made via PA2CHR: <c.ploeger@wxs.nl>.

Current Contests

The Microwave Spring Sprint is scheduled for May 5, between 6 AM and 1 PM local time. The 50 MHz Spring Sprint is scheduled for May 12–13, from 2300–0300 UTC. For more information see last month's column announcement.

New Field Day Rules For 2001

The ARRL has announced the following rules changes for this year's ever-popular Field Day:

The non-traditional mode bonus has been expanded from 100 to 300 points for doing three separate demonstration modes. Packet is back and will be counted as one of the three demonstration modes, but to claim packet credit, you must set up a portable digipeater system. Existing, permanent packet networks do not qualify for this bonus.

A Field Day entrant may earn a 100 point bonus if an invited local government official or representative of one of the agencies that ARES serves in an emergency visits the Field Day site. To earn this bonus, the invited official must actually visit the site, not just be invited.

The message-handling bonus has been changed. You may now earn 10 points per message, up to 100 points total, for origination, relay, and delivery of formal NTS messages. In the past, only messages received and relayed were counted. The Field Day participation message to the Section Manager or Section Emergency Coordinator under rule 7.3.5 does not also qualify for bonus points under these rules.

This will be the last year that the extra Novice/Tech-Plus station will exist in its current form. The Novice/Tech station is a non-counting transmitter, and its QSOs count for QSO point credit. The ARRL Membership Services Committee is considering several options to encourage participation by newly licensed hams.

The ARRL Contest Branch has compiled a 24-page Field Day 2001 Information packet available at <http://www.arrl.org/contests/forms/01fdpack.pdf>. This document is available in hard-copy format by sending an SASE with four units of postage to Field Day Package, ARRL, 225 Main St., Newington, CT 06111.

ARRL Files Petition and a Response with the FCC

219–220 MHz: According the the *ARRL Letter*, the ARRL has urged the FCC to retain the 219–220 MHz shared amateur radio allocation and says it wants the Commission to make it a bit easier for hams to use the segment. In comments filed February 6th in an FCC rulemaking proceeding, the ARRL said it believes the 219–220 MHz band "must be maintained and enhanced."

The League commented in PR Docket 92-257, which was released last November. The Third Further Notice in that proceeding proposed to designate licensing regions for the Automated Maritime Telecommunications System (AMTS) facilities at 216–220 MHz and to authorize a single licensee for each unassigned AMTS frequency block on a geographic basis. The current AMTS system uses a site-based licensing structure.

Current rules require that amateurs planning to operate within 80 km (50 miles) of an AMTS facility get written permission from the AMTS licensee, but getting that consent has been difficult to impossible for hams in coastal areas. "The Commission's intended flexibility in amateur station operation at 219–220 MHz has not, in general, been realized," the League commented.

The ARRL suggested letting amateurs seeking to use 219–220 MHz submit computer-generated field strength contours that demonstrate a lack of interference potential at the relevant AMTS boundaries in lieu of having to get written permission.

It is ARRL's intention that the Amateur Service be provided a practical opportunity to make substantial, flexible use on a secondary basis of the 219–220 MHz allocation, taking into account expanded development of AMTS stations," the League said. The FCC should "provide some flexibility in the engineering of amateur systems in that band, to the extent consistent with avoidance of interference to AMTS stations.

The 219–220 MHz amateur segment was created in 1995 as a result of an ARRL petition for rulemaking. The FCC has designated the band on a secondary basis for amateur fixed point-to-point digital message forwarding systems.

While the ARRL said it's unaware of any amateur interference to AMTS stations, attempts by hams to use the band to construct digital backbone systems "have been largely thwarted to date" because of the inability to get consent from AMTS licensees within 50 miles of the proposed operation, as rules now require."

(The League has followed up with a request for secondary amateur access to the entire 216–220 segment. See "Ham Radio News" for details.—ed.)

420–450 MHz: The ARRL is urging the FCC to deny or dismiss a petition that seeks to boost the field strength and duty cycle of RF identification systems deployed as unlicensed Part 15 devices in the 420-450 MHz band. The League filed comments March 1 in a petition filed by SAVI Technology Inc.

The petition, designated RM-10051, asks the FCC to change certain Part 15 rules affecting unlicensed, periodic, intentional radiators. SAVI, which markets radiolocation and wireless inventory control products, says it needs the rules changes to satisfy customer demand for increased RFID system capabilities.

The ARRL argues that the field strengths and duty cycles SAVI proposes for its RFID tags "are completely unreasonable and would undoubtedly seriously disrupt amateur communications in one of the most popular of the Amateur Service allocations."

The ARRL characterized SAVI's petition as another in a long series in which manufacturers of unlicensed RF devices seek to liberalize rules regarding permitted field strengths for such devices in bands allocated to the Amateur Service. The League said SAVI obviously did not have interference avoidance in mind when it chose the 420–450 MHz band. "It is among the worst choices SAVI could have made from that perspective," the ARRL said. The League suggested that SAVI would be better off deploying the devices in the 902–928 MHz band.

The ARRL said SAVI not only has failed to show that its unlicensed devices could operate at the requested field strengths and duty cycles on an itinerant basis without unduly risking harmful interference to amateurs, it hasn't shown why it needs such extremely high field strengths to communicate over paths of 100 meters.

The ARRL said its limited anecdotal studies of noise levels from unlicensed devices in certain metro areas indicate that manmade RF noise "is substantially increasing." The League warned the FCC to "be extremely careful in evaluating rulemaking petitions proposing substantial departures from present Part 15 rules.""

2.4 GHz TV Links

The FCC has denied Los Angeles County California's request for an experimental license for airborne TV downlinks at 2402–2448 MHz. See "Ham radio News" for details.

AO-40 News Continues to Get Better

As this column is being prepared, reports from AMSAT indicate that the spinning speed of AO-40 had been reduced from 18 RPM to approximately 10 RPM. Hopefully, by the time you read this, the spin rate will be at the 5 RPM level and the satellite will have been repositioned. A lot of work has yet to be done to get the

satellite operational now that it is in orbit. Continue to check <www.amsat.org> for the latest information on the satellite.

VHF-Plus Operating Reports

Jon Jones, NØJK, reports the following:

February is usually a slow month on VHF here in the midwest, with little tropo, sporadic-*E* or F_2. However, I had a nice treat on Feb. 8 with a 6 meter sporadic-*E* opening to the desert southwest and west coast. Six meters popped open around 0130 to Arizona from central Kansas. This sporadic-*E* opening was over a two hour period, which is kind of rare for February. I worked or heard the following: KC8CC, DM33; WX7P, DM44; K7JE, DM33; KC7OVF, DM42; WA5LIG/6, DM12 (he had lots of QSB but was in for almost one hour); and XE2UZL/b, DM10.

The AZ and CA stations were also working 5s in AR and TX. South Texas stations were spotted by K7ICW in NV. I heard the XE2UZL/b DM10 50.028 from 0202–0330 UTC. At 0106 UTC Feb. 08 ZL2TPY reported "XE2UZL/b still in 579." Had the *Es* appeared just a little earlier, there could have been a sporadic-*E* to F_2 link from New Zealand to the upper midwest of United States.

Analyzing at the geometry of where the *Es* clouds occurred, stations in NE and SD would have been in about the right place. KMØT was active Feb. 9, but only reported a few weak AZ stations. I suspect the F_2 from New Zealand to the west coast of Mexico dropped out right before the *Es* appeared.

Regarding other DX, a month later Sam Whitley, K5SW, wrote: "At 0251 UTC 9 March 2001, I worked 3GØY, DG52, on SSB on 50.110 MHz. He was running 2 watts! I heard him work Texas and New Mexico and Brazil. In total, he was in for about 45 minutes and peaked at an S5 signal strength with TEP flutter.

Dave Batcho, N5JHV, added that he also worked 3GØY a little before Sam. Commenting on the station's signal Dave stated, "He was never stronger than about S3 here and the path was skewed to about 155 deg. This makes sense since the XE1KK/b was vy strong here at the time and that E-link probably provided the connection to TE. I also heard him work YS, TI and HP."

220 MHz Operating Award

The Weathersfield Radio Club offers a 220 MHz operating award for working 100 stations on this band. Submit a log showing the date, time in 24 hour format (local time is okay), frequency, call and name of 100 stations you worked, and of course your information. Awards are numbered sequentially; get extra status by getting a low number (apply soon!). Although not required, a large SASE would be appreciated. Send your application to: Weathersfield Radio Club, 815 Woodland Heights Blvd., Streamwood IL 60107.

Meteor Scatter Publicity

Thanks to the efforts of Shelby Ennis, W8WN, we who subscribe to the VHF reflector have been kept informed about meteor-scatter-related publicity. A very interesting article written by an ABC News reporter appeared on their web page at <http://abcnews.go.com/sections/scitech/DailyNews/meteor010208.html>. Alsoy, a couple of times Shelby was interviewed on the Radio Amateur Information (RAIN) Network at <www.rainreport.com>. Check out Shelby's web page at <http://www.qsl.net/w8wn/hscw/papers/hot_news.html> for the latest in hot news on meteor-scatter-related communications.

Research Project on Ham Radio Usage and Driving

In a previous column I quoted an article published in the February 13, 1997 issue of the *New England Journal of Medicine* entitled "Association between Cellular-Telephone Calls and Motor Vehicle Collisions," in which authors Donald A. Redelmeier and Robert J. Tibshirani studied 699 drivers who had cellular telephones and who were involved in auto accidents resulting in substantial property damage but no personal injury to see if there was a direct correlation between operating a cellular telephone and operating an automobile at the same time.

I asked the question, "So what does this have to do with amateur radio operators?" A significant number of us amateur radio operators operate a radio (a cellular-telephone is a radio) while driving. We also are not as fully attentive to our driving activities as we should be while using the radio and driving. By definition, "fully attentive" means that we are fully concentrating on our driving, with both hands on the wheel.

By clear inference, considering the results of the *NEJM* article, we should be able to claim statistics similar to those cited in it. We need to be aware of this danger both to ourselves and to those around us on the road. Even so, my observation is that not all amateur radio communication is distracting. In an effort to identify levels of distraction, I have outlined the most common levels of involvement in amateur radio communications, beginning with none to the most intense. These levels are as follows:

1. No amateur radio communications. The radio is turned off.
2. No amateur radio communications, but the radio is turned on. The sound is background noise, such as with any car radio.
3. Limited amateur radio communications. The operator/driver is occasionally engaged in conversations with other hams while driving.
4. More involved communications. The operator/driver is engaged in a nearly constant conversation while driving.
5. Intensely involved communications. The operator/driver is engaged in multiple contacts with many different stations while driving. This type of involvement would take place during a contest or during an intense band opening.

For my class in cognitive psychology this spring I have proposed to test one of the levels of involvement in order to demonstrate that amateur radio operators are distracted from their driving activities when they are involved in amateur radio communications. If I can demonstrate

involvement at the number 2 level, then I can postulate involvement at each subsequent level.

Among cognitive psychologists there is what is known as the "cocktail party effect." The cocktail party effect is when we are in a group of people and suddenly we hear our name mentioned across the room. Our ears perk up and tune into that conversation to the exclusion of what we were listening to previously or what activities we were performing.

I believe that this effect is what takes place when we are driving and operating a rig. Say, for instance, we have a radio on 144.200 MHz casually listening when suddenly we hear someone calling us. Immediately our attention to our driving is diverted to the radio. No matter how skillful we are at driving, we are distracted. We also are distracted when we have preprogrammed ourselves to listen to something that we might expect to hear, such as a meteor burst. This preprogramming is so intense that it can override anything we might be doing at the moment.

In an effort to demonstrate that we are distracted by our ham radio sets while we drive, for my cognitive psychology class I have proposed that an experiment be constructed that would engage the participant physically, visually, and auditorially. As part of the experiment some of the participants would hear something that would distract them, such as their callsigns. My assumption is that those who hear their callsigns will have a measurable degraded performance as compared to those who do not hear their callsigns. It is my premise that we can only concentrate on one activity at a time. Therefore, the activity of doing the puzzles will be interrupted by the activity of being engaged in the monitoring of the QSO. In real life, my contention is that our driving activity will be interrupted by our involvement with our radio, thereby putting us at a greater risk of becoming involved in an accident.

I am working with a local club to develop my experiment and will report on my results in a future issue of this column.

More on Bill Hewlett

Following my eulogy to Bill Hewlett in the March column, I received the following from Dean Davis, KLØUX:

In response to your comments about William Hewlett, I would like to share some insight about both David Packard and William (Bill) Hewlett.

In 1961 when I was 16 and excited about radio and electronics I heard about a Boy Scout Explorer troop that was meeting weekly at Hewlett Packard and decided to join. We only had five or six other scouts in our troop and on a given night three or four would show up. Therefore, this Explorer post intrigued me.

Shortly after joining I discovered that after a brief meeting in an upstairs conference room we were ushered downstairs to a research and development lab and were essentially let free to use all of the facilities. Two of the Scouts were building complex reel-to-reel tape decks, one was building an HP scope all from parts he had scrounged, and for myself, I mostly used the metal equipment to build chassis and cabinets for my own electronic projects.

As the word spread in my school and other schools in Palo Alto we continued getting more Scouts, and by early 1962 we had about 25 in our troop. It was at this point that our advisor explained to us that HP was not in a position to supply us with parts and materials any longer.

Upset by this action, I decided to go visit with either Bill Hewlett or Dave Packard at their Page Mill office and ask why. After a short discussion with Bill, things changed dramatically, and we were able to buy parts at cost, and miscellaneous materials (nuts, bolts, metal, etc.) in the R&D shop were made available to us.

Also from time to time either Bill or Dave would visit with us to give us support. During the Scout Jamboree in the fall in 1962 our troop brought to show two completed tape decks, many hi-fi/stereo components, and a complete ham station powered by our own generator, all scratch-built with the exception of the generator and a vertical antenna.

With the influence of other Scouts in our troop who were interested in ham radio, I got my first ticket, WN6DNB (Novice), in early 1963. Without HP and its founders being a part of my life I am not sure where I would have wound up.

In the summer of 1963 my parents decided to move to South America, pulling me from my passion of radio and electronics and ham radio. When my parents had a going-away party I was impressed that Bill Hewlett was able to attend and have an opportunity to see my ham shack.

As my mother told me in later years, Bill was more interested in my ham shack than socializing at the party. I think we even made a couple of local 2 meter contacts before my parents kicked me out of the house for the evening.

Both Bill Hewlett and Dave Packard have made a profound impact on many people, including myself, and both will be missed. In today's fast-paced world, founders and execs make them selves unavailable to common people like myself and I feel very fortunate to have had these experiences.

Joe, I hope that this will give you more insight about Bill Hewlett and his involvement in ham radio. I just wish that I had kept track of our advisor and the other hams in our troop. Sincerely, Dean Davis, KLØUX."

One final note about Bill Hewlett: Concerning my lead story about Al Ward, W5LUA, he is an employee of a subsidiary of HP. Al is the first to acknowledge that it is the creative atmosphere and availability of cutting-edge technology that has given him an invaluable boost in his ham radio accomplishments.

And Finally . . .

Your editor reported on lots of different bits and pieces of great news this month. Hopefully, soon I will report on your activities as well. Please let me know what you are up to in the wonderful world of the VHF-Plus frequencies.

Until next month... 73, Joe, N6CL

What's New

BY KARL T. THURBER, JR., W8FX

A New Column for A New Century

Maximum May Goodies

This month we have an array of radio gear and antennas plus accessories, portable and mobile gear, plus software and books. Let's dig right in!

Radio Gear

New Alinco FM Mobile/Base Transceivers. Alinco U.S.A. has announced two new FM mobile/base transceivers, the DR-235 (222 MHz, photo A) and DR-435 (440 MHz). Both transceivers have a large, 7-character alphanumeric display, 100 memory channels, ignition key on/off feature, theft alarm feature, CTCSS and DCS encode/decode and DTMF encode functions, along with European tone bursts. Ten autodial memories are available along with scan modes and extended receive capabilities. The new units can be ordered in either traditional black or classic pewter color schemes. Each unit is constructed in massive heat-sink chassis assemblies.

DR-235T features include 25/10/5 watt power output settings, extended receive from 216–280 MHz, transmit from 222–225 MHz, and the ability to operate on MARS frequencies as well as the special digital allocation from 219–220 MHz. The memory channels can operate in any split frequency configuration, with transmission limited to the ham frequency allocation. Manufacturer's suggested retail price is $335.95.

The DR-435T operates from 430–450 MHz, with extended receive from 350–511 MHz (FM), 35/10/5 watt output settings, and the ability to operate odd repeater splits on any memory channel (transmits only 430–450 MHz). Pricing of the DR-435 had not been announced as of this writing.

Digital operators can also order the optional EJ-41U packet board, which fits inside either transceiver. With the board installed, 1200 or 9600 bps packet operations can be achieved by connecting a computer to the rear-panel DSUB9 port. Operation begins by selecting the digital operating mode on the transceiver's front panel (or from memory) with no modifications to the radio and no need to remove the microphone. The radios will also work with external TNC units connected to the rear-panel serial port. Another digital feature is a front-panel data port that can be used for GPS input, cloning, or as part of the unit's anti-theft operation.

Photo A– The DR-235 FM mobile/base 222 MHz transceiver (and the 440 MHz DR-435) are the newest offerings from Alinco. Included with both models is the EMS-57 feature-packed microphone. (Photo courtesy Alinco U.S.A.)

Included with the new models, Alinco is also introducing a new feature-packed microphone, the EMS-57. In addition to basic microphone operation, the operator can use the backlit keypad to enter frequencies, switch from VFO to Memory operation (and back), select the transceiver's Call channel, execute

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

Photo B– The Oak Hills Research OHR 500 is a five-band CW transceiver that covers 150 kHz of the 80, 40, 30, 20 and 15 meter bands; it's shown here with the DD-1 Digital Display and WM-2 QRP Wattmeter. You'll find details in the text of this month's column.

Photo C– Jensen Tools distributes the high-quality Fluke 65 IR Thermometer, with its very rugged construction and laser spot aiming. The unit features a shock-absorbing holster and backlit dual LCD display. (Photo courtesy Jensen Tools)

Fig. 1– Lakeview Company offers an extensive product line fixed station and mobile antennas and accessories. Product descriptions and a catalog are available online.

the radio's autodialer memory function, select the transmitter's power output setting, and temporarily defeat the receiver's squelch setting.

Contact Alinco U.S.A., 438 Amapola Ave., Suite 130, Torrance, CA 90501 (phone 310-618-8616; fax 310-618-8758; web: <http://www.alinco.com>).

Oak Hills Research Five-Band CW Transceiver Kit. Oak Hills Research has emerged as a good source for high-quality QRP transceiver kits and accessories. The new OHR 500 is a five-band CW transceiver that covers 150 kHz of the 80, 40, 30, 20, and 15 meter bands (see photo B). Some of the radio's many features include a quiet single-signal superhet receiver, diode ring mixer, and ultra-stable pre-mix VFO providing high side local oscillator (L.O.) injection. Additional features include RIT, four-pole crystal filter, four-pole audio filter switchable from the front panel, and front-mounted TX power-out control.

The receiver includes a high-performance AGC circuit which can be turned off at the front panel, RF gain control, true sine-wave sidetone with separate frequency and level controls, and room-filling audio. The L.O. signal is available at a rear-panel jack for use with the DD-1 Digital Display, and the chassis is prepunched for an optional keyer. The transmitter provides 4 to 5 watts output on all bands except 15, where it's 3 to 3.5 watts.

The transceiver operates on 12 to 13.6 VDC. The completed transceiver measures 4" × 8 1/4" × 8 1/4" and weighs 3.8 pounds. The kit is complete with cabinet, three high-quality silkscreened printed circuit boards (PCBs), and all components and instructions. It's $359.95; the iambic keyer kit is $39.95.

Contact Oak Hills Research, a division of Milestone Technologies, Inc., 2460 S. Moline Way, Aurora, CO 80014-1833; 1800-238-8205 (e-mail: <qrp@ohr.com>; web: <http://www.ohr.com>).

Accessories for the Shack

Fluke 65 Infrared Thermometer from Jensen Tools. Jensen Tools distributes the high-quality Fluke 65 IR Thermometer (photo C), with its very rugged construction and laser spot aiming, qualities designed to take the rigors out of field measurements. The unit features a shock-absorbing holster and backlit dual LCD display, and it can measure temperature all the way from minus 40 to 932 degrees Fahrenheit. The tool lets users accurately measure temperature on hot, electrically live, or rotating equipment from a safe distance. It comes with a soft carrying case, two AA batteries, and a user's manual.

Contact Jensen Tools, Inc., 7815 S. 46th St., Phoenix, AZ 85044-5399 (telephone 1-800-426-1194; e-mail: <jensen@stanleyworks.com>; web: <http://www.jensentools.com>).

Antennas and Accessories

The Director HF Beam from Cushcraft. Cushcraft's amateur antennas are well known for their high performance and quality; I'm a user myself. Recently, Cushcraft introduced several new amateur radio antennas, including the R6000, a 6–20 meter, no-ground radial antenna that includes many features of the now-discontinued R7000 vertical; the X9/X7 Big Thunder series of 10, 15, and 20 meter tribanders; and the A627013S multiband Yagi for one-

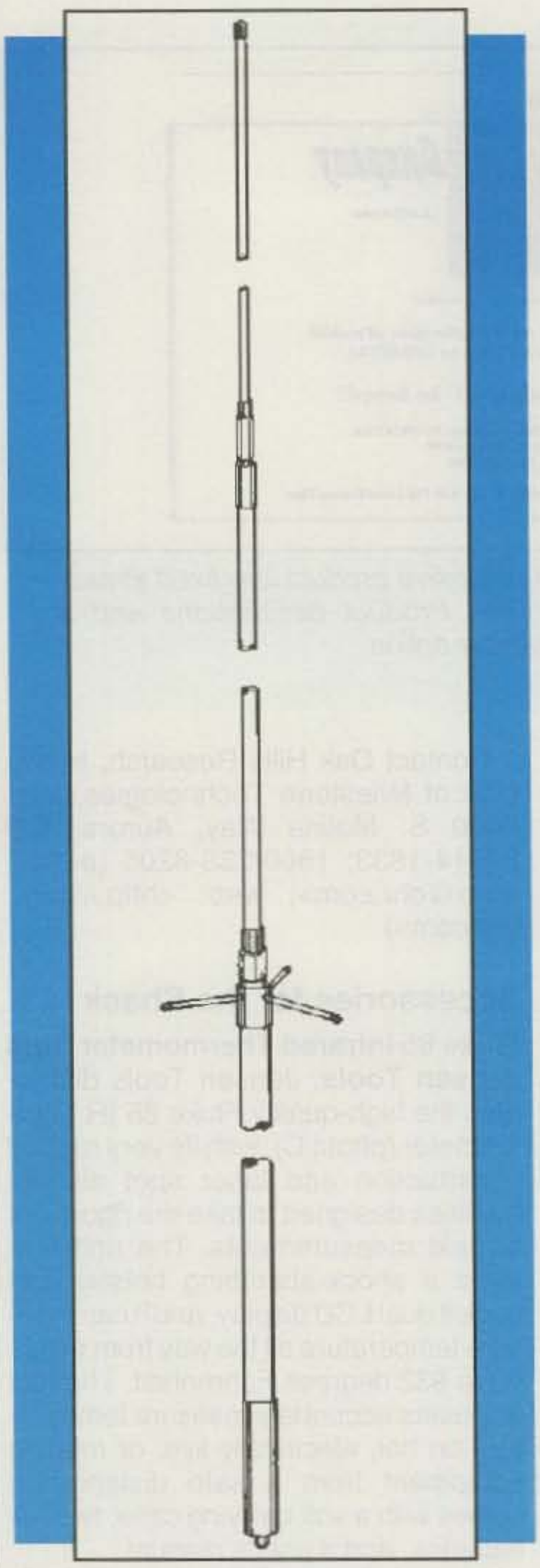


Photo D– This sketch shows construction details of the new Anttron 8010-B vertical antenna for 80–10 meters. The 18 foot antenna weighs just 7 lbs. and is rated at 250 watts PEP. (Photo courtesy Anttron Antenna Company)

boom operation on 6 and 2 meters as well as 70 cm.

Of special note is the MA5B, also known as The Director. Cushcraft's new multiband HF antenna provides five-band directivity in a package small enough to mount to a tripod. The MA5B embraces a design that does not sacrifice ruggedness, performance, and power handling for size and ease of installation. Covering 10, 12, 15, 17, and 20 meters, the antenna is designed to be easy to tune and turn, and it sports low SWR and rugged construction. The antenna has a single feedpoint, meaning that only one coax feedline is needed for all five bands.

For more information and pricing, contact Cushcraft Corp., 48 Perimeter Road, Manchester, NH 03103 (603-627-7877; e-mail: <sales@cushcraft.com>; web: <http://www.cushcraft.com>). You can download a copy of the Cushcraft catalog, various manuals, and product details from their website.

New 10 Meter Antenna from the Lakeview Company. On several occasions we've profiled the product line of low-cost, high-quality, and good-performing fixed-station and mobile antennas and accessories offered by the Lakeview Company of Anderson, South Carolina. It's now under the leadership of president Mike Swass, KJ6XE.

Scanning Lakeview's latest, eight-page flyer shows several new or improved antenna products. One such item being promoted in their "ten meters is back" magazine ads is the GP-28 10-Meter Ground Plane Antenna, which is priced at $54.95. The 10 foot tall vertical antenna features the proven "Ham Stick"® technology, 1 MHz operating bandwidth, 600 watt power-handling capability, and rugged fiberglass and aluminum construction.

For more information or a catalog, contact Lakeview Co., Inc., 3620-9A Whitehall Rd., Anderson, SC 29626; (864-226-6990; e-mail: <hamstick@hamstick.com>; web: <http://www.hamstick.com>). Product descriptions and a catalog are available online (see fig. 1). Check the "New Products" section of the website for the new and "coming soon" antennas and accessories.

Portable and Mobile Goodies

Anttron Antenna Company Products. I was quite surprised when I dialed up the Anttron® website to learn that the Ohio-based company manufactures over 100 mobile and base-station HF, VHF, and UHF antennas for amateur radio, CB, and business-band use. The company's product lines include a wide variety of mobile antennas, mounting bases, and accessories.

Among Anttron's newest products is the Anttron 8010-B 80–10 Meter Antenna (photo D). The 18 foot, easy-to-assemble, three-section vertical is especially designed for on-the-go RV, park, campground, portable, and Field Day operation; it can be mounted on a tower, fence post, chimney, or other suitable support.

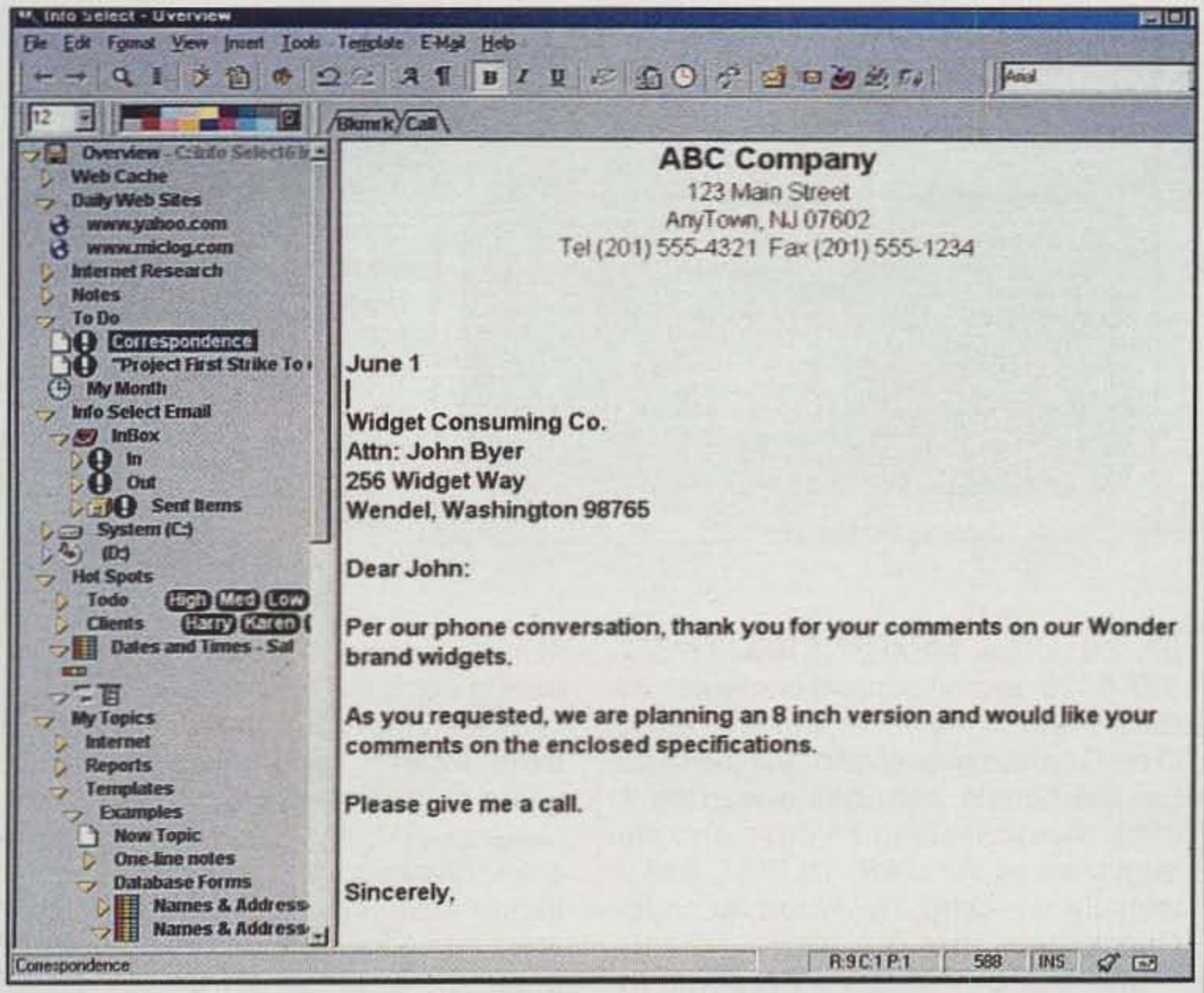


Photo E– Info Select Version 6 from Micro Logic is a full-featured personal information manager (PIM) that provides very fast organizing and access of random information, free-form and structured data management, calendars, scheduling, e-mail management, Web browsing, telephone dialing, and dozens more every-day tools. (Photo courtesy MicroLogic Corp.)

The antenna covers 80–10 meters and handles 250 watts PEP, using transceivers with built-in tuners, automatic tuners, or manual tuners. No ground-plane radials are required, and the antenna is DC grounded for static discharge. The new antenna is retail priced at $124.99, less tuner.

Other popular amateur products include the Hamwhip™ Single Bander HF Mobile Antennas. Nine separate Hamwhip models, each $22.99, are available for each band through 6 meters.

For more information, contact Anttron Antenna Company, P.O. Box 2744, Youngstown, OH 44507-0744 (1-800-837-5516; e-mail: <anttron@juno.com>. web: <http://anttron.tripod.com>).

Software and Computers

Amateur Radio Software from Computer International. In a prior column we noted Cord Schuette, W8/DG8FAI, of Computer International, offered a variety of mostly German- and Swiss-import monitoring and analysis tools and hardware accessories for radio receivers, transceivers, and scanners.

In the January 2000 "Digital Dipole" column we profiled VisualRadio. This powerful software product was created by Liedtke GmbH for professional-quality radio monitoring, including control of computer-ready radios, RF and spectrum display analysis, and database management. We noted that Computer International also offered RadioCom® by Bonito, which combined computer-assisted tuning with digital signal processing (DSP) capabilities for remote control of ICOM radios.

We should now mention some of the other hi-tech products currently offered. One of these is the Wavecom® plug-in. This is a professional, real-time data decoder, analyzer, and processor of radio communication transmissions. Wavecom works in conjunction with all major HF/VHF/UHF/SHF modes.

Also currently offered is the imported ARMAP® series of computer-based Amateur Radio Maps and Logbook, by Dieter A. von Plettenberg, DL7FU. In this comprehensive software package, over 300 maps and graphics are integrated into what is billed as "the outstanding alternative logging program." Coming soon from Computer International is "HAM Label," a software program to let you design and create your own QSL cards.

For more information, contact Computer International, 207 South Old US

Photo F– A topnotch Grundig shortwave radio is the Satellit 800 Millennium, pictured here. The radio is among the many profiled in the new book Grundig Satellit—All Models in Word and Picture, *by Thomas Baier, which provides the details for each model of the famous Grundig Satellit series (Photo courtesy Lectronix/Grundig)*

27, St. Johns, MI 48879-1903 (1-877-977-6918; e-mail: <info@computer-int.com>; web: <http://computer-int.com>). (The German publisher of VisualRadio, Liedtke GmbH, also has a website at <http://www.visualradio.de>; and the publisher of ARMAP, DL7FU, has a website at <http://www.armap.com>. Check these sites out, too.)

Info Select Version 6 Personal Information Manager (PIM). The new, web-oriented Info Select Version 6 from Micro Logic (photo E) is a full-featured PIM that provides very fast organizing and access of random information, free-form and structured data management, calendars, scheduling, e-mail management, web browsing, telephone dialing, and dozens more everyday tools.

Micro Logic developed Info Select, in its current Version 6 implementation, to best assist us in making sense out of and effectively managing the full spectrum of diverse, fragmented, and seemingly random information that we tend to come across and must use every day. Such information typically includes copious notes, voluminous information collected from web surfing, endless e-mails, and lots of difficult-to-classify miscellaneous data.

New to Version 6 are over 100 features and improvements to simplify use and help you accomplish more with the product. Highlights of the major upgrade include several new e-mail features, a new internal web-page viewer, a web cache search capability, document scanning, a built-in file manager, a handy "To-do" icon to mark priority items, compatibility with external databases, user-customizable menus, full synchronization with Palm Organizers, diary, or journal notes, and much more.

Info Select Version 6 is $149.95, but previous users may upgrade for $99.95. For more information, contact Micro Logic Corp., P.O. Box 70, Hackensack, NJ 07602 (201-342-6518; e-mail: <info@miclog.com>; web: <http://www.miclog.com>).

DFX™ Audio Enhancement Plug-in from Power Technology. In recent years many thousands of radio broadcasters—AM, FM, shortwave, and others—have migrated to the internet to distribute their signals. In fact, there even are a number of amateur-radio-oriented programs available for internet-based listening. The ARRL, for one, offers the "ARRL Audio News"; the audio webcast program contains highlights from the weekly publication, *The ARRL Letter*. It's at <http://www.arrl.org>.

There are several streaming audio transmission formats that are used for this purpose, and you must have the appropriate media player or jukebox installed on your PC to receive and listen to such programs. You may, for example, use the popular RealPlayer™, a free download from <http://www.real.com>. You may also use the free MusicMatch™ Jukebox, downloadable at <http://www.musicmatch.com>. There are several others.

The media player allows you to hear internet webcasts, generally with a "standard AM broadcast band" quality. This so-so audio quality leaves something to be desired, especially when listening to music. Enter the DFX Plug-in from Power Technology.

DFX dramatically enhances the listening experience for users of internet audio formats. DFX does this by correcting for the "sonic limitations" of the popular data-compressed internet audio formats, which include loss of high- frequency fidelity and loss of stereo separation and depth. Correcting for these deficiencies, the DFX plug-in lets you adjust and enhance parameters such as fidelity, ambience, 3D surround-sound processing, dynamic boost, and low-frequency compensation.

DFX is available in separate versions to support a variety of players and juke-

boxes, including Nullsoft Winamp, RealPlayer™ and RealJukebox™, Sonique™, Media Jukebox, and MusicMatch™. These versions are under $30. Also available is a "DFX Master Pack" combo to support a variety of different players; it's under $40. While the DFX plug-ins aren't free, as are most players, I've used them and find they really do work.

For more information, contact Power Technology, 100 Northill Drive, Bldg. 24, Brisbane, CA 94005 (e-mail: <dsphelp@dspfx.com>; on the web: <http://www.fxsound.com>). You can download and pay for the DFX plug-ins online.

From the Bookshelf

Two from Universal Radio, Inc. A recent book distributed by Universal Radio jumped out at me. As one who highly respects most any radio gear carrying the Drake label, I just had to read it. The book was the intriguing, nostalgic *A Family Affair—The R. L. Drake Story,* by John Loughmiller, KB9AT. While Drake essentially exited amateur radio more than 20 years ago, through the new KB9AT book its presence in amateur radio lives on.

This is the story of the famous R. L. Drake Company, focusing on the firm's glory days, when Drake was "king" in amateur radio equipment. Almost every amateur radio operator and shortwave listener knew R. L. Drake from the outside, but now the inside, behind-the-scenes story of this extremely interesting company is told. The book also includes a large section of useful circuits and modifications for many Drake radios. Thus, the 300-page book is both an interesting read and an excellent technical reference, and so it's a bargain at $29.95 plus s/h.

As a fan of the popular Grundig Satellit portable shortwave receivers (photo F), I also was interested in the 126-page, 19-chapter *Grundig Satellit —All Models in Word and Picture,* subtitled "A Grundig Radio Guide,"by Thomas Baier Printed in Germany but written in English, this guidebook is a good reference source that provides the details for each model of the famous Grundig Satellit series. Lots of photos, facts, and specifications for every member of this venerable line over the period 1964 to 2000 are provided; some 120 black-and-white photos are included. The book is $19.95.

The two books are distributed by Universal Radio, Inc., 6830 Americana Parkway, Reynoldsburg, OH 43068-4113 (1-800-431-3939; e-mail: <dx@universal-radio.com>; web: <http://www.universal-radio.com>).

Fair Radio Sales Catalog. Over the years, the radio and electronics surplus market has changed considerably as military surplus has decreased in availability and usability, at least for radio amateur purposes. Today, much of the surplus market is conducted by mail-order only, and few "radio rows" exist anywhere.

A reputable mail-order firm that since 1947 has offered military, government, and industrial radio surplus is Fair Radio Sales. A surprising number of the items featured in the Fair Radio Sales catalog are not of the questionably useful "boat anchor" type, but actually are useful to radio amateurs.

For a free catalog, contact Fair Radio Sales Co., Inc., 1016 E. Eureka St., P.O. Box 1105, Lima, OH 45802 (419-227-6573; e-mail: <fairradio@fairradio.com>; web: <http://www.fairradio.com>. Everything that's in the catalog is on the website. The site also has listings and photos of featured items. It even has a link to the popular eBay™ auction website, which helps facilitate ongoing auctions of Fair Radio Sales items.

Wrap-Up

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

Overheard: When I get going on a project, I find that I often run out of money before I run out of time or enthusiasm.

73, Karl, W8FX

March Column Correction

In the March issue we listed an incorrect web address for Zed Zed's Amateur Radio Clip Art. The correct one is <http://www.qni.com/~kg0zz/amateur_radio/clipart.htm>. Also, the website for the K2MPE Two-Way radio Troubleshooters Page <http://www.ckradio. com> seems to be down (or may have been moved) as of this writing. —*W8FX*

DX

BY CARL SMITH, N4AA

News Of Communication Around The World

DXpeditions Abound

Well now, the silent majority has been awakened. My comments in this column over the last few issues, as well as comments by others on the subject of operating ethics, have generated more response than anything in recent memory. Obviously there are a lot of you who don't appreciate what you have been exposed to in recent years by that vocal minority. *Good!* I had to chuckle when I saw one response that quoted an old saying. I don't remember the source, but it says, "We have met the enemy and it is us." Or, as another of those old sayings goes, "If the shoe fits, wear it." Having said all of the above, now all we have to do is do something about it. Thank you for supporting our cry for common sense and decency in operating habits. Hopefully, together we can make a difference.

The 4H2B IOTA DXpedition. Members of the CW Philippines Radio Club activated a number of Philippine islands in February. Here is Dr. Ed Soriano, 4F1OZ, operating station 4H2B on Batan Island (OC-093). (Photo courtesy Terry, KB4KA)

Dayton 2001

We are on the verge of yet another of those great weekends in Dayton. I'm looking forward to seeing a lot of you there in just a few weeks. Having the DX and Contest Forums back in the arena area will help a lot in keeping everyone together for more of each day. Don't forget to drop by the *CQ* booth area, as well as booth #313, and at least say hello. Glenn, WØGJ, will be at booth #313 on Friday and Saturday from noon to 2 PM with his logs and QSLs for the A5 operation by him and his family in January of this year. He will probably have copies of the fabulous A52A video produced by James Brooks, 9V1YC, available for sale. If you haven't seen this one, it is absolutely outstanding.

D68C – Comoros

The Five Star DXers Association operation from Comoros was successful beyond their wildest dreams. This group set more DXpedition records than you can count. With over 168,000 QSOs they have set a record that will not be broken for a long time. With outstanding equipment and operators, they were on the air almost constantly for three weeks in February on every band and mode you could ask for. If you didn't make at least a handful of contacts with D68C, you just weren't on the air. Online log checking, up to the minute, made things a lot easier for everyone. QSLing is being handled by G3SWH and should be well underway by the time you read this column. Our heartiest congratulations to the organizers of this DXpedition. Well done, gentlemen!

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

BQ9P – Pratas

Paul, BV4FH, and friends made a return trip to Pratas in early March for about ten days. They are being reported on a number of bands, including 40 meters, as this is being written. As usual Steve, KU9C, will handle the QSLing for this operation.

3D2CI – Conway Reef

This team did as well as they could under the conditions on the reef. A full-blown typhoon came along late in the operation and forced their early departure. They just barely made it back to Fiji, "seasick, but alive" as one report indicated.

3GØY – Easter Island

This group of Chilean and German ops put on a good show back in March for about three weeks, providing many folks with contacts. They spent a lot of time on the low bands and WARC bands, giving out a lot of new band-countries from Easter Island. QSLs were to be handled by DK7YY.

3YØC – Bouvet

Astronaut Chuck Brady, N4BQW, wrapped up his two-plus months on this Antarctic island on March 6th when the ship took him and the Norwegian scientists off the island. It was a very difficult operation with weather-related problems almost constantly. A generator problem threatened to cut short the entire operation before they were able to make necessary repairs. High winds kept tearing down antennas almost as soon as they were put up, and a balky amplifier kept Chuck limited to just 100

The WPX Program

SSB

2783 ..... S51ST
2784 ..... IZ1AOK
2785 ..... G3TSZ
2786 ..... KA9HFA
2787 ..... EA5DHK
2788 ..... EA1CKK
2789 ..... EA5CFZ
2790 ..... UA1AFZ
2791 ..... OK1XTB

Mixed

1876 ..... S58M
1877 ..... EA5AIA

CW

3060 ..... EA1EXE
3061 ..... DL5CF
3062 ..... 9A1CZZ
3063 ..... W1DWA
3064 ..... JL1FXW

CW: 350 EA1EXE, JL1FXW. 400 WaDWA. 550 EA5DHK. 750 DL5CF. 1000 K6UXO. 2450 W8UMR.

SSB: 400 KF3AA. 500 IZ1AOK, G3TSZ. 600 VE7SMP. 650 EA5TC. 900 S51ST. 1100 AK7O. 1200 EA7CD. 1750 W9JDX.

MIXED: 450 EA5AIA. 1000 K6UXO. 1900 ON4CAS. 2600 W8UMR.

10 meters: K6UXO, W1DWA
15 meters: EC5CFZ
20 meters: S51ST, E4/G3WQU
40 meters: S51ST, EA7CD
80 meters: S51ST

Asia: EC5CFZ
No. America: KA9HFA
So. America: K6UXO
Europe: EA5DHK, EC5CFZ, W1DWA
Oceania: EA7CD

Award of Excellence Holders: K6JG, 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, YB0TK, 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.
160 Meter Endorsement: K6JG, 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, SM0AJU, 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.

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.

The WAZ Program

Single Band WAZ

10 Meter SSB

514 ..... EA5GPQ
515 ..... EA5BRE
516 ..... PY2BW
517 ..... JA9PQ
518 ..... W7TSQ
519 ..... W6YJ

15 Meter SSB

547 ..... JA8VJ
548 ..... EA5BRE
549 ..... PY2BW

17 Meter SSB

24 ..... EA5GRB

20 Meter SSB

1073 ..... EA5GPQ
1074 ..... EA5BRE

10 Meter CW

160 ..... PY2BW
161 ..... KØDEQ
162 ..... W6YJ

15 Meter CW

286 ..... PY2BW

20 Meter CW

511 ..... NIØC

30 Meter CW

40 ..... N4JJ
41 ..... PY2BW
42 ..... W7LGG

160 Meters

69 ..... N4JJ (endorsement 37, 38, 39 zones)
101 ..... G4BWP (endorsement 38 zones)
135 ..... IK1GPG (endorsement 37 zones)

All Band WAZ

SSB

4623 ..... KF8PD
4624 ..... IK2QEL
4625 ..... IK4NZD
4626 ..... I7FMN
4627 ..... DS5WQT
4628 ..... VE3DMJ
4629 ..... EA5GPQ
4630 ..... SM3GBA
4631 ..... CE8EIO
4632 ..... XE1JRV
4633 ..... IØUVP
4634 ..... IK2QPR
4635 ..... N8KOJ

Mixed

8012 ..... W9XF
8013 ..... NØTW
8014 ..... KF9WV
8015 ..... I1UP
8016 ..... PY7YL
8017 ..... JH3EGJ
8018 ..... JL1FXW
8019 ..... RA3AJ
8020 ..... AA8TC
8021 ..... NX4W
8022 ..... W6NUC

All CW

227 ..... DH2FW
228 ..... PY7IQ
229 ..... IK2QPR
230 ..... K9MM
231 ..... K4DGJ

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>.

watts. In spite of all these problems, Chuck managed to get on some band to pass out as many contacts as possible in the time he had for operating. The exact number is not known, but rumor has it that he made some 10,000 contacts. This should surely drop Bouvet down on the Most Wanted lists for this year. QSLs are being handled by Mac, WA4FFW, at his callbook address.

HKØ – Malpelo

Pedro, HK3JJH, scheduled the entire month of April on the island. He has made a number of trips to Malpelo in recent years for shorter periods of time. This time he had a new IC-706 to take along. Access to the island makes taking an amplifier virtually impossible, but the new radio is expected to help. QSLing difficulties of the past are being eliminated this time, with those chores being taken over by Carl, N4AA. Yes, I have agreed to act as the QSL Manager for Pedro and have arranged the donation of the cards for him. Along with volunteers Lynn, W4NL, and his wife Rosie, KA4S, we will be accepting *direct* requests at the N4AA address – P.O. Box DX, Leicester, NC 28748-0249. We will also handle bureau requests sent to N4AA via the W4 Bureau, as usual after the direct requests are taken care of. E-mail requests for a return card by the bureau will also be accepted. Those requests, with full QSO details, should be sent to <N4AA @dxpub.com>. This arrangement is *only* for the April 2001 operation. No log information is available at this time for previous operations by Pedro.

HZ – Saudi Arabia

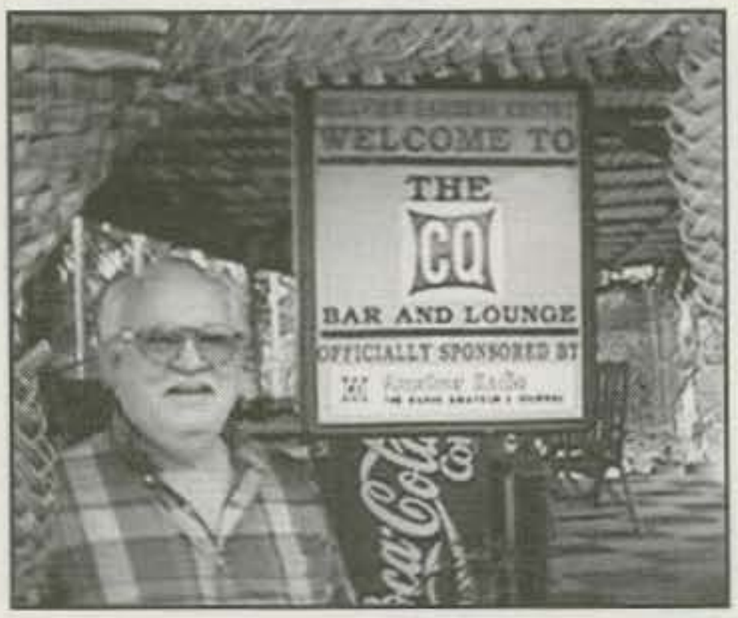
A couple of items on operation from Saudi Arabia came up recently. The station 7Z1AB, operated for a long time by Mike, K3UOC, was shut down and dismantled when he left the country. I'm told there is an effort to re-establish this station. Jim Lane, KN4F, was the QSL Manager for 7Z1AB and still has the logs and QSL cards, if anyone still needs confirmation.

The other news reported by the "425 DX News" was that Joe, W5FJG, had been assigned to the American Consulate in Jeddah for two years. He had received permission from the government to operate from the consulate as 7Z1AC. He expected to be on the air in April. Web page <http://sites.netscape.net/joeyjeep99usa/homepage> was to provide operating updates as well as on-line log info. WA4JTK was listed as the QSL Manager.

VP8SDX – Falklands

Tom, GM4FDM, says four members of the GMDX Group are going to the Falklands, April 22 – May 9. They will leave the UK Sunday, April 22 and expect to arrive Monday afternoon (April

The 9H3DLH DXpedition by the Lufthansa ARC of Frankfurt in February. The operators in the photo (left to right): Tom, DC9PO; Karl-Heinz, DL4FP; Heinz, DL1FDS; Bernd, DK7TF; Bernd, DG5FCN; Guenter, DK6ZZ; Rudi, DK7PE; and Jochen, DL3MH. (Photo courtesy Rudi, DK7PE)



Don, K6IPV/9M6IPT, poses at the brand-new poolside "CQ Bar," sponsored by CQ magazine, at the Hillside Gardens Resort. Don and Dave, W6AQ, operated from here in the ARRL DX CW contest as 9M6V. (Photo courtesy Bob, N2OO)

23). Check their web page <www.hfdx.co.uk/vp8sdx> for the latest info, pictures, equipment, etc. Tom hopes to have the logs on-line as well.

Direct QSLs go to GM4FDM. If there is no SAE or insufficient funds for postage, the return QSL will be sent via the bureau. E-mail requests for QSLs will be accepted. The return QSL will be sent via the bureau. Please do *not* send a paper card via the bureau as well.

Bureau QSLs will be answered in the normal way. Before sending a QSL, please check the on-line Log Search to ensure that your QSOs are valid. This will avoid any problems later on. As Tom is a member of the DXpedition, the QSLing process will start only after his return from VP8. Please be patient.

PWØS – St. Peter & St. Paul Rocks

(By Bill Smith, W9VA/PYØZFO)

The PWØS DXpedition to St. Peter and St. Paul Rocks is now history. Here is a short summary of this incredible DX-pedition. Stick with me on this; it's worth the trip.

"The Rocks" is actually the rim of a submerged volcano some 700 miles off the coast of Brazil in the middle of the Atlantic Ocean. The actual land mass is a small, irregular, broken volcanic reef. There is a reason for PYØS being number 26 on the *DX Magazine* 2000 "Most Needed" list. Under optimum conditions it is difficult to get to, difficult to land on, difficult to find a level area to set up a station—just plain difficult. The risk of damage to equipment and bodies is not insignificant. Check out the photos at the PWØS website: <www.soutomaior.eti.br/mario/paginas/dx.htm>.

Nevertheless, a group of Brazilians (Jim, PY7XC, Ciro, PY7ZY, and Eli, PT7BZ) started out from Recife on February 3 on the 49 foot motor/sailer *Old Smuggler,* stopping off briefly at Fernando de Noronha for a rest and minor repairs. While they were there, Andre, PYØFF, decided to join the group. They arrived at the Rocks on the morning of February 9, finding the sea much too rough to even consider landing. Imagine the frustration at arriving at one of the rarest DX sites in the world with a boat full of equipment and being unable to land. Then imagine bobbing around in this small boat for three more days waiting for a break in the weather. At this point many (most? all?) of us would

5 Band WAZ

As of January 30, 2001, 548 stations have attained the 200 zone level and 1188 stations have attained the 150 zone level.

New recipients of 5 Band WAZ with all 200 zones confirmed:
OH1AA

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)
ABØP, 199 (23)
KL7Y, 199 (34)
NN7X, 199 (34)
IK1AOD, 199 (1)
DF3CB, 199 (1)
F6CPO, 199 (1)
W3UR, 199 (23)
KC7V, 199 (34)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W6SR, 199 (37)
W3NO, 199 (26)
K4UTE, 199 (18)
K4PI, 199 (23)
HB9DDZ, 199 (31)
RU3FM, 199 (1)
HB9BGV, 199 (31)
N3UN, 199 (18)
K4IQJ, 199 (23)
K3NW, 199 (23)
OH2VZ, 199 (31)
K2UU, 199 (26)
W1FZ, 199 (26)
UT4UZ, 199 (6)
SM7BIP, 199 (31)
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)
K4ZW, 198 (18,23)
LA7FD, 198 (3,4)
K5PC, 198 (18,23)
VE3XO, 198 (23,23 on40)
K4CN, 198 (23,26)
KF2O, 198 (24,26)
W6BCQ, 198 (37,34on40)
G3KMQ, 198 (1, 27)
W5BOS, 198 (18,23)
N2QT, 198 (23,24)
OK1DWC, 198 (6,31)

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

RU3FM (199 zones)
G4NXG (153 zones)
EA3KB (188 zones)
IK6GPZ (188 zones)
N7WO (180 zones)
OE1WHC (175 zones)
K9XD (166 zones)

Endorsements:
K6FG (193 zones)
W4DC (196 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 at e-mail: <k5rt@cq-amateur-radio.com>.

QSL INFORMATION

3E500AC to HP1RCP
3G0Z to CE1VLY
3W2DK to N0ODK
3W7CWSP5JTF to
3Y0C to WA4FFW
4J4K to PA3EPG
4L1UN to IK7JTF
5T5YD to F6FYD
5U7DG to K4SE
5W1SA to JH7OHF
5X1GS to WB2YQH
5X1P to G3MRC
7Q7DC to G0IAS
7Q7KZ to JA2LZF
8Q7DV to UA9CLB
9G1BJ to GM0FQV
9G1TM to GM0FQV
A22DX to ZS1FJ
A52DX to JF1PJK
C21HC to DL9HCU
C56/G2YT to G2YT
C56RF to G3NKO
C6AGS to KI6T
CE9/R1ANF to RK1PWA
CN8RM to IK7YZG
CT3FN to HB9CRV
CV0F to CX2FR
D68BT to EA3BT
D68WL to EA3BT
ED2XXI to EA2RCF
EF2XXI to EA2RCF
EK1700GM to IK2QPR
EK1700WY to IZ8CLM
EM1KY to UT7UA
ER0ITU to ER1DA
ER1A to ER1DA
ER1CW to ER1DA
ER2000A to ER1DA
ER2000L to ER1LW
ER200P to ER1DA
ER27A to ER1DA
ER50A to ER1DA
ER50CE to ER1DA
ER7A to ER1DA
ER8C to ER1DA
ER9V to ER1DA
EY8JJ to LA5JX
FG/JE2YRD to XW2A
FH/DF2SS to DL2MDZ
FO0KUN to JA8VE
3D2AD 2000/2001to YT1AD, Hranislav Milosevic, Lenjinov Bulevar 10-E 254, 11070, Novi Beograd, Yugoslavia
4N1DX to Zrinko Zibert, 99 palih boraca 7, 11277 Ugrinovci, Yugoslavia
5B4AGW to Dez Watson, C.A.O., JSSU (AN), BFPO 59, Cyprus
9M6CT to Philip Weaver, P.O. Box 7, Bangkok 10506, Thailand
BA4DW to David Y. J. Zhou, P.O. Box 040-088, Shanghai, 200040, P.R China (ba4dw@qsl.net)
BQ9P 2000 to KU9C, Steve Wheatley, P.O. 5953, Parsippany, NJ 07054 USA
BV2A to T Chen, P.O. 30-547, Taipei, Taiwan
DL2MDZ to Rainer Kuehnberger, Hofer Str. 54, D-95233 Helmbrechts, Germany (DL2MDZ@t-online.de)
DS4CNB to Dae Ryung Lee, Kwangsan P.O. 111, Kwangsan-gu, Kwangju 506-050, Rep of Korea
EP2FM registered mail to Abdollah Sadjadian, P.O. Box 16765-1187, Tehran, Iran (as@neda.net)
EP3SMH to P.O. Box 17665-441, Teheran, Iran
ER1DA to Valery Metaxa, P.O. Box 3000, Kishinev, MD-2071 Moldova, Europe
FR5FD to Patrick Lebeaume, 40 rue Louis Desjardines, Bois de Nefles, F-97411 Saint Paul, Reunion Island via France
GM0FQV to John Black, Solway View, Carlisle Road, Annan, DG12 6QX, Scotland
H44NC to Norried Chaisson, P.O. Box 168, Munda, Western Province, Solomon Islands
HF0POL 2000 to SP3WVL, Tomasz Lipinski, Ul.l Paderewskiego 24m 1, 69-100 Slubice, Poland
HR1RMG to Rene Mendoza Garay, P.O. Box 1000, San Pedro Sula, Honduras (hr1rmg@yahoo.com)

(The table of QSL Managers is courtesy of John Shelton, K1XN, editor of "The Go List," P.O. Box 3071, Paris, TN 38242; phone 901-641-0109; e-mail: <golist@wk.net>.)

have said "the heck with it" and headed for home. They didn't.

The seas subsided enough on the morning of Monday, February 12 to attempt a landing, and they were able to get some equipment ashore and operating by 2100Z. The bad weather continued with high winds, lightning, and rain frequently interrupting operations. If you were searching and not finding them during these periods, now you know why.

Because of the three-day delay in landing, by Friday, February 16 the group was already way overdue getting home to their families and jobs. Supplies were running out. The weather was such that they could safely get themselves and equipment off the Rocks, and the sensible decision to leave was made. Their bad luck continued as the boat encountered problems on the way home, and it was necessary for three operators to fly from Fernando de Noronha to Recife, further adding to the expense.

The final QSO count was around 7800. Obviously, the final tally is well below expectations, but is still 7800 contacts that would have not been made at all without incredible courage and devotion to our hobby. Many picked up an "all-time new one," the real objective of this operation. Others gained a rare country on a new band or mode. An effort was made to spend at least a little time on all bands, all modes, including RTTY. I have particular respect for the DXers who were not in the pile-ups so that others would have a better shot at a new one.

Many of us have carried or shipped our FT-1000s and Alpha amplifiers down to a Caribbean island or walked into a well-equipped, air-conditioned turn-key shack for a little fun in the sun and the thrill of being at the other end of the pile-up. Now picture the opposite end of that continuum: PW0S was a grass-roots, low-budget operation to one of the rarest and most difficult uninhabitable pieces of rock in the world. Well-used equipment was scrounged together from many sources, laptops were borrowed, favors were called in. The callsigns of these four fellows may not have instant recognition, but to me they are what DXing is all about.

CQ DX Awards Program

CW

1017	OK2SJ	1018	VE2ME

SSB Endorsements

320	N5FG/333	320	VE7WJ/331
320	EA2IA/333	320	VE2GHZ/330
320	VE4ROY/332	320	YV1JV/330
320	YV1KZ/332	320	KD8IW/328
320	YV1AJ/332	320	I0SGF/326
320	W2FXA/332	200	KU4BP/202

CW Endorsements

320	EA2IA/333	320	K4JLD/323
320	W2FXA/333	275	KD8IW/286
320	G4BWP/332	200	OK2SJ/225
320	N5FG/331		

RTTY Endorsements

300	G4BWP/307

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

CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries. With few exceptions, the ARRL DXCC Countries List is used as the country standard. The CQ DX Award currently recognizes 333 countries. Honor Roll listing is automatic when an application is received and approved for 275 or more active countries. Deleted countries do not count and all totals are adjusted as deletions occur. To remain on the CQ DX Honor Roll, annual updates are required. All updates must be accompanied by an SASE if confirmation of total is required. The fee for endorsement sticker s is $1.00 each plus SASE. Please make checks payable to the awards manager, Billy F. Williams. All updates should be mailed to P.O. Box 9673, Jacksonville, FL 32208.

CW

K2TQC 333	W2FXA 333	N4JF 331	PAØXPQ 328	IT9TQH 326	YU1AB 325	VE7DX 320	W3II 312	F6HMJ 296
K2FL 333	EA2IA 333	YU1HA 331	K8PV 327	4N7ZZ 326	K8LJG 324	W4UW 319	N4OT 311	WG7A 295
K6JG 333	WØHZ 332	WA4IUM 331	W4QB 327	VE7CNE 326	DL3DXX 324	HA5NK 319	KF8UN 308	KD8IW 286
K9BWQ 333	W7CNL 332	F3AT 331	I1JQJ 327	WA8DXA 325	I2EOW 324	SM5HV/HK7 317	PY4WS 308	W9IL 282
K2ENT 333	N7RO 332	N5FG 331	I4EAT 327	N5FW 325	N4AH 324	G3KMQ 317	WG5G/QRPp 307	EA3BHK 282
N7FU 333	K4IQJ 332	W2UE 330	DL8CM 327	IK2ILH 325	LA7JO 324	YU1TR 316	IKØADY 307	F5OIU 282
K3UA 333	K2JLA 332	W6DN 330	SM6CST 327	9A2AA 325	NØFW 324	K8JJC 315	W7IIT 305	YC2OK 282
K9MM 333	K4CEB 332	W8XD 330	N4KG 327	OK1MP 325	W6SR 323	OZ5UR 315	W6YQ 305	XE1MD 278
K2OWE 333	G4BWP 332	K9IW 329	WØJLC 327	W4LI 325	9A2AJ 323	K1FK 315	KE5PO 304	EA2CIN 278
N4MM 333	K6LEB 331	IT9QDS 329	I4LCK 327	K3JGJ 325	K4JLD 323	HB9DDZ 314	N7WO 303	I3ZSX 276
W4OEL 333	PT2TF 331	KZ4V 329	KA7T 327	K1HDO 325	KUØS 322	N1HN 313	LU3DSI 302	G3DPX 275
W7OM 333	K6GJ 331	K4CN 329	N4CH 327	I5XIM 325	HA5DA 321	CT1YH 313	YU7FW 301	
F3TH 333	K2JF 331	WB4UBD 328	K7LAY 326	K5UO 325	K6CU 321	K9FYZ 313	KH6CF 300	
WB5MTV 333	W1WAI 331	DJ2PJ 328	NC9T 326	N5HB 325	K7JS 321	K9DDO 312	K9HQW 299	

SSB

K4MZU 333	N7RO 333	EA4DO 331	K8CSG 330	SM6CST 327	IØSGF 326	DL3DXX 320	WR5Y 310	YV5NWG 287
K2TQC 333	IK8CNT 333	PT2TF 331	LA7JO 330	W3GG 327	KE5PO 325	AE5DX 320	SV3AQR 310	KK4TR 286
K2FL 333	VK4LC 333	XE1VIC 331	W9SS 330	CX4HS 327	YV5AIP 325	KB1HC 320	K7HG 309	RW9SG 286
W6EUF 333	N5FG 333	W3AZD 331	VE2WY 330	IT9TQH 327	K9IW 325	EA1JG 320	EA3BHK 307	VE7HAM 285
K2JLA 333	DJ9ZB 333	WA4WTG 331	W8AXI 330	IT9TGO 327	WA4JTI 325	EA7TV 320	N1ALR 306	F5RRS 284
K6JG 333	EA2IA 333	N4JF 331	WS9V 329	WD8MGQ 327	W8KS 325	SV1RK 320	XE1MDX 305	CT1CFH 284
K6GJ 333	XE1L 333	EA1JG 331	I2EOW 329	I1EEW 327	KC4MJ 325	N6RJY 319	EA5OL 305	WØIKD 283
K2ENT 333	W6BCQ 333	VE1YX 331	K2JF 329	SV1ADG 327	IKØIOL 325	CT1EEN 319	YT1AT 305	EA3CYM 283
K6YRA 333	W4UW 332	VE3MR 331	W7FP 329	DL8CM 327	K3JGJ 324	WA4DAN 319	WB2AQC 305	K7ZM 282
K4MQG 333	OE7SEL 332	K1UO 331	DU1KT 329	KE4VU 327	AC7DX 324	EA3EQT 319	K6CF 304	WN6J 281
K7LAY 333	K4JLD 332	YV5IVB 331	4Z4DX 329	I1JQJ 327	KØHQW 324	CE1YI 318	KC4FW 304	CP2DL 281
IK1GPG 333	I8KCI 332	VE3XN 331	VE7DX 329	F9RM 327	ZL1BOQ 324	EA5GMB 317	EA5GMB 304	F5JSK 281
K5OVC 333	OE2EGL 332	PY4OY 331	K4CN 329	XE1MD 327	EA3BKI 323	YV4VN 317	YC2OK 303	N5WYR 281
NØFW 333	WB4UBD 332	I8LEL 331	ZL1AGO 329	I4EAT 327	K4JDJ 323	CT1AHU 316	WB2NQT 303	YU1TR 280
OZ5EV 333	WØYDB 332	OE3WWB 331	N5FG 329	CT1EEB 327	W9IL 323	N5HSF 316	VK3IR 303	KK5UY 280
K9MM 333	WB3DNA 332	DL9OH 331	W2JZK 328	W2CC 327	WW1N 322	K6RO 316	W5GZI 302	KA5OER 280
ZL3NS 333	K5TVC 332	N2VW 331	KZ4V 328	W9OKL 327	F6BFI 322	WA4ZZ 315	N5QDE 302	N1KC 278
N4MM 333	K9BWQ 332	KX5V 331	WDØBNC 328	W5RUK 327	LU7HJM 322	K7TCL 315	KD4YT 302	EA3CWT 278
OZ3SK 333	KØKG 332	VE7WJ 331	K1HDO 328	DL6KG 326	K5NP 322	WB8ZRV 314	LU3HBO 301	9A9R 277
N4CH 333	W4NKI 332	K3UA 330	KF8UN 328	W6SR 326	NI5D 322	NØMI 313	YT7TY 300	VE2DRN 277
IØZV 333	VE2PJ 332	VE3MRS 330	K5UO 328	N4KG 326	PY2DBU 322	K9YY 313	LU5DV 300	XE2NLD 277
YU1AB 333	VE4ACY 332	W6DN 330	N5ZM 328	W4QB 326	N3RX 321	KD5ZD 312	SV2CWY 300	W6UPI 276
W7OM 333	VE4ROY 332	WA4IUM 330	PAØXPQ 328	K8PV 326	EA8TE 321	VE3CKP 311	K6GFJ 299	VE2AJT 275
KZ2P 333	YV1KZ 332	ZL3NS 330	W6SHY 328	YZ7AA 326	XE1CI 321	CT1YH 311	4X6DK 297	Z31JA 275
K7JS 333	YV1AJ 332	XE1AE 330	K9PP 328	W4LI 326	W6MFC 321	W5OXA 311	OA4EI 292	
DU9RG 333	W2FXA 332	I4LCK 330	K9HQM 328	K6BZ 326	KØFP 320	WX3E 311	KØOZ 291	
W4UNP 333	W8ZET 332	4N7ZZ 330	KD8IW 328	W4WX 326	N4CSF 320	HA6NF 310	KE4SCY 291	
N7BK 333	K9FYZ 331	YV1CLM 330	AA6BB 327	W2FKF 326	N4HK 320	K3LC 310	EA5GMB 287	

RTTY

K2ENT 331	W2JGR 316	G4BWP 307	W4EEU 291	EA5FKI 284	YC2OK 280	KE5PO 274
WB4UBD 325	K3UA 315	NI4H 305	I1JQJ 289	W4QB 280	I2EOW 278	PAØXPQ 272

The operators of the YK9A DXpedition in February. Standing (left to right): Rosalie, N4CFL; Lee VE7CC; Fadil, YK1AH; Dick, N7RO; Omar, YK1AO; Melissa, VA7MI; and Jim, W4PRO. Kneeling (left to right): Al, K7AR; Carl, K9LA; Vicky, AE9YL; and Bob, W4DR. (Photo courtesy Carl, K9LA)

Because of the extreme adverse conditions, PWØS expenses ran well above expectations. If you worked them, please include with your QSL request to KU9C extra bucks in appreciation of what these guys did for you. If you would otherwise like to show your support for this type of operation, I am consolidating contributions and will forward to Brazil. You may also want to bring this story to the attention of your DX club; significant contributions will be recognized on the QSL card.

PWØS Operators: Jim Faria, PY7XC (leader); Ciro da Silva, PY7ZY; Eli Pinheiro, PT7BZ; and Andre Sampaio, PYØFF.

PWØS QSL Manager: Steve Wheatley, KU9C, P.O. Box 5953, Parsippany, NJ 07054 USA.

PWØS Coordinator: Bill Smith, W9VA, 1345 Linden Ave., Deerfield, IL 60015 USA.

Note: Do not worry that contributions may exceed expenses. If that happy event should occur, all excess contributions will be placed in a fund for future PYØS/PYØT operations.

—Bill, W9VA/PYØZFO

I've run a bit long this month, but hopefully I have provided you with some good and interesting reading material. Until next month . . .

73, Carl, N4AA

Our Readers Say

"Green Flame" Letters

The following are just several of the letters sent to "Keeping the Green Flame Burning" author Mike Bryce, WB8VGE. Either this is an incredibly popular topic or Mike paid off all his friends to write!

Hi, Mike:

Congratulations on the great article in *CQ*. I've been collecting Heathkits for some time. My current collection includes over 110 various products from Heath. Mostly ham gear with some test equipment and a floor clock and metal detector thrown in for good measure. Most of the equipment is untested since acquisition, but my SB-102 has been my primary rig since 1978!

We moved into a new house last year, and the plan is to put the station in order this winter and start restoring the equipment as needed. I've attached a picture of some of the equipment as set up at my previous residence. It includes the 102 with accessories, a SB-110 and SB-500, SB-300/400 pair, SB301/401 pair, and SB-303/ 401 pair, and well as many others.

73 & keep up the good work. I'm anxious to see future articles. (How about one on the SB-110?)

Ken Allen, KB8KE
Dayton, Ohio

Hi, Mike:

Although I have built and owned (and still do) several Heathkits over the years, I never paid much attention to the HW-16. It came along after my Novice days, so I built the single-band rigs and the HW-101 after my favorite build, my Novice rig, DX-20. I must say you made the HW-16 sound interesting to me, a feat that even Heathkit marketing was not able to do! Thanks for the good article. I would like to see an article in your series on what I suspect is the most popular Heathkit still in daily use, the SB-220 amplifier. Mine seems indestructable, and from the number of them I hear hams using today, most of them must still be on the air. So, how about it? I am looking forward to the HW-101 article (I have two of them if anyone needs one!).

John, AD1E

Kudos for W3ASK

The following letter was addressed to CQ Propagation Editor George Jacobs, W3ASK:

Hi, George: I just finished reading your column in the February issue of *CQ* and noted that the March issue will mark 50 years that your column has been continuously published. *Congratulations on a job well done!!*

I think that I can safely say I have read each and every column you have written over all those years. In fact, I relied heavily on the knowledge I gained from reading your columns to write my thesis on "Factors Affecting the Propagation of HF Radio Signals" associated with obtaining a Bachelor of Science Degree in Electrical Engineering at the University of New Brunswick in 1961.

Since then I have been an active DXer and contester and have always used the information in your columns as an aid in planning my operating strategy for these events.

Thanks for making such a major contribution toward the betterment of amateur radio over the years which has helped us all maximize the enjoyment we can obtain from our hobby. I look forward to being able to read your future columns for many years to come.

Lin Titus, VE9FX
Fredericton, NB Canada

Contesting

BY JOHN DORR, K1AR

News/Views Of On-The-Air Competition

Is This Frequency in Use?

May's Contest Tip of the Month

It's a good idea to ask multi-operator stations what other frequencies they are using while searching and pouncing. The good operators never hesitate to provide an answer even in the middle of their pile-ups. I usually use this strategy during the second day of operating, not passing multipliers in the traditional sense, but rather "passing myself." *(tnx N4GI)*

The subject of "owning" a frequency in amateur radio is nearly as old as dirt itself. One of the first phrases out of our mouths as ham radio babes was "QRZ, is this frequency in use?" As contesters, we've always been challenged in this area. The reality of the situation is that in most major contests, there are more operators and requests for operating channels than available bandwidth. Fortunately, in recent years the solar maximum has helped alleviate the problem, but it's still a challenge under the best of circumstances.

Take a look at 10 meters during the CQ WW DX Contest. Last fall stations were found operating the contest well north of 29.000 MHz. On CW there were stations making QSOs above 28.200 MHz. You could actually have a fine run well above 28.100!

What exacerbates the situation is that some hams actually like to use our bands for other purposes during contest weekends. Imagine that! And while this is a separate subject for a future contest column, we should heartily endorse their efforts. However, the great number of contest operators combined with net managers, slow scanners, DXers, and a myriad of other operators with their own styles makes the phrase "Is this frequency in use?" extremely relevant.

The world of competitive contesting is one in which operators are constantly "cruising" around the bands. This is a growing practice that has truly taken off in recent years. While it may not seem that way when you hear a loud W6 running JAs on 10 meters, most serious stations have a second radio they are using to listen on other bands while the "CQ button" is active. I've always maintained that it takes a certain type of mutant behavior to be able to juggle all of the demands of second-radio management. For most of us (and I put myself in this category to an extent), we have all we can manage to simply use one radio effectively.

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

Calendar of Events

Apr. 25-27	DX YL to NA YL SSB Contest
Apr. 28-29	Helvetia (HB) Contest
Apr. 28-29	Florida QSO Party
Apr. 28-29	Nebraska QSO Party
May 5-6	ARI Int'l DX Contest
May 5-6	10-10 Int'l Spring CW Contest
May 5-6	Massachusetts QSO Party
May 5-6	MARAC County Hunter CW Contest
May 5-6	Indiana QSO Party
May 12-13	Oregon QSO Party
May 12-13	CQ-M DX Contest
May 12-13	Nevada QSO Party
May 12-13	VOLTA WW RTTY Contest
May 19-20	Baltic DX Contest
May 26-27	**CQ WW WPX CW Contest**
June 2-3	IARU Region 1 CW Field Day
June 9	Portugal Day Contest
June 9-11	ARRL June VHF QSO Party
June 16-17	All Asian CW DX Contest
June 23-24	Marconi Memorial HF Contest
June 23-24	ARRL Field Day

In recent months there has been quite a bit of debate about frequency utilization. I selected the word *utilization* carefully, as it's really not ownership. As operators, we don't own any frequency. I'm sure many of us have had that on-the-air "debate" when a net operation fires up on a run frequency we've been using for the past two hours or we encounter the self-proclaimed 20 meter slow-scan TV frequencies. This month I want to probe into our operating behavior in contests. While we certainly need to consider our operating practices when encountering non-contesting hams, there's an entire separate discussion about how we engage in contest activity among ourselves.

Hey, Butt Out— It's My Frequency!

I often wonder if we would behave the same way on the air if we were sitting directly in front of the people with whom we have on-the-air disagreements. The answer is we would probably respond very differently. However, at the end of the day (as my boss likes to say), the issue of frequency usage boils down to two points. They are:

- The natural jockeying and negotiating caused by near-channel frequency usage.
- The results of vacating run frequencies on a short-term basis.

The process of maintaining a run frequency, like it or not, can best be compared to Darwinian theory—it's the survival of the fittest. Even if you have the good fortune of finding an absolutely clear run frequency, your longevity in that spot is directly related to your signal strength relative to the competition around you. That doesn't imply in any way that we have free reign to move in and overtly steal frequencies being used by smaller stations. However, it does suggest that over time you are likely to get "squeezed out" by propagation and/or other changes in the operating environment of that band. The inevitable "frequency battles" that can ensue in any contest are certainly regrettable. They never create a positive result and are more likely to result in our doing and saying things that we will regret later. I challenge anyone who can point to a situation in which a long-term argument over a frequency resulted in his score being higher.

An equally contentious point is the events that can take place when you vacate a run frequency. When I'm fortunate enough to lock down a great run spot, it's somewhat akin to reaching the summit of a large mountain. This is especially true in the heat of battle on 20 meter SSB. In those situations, I don't think a 9-magnitude earthquake would get me out of the operating chair. However, there are several other situations to consider. They all boil down to the issue of risk assessment. If I choose to leave my run frequency for any reason, I am assuming the very real risk of not being able to return. There are plenty of excuses to temporarily vacate your well-earned spot, whether you are chasing a good find on your second radio, passing a needed multiplier, or trying to work a DX spot delivered by packet. Frankly, my own thinking in this area has been influenced based on a

great deal of e-mail dialog on the subject. The bottom line is that if you leave a frequency and someone else starts to use if, it's no longer yours—period. Is it reasonable to ask for it back when you return? Most will agree with that approach. Do you cross the line by attempting to take it back without permission? Absolutely yes! It's our behavior in these situations that dictates our reputation outside of contesting circles.

Frankly, this scenario has much to do with doing the right thing. Packet, two radios, and other operating aids have forced us to fine-tune our operating practices. Fortunately, as a group I believe we have our hearts in the right place and that's a good thing for contesting. Think about it, and feel free to share your thoughts with me.

The smoldering remains of Bob Norin, W7YAQ's old Plymouth. (Tnx W7YAQ)

You Think You're Having a Bad Day?

I received this little gem from Bob Norin, W7YAQ. Just when you think you've heard it all, take a minute to read Bob's soapbox from the 2001 ARRL SSB DX Contest. I have to warn you that you won't stop laughing for several minutes.

W7YAQ 2001 ARRL DX SSB
Summary Sheet—Oregon Section

Callsign: W7YAQ
Operator: W7YAQ
Category: Single Op, All Band, QRP, Unassisted
Team/Club: Willamette Valley DX Club

Band	Raw QSOs	Valid QSOs	Pts	Countries
80SSB	4	4	12	1
40SSB	9	9	27	5
20SSB	120	120	360	47
15SSB	112	112	336	49
10SSB	115	115	345	38
Totals	360	360	1080	140

Final Score = 151,200 points
Hours Operated = 14.5
Rig: TS830-S at 5 watts

Comments:

3/2 2300: Realize can't get away from work for start of contest

3/3 0000: Still at work

3/3 0200: Still at work—Sayonara 10 meters...

3/3 0300: Finally leave work for dinner with friends

3/3 0600: Leave friends for drive home

3/3 0620: Arrive home, leave 86 Plymouth in driveway

3/3 0625: Start thinking about contest. Need to move 486 upstairs to shack.

3/3 0628: Wife asks if I want tea. Sure, good for the vocal chords.

3/3 0630: Wife says, "Is that fog or smoke coming over the house?"

3/3 0631: IT'S SMOKE!!! Race through house to front. PLYMOUTH IS IN FLAMES!!

3/3 0632: Wife calls 911. I get kitchen fire extinguisher.

3/3 0633: 911 dispatcher has wrong (old) address. Extinguisher has no effect.

3/3 0634: Get garden hose. ...Outside water turned off for winter.

3/3 0635: Engine compartment engulfed. Navy language invoked!!

3/3 0637: Hear fire sirens.

3/3 0638: Hear fire engines and see flashing lights—on next street over!!!

3/3 0640: Front tires explode. Fire department finally finds us.

3/3 0645: Fire under control. Thankful I didn't drive Plymouth into garage!

3/3 0730: Fire department leaves. Hulk of car remains.

3/3 0745: Wife pours us both a stiff drink! Call the insurance company.

3/3 0800: Check car for flare-ups ... just quietly smoldering.

3/3 0900: We go to bed. 40 and 80 may be hot, but not in contesting mood!

3/3 1500: Get up, go outside. It wasn't a bad dream...car in a sea of foam!

3/3 1600: We go out for breakfast. Who cares if 10 meters is open to Europe?

3/3 1800: Begin salvaging a few smelly things from trunk of Plymouth

3/3 2000: OK, move 486 upstairs to shack.

3/3 2010: 20 hours into the contest and I'm ready to go!

3/3 2020: Can't win low power now. ... Well, weekend is a loss anyway...

3/3 2025: Let's do QRP!!

Anyway did finally have fun and got in 14 hours of air time, but nary a European on 10 (maybe they were there Saturday morning).

73, Bob, W7YAQ

Final Comments

Well, that's it for this month. For contesting (and ham radio in general), to survive long term it serves us well to be introspective on a regular basis. After a contest or even just an evening of DX-ing, consider whether or not your on-the-air conduct has helped or hindered our cause. You can't go wrong with that operating strategy. See you next month.

73, John, K1AR

Awards

BY TED MELINOSKY, K1BV

News Of Certificate And Award Collecting

Here are some interesting questions I received in recent e-mail correspondence with beginning county hunters, and my answers and philosophical comments.

Q: A mobile sent me his card showing he was parked on a county line in North Carolina and his card lists two counties. Does this card count for both counties, or do I need to choose only one?

A: Both counties count for you. There is nothing in the USA-CA rules permitting or forbidding this practice. There have been some abuses over the long history of the program, but not enough to invalidate the practice.

Q: A mobile station I worked sent me his base station QSL. On it, the operator noted he was mobile in such and such county other than the home location. Will the written location be challenged? Seems to me a person could cheat and write anything on the card.

A: The card normally would not be challenged. The handwritten entry takes precedence over the printed county. The USA-CA program is still one which relies very little on actual card checking and much on the honor of the applicant. The vast majority of county hunters are honest—as honest or more so than any representative group of folks in our society. The award rules require that cards be in your possession when you claim the various levels.

Q: I know anything more than a county line (i.e., 3 and 4 county points) can't be used. Can I use just one or two needed counties from these multiple county contacts?

A: Actually, there isn't any prohibition against using such lines in the rules. However, practically speaking, I would challenge any 4 county line. Even a valid contact from the famous "Four Corners" site where Utah, Colorado, Arizona, and New Mexico come together requires some kind of proof that the mobile actually sat on that spot. From photos I recall seeing, the actual spot is a monument surrounded by a fence. Contacts from the parking lot don't count, except for the actual county that you're in at that time. There have been a few portable operations in Pennsylvania from tri-county spots. They probably are valid, but I would be ultra cautious about using more than one or two such contacts for the whole award. The main reason I'm not a big proponent of county lines is that unless you can find a USGS survey marker, there's no guarantee that the county- line sign is accurate to the length of a vehicle.

65 Glebe Road, Spofford, NH 03462-4411
e-mail: <k1bv@cq-amateur-radio.com>

USA-CA Special Honor Roll
Michael Anderson, K8IW
USA-CA All Counties #1016
February 23, 2001

USA-CA Honor Roll

500		1500	
BA4DW	3142	AA9KH	1306
OK1ZP	3143	K8IW	1307
ON4CAS	3144		
JA7DWM	3145	**2000**	
K8IW	3146	AA9KH	1205
		K8IW	1206
1000			
AA9KH	1567	**2500**	
K8IW	1568	K8IW	1129
		3000	
		K8IW	1035

The total number of counties for credit for the United States of America Counties Award is 3076. 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, 65 Glebe Road, Spofford, NH 03462-4411 USA. DX stations must include extra postage for airmail reply.

Michael Anderson, K8IW
USA-CA All Counties #1016

This month we hear from K8IW, who received USA-CA All Counties on February 23 this year.

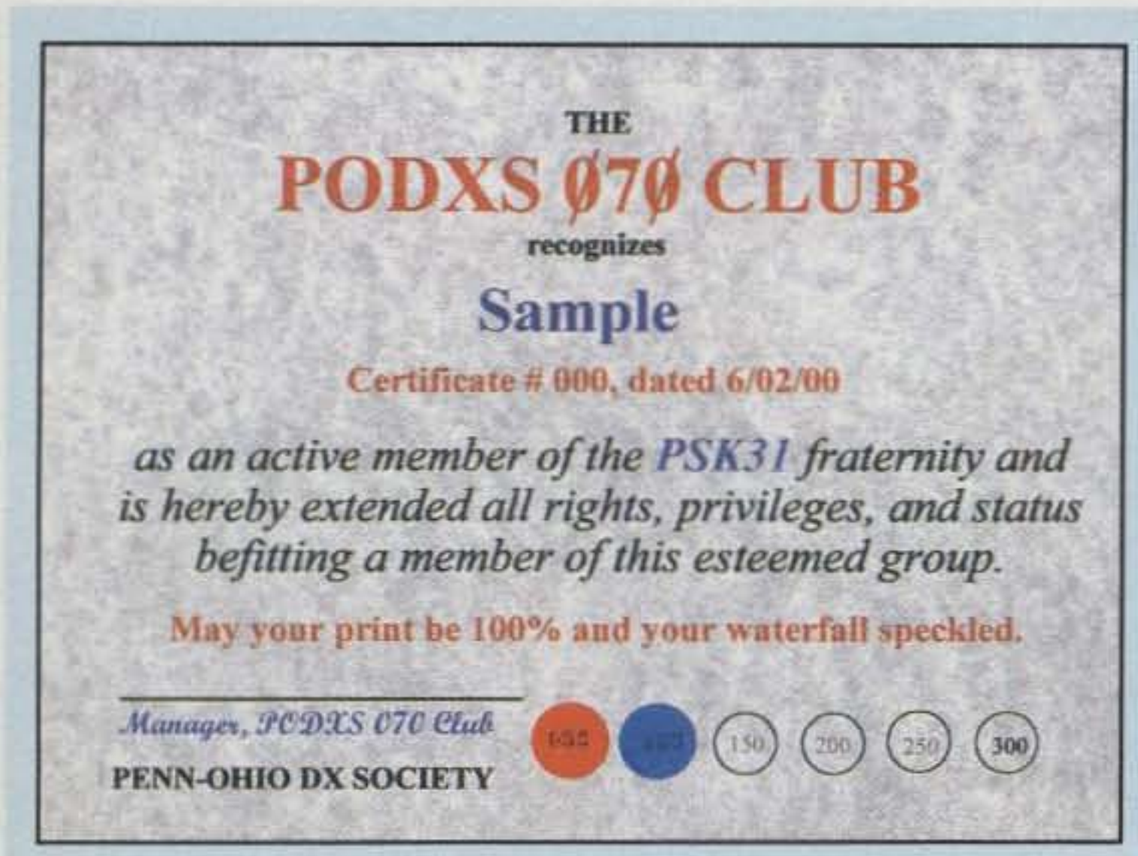
"When I first received my Novice ticket as WN8JDW in 1963, although I didn't know it then, my quest for the USA-CA award had begun. Years later, those old Novice QSL cards provided me with a base of county confirmations on which to build. However, ham radio came and went several times in my life. In my teen years in East Liverpool, Ohio, I was very active. My first receiver was a Hallicrafters S40A. My first transmitter was a Heath DX-60 I built myself. Later I built the companion Heath HG-10 VFO. My final piece of gear, for that phase of my radio career, was a Heath Mohawk receiver. It was made by a better kit builder than I! While in college from 1966 to 1970 I only made contacts in the summer. When I graduated from Ohio State I left ham radio far behind.

"Then in 1979 my friend Dick, WB8YGR (now KC1IY), coerced me into getting back on the air. First I used a Ten-Tec Century 21 CW-only transceiver. Then I bought an ICOM 730 and found the SSB county hunters net frequency on 14.336 MHz for the first time. For a couple of years I was very active and worked many counties. I also managed to earn DXCC. Then my wife and I built a house in an antenna-restricted area. Thinking I'd never be able to make contacts without outside antennas, I sold the radios and went QRT in 1981.

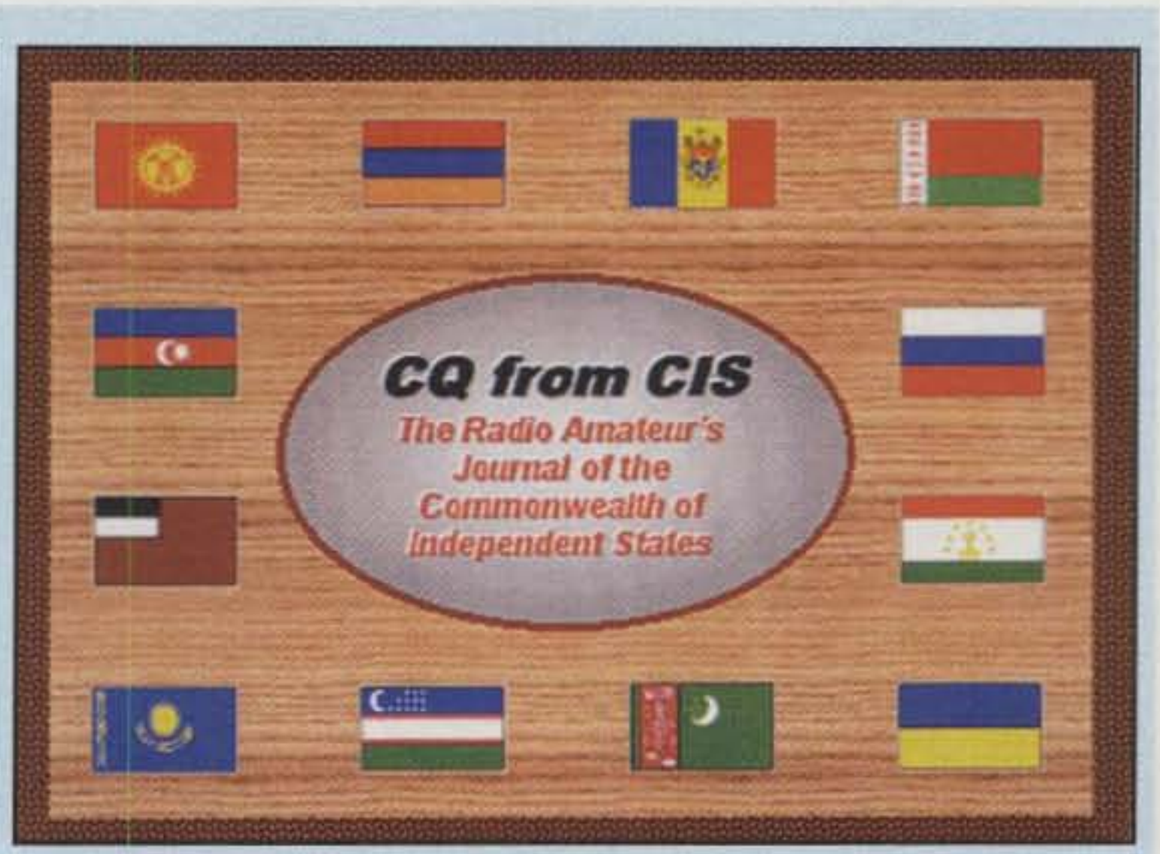
"In 1985 the ham radio bug bit me once again. First I bought VHF rigs—a little Yaesu FT-11 and a pair of ICOM 200H transceivers, one for my ham-shack and the other for my car. On my first, fateful trip to the attic I mounted an AR-270 'Ringo Ranger' 2/440 antenna, looked around, and thought, 'This is a pretty big attic!'" For two years, from 1995 to 1997, I operated only on VHF. Just for fun I found a website with practice amateur radio license exam questions, and I began taking the simulated tests. Soon I upgraded to Advanced, with the call KI8BI. Not too long after that I passed the test for Extra and requested the vanity callsign K8IW.

"Then in 1997 I bought my current HF rig, a Kenwood TS-570D. Even though we had moved into a yet another subdivision with antenna restrictions, I decided to see what I could do with a 40 ft. Alpha-Delta DX-EE multiband dipole in my attic. I found it just fit, with a foot to spare on each end. It has turned out to be no problem to work worldwide DX, let alone countries, with the antenna.

"From 1997 until early in 2001 I was very active chasing counties once again. I had never sent mobile reply cards to most of the stations I had worked back between 1979 and 1981, so I made a colossal effort to get those old county contacts confirmed. It's surprising how many county hunters keep their logs forever. Some had a lot of



The 070 Club award is sponsored by the Penn-Ohio DX Society and is the first PSK31 mode award we've seen.



The Commonwealth of Independent States award was created to promote greater amateur radio interest in the republics of the CIS (Russia).

trouble locating the log entries for those old contacts; some of them just trusted me. Sadly, a couple of the hams I asked to confirm old QSOs were silent keys.

"Eventually I worked all the counties. I have to say that without the selfless efforts of many mobiles I would never have completed USA-CA. Ed, N4UJK, and Kenny, KC4UG, for example, spent five days over the Christmas holidays in 1997 operating from the majority of the counties in Mississippi. They were out there on Christmas Day, Bob, N4CD, took a Hawaiian vacation just so he could put out those hard-to-contact counties. I found him on the Big Island for my last in Hawaii on 15 CW (21.056 MHz).

"Although I swore once I completed USA-CA that would be the end of my county hunting, the Kenwood's dial has wandered to 14.056 MHz, the CW County Hunter's net frequency, and I've started over from scratch. Maybe just one more time...*73, K8IW*"

Operating Awards

USA 070 Club. I believe this is the first PSK31 mode award I've seen. It's sponsored by the Penn-Ohio DX Society and is based on numbers of contacts using this new digital mode.

Join the 070 club (it's free) and provide proof of having made contact with 50 different stations on the HF bands up to 50 MHz, including all of the WARC bands, via PSK31 mode after 1 June 2000. Include date, call, and time. You must also submit one QSL card verifying any one of the contacts used for the award. Endorsements are available for each additional 50 up to a total of 300 contacts. No use of repeaters or cross-mode contacts allowed. There is no fee for the award, but I'd suggest supplying a 9" ×12" envelope and SASE to reduce the club's costs. Apply to John J. Hudak, KA3X, 212 Beechwood Blvd., Pulaski, PA 16143 (e-mail: <jhudak3rd@aol.com>; web: <http://members.aol.com/_ht_a/n3dqu/podxs070.htm>).

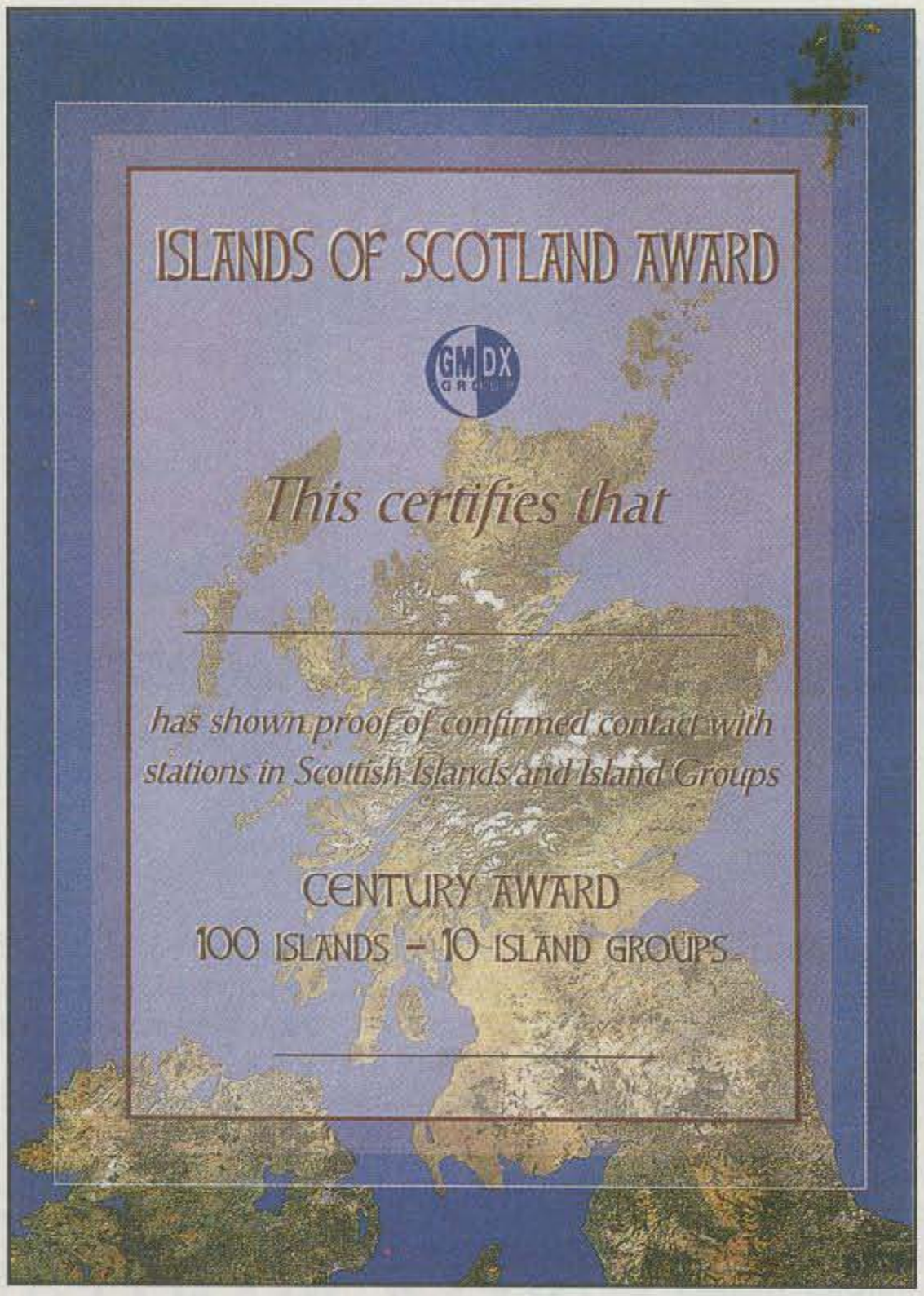
Russia's Commonwealth of Independent States Diploma. Here's a handsome certificate offered by The Funkner DX Family to hams and SWLs for contacting one station in each of the 12 countries/entities of the Commonwealth of Independent States on or after 1 Jan. 1993. Yuri, RN3FX, has arranged for DX stations to apply via K7INA to bypass the postal problems affecting the Russian delivery of foreign mail. It will be a challenge to make contacts with some of the countries, although a few of them may be polished off in any DX contest.

The award was established by the International Radioamateur's Club the Funkner DX Family to promote greater amateur radio interest in republics of the Commonwealth of Independent States. The award is available to both licensed amateurs and SWLs for working (hearing) 12 amateur radio stations in each of the 12 countries of the CIS on or after 1 January 1993.

CIS countries: 4K Azerbaijan, 4L Georgia, EK Armenia, ER Moldova, EU Belarus, EX Kyrgyzstan, EY Tajikistan, EZ Turkmenistan, R Russia, UK Uzbekistan, UN Kazakhstan, and UR Ukraine.

GCR list accepted. The manager of the diploma reserves the right to ask for any cards if necessary. Cost: Russian stations $U 2 or equivalent, stations from other CIS republics $US3 or equivalent, and for all others $US6. IRCs will be accepted on the basis of $US1 = 2 IRCs. Also accepted are the equal value of roubles of the Russian Federation.

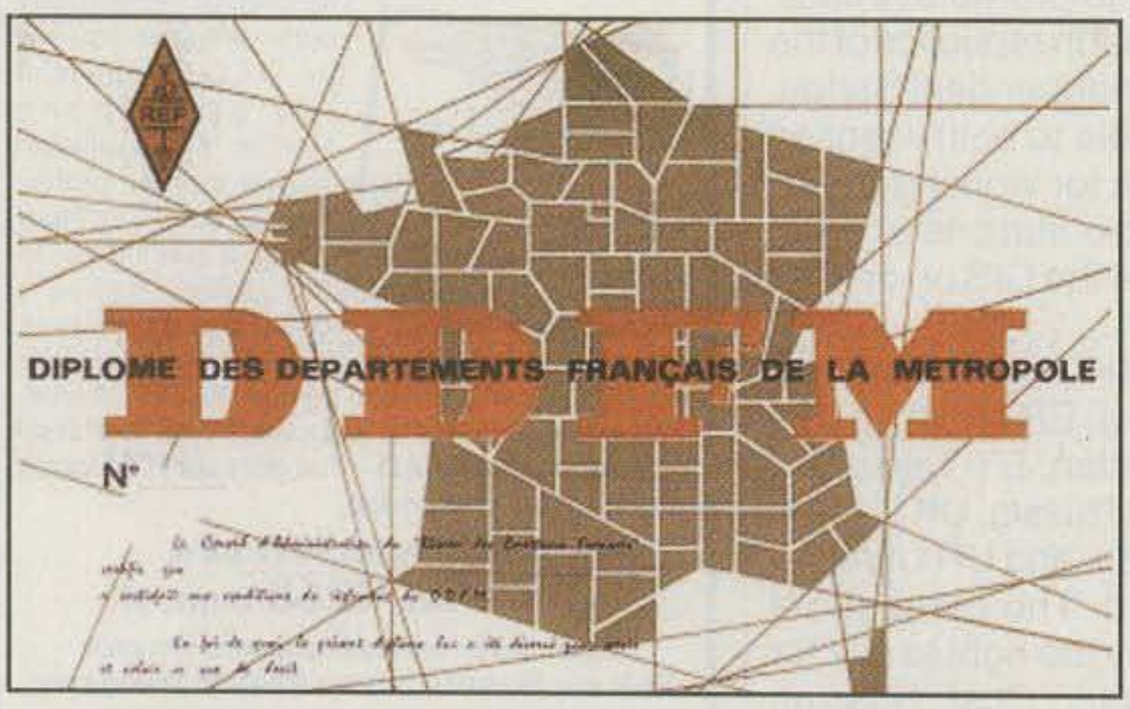
The application for the diploma and payment should be send t : Funkner DX Family, P.O. Box 50, Moscow, 109439, Russia. Any problems concerning the



The Islands of Scotland award is issued in various levels for contacting the island groups of Scotland.

diploma can be decided on the air with operators of club station RZ3DZZ or via e-mail: <fdxf@aha.ru>. Radioamateurs of the USA and Canada should send the application and payment to the official representative of the Commonwealth of Independent States Awards Program: Russ Fish, K7INA, 216 Spring Road, Port Angeles, WA 98362 USA; <http://www.funcap.narod.ru/index.html>.

Islands of Scotland Award. This is yet another DXCC entity island award, this time from Scotland. It appears to be quite well organized, and while the directory needed is somewhat expensive, that cost includes the cost of the basic certificate



This award is issued for contacting French "departments" and is available for both hams and SWLs.

Class	Chasers	Activators
Basic	10 islands in 6 groups	5 islands in 3 groups
Silver	25 islands in 7 groups	12 islands in 4 groups
Gold	50 islands in 8 groups	25 islands in 5 groups
Supreme	75 islands in 10 groups	40 islands in 7 groups

Table I. Classes of the Islands of Scotland award.

when you've made the necessary ten contacts. The sponsor is encouraging operations from the islands by providing a separate class of the certificate just for them. If you want to check out existing contacts that may qualify, an island listing is found on my website <dxawards.com> under the "Lists" heading. Since contacts going back to 1947 count, you may already have some of the islands in your collection.

The islands of Scotland have been divided into ten distinct island groups, and for the award there is a total of 120 such different islands. Contact islands since 1 Nov 1947 in four award levels. All bands may be used, 1.8 to 144 MHz. SWL okay. There are two classes of the award—one for island chasers and one for island activators. Requirements are as listed in Table I. Chasers must submit proof of contact (i.e., QSL card). Activators must show log evidence that they have made a minimum of 100 contacts from each island claimed.

Those interested in the award should send for the Scottish Islands Directory, which gives full details of the award and lists all valid islands and groups. It is available from GMØLVI, La Vista, High Street, Errol, Perthshire, Scotland, UK PH2 7QQ. Cost is $US10, 16 IRCs, or £6 and also covers the cost of the Basic certificate. (The island list can also be found on <dxawards.com>.)

Fees for the other levels of the award are £5, $US8, or 12 IRCs. Apply for the award to: Charlie Wilson, GM4UZY, Golden Acre, 1 Borrowfield Crescent, Montrose, Scotland, United Kingdom DD10 9BR. Complete details of the Islands of Scotland Award as mentioned earlier in this article may be found at: <http://www.gmdx.org.uk>.

DDFM Diplome des Departements Francais de la Metropole. After a number of years, you are probably going to have a nice collection of QSLs from some of the common European countries, including France. The REF (the French version of the ARRL) offers a wide variety of handsome, well-designed certificates well worth earning.

The French Department is an administrative unit similar to a US county. The French postal code will help you identify stations in the various departments, because the first two digits of their postal, or "zip," code will indicate the department. If you look at your stack of French cards, note the five-digit postal code. The first two digits always indicate the province number. There are 96 such departments, and the entry level for this award is 40.

Contact French Departments after 30 June 1957. The award is available for both amateus and SWLs. Submit a verified GCR list with the statement that the QSLs are in your possession. SWL okay. Endorsement for HF, VHF, CW, phone, or other modes are available. On HF, 40 departments are required; on VHF, 20. Endorsements are available for each additional 10 departments. A special "Excellence" sticker will be given for all 96 departments. No use of repeaters. Submit list and fee of $US12 or 16 IRCs to Christian Coupas, F6EDW, P.O. Box 83, F-63307 Thiers Cedex, France. Endorsement fee is $US6, or 7 IRCs.

Remember to send me a sample and write-up of your club or organization's award so that we can help you promote it to hams all over the world! 73, Ted, K1BV

Propagation

BY GEORGE JACOBS, W3ASK

The Science Of Predicting Radio Conditions

Solar Cycle Stalled!

As often happens when a sunspot cycle reaches its peak activity, it decreases from its high level at a very slow rate, often remaining at an almost constant level for several months. For users of the HF bands, this is a good thing, since it means that near-high, near-optimum propagation conditions continue over an extended period of time.

This now appears to be the case with Cycle 23. For the most recent five months of smoothed sunspot data, between March and July 2000, the count has varied only plus or minus 1, centered on 120.

Similarly, the 10.7 cm solar flux level for the same period has been at an almost constant 180 to 181. The longer that the cycle remains stalled at or near these levels, the longer we will continue to enjoy the good HF propagation conditions that we have had for the past year or two.

According to the Royal Observatory of Belgium, based upon daily telescopic observations made at 36 cooperating worldwide observatories, the mean sunspot count for January 2001 was 95.1. A high of 137 was recorded on January 7 and a low of 59 on the 17. This results in a running smoothed sunspot number of 120 centered on July 2000. This is an increase of 1 from the previous month's count. A smoothed sunspot number of approximately 115 is predicted for May 2001.

Solar Flux Values

The Dominion Radio Astrophysical Observatory of Canada, located at Penticton, B.C., reports a mean value of 181 for the January 2001 level of 10.7 cm solar flux. This results in a 12-month running smoothed solar flux level of 181 centered on July 2000. This is an increase of 1 from the previous month. A smoothed level close to 181 is forecast for May 2001, as the cycle is expected to continue to remain fairly constant.

For a wealth of very interesting information concerning sunspots and the sunspot cycle, check the web at <http://www.sunspotcycle.com>.

11307 Clara Street, Silver Spring, MD 20902
e-mail: <george@gjainc.com>

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for May 2001

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 4, 91-0, 16-17, 25-26	A	A	B	C
High Normal: 1, 5, 8, 11-12, 18, 23-24, 27, 31	A	B	C	C-D
Low Normal: 2-3, 13-15, 20-22, 28-30	B	C-B	C-D	D-E
Below Normal: 6, 19	C	C-D	D-E	E
Disturbed: 7	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 S9, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S6, with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing on the following pages.

2. With the *propagation index,* use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 3 will be good (B) on May 1st, fair-to-good (B-C) on the 2nd and 3rd, excellent (A) on the 4th, good (B) on the 5th, etc.

May Propagation

During May days continue to grow longer in the northern hemisphere, and the sun is higher in the northern sky. Optimum frequencies for long-distance propagation are expected to be somewhat *lower* during most of the daylight hours, and somewhat *higher* during the late afternoon, early evening, and nighttime hours than they were during the winter months. Static levels also increase noticeably during May, and signals may sound weaker on DX openings during the daylight hours.

The 10, 12, 15, 17, and 20 meter bands should provide DX propagation during the hours of daylight. Considerably fewer east-west openings are expected on 10 meters, but conditions should continue to be good to South America, Africa, and other southern areas of the world. Good worldwide DX conditions are expected on 15 and 17 meters, but the bands should peak later during the day.

Peak worldwide conditions are expected on 20 meters for an hour or two after local sunrise and during the afternoon hours. From sundown to midnight excellent DX conditions should exist on 20 meters to many areas of the world. Forty meters should provide good openings toward Europe, Africa, and the east. Good DX openings also should be possible on 15 and 17 meters toward the southern and western areas of the world. Some DX should also be possible on the 80 and 160 meter bands, but signals are expected to be mainly weak and noisy. Eighty meters should be open toward Europe and the east, while an occasional 160 meter opening may be possible toward the Caribbean. From midnight to sunrise look for openings to most areas of the world on 20, 30, and 40 meters, with some DX possible on 80 and 160 meters as well. All in all, May is expected to be a good month for DX propagation conditions on most of the HF amateur bands.

For specific times of DX openings, refer to the DX Propagation Charts which appeared in last month's column. This month's column contains Short-Skip Charts centered on Hawaii and Alaska. The Short-Skip Charts contain propagation forecasts for openings varying in distance between 50 and 2300 miles. For day-to-day variations expected in propagation conditions during May, see the Last-Minute Forecast at the beginning of this column.

Eighty meters is expected to be the best band for short-distance openings between 50 and 250 miles, both night and day. For openings between 250 and 750 miles, 30 and 40 meters should be best during the day and 80 meters at night. Twenty meters should be optimum for daytime openings between 750 and 1300 miles, while 40 meters should be best at night. Try 17 and 20 meters for daytime openings between

HOW TO USE THE SHORT-SKIP CHARTS

1. In the Short-Skip Chart, the predicted times of openings can be found under the appropriate distance column of a particular meter band (10 through 160 meters) as shown in the left-hand column of the chart. For the Alaska and Hawaii Charts the predicted times of openings are found under the appropriate meter band column (15 through 80 meters) for a particular geographical region of the continental USA as shown in the left-hand column of the charts. An * indicates the best time to listen for 160 meter openings. An ** indicates possible 10 meter openings.

2. The *propagation index* is the number that appears in ( ) after the time of each predicted opening. In the Short-Skip Chart, where two numerals are shown within a single set of parentheses, the first applies to the shorter distance for which the forecast is made, and the second to the greater distance. 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.

3. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 AM; 13 is 1 PM, etc. On the Short-Skip Chart appropriate *daylight* time is used at the path midpoint. For example on a circuit between Maine and Florida, the time shown would be EDT, on a circuit between New York and Texas, the time at the midpoint would be CDT, etc. Times shown in the Hawaii Chart are in HST. To convert to daylight time in other USA time zones add 3 hours in the PDT zone; 4 hours in the MDT zone; 5 hours in the CDT zone; and 6 hours in the EDT zone. Add 10 hours to convert from HST to GMT. For example, when it is 12 noon in Honolulu, it is 15 or 3 PM in Los Angeles; 18 or 6 PM in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to *daylight* time in other areas of the USA subtract 7 hours in the PDT zone; 6 hours in the MDT zone; 5 hours in the CDT zone; and 4 hours in the EDT zone. For example, at 20 GMT it is 16 or 4 PM in New York City.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts CW or 300 watts PEP on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts CW or 1 KW PEP on sideband. A dipole antenna a quarter-wavelength above ground is assumed for 160 and 80 meters, a half-wave 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.

5. 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.

CQ Short-Skip Propagation Chart
May & June 2001
Local Daylight Time
At Path Midpoint

Band (meters)		*Distance Between Stations (miles)* 50-250	250-750	750-1300	1300-2300
10	Nil		08-10 (0-1)	08-10 (1-2)	08-10 (2-0)
			10-14 (0-2)	10-14 (2-3)	10-14 (3-1)
			14-18 (0-1)	14-18 (1-2)	14-16 (2-1)
			18-22 (0-2)	18-22 (2)	16-19 (2)
			22-00 (0-1)	22-00 (1)	19-22 (2-0)
				00-08 (0-1)	22-08 (1-0)
15	Nil		07-10 (0-2)	07-10 (2)	07-10 (2-1)
			10-14 (0-3)	10-14 (3)	10-14 (3-2)
			14-18 (0-2)	14-18 (2-4)	14-16 (4-3)
			18-20 (0-3)	18-20 (3-4)	16-20 (4)
			20-00 (0-2)	20-22 (2-3)	20-23 (3-2)
			00-07 (0-1)	22-00 (2)	22-00 (2)
				00-07 (1)	00-07 (1-0)
20	10-13 (0-1)		07-10 (0-2)	07-10 (2-3)	07-10 (3)
	13-19 (0-2)		10-13 (1-3)	10-13 (3-4)	10-16 (4-3)
	19-01 (0-1)		13-19 (2-4)	13-19 (4)	16-23 (4)
			19-21 (1-3)	19-21 (3-4)	23-01 (3-4)
			21-01 (1-2)	21-23 (2-4)	01-03 (2-3)
			01-07 (0-2)	23-01 (2-3)	03-07 (2)
				01-07 (2)	
40	07-09 (1-2)		07-09 (2-4)	07-09 (4-3)	08-10 (3-1)
	09-12 (2-4)		09-10 (4-3)	09-10 (3)	10-18 (1-0)
	12-20 (3-4)		10-16 (4-2)	10-16 (2-1)	18-20 (2-1)
	20-22 (2-3)		16-18 (4-3)	16-18 (3-1)	20-22 (4-3)
	22-01 (1-2)		18-22 (4)	18-20 (4-2)	22-06 (4)
	01-07 (0-1)		22-01 (2-3)	20-22 (4)	06-07 (4-3)
			01-07 (1-3)	22-07 (3-4)	07-08 (3)
80	08-11 (4)		08-11 (4-1)	08-09 (1)	08-09 (1-0)
	11-19 (4-3)		11-17 (3-0)	09-11 (1-0)	09-19 (0)
	19-23 (4)		17-19 (3-1)	11-17 (0)	19-21 (1-0)
	23-08 (3-4)		19-21 (4-2)	17-19 (1-0)	21-23 (3-2)
			21-06 (4)	19-21 (2-1)	23-04 (4-3)
			06-08 (4-3)	21-23 (4-3)	04-06 (4-2)
				23-06 (4)	06-08 (2-1)
				06-08 (3-2)	
160	06-09 (4-1)		06-09 (1)	08-09 (1-0)	08-21 (0)
	09-10 (2-0)		09-19 (0)	09-21 (0)	21-01 (1)
	10-19 (1-0)		19-21 (1-0)	21-23 (1)	01-04 (2)
	19-21 (3-1)		21-23 (2-1)	23-01 (2-1)	04-06 (2-1)
	21-23 (4-2)		23-01 (3-2)	01-04 (3-2)	06-07 (1)
	23-06 (4-3)		01-04 (3)	04-06 (2)	07-08 (1-0)
			04-06 (3-2)	06-08 (1)	

HAWAII
May & June 2001
Openings Given in Hawaiian Standard Time

To:	*10 Meters*	*15 Meters*	*20 Meters*	*40/80* Meters*
Eastern USA	15-17 (1)	07-12 (1)	07-15 (1)	19-20 (1)
		12-15 (2)	15-18 (2)	20-23 (3)
		15-17 (3)	18-20 (3)	23-02 (1)
		17-18 (2)	20-22 (4)	20-21 (1)*
		18-19 (1)	22-00 (3)	21-23 (2)*
			00-02 (2)	23-01 (1)*
			02-04 (3)	
			04-07 (2)	
Central USA	12-15 (1)	05-07 (1)	08-12 (1)	19-20 (1)
	15-17 (2)	07-12 (2)	12-16 (2)	20-21 (2)
	17-18 (1)	12-16 (3)	16-18 (2)	21-01 (4)
		16-18 (4)	18-22 (4)	01-02 (2)
		18-20 (3)	22-00 (3)	02-04 (1)
		20-22 (2)	00-02 (2)	20-21 (1)*
		22-00 (1)	02-06 (3)	21-00 (2)*
			06-08 (2)	00-03 (1)*
Western USA	09-12 (1)	06-08 (1)	06-08 (4)	18-19 (1)
	12-17 (2)	08-10 (2)	08-16 (3)	19-20 (2)
	17-19 (1)	10-12 (3)	16-22 (4)	20-02 (4)
		12-17 (4)	22-02 (3)	02-04 (3)
		17-19 (3)	02-06 (2)	04-05 (2)
		19-22 (2)		05-07 (1)
		22-00 (1)		19-20 (1)*
				20-21 (2)*
				21-03 (3)*
				03-04 (2)*
				04-05 (1)*

ALASKA
May & June 2001
Openings Given in GMT

To:	*10 Meters*	*15 Meters*	*20 Meters*	*40/80* Meters*
Eastern USA	20-22 (1)	18-20 (1)	20-22 (1)	05-10 (1)
		22-02 (2)	22-02 (2)	
		22-01 (1)	02-06 (3)	
		01-03 (2)	06-08 (2)	
		03-05 (1)	08-10 (1)	
			10-14 (2)	
			14-16 (1)	
Central USA	21-23 (1)	18-21 (1)	02-08 (3)	05-07 (1)
		21-23 (2)	08-14 (2)	07-10 (2)
		23-01 (1)	14-22 (1)	10-12 (1)
		01-04 (1)	22-02 (2)	
Western	00-03 (1)	18-20 (1)	02-04 (3)	04-06 (1)
		20-23 (2)	04-08 (4)	06-08 (2)
		23-02 (3)	08-14 (3)	18-12 (3)
		02-05 (2)	14-18 (4)	12-15 (2)
		05-07 (1)	18-20 (3)	15-16 (1)
			20-02 (2)	08-12 (1)*

#See explanation in "How To Use Short-Skip Charts" in this column.
*Indicates best time 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.
Note: The Alaska and Hawaii Propagation charts are intended for distances *greater* than 1300 miles. For shorter distances use the preceding Short-Skip Propagation Chart.
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.

1300 and 2300 miles, although 15 meters may be equally as good during most of the daylight hours. At night 20, 30, and 40 meters should be optimum for openings over this distance range. Twenty meters should have the edge until midnight, with 30 and 40 meters best from midnight to sunrise.

VHF Ionospheric Openings

May should be a good month for ionospheric openings on the VHF bands, resulting from the high level of solar activity, increased sporadic-*E* propagation, meteor showers, trans-equatorial propagation, and auroral activity.

Solar activity continues to be high enough such that some *F*-layer DX openings should be possible on the 6 meter band during the daylight hours. Conditions are best for transcontinental openings, openings between the western states and Hawaii, and openings toward the Caribbean and Central and South America. The best time to look for these openings is during the afternoon hours, particularly when conditions are High Normal or better.

Sporadic-*E* ionization is expected to increase considerably during May, and fairly frequent 6 meter short-skip openings should be possible. These are most likely to occur over distances of approximately 1000 to 1400 miles. Although sporadic-*E* openings can take place at just about any time, the best time to check is between 10 AM and 2 PM and again between 6 and 10 PM local daylight time.

During periods of intense and widespread sporadic-*E* ionization, two-hop openings considerably beyond 1400 miles should be possible on 6 meters, and short-skip openings between approximately 1200 and 1400 miles may also be possible on 2 meters.

A seasonal decline in trans-equatorial (TE) propagation conditions is expected during May, but an occasional opening may still be possible on the 6 meter band toward South America from the southern tier states and the Caribbean area. The best time to check for 6 meter TE openings is between 9 and 11 PM local daylight time on north-south paths which will cross the geomagnetic equator at an approximate right angle.

Auroras. Auroral activity is generally at a seasonally low level in May, but some displays may occur. The best times to check for auroral activity on the VHF bands are when the HF bands are Below Normal or Disturbed. See the Last-Minute Forecast for those days during May that are expected to be in these categories. During auroral periods openings are likely to occur on 6 and 2 meters for distances up to approximately 1200 miles as a result of reflection or scatter from ionized patches produced by the auroral display.

Meteor showers. Meteor activity will pick up in May, with the *eta-Aquarids,* a major meteor shower, expected to take place between May 3 and 10. It is expected to peak at approximately 2300 UT on May 5, with at least 20 meteors an hour. Intermittent meteor-type VHF openings may be possible over distances between approximately 800 and 1200 miles.

Three minor shower peaks are also expected during May:

epsilon-Arietids	0600 UT, May 9
May Arietids	0600 UT, May 16
o-Cetids	0600 UT, May 20

For a more detailed discussion of VHF propagation conditions, see the "VHF Plus" column by Joe Lynch, N6CL, each month in *CQ.*

For an excellent discussion, review, and explanation of grey- and dark-line propagation, particularly on 160 and 80 meters, don't miss the two-part article "Go Surf the Grey and Dark Lines," by Steve Ireland, VK6VZ, in the February and March issues of *CQ.*

73, George, W3ASK

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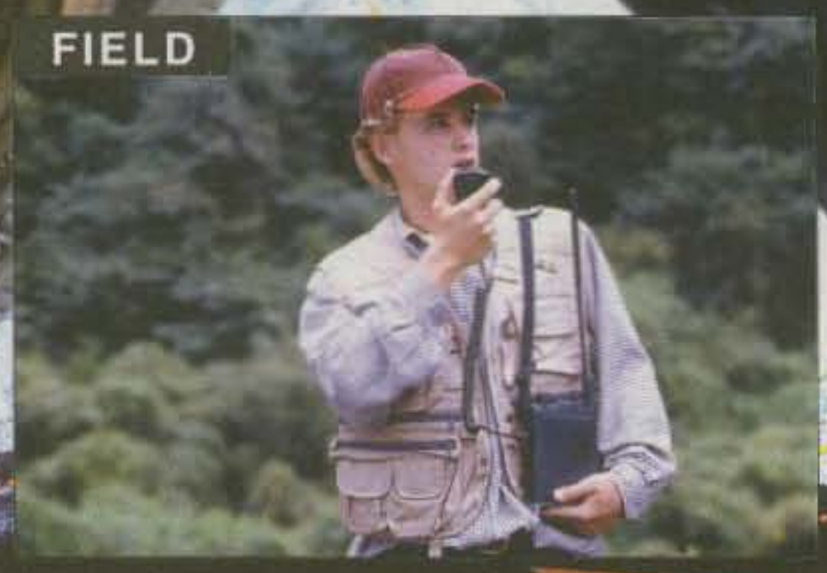

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FT-7100M

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20M
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2M
70CM

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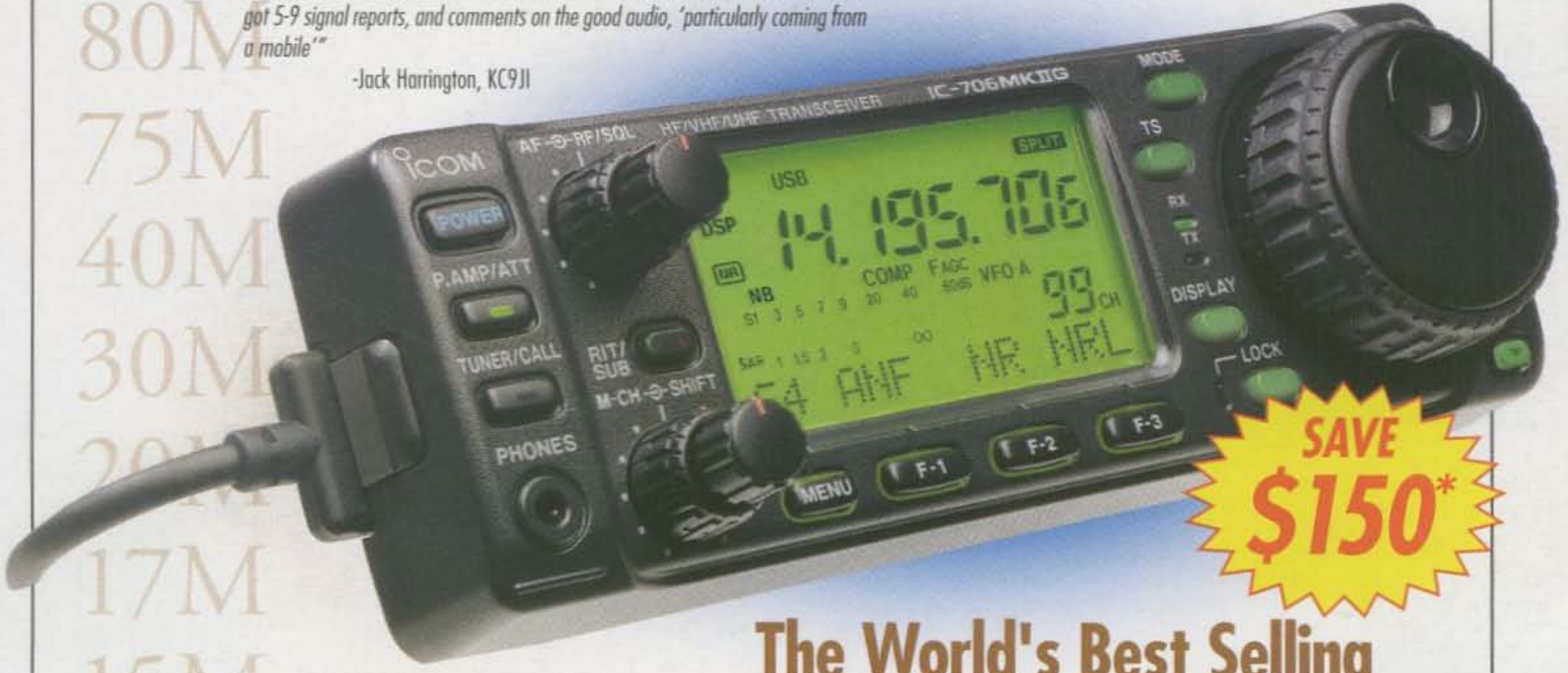

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