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COMMUNICATIONS & TECHNOLOGY

MAY 2002

CQ

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In This Issue

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HAM-IV, $529.95. *The heavy duty Ham-IV is the most popular rotator in the world!* It is designed for medium size antenna arrays up to 15 square feet wind load area when mounted in-tower, or 7.5 square feet when mast mounted with an optional lower mast bracket. New alloy ring gear gives extra strength up to 100,000 PSI for maximum reliability. New low temperature grease permits normal operation down to -30 degrees Fahrenheit. New wire-wound potentiometer gives reliable and precision directional indication, new ferrite beads reduce RF susceptibility, new Cinch plug connector plus 8-pin plug at control box (no screwdriver needed). Dual 98 ball bearing race for load bearing strength. Strong electric locking steel wedge brake prevents wind induced antenna movement. Easy-to-use Control Box has illuminated directional meter with North or South center of rotation scale, separate snap-action brake and rotation switches. Uses low voltage control for safe operation. Accepts masts up to 2 1/16 inches diameter. Rotator size is 13 1/2Hx8D inches.

T-2X, $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 3/16D 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.

Call your dealer for your best price!

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

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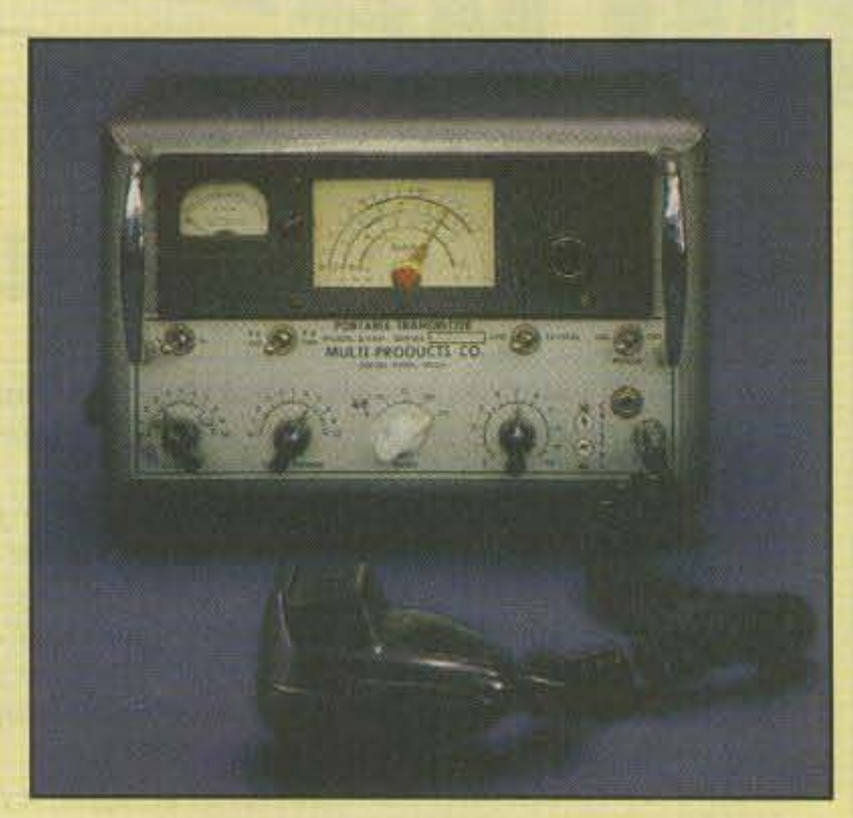
CQ Amateur Radio

MAY 2002 VOL. 58, NO. 5

FEATURES



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DEPARTMENTS

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- FM/FM-W/FM-N/AM plus SSB/CW receive
- Bar antenna for receiving AM broadcasts
- Special weather channel RX mode
- 435 memory channels, multiple scan functions
- 7.4V 1550mAh lithium-ion battery (std.) for high output[2] and extended operation
- 16-key pad plus multi-scroll key for easy operation
- Built-in charging circuitry for battery recharge while the unit operates from a DC supply
- Tough construction: meets MIL-STD 810 C/D/E standards for resistance to vibration, shock, humidity and light rain
- Large frequency display for single-band use
- Automatic simplex checker
- Wireless remote control function
- Battery indicator • Internal VOX • MCP software

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

"Specifications subject to change without notice."

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Ham Radio News

From The CQ Newsroom

Holly, Garriott, England, and Waller Receive Dayton Honors

Amateur radio journalist Alanson "Hap" Holly, KC9RP, has been named 2002 Amateur of the Year by the Dayton Amateur Radio Association. Holly's weekly "RAIN Report" audio magazine is heard on hundreds of amateur repeaters across the United States.

Two former astronauts share this year's Dayton Special Achievement Award: Dr. Owen Garriott, W5LFL, and Dr. Tony England, WØORE, were the first two amateurs to operate from space, launching the ongoing SAREX program in which ham radio contacts between astronauts in orbit and amateurs on the ground—particularly involving school groups—have become nearly commonplace. Students in Italy recently made the 50th scheduled "ARISS" contact with the crew of the International Space Station.

This year's Dayton Technical Excellence Award goes to Al Waller, K3TKJ. Al's <www.qsl.net> and <www.qth.net> websites have provided e-mail accounts and website space, plus online technical references, for tens of thousands of hams. Al began his service in 1993 and is one of the pioneers of integrating the internet into amateur radio.

All four of the honorees will receive their awards at the annual Dayton Hamvention® banquet on May 18th.

No Contacts For P5A

DXer Hrane Milosevic, YT1AD, had everything in place for a supposedly authorized operation from North Korea in early March but never got on the air. The *ARRL Letter* quotes a report from "The Daily DX" as saying P5A was reportedly authorized by the North Korean Ministry of Telecommunications and Foreign Affairs, but as the station was about to go on the air, soldiers appeared at the door, refusing to permit operation until additional clearance was received from military authorities. That permission never came.

"Meanwhile," Milosevic said in an e-mail, "we had fun listening to all the pirates pretending to be us, when we did not make a single contact." (So if you "worked" P5A in March, don't hold your breath waiting for a QSL.) In the same e-mail Milosevic said he's done trying to operate from North Korea and will not try again.

FCC Shuts Down Repeater

The FCC has ordered a South Carolina repeater off the air until it either obtains coordination or submits a detailed, specific plan for preventing interference to another, coordinated, repeater on the same frequency. According to the FCC, the NY4X repeater had been given nearly four months to get coordinated (on a different frequency) or figure out how to stop interfering with the KU4OL repeater. Neither happened, says FCC Special Counsel Riley Hollingsworth, K4ZDH, and he ordered the NY4X repeater off the air until the problem is resolved.

This action was one of several involving questions of repeaters and repeater coordination. The trustee of the K6POU repeater in California, which previously had been cited for having an abnormally wide bandwidth and "spurs," or off-frequency signals, was given 20 days to bring the repeater "into compliance with good Amateur practice" or take it off the air. The owners of an uncoordinated repeater in Kentucky were given 20 days to report on steps taken to end interference to a coordinated repeater. The owners of two repeaters in Tennessee were told they had to jointly work out a way to peacefully co-exist.

Finally, the FCC refused for a second time to get in the middle of a dispute between two repeaters and the Arkansas Repeater Council, again recommending mediation, and reminding all parties that "(t)he authority of a frequency coordinator is to recommend. It does not 'assign' frequencies."

Two More States Get Antenna Laws

West Virginia and New Mexico have become the latest states to incorporate the federal "reasonable accommodation" standard for amateur antennas and towers into state law. According to the ARRL, there are now 15 states that have passed similar laws, mandating "reasonable accommodation" of amateur communications and requiring that any regulations affecting placement or height of amateur antennas be the "minimum practicable regulation." Municipalities have less flexibility in challenging a state law than a limited preemption of state laws by a federal regulatory agency. Neither of the two new laws includes deed restrictions in condominiums and private developments.

Mr. Haynie Goes to Washington (Again)

ARRL President Jim Haynie, W5JBP, recently made his fourth trip to Washington, DC as League President and called it "the best trip we ever had." Haynie, Hudson Division Director Frank Fallon, N2FF, and several League staffers met with FCC officials, selected members of Congress, and key Congressional staff members. On Capitol Hill, according to the *ARRL Letter,* their main goal was to find a sponsor for legislation requiring the FCC to extend the "reasonable accommodation" protections of PRB-1 to private developments and condos as well as state and local governments. They also discussed amateur radio's role in the aftermath of last September's terrorist attacks.

The ARRL officials said the centerpiece of the visit was their participation in a brainstorming session of the National Public Safety Telecommunications Council, at which participants discussed better ways of incorporating amateur radio into public safety and homeland security planning.

Vanity Processing On-Again, Off-Again

There's been another snag in the FCC's efforts to work through the backlog of hundreds of vanity callsign applications that has built up since last fall's anthrax scare. After lengthy delays, processing finally resumed on March 6 and 600 callsigns were granted. However, then a glitch occurred in the software, according to the ARRL, and the system was shut down again. Some three dozen applications were processed the week of March 11th, but the system was then shut down again. As of March 15th, the ARRL says some 1700 amateur applications, mostly vanity calls, were pending at the FCC.

Meanwhile, the FCC was asking its "customers" for their opinions on its electronic licensing systems, including CORES (Commission Registration System) and ULS (Universal Licensing System), with which hams have been dealing. Comments and suggestions were being accepted via e-mail through March 28th.

Over 100 Ham Comments Oppose RFIDs on 70 cm

The ARRL says over 130 comments have been filed by amateurs or amateur radio organizations in opposition to a proposal before the FCC to permit so-called RFID tags to be operated on the 70 centimeter band at a much higher power and much higher duty cycle than at present. SAVI Technologies, which makes the tags, wants an exemption from the current Part 15 power limits. RFID tags are used for tracking shipments and packages. Many amateurs feel their use at high power between 425 and 435 MHz would cause unacceptable interference to amateur operations, especially weak-signal

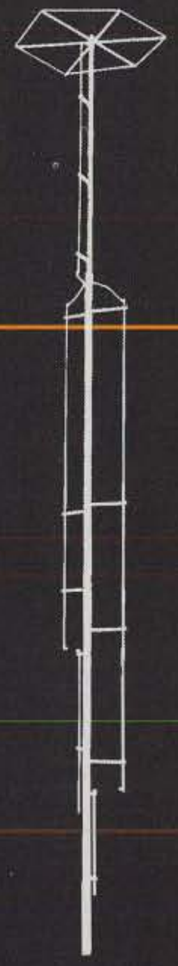
(Continued on page 107)

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."

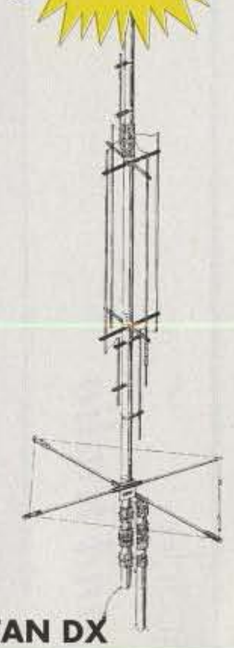
73–"This is a real DX antenna, much quieter than other verticals."

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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Zero Bias

BY RICH MOSESON, W2VU

An Editorial

Wood, Kids and Radio

Alan would not have been happy. There was no wood show the weekend we were in Charlotte. If you've been reading this column for more than a year or so, you'll know that my predecessor, the late Alan Dorhoffer, K2EEK, was as devoted to woodworking as he was to ham radio. The high point of the annual hamfest circuit for Al was going to Charlotte, North Carolina each March, because the hamfest shared space in the Charlotte Trade Mart with a regional woodworking show. Al's enthusiasm was contagious, and a large number of vendors made a point of taking a spin through the wood show as well as the hamfest. Al wrote about it regularly, and I have as well.

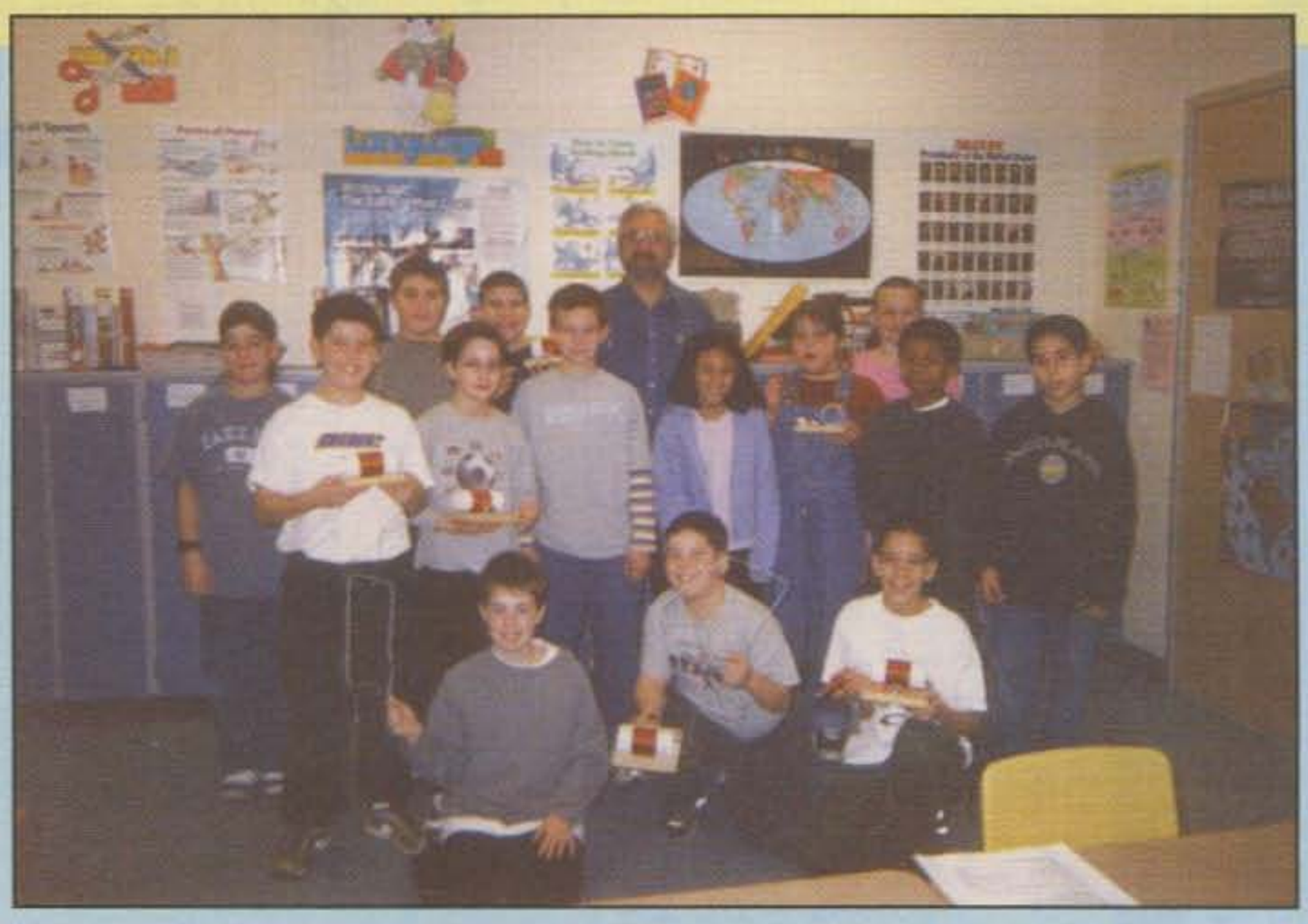
Two years ago, I went to the wood show out of respect to Alan, and found that I thoroughly enjoyed it. I went back last year because I wanted to, and I looked forward to returning this year. But there was no wood show this year, at least not when we were there. It had been rescheduled for the week after the hamfest, but for ham radio's traveling troubadours, a week is forever. Many exhibitors were upset. Alan would have been leading the pack, and probably would be grumbling about packing up and going home early.

Don't get me wrong. The hamfest was excellent. But it wasn't quite the same without the wood show. Should this column make its way to the organizers of the Charlotte woodworking show, please consider this an official protest on behalf of the ham radio industry and a request to return the show to the "correct" weekend next year.

Now, if you're relatively new to reading this column, you may be wondering why a ham radio magazine is devoting space to a woodworking show. Here's why: The people who go to the wood show are very similar to the people who go to ham shows, with the main difference being their choice of "toys." The shows, however, are not as similar.

Ham shows tend to be passive. Radios sit there, sometimes turned on, occasionally connected to an antenna. People look at stuff, maybe spin a few dials, ask questions, and buy and sell stuff. Imagine getting a chance to actually make a contact with that new super-rig, or see if you can snag something in a noisy hall with that just-out QRP radio. Highly unlikely. With very few exceptions, it just doesn't happen at hamfests.

On the other hand, vendors at the wood show are constantly demonstrating their products and often letting the customers try them out, cut things, hammer things, build things. This hands-on experience is missing from far too many hamfests and from far too many other demonstrations of ham radio equipment, and it doesn't help our hobby.



W2VU's hobby radio "enrichment cluster." (He's the one in the back, with the beard.) The 15 fifth- and sixth-graders each built a Vectronics crystal radio kit. (Photo by Marianne Sommerkamp)

Will doing things differently make a difference? You bet it will. Earlier this year, I had the opportunity to introduce the radio hobby to a group of 15 fifth- and sixth-graders in my hometown of Bloomfield, New Jersey. It was part of a program of "enrichment clusters" organized by the academically-talented teachers that brought together over 100 young people from our town's eight elementary schools. My cluster was one of about a dozen, on a wide range of topics from cooking to architecture. We had four one-hour sessions, spaced a week apart.

I tried to make my program as "hands-on" as possible. Fortunately, the school district had a small budget for this program, so I was able to purchase 15 crystal radio kits from Vectronics/MFJ, which I gave out at the first session. About half the kids had their kits finished the following week, most of the rest by week three.

They were totally captivated by these little radios—first of all, because they work without batteries or other visible source of power; secondly because they (the kids and their parents) built them and they (the radios) worked. The sense of accomplishment one gets from building something and having it work is incomparable. Many of the kids took the radios back to their home schools and showed them off to their classes.

I also made sure to have handouts at each session, but what really got the kids excited was the stuff they could touch, and try, and *use*. For example, I brought in a pair of FRS (Family Radio Service) radios, and let one group of kids go out in the hall and talk back into the classroom. They were practically fighting over the radios! (I must note, by the way, that this group of children was *extremely* well-behaved while still being enthusiastic and excited.) Any time they could put their hands on something and try it, their excitement level climbed a notch, whether it was an FRS handheld, the control switch to raise or lower the High Sierra HS-1500 MkII/MVA screwdriver antenna I had set up outside, tuning around for a station on the radio, or talking on the microphone when we made contact with other hams. What was their favorite? Code keys! They just couldn't get enough of trying out the two hand keys and two keyers I brought in (off the air, of course!). One thing I've consistently seen about kids and code: *they love it!* They love making dits and dahs and they love the idea of a secret code that very few other people know!

(Continued on page 106)

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705 Desk Microphone
$99.95

963 Switching Power Supply
$169.00

Model 701, Accessory Hand Mic, not shown.

Announcements

•**Connecticut QSO Party** – Sponsored by the Candlewood ARA, 2000Z May 4 to 2000Z May 5 with rest period 0400–1200Z. Phone, CW, RTTY, work stations once per band and mode, mobiles as they cross county lines. No repeater QSOs. Single op, fixed/mobile, Novice, QRP (5W), multi-single, multi-multi plus Connecticut club competition. CT stations may contact other CT stations for QSO/multiplier credit. CT stations exchange report and county; others report and state/province/ DXCC country. Non CT stations work CT stations only. SSB 1.860, 3.915, 7.280, 14.280, 21.380, 28.380; CW 40 kHz up from lower band edges; Novices 25 kHz up from low end; VHF 50.150, 144.200, 146.580; RTTY/PSK31/Digital normal RTTY bands. All bands except WARC count. Score 1 point per phone QSO, 2 points per CW or RTTY/Digital QSO. QSOs with club station W1QI and ARRL HQ W1AW count 5 points. CT stations multiply QSO points by states/provinces/CT counties worked (DX only one multiplier); others multiply by CT counties worked (work CT stations only). Plaques and certificates (100 point min.). Special certificate for working all eight CT counties. Send entry and SASE for results by June 5 to CARA, P.O. Box 3441, Danbury, CT 06813-3441.

•**Oregon QSO Party** – Sponsored by the Central Oregon DX Club, 1400Z May 11 to 0200Z May 12. Oregon stations work everyone; others work OR stations only. Works stations once per band/mode, mobile again as they cross county lines. No repeater QSOs. One point per SSB QSO, 2 points CW QSO. Score: Multiply QSO points by OR counties worked (max. 36); OR stations multiply QSO points by OR counties/states/provinces/DXCC countries. Fifty bonus points for working special Oregon QSO Party station K7O; 100 bonus points for working Central Oregon DX Club station K7ZZZ. Suggested freqs.: CW 1815, 3540, 7040, 14040, 21040, 28040; SSB 1855, 3900, 7240, 14280, 21390, 28390. Awards. Send logs by June 10 to: Oregon QSO Party, c/o K9QAM, 23083 Maverick Lane, Bend, OR 97701. Commputer logs to: <k4xu@arrl.net>.

•**The following Special Event stations are scheduled for May:**

K2BSA/1, from Extravaganza Camporee, Hamonasset State Park, Madison, Connecticut; 0000Z May 11 to 1200Z May 12 all bands on worldwide Scouting freqs. QSL with large SASE for certificate and QSL to Bruce Backer, WT1R, 272 Charles Court, Orange, CT 06477.

W1ACT, from Martha's Vinyard (IOTA NA-046), Massachusetts, Weekend Expedition; 1300Z May 4 to 1700Z May 5 HF, VHF, UHF, and satellite. Send QSL/SASE to Mark Dieterich, N2PGD, 23 Naomi St., Bristol, RI 02089.

W1FN, from Armed Forces Day 2002, White River Junction, Vermont; 1400–2000Z May 18 on phone 28.360, 21.360, 14.260, 7.260; CW 21.150, 7.115. QSL (SASE) or certificate (9×12 SASE). QSL to Karl Zuege, KB1DSB, 2176 Drake Road, Bomoseen, VT 05732 (e-mail: <kb1dsb@arrl.net>).

K2BAR, from Aviation Hall of Fame & Museum, Teterboro, New Jersey; 1500–2200Z May 11 on 10, 15, 20 meters, plus 146.580 FM simplex. For 8$^1/_2$ × 11 certificate send QSL and SASE to Jim Joyce, K2BAR, 286 Ridgewood Blvd., Washington Township, NJ 07676.

W2CVT, from Samuel F. B. Morse home, Poughkeepsie, New York; 1400–2000Z May 4 on 7.125, 14.250, 21.125, 28.110. Send QSL and 9×12 SASE ($0.57) to Don Stein, W2PTF, 3 Little Rd., Wappingers Falls, NY 12590.

W2GLQ, Nutley ARS from Edison Historical Labs, West Orange, New Jersey; 8 AM to 5 PM in General portion of 10–40 meters. For QSL sned QSL and SASE to Nutley ASR, 169 Chestnut St., Nutley, NJ 07110.

W2Q, from PCARA QRP Special Event, Peekskill, New York; 1300–2100Z May 4 on 28.350, 21.350, 14.280, 7.240. For certificate send QSL and SASE to PCARA, P.O. Box 32, Crompond, NY 10517.

3-land, from Chestertown Tea Party of 1774 commemoration, Kent ARS; 1400–2100Z May 25 on 7040, 7240, 14240, 28340. For certificate send 10×13 SASE to Paul Gerhardt, K3PG, 313 Chesterfield Ave., Centreville, MD 21617.

NC4ZO, from North Carolina Zoo; 1300– 2000Z May 4 on 28.400, 21.320, 14.240, 7.240 ±QRM. For certificate send $1.00 and QSL to Randolph ARC, 6747 King Mt. Rd., Asheboro, NC 27205.

WC7O, from Mt. St. Helens Memorial Event Station, Cascade ARS; May 18 in the General portion of most bands. For more info contact <K7DXR@msn.com>.

W8YAF, from Memorial Day Special Event, Yankee Air Force Museum, Willow Run Airport, Belleville, Michigan; 1200–2000Z May 27; SSB 7.270 ±QRM. For certificate send QSL and 9×12 SASE to Frank Nagy, N8BIB, 24315 Waltz Rd., New Boston, MI 48164-9167.

Ø-land, St. Cloud (Minnesota) ARC 80th anniversary celebration, 24 hours beginning 1800Z May 25 on SSB up from 1.870, 3.890, 7.230, 14.290, 21.390, 28.420 MHz. For certificate send QSL and SASE to WØSV, 401 N. 4th Street. Waite Park, MN 56387.

•**These hamfests are slated for May:**

May 4, **2002 Owego Hamfest**, Tioga County's Marvin Park Fairgrounds, New York. Contact BARA, P.O. Box 853, Binghamton, NY 13902-0853; <http://www.wtsn.binghamton. edu/bara>. (Talk-in 146.76; exams 8 AM school next door)

May 4, **Wexaukee ARC Amateur Radio & Computer Swapmeet**, Cadillac Junior High School, Cadillac, Michigan. Contact Alton McConnel, 231-862-3774 evenings, 231-779-6215 days, e-mail: <nu8l@arrl.net). (Talk-in 146.98; exams 10:30 AM, must preregister, starting at 8:30 AM)

May 5, **DeKalb Hamfest**, Sandwich Fairgrounds, Sandwich, Illinois. Contact Bob Yurs, W9ICU, 815-895-3310; e-mail: <bob@w9icu.com>; <http://www.qsl.net/wa9cjn>. (Talk-in 146.73–, 146.52)

May 5, **Greater Hagerstown Area Hamfest**, Washington County Agricultural Center, near Hagerstwon, Maryland. Contact Carl Morris, WN3DUG, phone 717-267-3411; e-mail: <wn3dug@arrl.net>; <www.qsl.net/w3cwc>. (Exams 1 PM)

May 11, **AARG Hamfest & Auction**, Fredericksburg Fireman Park, Fredericksburg, Pennsylvania. Contact Neil Shatto, N3JQM, 717-469-7357; e-mail: <n3jqm@juno.com>; <http://www.aa3rg.org>. (Talk-in 146.640)

May 17–19, **Dayton Hamvention®**, Hara Arena, Dayton, Ohio. *(See display ad in this issue and visit us at the CQ booth.)*

May 11, **Reno Spring Ham Swap**, KNPB Television Station, University of Reno, Nevada. Contact Glen Haggard, KK7IH, 775-673-6401; <kk7ih@nvrams.org>. (Talk-in 147.060+; exams contact W7FD, 775-851-1176, e-mail: <dfree1@worldnet.att.net>)

May 11, **RI Amateur FM Repeater Service Fleamarket & Auction**, VFW Post 6342, Forestdale, Rhode Island. Contact Rick Fairweather, K1KYI, 401-725-7507 (7–8 PM only); e-mail: <k1kyi@arrl.net>. (Talk-in 146.74)

May 26, **Maryland FM Assn. Hamfest**, Howard County Fairgrounds, West Friendship, Maryland. Contact Mike, W3IP, 410-923-3829. (Talk-in 146.76, 224.76, 444.00)

Oops...

A clarification of one item in our March issue Market Survey of HF transceivers: We reported that the ICOM IC-775DSP is now a special-order item. ICOM informs us that while some dealers have decided to make this radio a special-order item, the 775DSP is still an active model and other dealers are keeping them in inventory.

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Our Readers Say

Can't See DeForest for da Trees?

Editor, *CQ*:

I just read the article in the December 2001 issue entitled "Some Reflections on the Early Days of Radio." The omission of Dr. Lee DeForest's name from the article was a major fault. We owe Dr. DeForest our whole world of communications. There was no mention of the fact that it was his station on Long Island, in New York, that sent the first voice across the Atlantic in 1903.

I have seen this same omission on documentaries and in other places. His biography is the hardest thing to find on the internet, if you can even find his name.

Next April will be my 50th year as a ham. I am very proud of that and guard the privileges that it grants me, as an American, very carefully. I have met a fair number of great men in my life, but the outstanding one is Dr. DeForest. I was a senior in high school and went to a ham picnic in Corona, California. Dr. DeForest was the honored guest that spring afternoon. That was about 48 years ago, but to this day I can still see the gentleman and the day in my mind. Of course, our question was did he finally beat RCA and get the rights to the triode that he invented—and though 30 years late, he did.

The impression that I came away with was that he wanted to know what us kids and young adults wanted to see in the field of communications. He just sort of tossed off what he was doing and what he had done as if it were history. I remember so well that this giant of a man was more interested in new ideas and our thoughts than anything else. That has been a yardstick I have carried all my life when it comes to judging people.

John Bradley, W6QBM
via e-mail

W2ZF replies:

Dr. DeForest's invention of the triode was certainly significant, and a case can be made for my not having included it in my "Reflections." But then where does one start? In my view, Thomas Edison's discovery of the "Edison Effect," which preceded the triode by some 24 years, was at least as important and it wasn't included either. (To those who say Edison made no attempt to put his discovery to practical use, I would be willing to write a paper in his defense.) Mr. Bradley seems to regard Dr. DeForest as a "knight in shining armor" but wonders why the biography of the man to whom we owe "our whole world communications is the hardest thing to find on the internet." I can suggest a likely reason: His reputation has suffered because of his penchant for appropriating the ideas of others for his own aggrandizement. Good examples are "regeneration" invented, without question, by Howard Armstrong, and the early radiotelephone efforts of Reginald Fessenden. For the true story of the long, drawn-out patent suits between DeForest and Armstrong—which, by the way, had nothing to do with the "rights to the triode," which were clearly DeForest's, but rather had to do with who invented the principle of regeneration and oscillation—I suggest that Mr Bradley read Lawrence Leswing's *Man of High Fidelity*. He should make it a point to read Chapter 10, "Armstrong vs. DeForest," and especially about what happened at the Ninth Annual Convention of the Institute of Radio Engineers held in Philadelphia on May 28, 1934. Mr. Bradley might also do well to obtain a video-tape copy of the PBS special entitled "Empires of the Air," which covers some of the fraudulent stock-market activities with which Dr. DeForest allowed his name to be used.

One further point is of interest: Mr. Bradley's e-mail makes mention that DeForest "sent the first voice across the Atlantic in 1903." He has not seen this "same omission" for the simple reason that it never took place, since it was technically impossible at that time. (What was the nature of the carrier that was modulated?) Dr. DeForest may actually have made the claim, for there is also evidence of similar "successes" which were staged.

(Note from W2VU: A Google search on the internet turned up 15,400 references to Lee DeForest and another 1740 by spelling his name DeForrest, which is how we spelled it when we inducted him into our Amateur Radio Hall of Fame last year. The most authoritative sources use the one-R spelling, though, so consider this a correction of our misspelling.)

Interview with Al Kahn, K4FW

Editor, *CQ*:

Ted Cohen's interview with Al Kahn, K4FW (*CQ*, December 2001) was great! Al certainly has led a most interesting life, the fruits of which have benefitted amateurs worldwide.

George Coyne, N1BV
Alexandria, VA

Code and the ITU

Editor, *CQ*:

I have to agree with the Russians when it comes to retaining the testing for Morse Code to obtain an amateur radio license. I see eliminating it as another way to dumb down the American amateur radio operator. I also think it should be left up to the individual country. In addition to this, if the existing amateurs in that country want to keep that as part of their communications mode, then so be it.

Leo Casey, K8HZK
via e-mail

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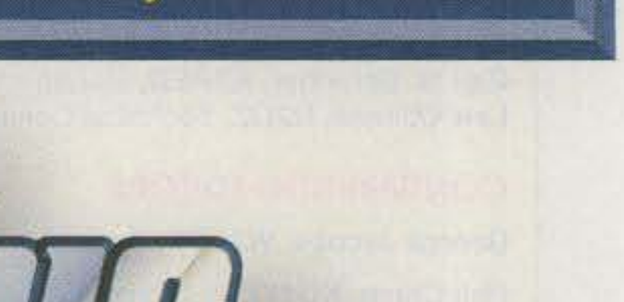

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Results of the 2001 CQ WW RTTY DX Contest

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

The 15th annual CQ WW RTTY Contest was held September 29–30, 2001 with solar Cycle 23 at its second highest peak. Geomagnetic conditions were excellent, although a proton event around 1600–2000Z on September 30 disrupted propagation for those in northern latitudes. In another year of generally excellent worldwide propagation, RTTY contesters competed in record numbers, with almost 800 logs submitted. As a result, competition was fierce, and a new World Record was achieved in the Single Operator Low Power category (beating even last year's great Single Operator High Power record) and many regional records were broken. Thirteen logs in six categories scored more than 3 million points, a feat achieved only by multi-multi stations prior to 1998. In most of the world, 15 meters was the most prolific single band this time. Twenty and 10 meters were about equal to each other in performance, and a few records were set on each band. Scores on 80 and 40 meters improved over those in the 2000 contest, but these bands continued to be generally noisy with no new records set.

WØGJ (at WBØO) added a lot of color from North Dakota, a rare find in the CQ WW RTTY Contest.

Single Operator

Single Operator, Low Power (SOL). While there were many excellent scores this year, the most impressive noted must be that of Tyler, K3MM, operating as P40MM. Long the leader of the W3LPL multi-multi RTTY gang, Tyler moved to the Single Operator category this year, using the same station (owned by Carl Cook, AI6V) where the old world SOL record was set by Ray, WF1B (as P40TT), in 1997, and the current world Multi-Operator Low Power (MOL) record was set in 1998 by GØAZT, WF1B, and KA1JGB. Tyler's achievement is all the more impressive because he exceeded even the great 2000 Single Operator High Power (SOH) performance of Tim, N4GN, at EA8BH (5.01 million points). Scoring almost 5.6 million points (2873 QSOs, 651 multipliers), Tyler beat Ray's SOL record by more than 50% and Tim's SOH record by 11%.

Second in the world and beating his own NA record was Barry, W2UP, scoring almost 2.7 million points (1813 QSOs, 629 mults), a very impressive score from a U.S. location. In the world only the P4 stations have ever scored higher in SOL. Third was ZX2B (PY2MNL op.), last year's winner in SOH from SA, with approximately 2.6 million points (1748 QSOs, 508 mults), a great score from a QTH so distant from Europe and the key W/VE mults. Don, AA5AU, was fourth in the world and the U.S. winner with 2.4 million points (1855 QSOs, 635 mults). As in 2000, Don and Barry battled for the top spot in NA, but Barry had more 2- and 3-point QSOs (4240 QSO points vs. Don's 3837), to overcome Don's slender lead in total QSOs and mults.

Single Operator, Assisted (SOA). Always a strong contender in RTTY contests, particularly in SOA, Rick, KI1G, beat W2UP's 1999 SOA NA record and won the world this year with a serious 3.4 million points (2085 QSOs, 675 mults). Unlike the results in CQ WW CW and SSB where SOA scores are often lower than SO, for RTTY contesters in the U.S., the SOA category continues to produce higher scores than the SOH or SOL categories. World second was Koji, JM1CAX, operating as JY9NX, always a sought-after multiplier, setting a new Asia record (the third in this class in three years) of 3 million points (1954 QSOs, 531 mults). Third was DL5AXX with almost 2.5 million points (1578 QSOs, 617 mults).

Single Operator, High Power (SOH). Several of the top finishers in SOH set new records, although the 2000 score of EA8BH was unchallenged. First in the world was CT9L (DJ6QT op.), who scored 3.7 million points (2211 QSOs, 562 mults). TI5U (JH8KYU op.) was second, setting a new NA record of 3.5 million points (2431 QSOs, 565 mults—but from a two-point location, making only 6268 QSO points vs. the 3-point location of CT9L which made 6613 QSO points). UP5P (UN5PR op.) was third with 2.7 million points; K4JA set a new U.S. record with almost 2.5 million points; and VE3XO set a new Canadian record with almost 2 million points.

Single Operator, Single Band 28 MHz (28). While the solar flux remained above 200 this year, results on 10 meters reflected the fact that the absolute peak of this cycle probably has passed. Scores were approximately one half of last year's exceptional, all-time records, but still exceeded 1999 levels. First in the world was L40E (LW7EIC op.), scoring 399,516 points (864 QSOs, 156 mults). Very close behind in second place was HC1JQ with 395,048 points (876 QSOs, 152 mults). Third was LU8EKC with 329,737 points. Also of note was S50C (269,780 points), who finally broke the 1990 European record of 4U1ITU.

Single Operator, Single Band 21 MHz (21). As indicated above, some SO activity

*e-mail: <w6otc@garlic.com>
†e-mail: <edlyn@california.com>

TOP SCORES

Single Operator High Power

CT9L (Op: DL6QT) 3,716,506
TI5U (Op: JH8KYU) ...3,541,420
UP5P (Op: UN5PR) ...2,713,332
K4JA 2,464,814
VE3XO.....1,996,137

Single Operator Low Power

P40MM (Op: K3MM) .5,557,768
W2UP 2,666,960
ZX2B (Op: PY2MNL) .2,636,012
AA5AU 2,436,495
ZC4DW 2,194,400

Single Operator Assisted

KI1G.....3,424,950
JY9NX (Op. JM1CAX)3,001,743
DL5AXX.....2,489,595
IKØYVV 1,988,516
DK3GI 1,885,520

Multi-Operator Single Transmitter, High Power

HO1A 5,954,235
RW9C 3,256,110
HG1S 3,054,096
RU1A 3,049,137
OM5M 2,869,935

Multi-Operator Single Transmitter, Low Power

Z37GBC.....2,086,920
K1TTT.....1,957,278
TI2/AKØA 1,915,263
KP2D 1,749,660
YU7AL 1,404,500

Multi-Operator Two-Transmitter

HC8N 8,973,720
W5KFT.....3,098,784
JH4UYB.....1,904,782
RI4M 1,848,483
KI6DY 1,804,006

Multi-Operator Multi-Transmitter

IG9A.....5,130,450
K9NS 4,164,160
KA4RRU 2,303,444
OL7R 2,212,006
W4GKM 1,352,516

Single Operator

3.5 MHz

IK2QEI 82,532
S54E.....71,036
UR6F (Op: UXØFF).....64,962
S51DX 58,212
HA9RU.....54,975

7.0 MHz

IK4MHB 169,830
J41YM (Op: OK1YM)....165,312
DF8QB.....134,540
RK6BZ 84,249
KH7U 58,513

14 MHz

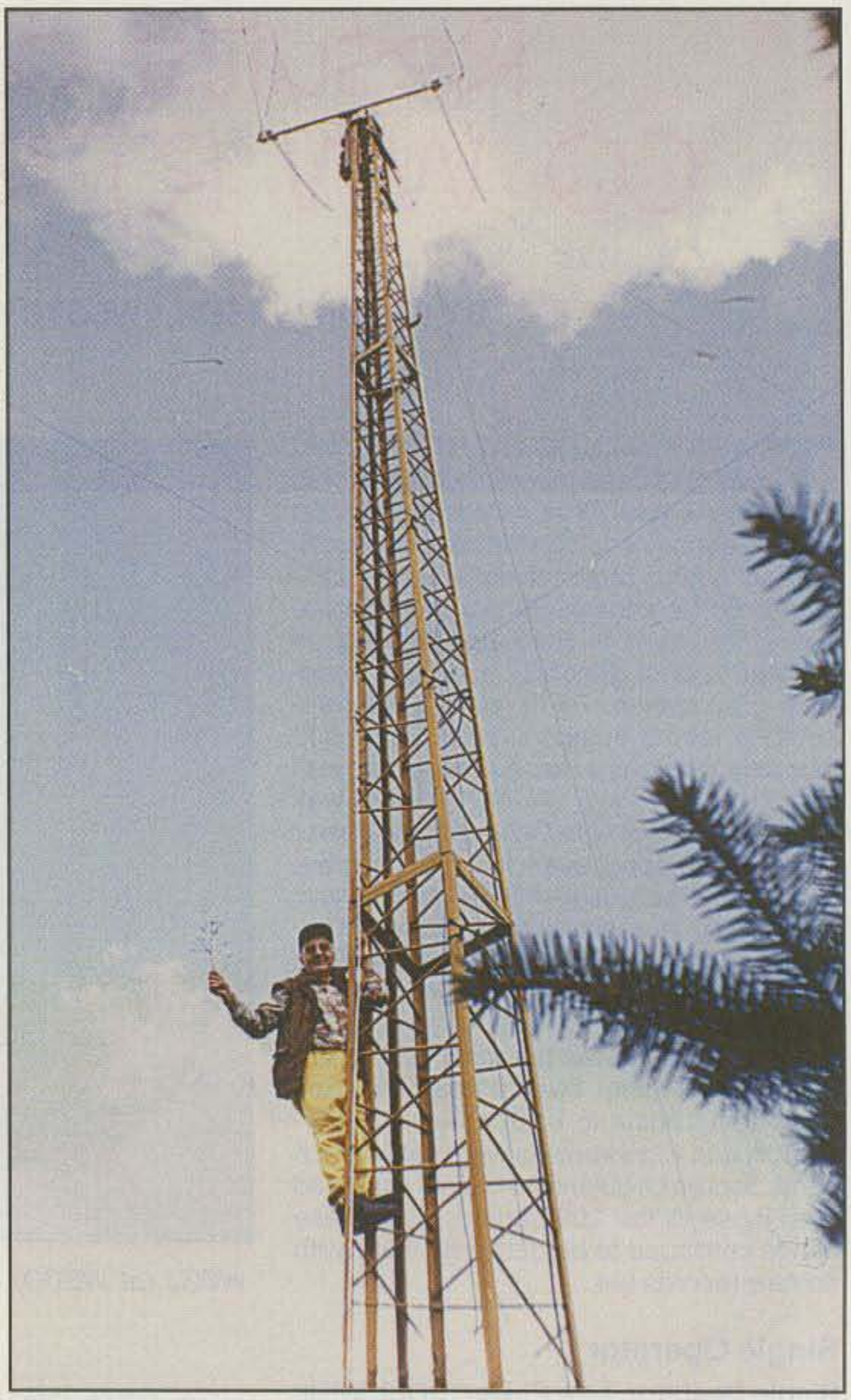
AH6OZ.....355,971
9A2DQ.....344,394
DL4MCF 327,123
IT9STX.....296,102
DH6LS 250,660

21 MHz

9A5W 567,666
KH6ND.....511,184
CT3BX 474,885
S50U.....401,855
VA3MM 393,921

28 MHz

L40E (Op: LW7EIC).....399,516
HC1JQ.....395,048
LU8EKC.....329,737
LW9EOC.....301,015
S50C.....269,780



SP3PL (single op, 20 meters) and his 2-element delta loop.

moved from 10 meters to 15 meters this year, resulting in several new records. 9A5W repeated as first in the world, again establishing a new Europe SO 21 record with a score of 567,666 (1097 QSOs, 198 mults). KH6ND was a remarkably close second, given his Oceania location, with a new record score of 511,184 (997 QSOs, 172 mults). Third in the world was CT3BX, scoring 474,885 points (919 QSOs, 173 mults), establishing a new African record for SO21. Setting a new Asia record, veteran contester Brett, VR2BG (who set the SO10 Asia record in 2000), made 332,748 points (794 QSOs, 156 mults). Only North and South America failed to achieve new SO 21 records in 2001.

Single Operator, Single Band 14 MHz (14). While the number of SO14 entries was less than for 15 meters, AH6OZ easily exceeded the 1997 Oceania record of FK8VHN, scoring a fine 355,971 points (743 QSOs, 161 mults) from a nice 3-point location. The 2000 and 1997 SO14 world winner, 9A2DQ, was second in the world and first in Europe with a score of 344,394 (849 QSOs, 171 mults). Third in the world was DL4MCF, scoring 327,123 points. We should see more new records on this band in the coming years as the solar flux continues to decline.

Single Operator, Single Band 7 MHz (7). As we said last year, 40 meters is a difficult band for RTTY because the RTTY sub-bands vary dramatically around the world, ranging from a legal low of 7.025 MHz in Japan to an operational high of 7.1 MHz in the U.S., with lots of conflicting uses throughout. In addition, the peak of a solar cycle, now apparently just past, does not produce the finest conditions on this band. Nevertheless, we received many entries, with Europeans dominating the competition and scores now in an upward trend over the past three years. First in the world was IK4MHB, scoring 169,830 points. He was closely followed by J41YM (OK1YM op., who as SV/OK1YM was also second in 2000) with 165,312 points, and DF8QB third with 134,540 points.

Single Operator, Single Band 3.5 MHz (3.5). Like 40 meters, 80 meters continues to be a tough band for SO, although scores doubled compared to 2000. IK2QEI won with a score of 82,532 points, with S54E second at 71,036 points and UR6F (UXØFF op.) third with 64,962 points. These results will certainly improve in the next few years as solar activity declines.

Multi-Operator

Multi-Operator Two Transmitter (M2). The largest score in the 2001 contest was achieved in M2, a new class added to CQ WW RTTY in 2001. Here, HC8N (ops.: N5KO, K6AW, W6OTC) scored 8,973,720 points (3987 QSOs, 756 mults, including all states), second in any

2001 CQ WW RTTY CONTEST PLAQUE SPONSORS AND WINNERS

Single Operator High Power

World: Sponsored by HAL Communications Corp. Winner: **CT9L (Op: Walter Skudlarek, DJ6QT).**
N.A.: Sponsored by W2JGR. Winner: **TI5U (Op: Hidetoshi Tsutsumi, JH8KYU).**
USA: Sponsored by W6OTC. Winner: **Paul Hellenberg, K4JA.**
S.A.: Sponsored by HC8N. Winner: **LV5V (Jorge Krienke, LU5VV).**
Oceania: Sponsored by N6TQS. Winner: **Bob Stewart, ZL2AMI.**
Europe: Sponsored by K9JY. Winner: **Patrick Egloff, TK5EP.**
Asia: Sponsored by K7VS. Winner: **Romeo Loparev, UP5P.**

Single Operator Low Power

World: Sponsored by *The New RTTY Journal*. Winner: **P40MM (Op: Tyler Stewart, K3MM).**
USA: Sponsored by WØETC. Winner: **Don Hill, AA5AU.**
S.A.: Sponsored by N6TQS. Winner: **ZX2B (Op: Wanderly Gomes, PY2MNL).**
Africa: Sponsored by W6OTC. Winner: **Mohamed Kharbouche, CN8NK.**
Europe: Sponsored by AA5AU. Winner: **Peter Milicic, 9A6A.**
Asia: Sponsored by KD6WW. Winner: **Dez Watson, ZC4DW.**

Single Operator Assisted

World: Sponsored by WA9ALS. Winner: **Rick Davenport, KI1G.**
USA: Sponsored by K4WW. Winner: **Shelby Summerville, K4WW.**
Europe: Sponsored by KK5OQ. Winner: **Ulf Ehrlich, DL5AXX.**

Multi-Operator Single Transmitter, High Power

World: Sponsored by *CQ* Magazine. Winner: **HO1A (Ops: DJ7AA, DK1BT, DL7CM, HP1XVH).**

Multi-Operator Single Transmitter, Low Power

World: Sponsored by KP2N. Winner: **Z37GBC (Ops: Z31GX, Z32PT, Z33F, Z36W).**
N.A.: Sponsored by K1TTT. Winner: **K1TTT (Ops: K1TTT, WM1K, WF1B, W1TO, N1XS).**
Europe: Sponsored by K1TTT. Winner: **YU7AL (Ops: YU7AL, YT7AW, YZ7EM).**

Multi-Operator Two-Transmitter

World: Sponsored by WA9ALS. Winner: **HC8N (Ops: N5KO, K6AW, W6OTC).**
Asia: Sponsored by JA6BEY. Winner: **JH4UYB (Ops: JH4UYB, JL4NCF).**

Multi-Operator Multi-Transmitter

World: Sponsored by *CQ* Magazine. Winner: **IG9A (Ops: IT9GSF, YL2KL, YL2KA, YL2LY, YL3CW).**

class only to the Multi-Operator Multi-Transmitter results of HC8N in 1999. Second was the team of RTTY contesting veterans at W5KFT (ops.: K5DJ, WS7I, VK4UC, K7WM), who scored 3,098,784 (2358 QSOs, 624 mults). World third was JH4UYB (ops.: JH4UYB, JL4NCF), last year's Asia SOA winner, with 1,904,782 points (1457 QSOs, 463 mults). As in CQ/RJ WPX, this class promises to be popular with those who do not want the operating restrictions of the extremely competitive MOH and MOL classes or the really big setups required for MOM class.

Multi-Operator Multi-Transmitter (MOM). The 2001 contest saw the first important MOM entry from Africa, with IG9A (ops.: IT9GSF, YL2KL, YL2KA, YL2LY, YL3CW) submitting the world best score of 5,130,450 points (2638 QSOs, 650 mults), a very impressive entry and a major new record. K9NS (ops.: K9DX, K9HMB, K9PW, K9RO, KS9W, N9NCX) was world second, scoring an excellent 4,164,160 points (2700 QSOs, 715 mults). The K9NS total would have been enough to win the world only a few years ago. World third was KA4RRU (ops.: KA4RRU, N4DXS, W4MGM, W4DC), with 2,330,444 points (1789 QSOs, 572 mults).

Multi-Operator Single Transmitter, High Power (MOH). Always an intensely competitive class, MOH saw the HO1A German crew—world third last year—(ops.: DJ7AA, DK1BT, DL7CM, HP1XVH) try to better the HC8N 2000 record. Despite exceeding the HC8N MOH multiplier number and almost equaling the HC8N QSO num-

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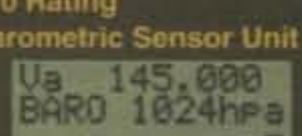

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● **WIDE CHOICE OF POWER SOURCES:** The FT-817 is equipped with an alkaline "AA" cell battery case, and a 13.8 volt DC cable is also supplied. Available as an option is the FNB-72 Ni-Cd Battery Pack (9.6 V, 1000 mAh), which can be recharged using a 13.8 Volt power supply while the radio is being operated.

● **TWO ANTENNA PORTS:** A "BNC" connector is provided on the front panel, and a type "M" connector on the rear panel, with Menu selection of which connector will be assigned for operation on HF, 50 MHz, 144 MHz, and 430 MHz.

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bers, HO1A still suffered from being a 2-point location, and fell short of the HC8N record by 700,000 points. Nevertheless, HO1A easily won the world title this year with 5,954,235 points (3049 QSOs, 730 mults), beating their own 2000 NA record by almost 50%. World second was RW9C (ops.: UA9CGA, RW9CF, UA9CR, RU9CK, RA9DK), scoring 3,256,110 points (1925 QSOs, 605 mults). World third was HG1S (ops.: HA1TJ, HA1DAE, HA1DAC, HA1DAI, HA1AG), scoring 3,054,096 points (1813 QSOs, 668 mults). Again, the 1999 KH7R Oceania (2.6M points) and 1996 TY1RY Africa (2.7M points) MOH records survived the competition this year.

Multi-Operator Single Transmitter, Low Power (MOL). In the MOL category, the scores, but not all of the winners, were about the same as in 2000. First was Z37GBC (ops.: Z31GX, Z32PT—both on the Z30M winning team last year—and Z33F, Z36W), which scored 2,086,920 points (1565 QSOs, 558 mults). Second with 1,957,278 points (1422 QSOs, 519 mults) was K1TTT (ops.: K1TTT, WM1K, WF1B, W1TO, N1XS). Very close behind in third place was TI2/AK0A (ops.: AKØA, KI7WO), scoring 1,915,263 points (1714 QSOs, 441 mults).

Summary

This was another great and highly competitive contest. Solar Cycle 23 has clearly peaked, but propagation for the contest remained very good. Participation, whether measured by logs submitted or total QSOs, again set new records, confirming CQ WW as the most popular RTTY contest run annually (CQ/RJ WPX is the second most popular!). To check all-time CQ WW RTTY records, look at <www.rttyjournal.com/records/cqww.html> maintained by GØAZT.

Approximately 95% of all logs (and 100% of competitive logs) were submitted via e-mail. The September 11th tragedy at the World Trade Center disrupted snail mail, but all mail logs received were processed and their results are included here. All e-logs and those few snail-mail logs with diskettes enclosed were converted to Cabrillo format. They were then checked against a master call file built by the log checkers from the submitted logs for the 2001 contest. As in prior years, snail-mail logs without diskettes were checked manually. We also received a record number of check logs, which were used extensively for log checking. Thanks to all of you who submitted logs.

While most logs were generally accurate, some neglected to copy QSO information carefully, particularly zones and states. Accordingly, quite a few scores—particularly for the high-scoring logs—vary significantly from those submitted. Note that most of these errors (states and zones) are fairly easy to double-check before submitting a log. For example, it should be apparent that neither HO1A nor IG9A is in Zone 5, but some big logs located them there. In previous years this sort of error might not have been detected in all cases by the log checkers. However, today all such variations are automatically flagged when the log file is opened.

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. Given the preponderance of Cabrillo-format logs submitted and the relatively few other logs submitted, we will be looking in the 2002 contest to coming closer to eliminating paper-log submissions altogether.

Plaques: All plaques sponsored as of March 5, 2002 are shown in the 2001 Plaque Sponsors and Winners box here in this write-up. However, any winner of any class may order a plaque from W6OTC for a cost of $55 each, as long as the order is placed by August 31, 2002.

Rule Changes for 2002 CQ WW RTTY Contest. The 16th annual CQ WW RTTY Contest will be run on September 28–29, 2002 and will have only one significant rule change. Based on our experiences in the past two years, *Cabrillo*-format logs will be even more *highly* encouraged than before for *all* entrants, with *e-logs required* from *all* potential *high-scoring* entrants in any category. Also, any computer-generated log with *more than 100 contacts must be submitted via e-mail or on a 3.5 inch diskette via snail mail.* For those who submit diskettes, please remember to send the diskettes in a protective envelope. E-mail is clearly the most reliable and easiest mode for log submissions but we welcome all logs, including (subject to the restrictions described above) paper logs, no matter how they may be sent.

Finally, the **deadline** for log submissions for the 2002 contest is **November 15, 2002**. The full text of the 2002 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 note that *all* logs submitted via e-mail go to **<cqwwrtty@kkn.net>.**

73, Glenn, W6OTC, and Eddie, GØAZT

Soapbox

P40MM (K3MM)...What a great time! Broke old SOLP record after 24 hours and the HP record at about 42 hours. My thanks to Carl, AI6V, for the FB station, N3OC for his Soundblasting notebook computers, and WF1B and K6STI for their still unbeatable RTTY contest software! *AA5AU*...Great contest as usual! First time over 1800 Q's Low Power. *W2UP*...Highlight of contest was receiving the exchange 599-25 God Bless America from a JA. *N4GN*...Congrats to K3MM at P40MM for blowing away my short-lived world record. *HO1A*...Having fun in this year's contest. Too bad that second day conditions were not so good. We hoped to break the HC8N world record, but from North America a hard job. From a 3-point QTH our claimed score would be more than 7 million points, hi. See you again next year.

ZL2AMI...A great contest, my personal best total. *K1TTT*...Thanks to Dave for the use of his fine contest station. Conditions seemed to be off from last year, fewer Q's but hard work moving multipliers and we broke 2M for the first time. CU all next year. *WØETC*...I had planned to give the contest full effort, but my first week-long round of chemotherapy for CLL ended the day of the contest. Due to that I had to limit my operating time to what I felt able to handle. *GUØ-SUP*... Great contest! Great conditions, and some nice DX to work as well. Many thanks to the sponsors of the contest. *ZS6RVG*... Great contest. Radio gave up with still 8 hours to go; better luck next time. *TI5U (JH8KYU)*... There seemed much more participants than before and the condition was excellent. I appreciate TI5KD's great effort for my contesting in Costa Rica. *VK6GOM*... Great propagation. Best score yet in this contest.

Station Operators

L40E: LW7EIC. **EO1I:** UT1IA. **4U1ITU:** OM1AM. **AY8A:** LU8ADX. **C98DC:** DLSFAG. **OH6N:** OH8VJ. **SN4G**: SP4MPG. **PJ2EL:** ON4CFD. **HG5C:** HA5WE. **J41YM:** OK1YM. **UR6F:** UXØFF. **DAØRC:** DL4RCK. **W5KFT:** K5DJ, WS7I, VK4UC, K7WM. **HC8N:** N5KO, W6OTC, K6AW. **JH4UYB:** JH4UYB, JL4NCF. **RI4M:** RA4LBE, RA4LW, RA2LZ, RN4LP, RU4LM. **KI6DY:** KI6DY, VE6RAJ, Carol. **NØNI:** NØAC, NØNI, NØHR, KØKD, KØWHV. **WA9ALS:** WA9ALS, KB9YTW, WD9GMK; **J41K:** SV1CIB, SV1DPI, SV1DPX. **K6KM:** NA6E, WT6P. **IG9A:** IT9GSF, YL2KL, YL2KA, YL2LY, YL3CW. **K9NS:** K9DX, K9HMB, K9PW, K9RO, KS9W, N9NCX. **KA4RRU:** KA4RRU, N4DXS, W4MGM, W4DC. **OL7R:** OK1XUV, OK1VWK, OK1WMV. **W4GKM:** W4GKM, W4RRE, WA4CGF, KF4YWW. **JA6ZPR:** JH6JSR, JR6CKX. **HO1A:** HP1XVH, DJ7AA, DK1BT, DL7CM. **RW9C:** UA9CGA, RW9CF, UA9CR, RU9CK, RA9DK. **HG1S:** HA1TJ, HA1DAE, HA1DAC, HA1DAI, HA1AG. **RU1A:** RA1ACJ, RN1AM, UA1AKC, UA1ANX, UA1ARX, Yuri.

OM5M: OM3RG, OM2KW, OM2RA. **RK2FWA:** UA2FB, UA2FF, RA2FA, RN2FA. **OL5Q:** OK1HRA, OK1FFU, OK1VSL, OK1INC. **IK2BUF:** IK2BUF, IZ1AVK, IK2ZJJ. **MW2I:** GW5NF, GW4JBQ, G4VXE. **K4QD:** K4QD, AF4Z, K4PX, KE4MMI, WT4I, AB4ET. **RK9CZO:** RX9CAZ, RX9CGR, Igor, Fedjanin, Alex, Andreev. **LY2ZZ:** LY2PAJ, LY3MM. **RW9OWD:** RW9OW, RA9YDR, UA9UIV, UA9ZBQ. **JJ3YBB:** JA3PJL, JA3FHL, JA3OOK, JH3FQF, JS3VEX, Toshi Nakamura. **K9YY**: K9YY, KG9OV. **WØDC**: WØLSD, WØBV, WØDC. **F8KCF**: F6FNL, OM3CGN, FØDIA, F6BGC, F1ADG, F1BGO. **SP5ZCC**: SP5HGB, SP5UAF, SQ5BPM, SQ5EBL, SQ5EBJ, SQ5HAB, SQ5VJB. **SK4TL**: SM4RGD, SM4LLP, SM4UOS. **UT7L**: UR4LRG, UR4LTX, US4LGW, UXØLL, UY5LW. **RK3RWL**: RN3RC, RN3RX, RU3RQ, RK3RX. **RZ1AWO**: UA1ACC, UA1ATZ, RA1ARJ, UA1AAF, RV1AQ. **DL1YFF**: DL1YFF, DK1QH. **LW8EXF**: LU1AEE, LU2BA, LU7DW, LW8EXF. **KJ7TH**: KJ7TH, KW7N. **RK6AYN**: RV6ARU, RW6ACM, UA6AH. **Z37GBC**: Z31GX, Z32PT, Z33F, Z36W. **K1TTT**: K1TTT, WM1K, WF1B, W1TO, N1XS.

TI2/AKØA: AKØA, KI7WO. **KP2D**: KP2D, KP2VI, NP2E, NP2W, NP2BT, NP2DJ, NP2DZ, WP2S, W5TTY. **YU7AL**: YU7AL, YT7AW, YZ7EM. **YL7C**: YL2MD, YL2GQT, YL-RS463. **9A7T**: 9A2EU, 9A2NO, 9A4KJ, 9A5MR. **OK1KSL**: OK1FAK. **ES9C**: ES1QV, ES1TM, ES2NA. **DN1JC**: DN1JC, DL7VBJ. **KE7AJ**: KE7AJ, K7OX. **DF4OR**: DL1ZBO, DF4OR. **UZ4E**: UR7EU, UR4EN, Igor, Serg. **3Z1V**: SP1MHV, SQ1FTD. **PY2ZR**: PY2ZR, PU2NYV. **N7PWZ**: N7PWZ, W1DRY. **OK5SWL**: OK2SWD, OK2WHG. **DKØEE**: DL4MDO. **CT9L**: DJ6QT. **TI5U**: JH8KYU. **UP5P**: UN5PR. **LV5V**: LU5VV. **WW7OR**: W7GG. **EM1HO**: UX2HO. **UW5U**: UY2UA. **P40MM**: K3MM. **ZX2B**: PY2MNL. **LY6M**: LY1DS. **ER3A**: ER1LW. **OSØTIB**: ON4AME. **RG9O**: RZ9OU. **J49XB**: DJ9XB. **9K2USA**: K4CY. **7S3A**: SM3CER. **ZSØE**: ZS6AJS. **W8NP**: KF8UN.

(Continued on page 108)

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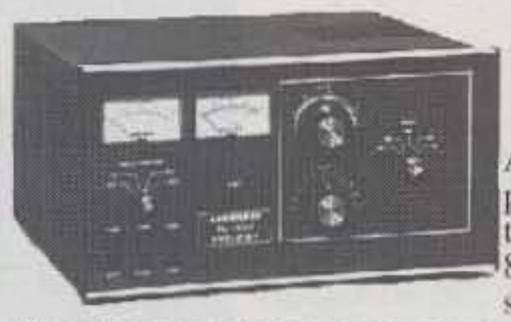

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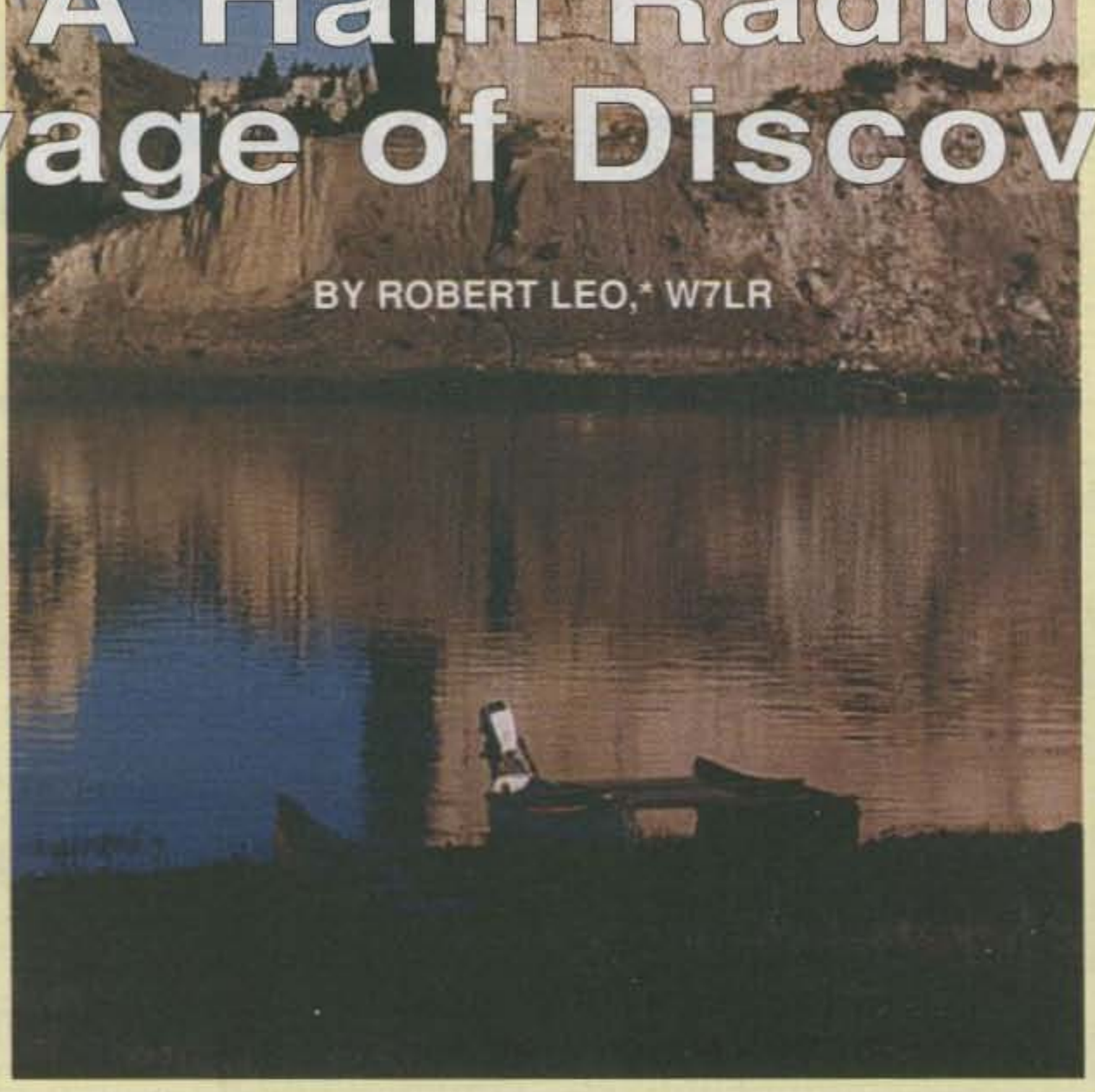
America's first highways were its rivers. Recently, W7LR and a group of other hams from Bozeman, Montana, recreated part of Lewis and Clark's trip along the upper Missouri River, but unlike those early explorers, they went fully equipped with ham radios for communicating with each other and the outside world.

A Ham Radio "Voyage of Discovery"

BY ROBERT LEO,* W7LR



In 1805 the Lewis and Clark expedition, known as the Corps of Discovery, explored the Missouri River in Montana, attempting to find an all-water route to the Pacific. The journey has become known as the Voyage of Discovery. Some 195 years later, in June 2000, a group of hams from Bozeman, Montana retraced some of the expedition's route by canoe on a ten-day float trip. We also called ourselves the Voyage of Discovery, because we were exploring the beauty of the river while following in the wake of history.

Our journey was somewhat like an extended Field Day. We used HF radio to report our positions and progress. Daily weather forecasts were critical due to the high incidence of dangerous winds and lightning storms, which would have made it unwise for river travel. We contacted Fred Cady, KE7X, back in Bozeman to request resupply items such as water when he joined us mid-trip. The HF radio was also important in getting information to fine-tune our gourmet recipes. Although the radio could have been used for medical emergencies, everyone avoided snake bites. It was comforting to know that the rig was there if needed, however.

The HF radio was a Yaesu FT-70G manpack radio running about 10 to 15 watts output. The power source was a 7 amp/hour gel cell charged from a small 350 ma solar panel. A wire dipole was used, slung over low tree branches. There were insulators with jumpers at mid-span which were manually opened for 40 meters and closed for 80. "The Voice of the Voyage of Discovery" usually received 5-9 reports on 40 and 80 meter SSB in spite of utilizing a minimal setup.

We had to rely on HF radio in such a remote area since there were no VHF repeaters anywhere near the river. On one hike to a mountaintop we did hit one far-off repeater, but it was in some other remote part of Montana and no one answered. The lesson learned was that HF capability should be included when exploring remote areas, and new hams should upgrade to assist.

Our low dipole worked well due to the relatively short distance (250 miles) to Bozeman and the need for high-angle sky-wave radiation. Propagation comparisons showed that 40 and 80 meters both were equally usable.

VHF handheld communications were used between our watercraft. One highlight was a canoe/airplane contact with a ham pilot who inspected our flotilla from the air. VHF was also used to direct a vehicle approaching for resupply. HTs assisted in coordinating activities between hikers and the base camp. We used GPS to help navigate and to keep track of where we were along the river. We could estimate speed and the expected travel time to the next camp. All the river miles were loaded into the GPS units to aid in locating all physical aspects of the river. GPS was also a useful aid in knowing our location during hikes in remote areas with few trails or markers.

We developed quite a following among hams from the Northwest who tuned in each evening to follow our progress. Our best DX contact was with Bill Rinker, NE9Z/7, near Grand Teton, Wyoming. Chief operators on the trip were Todd Gahagan, WA7U; Mal Goosey, N7GS; and the author, Bob Leo, W7LR. Other hams on the trip were Don Wilson, KC7EWZ; Don Regli, KI7OJ; Wendell Morrill, N7WM; Gina Gahagan, N7BJS; John Underwood, KC7BLO; Fred Cady, KE7X; and Katie Cady, KC7BKP. Ian and Chelsey Gahagan, the children of WA7U and N7BJS, also came along. Harley Leach, KI7XF, was along on our 1999 trip but didn't join us in 2000. Due to low water levels we didn't canoe in 2001.

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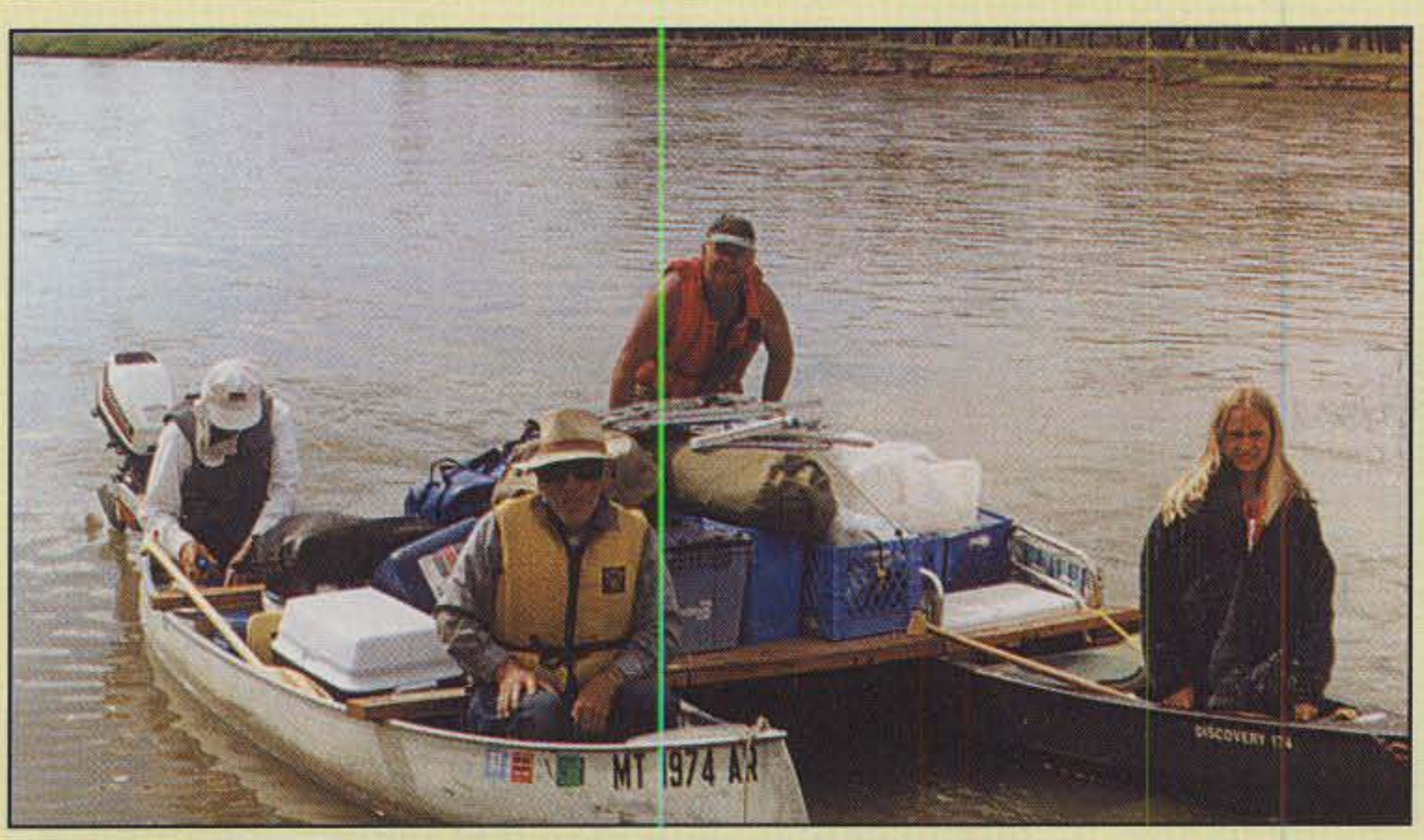


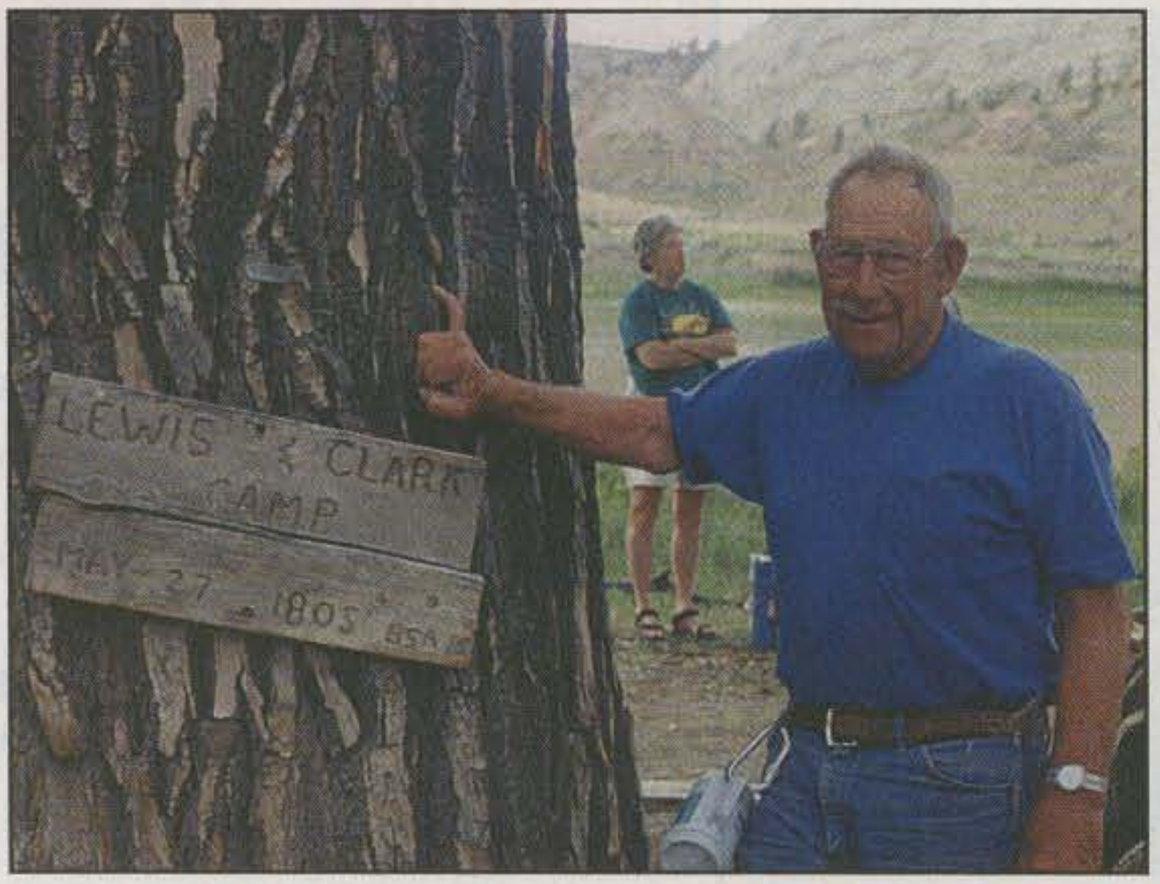
Who ever heard of hams traveling light? Here (from left) are KI7XF (looking down), the author, WA7U, and his daughter Chelsey in their canoes-turned-catamaran. It's a good thing there weren't any rapids! (W7LR photo)

In 1804 Lewis and Clark began their voyage in St. Louis, Missouri. They headed upstream on the 2714-mile-long Missouri River, starting at its confluence with the Mississippi River. The party spent the winter of 1804–05 in present-day North Dakota. After going up the same stretch of the Missouri on which we floated, Lewis and Clark took their boats out of the water near what is now Fort Benton, Montana. They then made a difficult winter trek over the snowy Rocky Mountains to finally reach the Pacific in what is now Oregon; they were the first U.S. citizens to do so. They returned to St. Louis in December 1906.

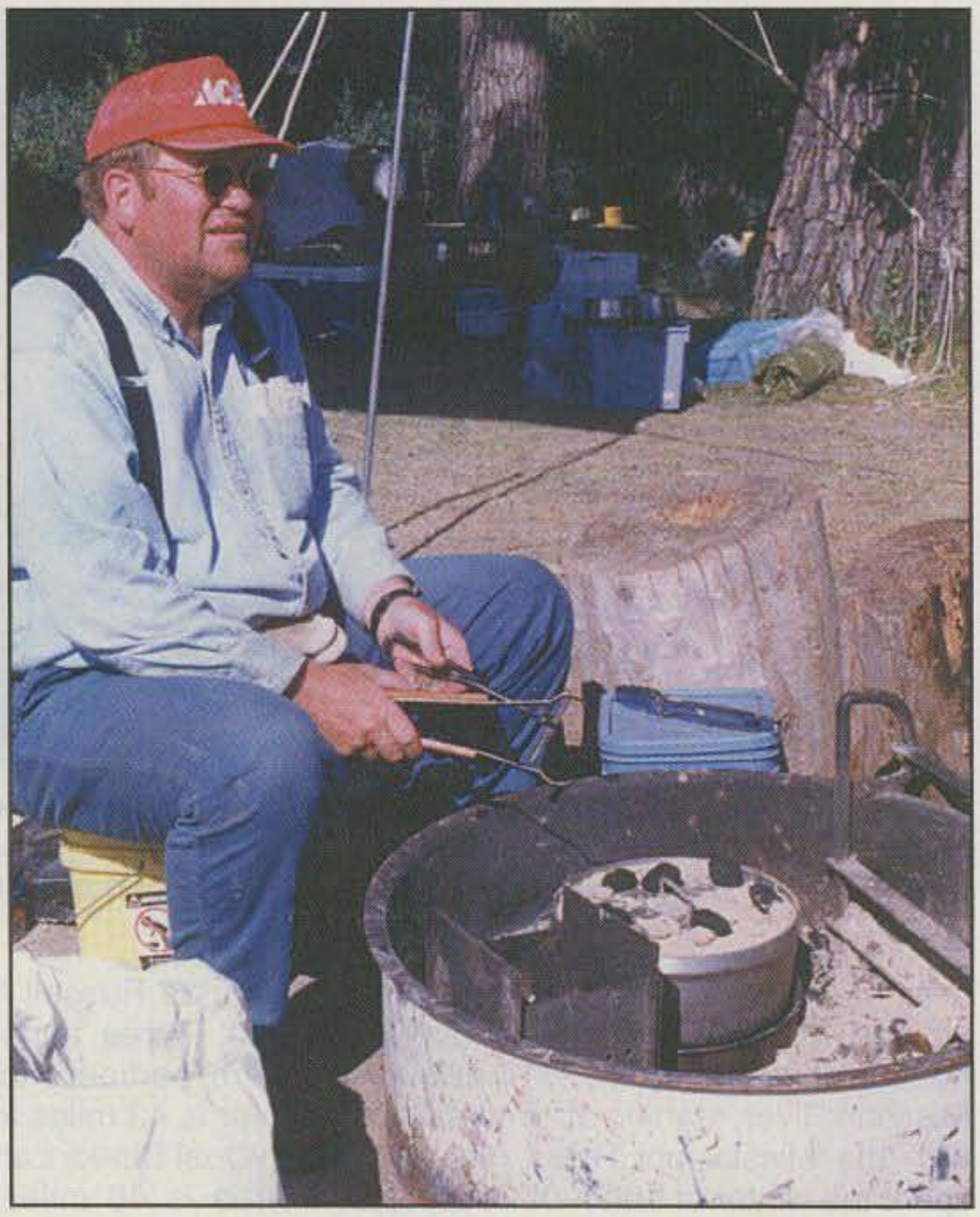
The upper Missouri in central Montana is designated a National Wild and Scenic River for a distance of 149 miles between Fort Benton, Montana and the Charles Russell National Wildlife Refuge. Three sections of this distance were pertinent to our trip. The upper river is 42 miles long from Fort Benton to Coal Banks Landing; the White Cliffs Area is 46 miles long between Coal Banks and Judith Landing; and the Missouri River Badlands stretch for 61 miles from Judith Landing to the Charles Russell Wildlife Refuge. In the 1800s steamboats used to travel on much of the Missouri between St. Louis and Fort Benton.

Like others who had come this way during the nearly 200 years since Lewis and Clark, we were attracted by the scenery, primitive setting, ease of boating, and solitude. This story is timeless, since the area has changed little since the early 1800s. Lewis and Clark had

Partial group photo. From left: KC7BKP, KE7X, WA7U, son Ian (in front of him), daughter Chelsey, N7GS, W7LR, and N7WM. (KI7OJ photo)



KI7OJ poses for the camera in front of a Lewis and Clark campground sign as KC7BKP stands in the background, perhaps waiting for dinner… (KI7OJ photo)



… which was one of the features of the trip, as Chief Cook KC7EWZ prepared a variety of delicacies in his Dutch oven cooker. (W7LR photo)

22 campsites along the 149-mile stretch of river on which we floated, and we spent nights at some of the same put-in spots.

Our first campsite at Coal Banks was where we transferred all the trip gear from our vehicles into the canoes and catamaran platforms, barely proving wrong those who insisted, "It won't all fit." It did. Our flotilla consisted of six canoes, plus a kayak paddled (but mostly floated) by N7GS. Four of the canoes were used to construct two catamarans, each with a cargo platform between them (see photo).

That first campsite was near the tiny "town" of Virgelle, which boasts one general mercantile store and a home for the operator of the car ferry there. We had to patronize the store, since WA7U and his daughter Chelsey didn't like sharing one toothbrush. Besides food and personal gear, we had to carry all of our drinking water, as none was available along the way. KE7X, who joined the trip at Judith Landing, brought more water and more steaks.

We often floated leisurely with the current. Periodically we used small outboard motors to power through wide, slow stretches. When the river spread wide, the water grew shallow and we made good use of our supply of motor shear pins after hitting gravel bars.

Along the river banks we saw herds of mountain sheep and deer and flocks of blue heron, pelicans, and geese. We also saw nighthawks, rattlesnakes, and Lion spiders (which snatch insects that get too close to the spiders' sand-cone hideaways).

The cargo platforms were handy for cooking Polish sausages for lunch on a propane stove as we floated down the river. KC7EWZ manned a solo canoe, while Fred and Katie, KE7X and KC7BKP, used the other single canoe. The rest of the crew was on the two catamarans.

We stopped to camp at interesting places along the riverbanks, and we hiked and explored the wonderful scenery up close and viewed old pioneer relics—log cabins and farm machinery. On a one-day hike through beautiful meadows and canyons along Eagle Creek, our birdwatcher, Gina, N7BJS, observed 33 species of birds. There was little evidence of civilization. We saw long-abandoned cabins and two operating flat-bottomed car ferries that were towed across the river with cables. There is only one bridge in 149 miles, at Judith Landing.

At each camp we unloaded all the gear from the canoes and hauled it to a campsite. A couple of us said we were like pack mules, so from then on John, KC7BLO, was "pack," and Bob, W7LR, was "mule." In the evenings in meadows near a camp, Don, KC7EWZ, made kites for the two children to fly.

Our chief cook, also Don, KC7EWZ, and assistant, Todd, WA7U, made wonderful meals, often with Dutch-oven cooking. There was spaghetti, lasagna, beef stroganoff, rhubarb

WA7U operates HF with a Yaesu FT-70G "Manpack" radio, while KC7EWZ logs. (N7WM photo)

W7LR (at controls) and N7GS (right) take a turn on the radio. The expedition included 10 hams plus WA7U's two children, who are not (yet) licensed. (N7WM photo)

crisp, chocolate pudding, pancakes, eggs, bacon, etc. None of us lost weight on the trip! A motto soon developed and was used often: "That was the best I ever ate!" It was true, but if we didn't sound off we might have wound up washing dishes.

Sometimes in camp we warmed water in hanging pouches and then took a shower with the pouch hanging from a tree branch. Evenings we sat around the campfire and watch the cribbage game or had a mild happy hour. At night we slept in sleeping bags in tents. All was quiet except for my tent partner, John, KC7BLO, who snores quite loudly. Being a sound sleeper, I never heard him, but those who were several tents away heard the serenade in the night.

I didn't read much, as most of the time we socialized or were busy hiking, floating, packing, sleeping, or eating. It was wonderful to sit in camp by the edge of the slowly flowing river, watching the birds nearby or listening to the quiet, which was interrupted occasionally by Air Force fighters overhead practicing in that remote part of Montana. We started off each morning with a cup of good, hot coffee.

It all was a great experience, and after ten days we packed up and headed back home to Bozeman. It was not an expensive trip, costing about $100 each for food and vehicle gasoline, which is less than it cost to live at home!

If you're interested in making a similar trip, the Federal Bureau of Land Management office in Lewistown, Montana has booklets and maps on this portion of the Missouri River. One of special interest is "Highlights of the Upper Missouri National Wild and Scenic River, and Lewis and Clark National Historic Trail." An interesting and informative book about the travels of Lewis and Clark is *Voyage of Discovery*, by Stephen Ambrose.

In addition, there will be a bicentennial celebration in Montana in 2004–2005 to commemorate the Lewis and Clark Expedition. There are several outfitters in Montana that may set up trips similar to ours. If you do go, don't forget the ham gear, and remember that you'll need HF capability! ■

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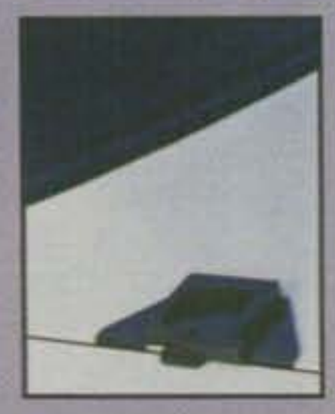

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Maldol NEW MSG-1100C • Dual-band 146/446MHz w/spring whip
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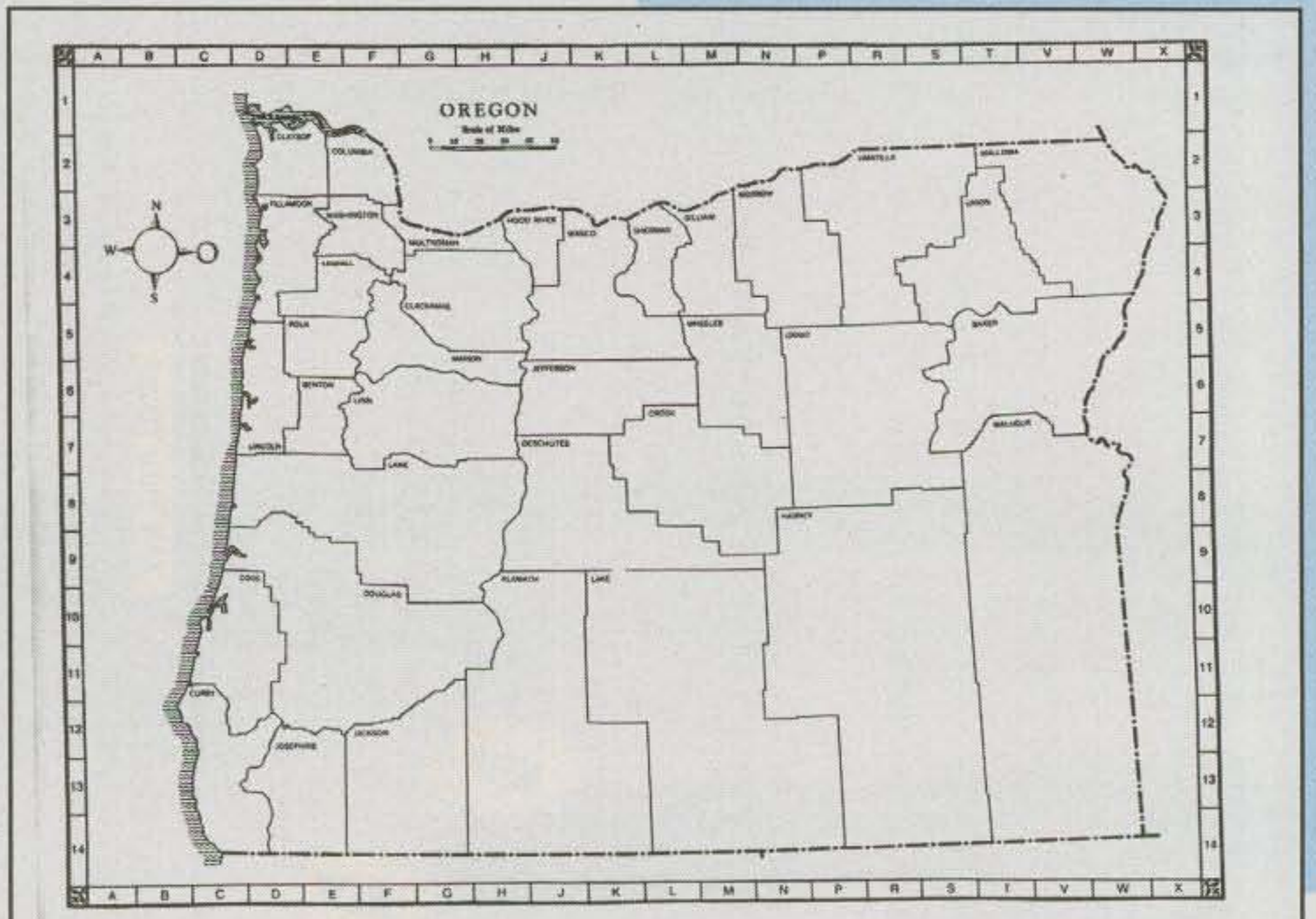
Want mobile adventure, great friends and a big challenge? County Hunters have that and more! Plus, if you need a "rare" county, it's not unusual to find someone willing to drive there to let you work it!

County Hunting on the Road

BY JEFF REINHARDT,* AA6JR

One of the things that has always fascinated me about hams who love county hunting is their dedication to helping each other achieve their goals. One of the principal ways in which they do this is by organizing trips to operate from "rare" counties and helping others "fill in the blanks" in their county log books. When AA6JR told me he'd just finished up his USA-CA award—working all 3077 U.S. counties—I asked him to write about these hams who will drive hundreds or thousands of miles primarily to help other hams in pursuit of an award. He did that and more, letting some of those folks speak for themselves and providing a county-hunting primer at the same time. Thanks, Jeff.
—W2VU



Your "coloring book" can help identify needed counties. N4UJK is one source for this material as well as Mobile Response Cards (MRCs).

They drive big rigs, motor homes, sedans, and sub-compacts. They use every type of radio you can operate from a vehicle. They are men and women, young and old, working and retired. They come from every state in the union (and beyond!), and a few have *been* to every state of the union, pursuing a passion they want to share with you—county hunting.

Since our emphasis in this issue of *CQ* is on mobile operating, we'll focus on those heroes who travel the highways putting out counties for you to add to your collection.

The Extra Mile

Mobile county hunters are amazing in their diversity and abilities. Some will divert their trip a hundred miles or more to put a needed or "rare" county on the air. When you see the wide-open spaces of the Great Plains or desert southwest, you may think of rare counties, but it's also unusual to hear Manhattan (also known as New York County) and populous locations such as Nantucket and Martha's Vineyard (Barnstable County) in Massachusetts on the air. The same holds true for Kalawao county in Hawaii. If you hear any of them, try to get 'em in the log!

A few county hunters such as Bob Voss, N4CD, are determined to trans-

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mit *from* every one of the 3077 USA-CA counties. That's a commitment! According to Don Strom, KØVPP, Ken Wosika, KB7QO, transmitted from all counties and is acknowledged to be the first to have done so. Gene Kowalewski, W1TEE, transmitted from all of them on CW, and he did it alone from a car that was not air-conditioned!

Another Bob, Bob Demchak, KC1NA, criss-crosses America just about every day of the year (or so it seems) driving a big rig. He started county hunting in June 1992. He has put out 2077 different counties and has done so over 14,200 times on nearly every HF band. This is no small feat in a big rig, but Bob was also recognized for 1,000,000 accident-free miles by the American Trucking Association in July of last year. Another big rig driver is Ralph Wiley, WB4FFV, whose 18-wheeler runs about the Midwestern Plains states.

Far from the cab of a big rig is Carol Morkrid, KIØJD, a retired librarian who logs thousands of miles each year and promptly acknowledges her many contacts, which range from Texas to Minnesota.

You might catch Ken Carpenter, KC4UG, on the air. He has one of the nicest 1957 Chevrolets to be found anywhere. Ken is likely to turn up just about anyplace but is often tearing up the backroads in the deep south of Alabama, Mississippi, or Georgia. When not putting out counties, look for Ken at a Waffle House!

Eldon Hall, N8STF, and his intrepid logger Mary travel a lot through Michigan (including those rare upper-peninsula counties). Wisconsin and other states are often put on the air by these kind folks.

Aaron Reitman, WA2AKB, and XYL Carol Ann, AB2LS, often motor around the New York, New Jersey, Connecticut area and put out "rare" counties such as Richmond (Staten Island), Kings (Brooklyn), and the Bronx, in addition to many others.

There are many more "regular" and occasional mobiles out there. I wish I could mention them all. How about making plans to join them? County hunters have great stories to tell.

Happy to Help You!

John Sims, WB5LFO, and Lynda, his XYL, planned a cross-country trip and decided to make county hunting part of it. John says,

The trip was great. We gave out 78 counties in 15 states. The most exciting to us were the counties in Montana and Wyoming, since most of them appeared less populous

A County-Hunting Primer

The CQ USA-CA All Counties Award, mentioned regularly in this publication's "Awards" column, is earned when you make confirmed contacts with all of the 3077 counties in the U.S. (*There are lower levels of the award you can earn, starting with 500 counties.—ed*). County hunters can use any contact, fixed or mobile, where there is an exchange between the two parties (usually a signal report); written confirmation of each contact is required for the USA-CA Award. Any amateur band, almost any mode, including CW and digital, can be used to make county contacts, but repeater contacts and certain other types are "off limits." See the award rules to get all the details. They're on the CQ website at <http://www. cq-amateur-radio.com/usacarul.html> or available by mail for an SASE sent to the *CQ* office.

Getting Started

The center of county hunting activity is 14.336 MHz, where there is usually a net control operator and several mobiles scattered across the country. Other frequencies to check include 7.238 (SSB) and 7039 or 14.0565 (CW). One of the main purposes of the net is to listen for mobiles that are in distress or reporting an emergency situation. There have been many occasions when county hunters played a role in getting help to where it was needed. While monitoring for emergencies, collecting counties is a fun pursuit and it ensures a number of "ears" across the country listening for distress calls. As with any net, listen for a few days and monitor the way the net operates. County hunter net control operators have a big job to do; there are usually 10 to 20 mobiles all over the country and scores of base stations on the air. Help out the controllers with a cooperative attitude.

Each mobile usually engages in a 10-minute run for the county it may be in. Here's a bonus: If the mobile is parked on a county line, you get credit for both counties in a single contact! Phonetics usually are not used by county hinters unless requested. This practice saves time for others who also wish to contact the mobile. If you have questions about the mobile's directions or other concerns, offer to move the mobile to another frequency at the end of his run and keep the net flowing for others.

Easy Pickins

At least twice a year county hunters have gatherings, where the preferred method of travel is along the highways. This July there's a national convention in Visalia, California and in October there's a gathering in Tennessee, plus there are other "mini" conferences. That's not to mention the many mobile operators who travel to Dayton each May! It's great fun to attend these conventions, but even if you can't, it's a good time to be listening for mobiles traveling to those gatherings through the counties *you* need.

Confirmation

The USA-CA Award requires written confirmation of contacts. QSL cards are one acceptable form, but an individual QSL for each county could get quite expensive. Thus, county hunters use another method—the MRC, or Mobile Reply Card, which lists many contacts with the same station on each card. This is a great way to save postage and time for the mobile who made hundreds of contacts on a recent trip. You fill out the MRC with your contacts, send it to the other operator along with an SASE, and usually get your signed confirmation card within a few days or weeks. Some computer programs will even generate the MRC for you! It's also customary to send a mobile your QSL card (from your fixed station) the first time you send along an MRC. Remember, they may need your county for their efforts!

Like many, I have suffered from low QSL responses while seeking DXCC and other awards. Not so with county hunters! Their QSL/MRC response rate is nearly 100%!

Tracking Your Progress

Ask 500 county hunters how they track their exploits and you're likely to get 500 different answers. Many use paper logs, always a good backup to computer records. There are computer programs available for county hunting, from simple word-processing or spreadsheet records to *Kwiklog*, a Windows program written by a county hunter expressly for county hunters.

While on the road, some operators have a passenger who logs on paper or computer, and many county hunters use small tape recorders to log contacts while in motion and then transfer the recorded contacts to paper later on. Using a recorder is also a good backup.

To keep track of their "collection," many county hunters also use a "coloring book," which is a map of each state; completed counties are colored in. This is useful as you track mobiles; you easily can see if they're headed in the direction of a county you need.

Closing In

As you start accumulating counties, you will begin to attain goals, such as completing all the counties in a given state. It's a thrill to bag that "last one," and most county hunters will pay $2.00 for an award to be issued by MARAC, a county hunter club, to the mobile who gave you that coveted "last county" contact. For the mobile who gets you the last county you need for USA-CA, a nice plaque is in order; it's quite an achievement!

Getting those "needed" counties can be a study in patience and persistence. It can take the better part of three years or more to work all 3077 counties from "scratch." However, if you have been on the air and have a collection of QSL cards from U.S. contacts, you already have a head start in the pursuit of USA-CA. You sometimes can hasten your progress by checking some of the county hunter websites where those who are planning trips post their anticipated routes. There are also websites for posting counties you need. Some mobiles check that list before they hit the road. It's nice to have them call you, instead of fighting to make a contact on a busy day.

Speaking of calling you, as you near that goal of 3077 you can post a note on a CH website asking to be alerted if the needed last few counties come on the air. I received several e-mails and phone calls from helpful county hunters who wanted to make sure I didn't miss a needed contact. I even offered to accept collect calls, but all the alerts came on someone else's dime. Who said hams are cheap? Actually, I did, but that was when I was selling something at a flea market.

(and more rare). Besides the great scenery in all states, one of the high points was giving out the county line of Powder River and Carter, Montana. It is located in the middle of nowhere, even by my old south Texas standards, and is somewhat off the beaten path. We had 50 contacts on 20 meters, including a few European DX contacts plus a couple of 40 meter contacts. Overall we made a total of 1022 contacts. Lynda logged all but about 50, which I hand logged while stopped. She and I enjoyed the trip immensely, and yes, we did visit Yellowstone and Devil's Tower, and Mount Rushmore, etc., but that's another story.

I Was Just Leaving...

County hunting can also be an adventure. Listen to Steve Morton, AA8HH and imagine "Deliverance" playing in the background!

"I was traveling through West Virginia and decided to get way off the beaten path to transmit from Hardy County. I was looking for a short cut and took a narrow country lane. After several miles I knew I was getting close to the Hardy County line, but the country lane turned into a very narrow, pock-marked gravel road. Using no good judg-

ment whatsoever, I kept on going. In several miles I only saw one small house. Eventually, I spotted a small, rusty sign that said "Hardy County." I didn't even pull over...I just stopped the car in the middle of the road, announced that I was in Hardy County, and worked the ensuing pile-up.

Now it was time to go back. After jockeying the car back and forth to get turned around, I started back toward civilization. When I came upon the small house that I had noticed on my way "in," I was dismayed to see three large dogs lying dead in the road. It didn't even occur to me that if a car had just recently hit these poor animals, I would have passed it coming back "out." I had not passed any cars at all.

Since the dogs were blocking the gravel road, I stopped the car to drag them out of the road. Just as I got out of the car, all three dogs jumped up and came running over to me with a fine West Virginia welcome! At that point, a man and woman came running out of the house....He was carrying a homemade wooden rocker; she was carrying a homemade quilt....both items were for sale.

After telling the man that I was a woodworker and that my wife made quilts, I complimented them on their craftsmanship, petted the dogs on the head, politely refused to buy anything, and then made tracks on down the road.

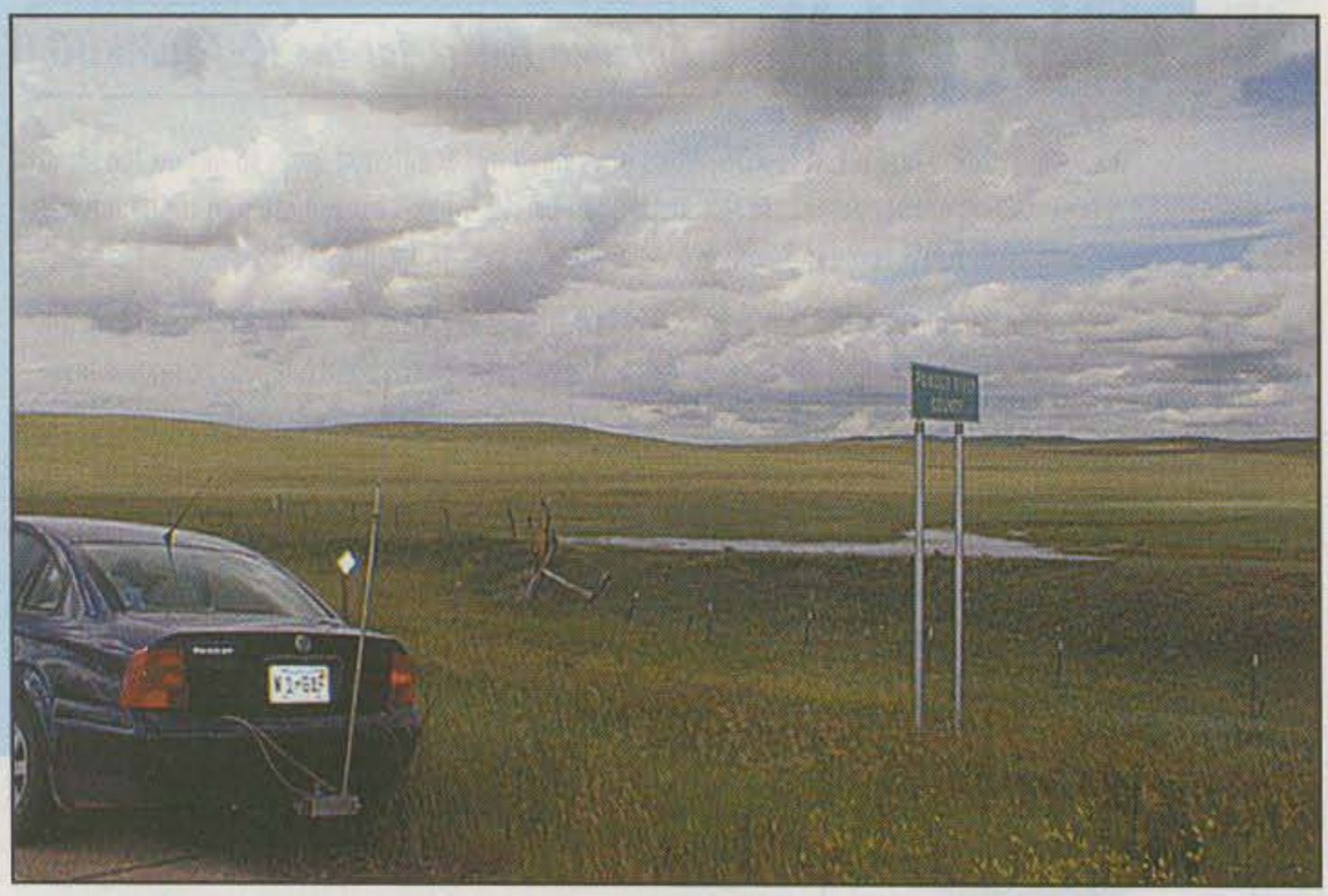
DX for DX

If county hunting sounds like a challenge to you, you're right. However, several county hunters have "worked them all" from Europe, Australia, and Japan. Here's what one county hunter did to help out an Aussie:

I went over to Lake, Oregon for Jim, VK4BS. I left Corvallis about 0400 local time in order to get to the Harney/Lake line while propagation was still good to Australia. The line is about 60 miles southeast of Bend on Highway 20. There is very little shoulder there, and as you can see from the photo, there is very little of anything there. I found turnouts within a quarter mile of the line in each county and ran the counties separately, thus avoiding having the car parked partially in a lane of the highway. I guess I didn't need to worry about that, because in the hour and a half it took to run both counties on SSB and CW, exactly one car went by and that was an Oregon State Patrol car. He stopped to see if I was in trouble, and I explained what I was doing. He was fascinated and listened for a while and was there when I worked Jim. He was amazed when I told him where Jim was. I drove back through Bend and went fly fishing on the Deschutes River and caught several nice Deschutes redside rainbows before heading home. All in all, a typical county hunter's day!!

Equipment

Putting out counties on HF while mobile is not a daunting task, but successful



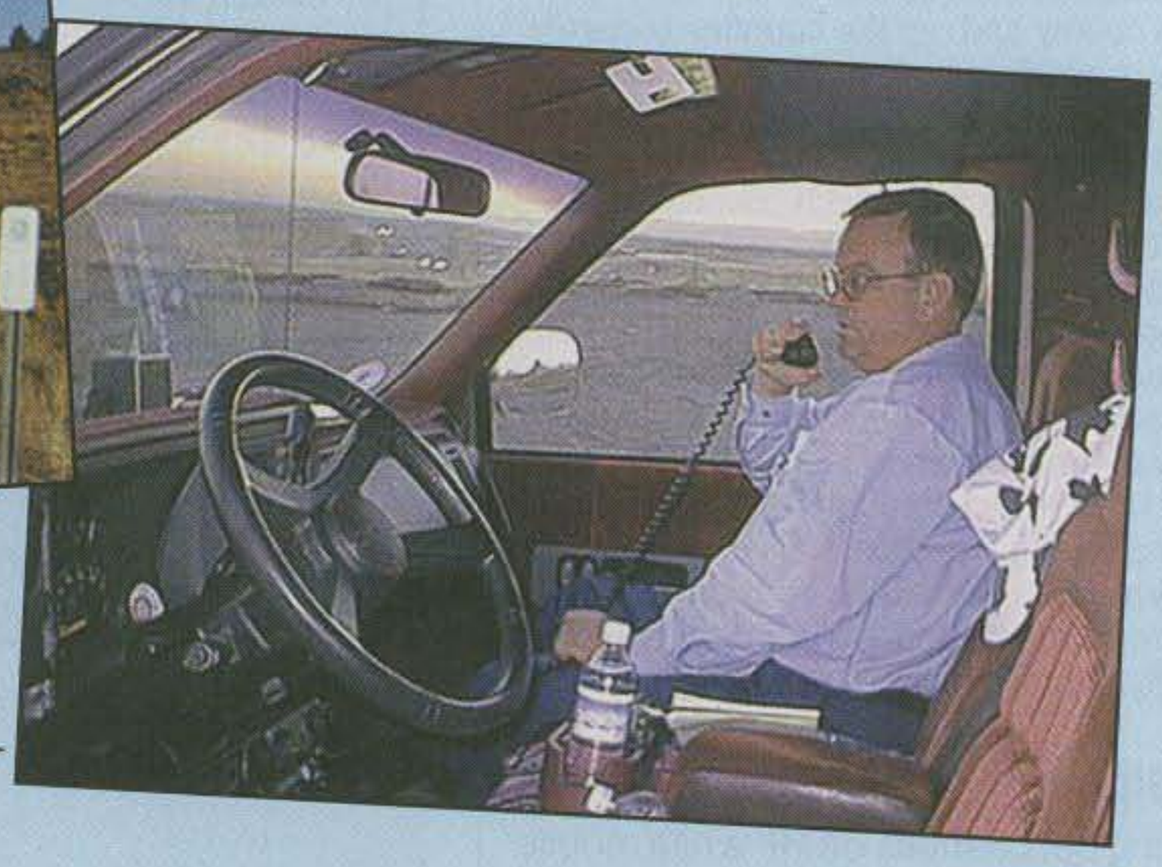
The spaces don't get more "wide open" than this! Here W1GAF is parked on a remote county line in Montana.

operations depend on a good installation. Starting with a vehicle that is electrically quiet is a challenge, as fuel injectors, engine management computers, electric fuel pumps, and other accessories can create noise that hinders your ability to receive. On your side, there are good wiring and antenna installation practices that can help minimize these problems, along with DSP rigs, external DSP units, and noise-reducing speakers. Making sure your car is properly grounded with bonding straps connecting the panels of your vehicle is often good for a dramatic reduction in noise.

Your antenna is critical. Many have reported good results with mobile antennas from major manufacturers such as those which advertise here in *CQ*. N4CD recommends getting the antenna up as high as possible and ensuring

CQ *magazine publishes this* County Hunter's Record Book, *which doubles as an award application form.*

K7DM traveled to this Oregon outpost for an Australian county hunter!



WB5YOE doing what county hunters love most.

it is securely mounted. Of course, be mindful of low clearances!

A computer for logging is a nice "extra" to have on board, but be sure it doesn't generate noise that interferes with your radio's receiver. In addition, logging on a computer while in motion can be a dicey proposition for your passenger/logger.

There are many choices of HF mobile transceivers. Shop around for a good new or used unit, or use that 12 volt base radio securely mounted in your car. Having an extra transceiver around for mobile and Field Day use adds to your enjoyment of the hobby.

The Ecstasy and The Agony

Yes, I turned it around. That's because county hunting while mobile or at home is great fun. However, like any worthwhile pursuit, it's not without its challenges. It feels great when you get a needed county. On the other hand, you *will* miss out on contacts because of adverse band conditions, the mobile leaving the county you need before you could make the contact, the mobile bumping up against time limits, interference keeping you from exchanging reports, and so on. Fear not! The county you need will not go away; it will be right where they left it for the next mobile that rolls through it. There have been several county hunters who have "worked them all" four, five, six times and more! After all, what's the thrill of a "hunt" if your quarry doesn't get away now and then?

The Best Secret

If you want the best way to gather a lot of counties in a hurry, go mobile in your area and put counties on the air! You will get many needed counties in a short time because while you're on the road and a coveted contact, all those contacts with other fixed and mobile stations count toward *your* needed county list. It's a win-win situation, and just think of the adventures that await just down the road. Happy Hunting! ■

The Mobile Amateur Radio Awards Club is a support group for county hunting activities. Check out their website at <http://marac.org>.

Resources for the County Hunter

Here is a partial list of web resources that can be useful to county hunters.

http://www.countyhunter.com/
http://marac.org/
http://www.eCompuQuest.com/ch/
http://kwiklog.com/
http://www.dxawards.com/
http://www.n3fjp.com/
http://www.cq-amateur-radio.com/usacarul.html

That strange beeping sound on your radio may signal may give you an opportunity to learn some useful direction-finding skills and have lots of fun in the process. Don't pass up your chance to take part in this year's National Foxhunting Weekend.

Announcing:

The Fifth Annual CQ National Foxhunting Weekend

May 11–12, 2002

Plus

Results of the 2001 National Foxhunting Weekend

BY JOE MOELL,* KØOV

You participate in a ham radio contest for hours, but you never transmit. You drive for miles in your vehicle, but you're not a "rover." You try to finish as fast as you can, but it's not a "sprint." When it's over, there are no logs or dupe sheets, and you'll know who won very soon. What kind of ham radio contest is this, anyway? A hidden transmitter hunt, of course!

It's as intense as Field Day and as challenging as snagging a new country or a rare grid square. Some hams do it several times a month, others only once a year or so. It's suitable for both "techie" hams and those who have never picked up a soldering iron. Simply put, this contest involves finding transmitters by using radio direction-finding (RDF) techniques. When the hunt area covers many miles and the hams use RDF-equipped vehicles, it's called foxhunting, bunny hunting, or T-hunting. When it's all on foot in a park or other outdoor setting, it's still called foxhunting by many, but it also has other names such as foxtailing, radio-orienteering, and ARDF (Amateur Radio Direction Finding).

On and around the weekend of May 12–13, 2001, experienced hunters and newcomers around the country took to the roads and fields for the fourth annual CQ National Foxhunting Weekend (NFW). Actually, I should say "around the world," because Bruce Paterson, VK3TJN (photo A), e-mailed to tell me that Australian hams were holding the Victorian Championships of foxhunting that weekend, too.

This year's NFW will be May 11–12. If you didn't take part last year, don't miss this chance. If you did take part last time, you'll want to make this year's NFW better than ever.

The best way to explain the concept and give you ideas for your own club's activities is to let some of last year's participants tell you about it in their own words.

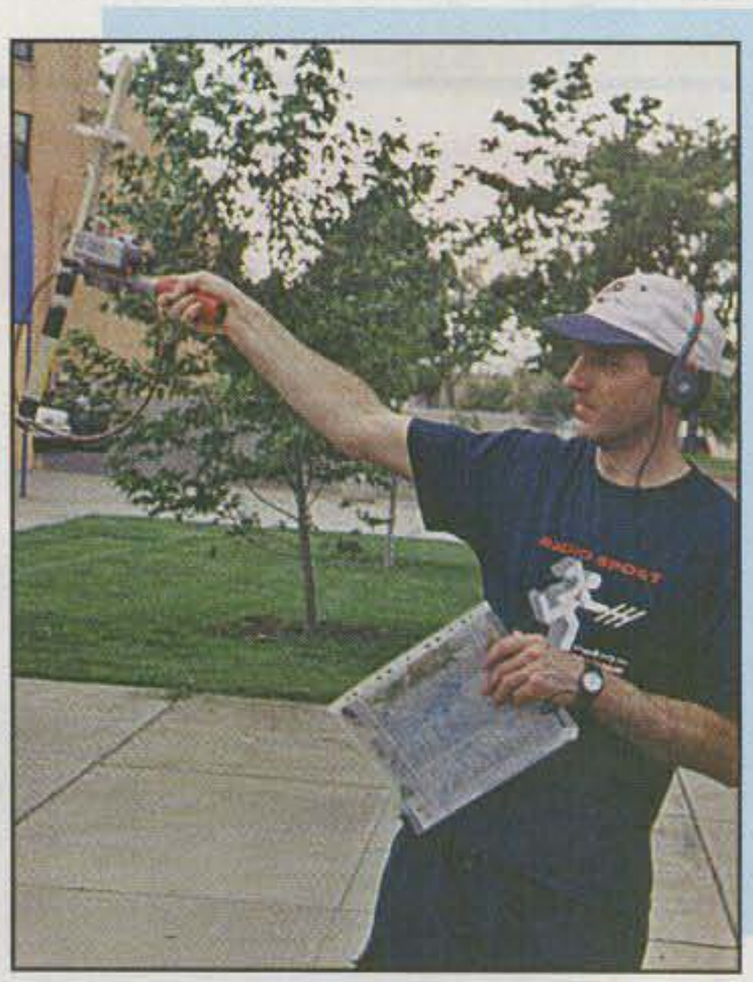


Photo A– Bruce Paterson, VK3TJN, is an avid foxhunter from "down under." He traveled around the world last year to attend many ARDF events, including the first U.S. national championships, where he used his unique 80 meter ARDF set. (Photo by Joe Moell, KØOV)

A Picnic Table in the Windy City

"In Chicago," says Mike Brost, WA9FTS, "it is foxhunting weekend every weekend. There is no seasonal time out; our hunts continue through the winter. Unless there is a severe weather advisory, we hunt. We just dress for it."

Chicago hunters designated their regular May 12 hunt on the Arlington Communications League (ACL) repeater as their NFW event. Mike says that the cool weather was just perfect for the hunt, but the hider, Tony Levand, AA9CC, almost wasn't there.

"Tony is working temporarily in Minneapolis," Mike explained. "As he was on his way to Chicago to participate in the previous week's hunt, his car lost power, then lights, and then power steering. Smoke started to pour out from the engine. Tony pulled over, got out, and

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web: <www.homingin.com>

threw his suitcase, radio, and a blanket away from the car. The car became an inferno and then the gas tank blew. The heat was so intense that it melted the microphone. Tony then realized that he left his home keys in the ignition."

Tony took the bus back and contacted a neighbor to get into his apartment. Then he bought a new wagon which got him to Chicago to hide for the NFW. Since Mother's Day was the next day, he hid at his mother's house in a residential area of Des Plaines with limited road access (photo B). The property has a huge backyard and numerous obstacles at the perimeter. A lone picnic table was in the center. Chris De Waal, KA9MGS, stood next to the table taking bearings for quite a while before he realized that Tony was under it and tagging him to win the hunt."

"After he left, Paul Tuttle, N9LXF, and I drove by, left, returned, and entered the back yard. The picnic table was too obvious, so I checked the perimeter. Greg Buttimer, N9SA, arrived, and by the time I checked everything except the table, Greg was running for it. I got there a second too late, so Greg took second place and I got third. The three other teams arrived within an hour."

Out in California, where there's also foxhunting almost every weekend, the first finder doesn't always win. Most hunts are scored by odometer mileage only. Hunters try to navigate to the transmitter (or transmitters) with the least elapsed mileage. Instead of a road race, southern California hunts are more like road rallies. On NFW 2001 the hiders were Steve Wallis, WA6PYE, and Vince Stagnaro, WA6DLQ, for a hunt that began at 7 PM in the city of Diamond Bar. By local standards it was a relatively simple hunt, because there was only one transmitter and it was only 16 miles away, near Ontario International Airport (Ontario, California, that is). Don Lewis, KF6GQ, and Steve Harris, KD6LAJ, won by keeping their mileage to 20.6. The hunt report doesn't give their time of arrival, but it could have been quite late. Careful hams in mileage-scored hunts sometimes average only a few miles an hour!

Another part of California where you'll find lots of foxhunting fun is the Bay Area and nearby Central Valley. Both time-scored and odometer-scored hunts are popular there, but the May 12 hunt was a daytime mileage event put on by Paul Shinn of Stockton.

Typical valley hunts have two transmitters, one expected to be "easy" and another on a different frequency expected to be "hard." Hunters are to find the hard one first, then the easy one. The transmitters are timed to run for 4 hours then shut off. Since Paul had BBQ chicken, chips, dip, and sodas awaiting the hunters, there was additional incentive for them to hurry.

Suspicious Activity?

As Paul put out his easy T at a marina about 20 miles northwest of Stockton, he apparently aroused some curiosity. A helicopter flew over and began to check him out very closely.

"At one point it was so low over my head that my hair was being blown around along with the trees," Paul exclaimed. "I got a good enough look at the pilot that I could pick him out of a lineup! He just wouldn't go away, following me as I walked back and forth between the transmitter and where I parked my truck. The smell of the exhaust was suffocating, so I got inside my truck and waited him out. After all, I had 4 hours with nothing else to do until the hunters arrived. Finally after about 15 minutes, he flew away."

Photo B– Tony Levand, AA9CC, almost didn't make it to Chicago to hide the NFW hunt. Here he is crouched under the picnic table. (Photo by Mike Brost, WA9FTS)

Photo C– If there were an award for the most unusual RDF antenna system during NFW 2001, the winner would have to be the setup of Bruce Allen, N9MND, and Karl Bretz, K9BGL, of the St. Clair Amateur Radio Club. It's even higher than this photo shows. (Photo by Paul Sanford, WB9IGB)

The hard T was at the Stockton Auto Mall on the back of a handicapped access sign. The signal was bouncing off all the light posts and other signs. From there, the hunters had trouble hearing transmitter 2, but with care they could get bearings showing that it appeared to be at the west end of Eight Mile Road. Following that bearing, the hunters headed west to Interstate 5, then west out Eight Mile Road.

"Surprise!" exclaimed Paul. "That road dead-ends at the water. In order to get to me, the hunters should have gone north on I-5 another couple of miles to Highway 12, then west to the road loop going by the marina. I was about 4 miles from the end of Eight Mile Road running 5 watts to an elevated 2-element quad antenna, which made for a super-strong signal at the end of Eight Mile Road.

"Just a few hundred feet down the road from T2, I waited at the BBQ table watching baby birds learn to fly. At three hours into the hunt, the hunters were still at the end of Eight Mile Road, yakking on the talk-in repeater and coordinating

Become a Foxhunting Champion

If you excel at on-foot foxhunting, there could be world travel and gold medals in your future. For over 20 years, hams in Europe have staged national and multi-national on-foot foxhunts. Asian countries joined the fun a dozen years ago. Hams in the U.S. began to participate in these overseas events in 1996 and went to the World Championships for the first time in 1998.[1]

Last year, for the first time the U.S. held its own national championships, hosted by the Albuquerque Amateur Radio Club. Competitors came from ten states, including groups from several metropolitan areas such as Los Angeles, Denver, Atlanta, Cincinnati, and Raleigh. Also taking part were visitors from China, Australia, and the Ukraine.

Because of its importance in the selection process for the U.S.'s team to the ARDF World Championships, the U.S. national championships must take place in the spring this year. Georgia Orienteering Club, the host organization, scheduled them for April 19–21, 2002 at F. D. Roosevelt State Park near Pine Mountain, Georgia. The site of U.S. national ARDF championships for 2003 will be announced later this year.

ARDF World Championships (WCs) take place in even-numbered years to find the best on-foot radio foxhunters on the planet. Standardized rules for national and world championships are set by the International Amateur Radio Union (IARU). In 2000 twelve stateside hams traveled to Nanjing, China as the U.S. competed in the WCs for the second time.

Later this year the U.S. takes on the world once again as Team USA travels to Slovakia for the Eleventh WCs of ARDF. The Slovak Amateur Radio Association is hosting. The site is Tatranske Matliare in the High Tatras of the Slovak Republic, at about 3000 feet elevation. It's about 240 miles east of Prague and 125 miles north of Budapest. Competitors will arrive on Monday, September 2, have a training session and opening ceremonies the following day, then go on the formal 2 meter hunt the day after. Thursday is a day of rest with an optional cultural program. Friday is the 80 meter hunt in a different venue, followed by the closing ceremony and a mini-hamfest. Competitors are divided into five age categories for males and four for females, per IARU rules. Each country may have a maximum of three persons per category on its team.

ARDF Team USA members are responsible for their own transportation expenses to and from Slovakia. Entry fees are due in full to the organizers by July 15, 2002. The ARRL will handle the wire transfer of funds, but it is not known yet if there will be any financial support from the ARRL for team members' entry fees.

If the 2002 ARDF World Championships are typical, there will be a total of about 250 competitors from 25 European and Asian nations. The "big guns" of the contest will be all the eastern European and former Soviet Union countries, plus China and Germany. We're still "little pistols," but that just means we learn a lot more when we attend, and we learn from the best.

As of this writing, 12e stateside foxhunters with current ages from 11 to 60 have expressed strong interest in attending. It's not too late to put in your name for Team USA consideration. It is also possible to attend as a non-competing visitor, but visitors must be listed as such on the national team roster and fees must be paid via the ARRL, just as for competitors.

If you are interested in traveling to the 2002 ARDF World Championships as a member of Team USA or as a USA visitor, please contact the author immediately. If you have not been on Team USA before, include your full name and mailing address, callsign, home phone number, and date of birth. You must be an American citizen or have resident status in this country. Also visit <www.homingin.com>, where you can read the latest news of Team USA formation plus stories and photos of previous Team USA trips to give you an idea of what to expect.

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

some hunches. I heard hunters saying that they were getting 'you-are-here' indications, but the bearing was still pointing towards the water. One hunter got on the repeater to ask me if he should take the ferryboat to the island. He didn't know that the island was actually in the middle between us."

The teams finally came in during the last half hour before the transmitters automatically switched off. The team of Jeff Child, KG6EWZ, and Art Jury, KF7GD, won the hunt with 36.0 miles. The unluckiest team drove almost 62 miles to get there.

T-Hunters are meticulous about mileage in Massachusetts, too. The 2001 NFW hunt for Northern Berkshire Amateur Radio Club (NoBARC) was won by a team averaging less than 7 mph. However, I'm getting ahead of that story.

"We had six teams of hunters of varying experience and equipment," wrote Don Horton, N1ISB, who hid the NoBARC transmitter with help from George Bourassa, KB2SAE. "The hunt difficulty was greater than planned, but far from our toughest. The fox was in an 'echoy' location, which really messed up the Doppler sets. The winners racked up an amazing 13.2 miles and took about two hours to do it, very careful hunting. Beanie Baby Fox, our traveling winners' trophy for about four years, is now back at the home of the husband-wife team Dave and Roanne Wendling, KB1EAA and KB1EUH. Everyone else has vowed to repossess the trophy next month!

"Our group's level of experience ranges from beginners to expert hunters," Don continued. "We attempt to make the hunts of enough difficulty to challenge everyone. The standing offer is that beginners can ride along with experienced hunters just to get the feel of it. While there is a lot of banter on the local repeaters, we don't take winning and losing that seriously. The hunters usually share information and work together. Sometimes we do mileage hunts; sometimes we do timed hunts. We even did a 'hybrid' hunt once.

"The RDF gear used varies from team to team and from event to event. We have a couple of hunters who use Dopplers. Several variations on beams are used, especially the steel-rule portables. We even have an operator who mounts a Yagi on his roof rack with a rotator! Body shielding with no directional antenna is popular as a backup, and has actually been used to win a couple of hunts. Most of us don't leave home without handi-talkie and paper clips, just in case.

"We give out awards at the end of the year for Best-Hidden Fox, Quickest Hunt, and Rookie(s) of the Year. We also put together special awards, such as the tongue-in-cheek award for most DNFs (no-finds) in the year. While we try to recognize the best, we also keep it fun, since that is what we claim it's all about."

Hiding transmitters behind signs was a recurrent theme in 2001. Paul Sanford, WB9IGB, did it for the St. Clair Amateur Radio Club of Belleville, Illinois.

"The sign was held by a PVC pipe," Paul wrote. "The antenna was inside the pipe and the transmitter was in the base. Bruce Allen, N9MND, and Karl Bretz, K9BGL, the winners, were lucky that it wasn't in a parking garage (photo C)."

Aloha! Come Find the T!

In Hawaii, where "hang loose" is the philosophy of many hams, the NFW mobile T-hunt in Honolulu was a leisurely affair. The participants didn't have to worry about either the clock or the odometer.

On Saturday, Russell Houlton, WH7O, put out two ammunition-can foxboxes (photo D) on the same fre-

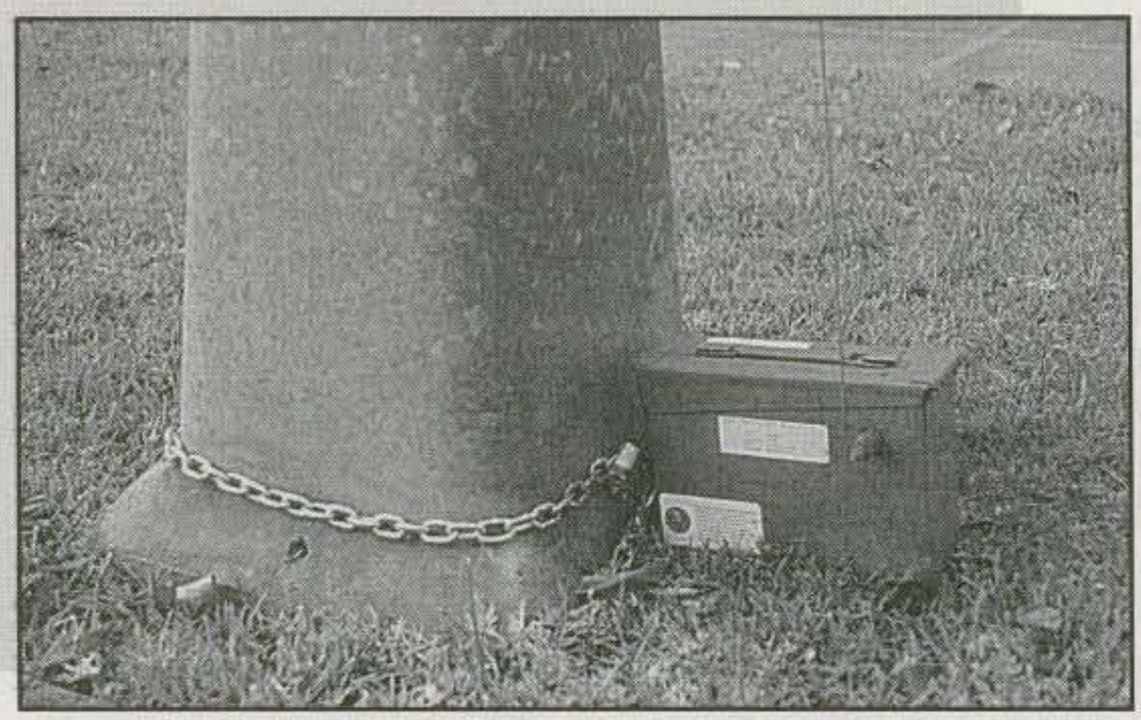


Photo D– A screw eye doubles as a locking hasp for the lid and a securing point to keep this Hawaiian fox from sprouting legs. Placed behind a light pole on a one-way street, this foxbox was surprisingly inconspicuous. (Photo by Russell Houlton, WH7O)

quency, transmitting for one minute each in sequence in a five-minute cycle. He told hunters that the boxes were somewhere between Kalihi and Kahala Mall and located in a public area.That's where the similarity to other hunts ended.

Hunters were told that they could go hunting any time before the transmitters shut down sometime after 10 PM on Sunday. When hunters found a fox, they were to write down the "control code" found on it and e-mail it to the hider.

"There is no race," Russell wrote. "Everyone who finds both foxes is a winner. Sorry, no prizes this time, other than the fun and practice."

Of the six vehicles that went hunting, mostly with newcomers, three found both foxes and three found only one. According to WH7O, "I noticed that only two-person teams found both and only single-hunter vehicles found only one."

NFW 2001 had its share of on-foot-only hunts, too. These are ideal for hams and non-hams of any age, with or without a driver's license. To entice beginners who had never chased a radio fox before, Byon Garrabrant, N6BG, and Randy Holland, KO6KC, of the Las Vegas Radio Amateur Club put on a walking hunt in the hills of northeast Las Vegas. For those with no gear, the two had plenty available for loan (photos E and F).

"There were four ammo-box transmitters running in sequence for 30 seconds each every two minutes," Byon wrote. "All were set to lowest power. We had lots of equipment available for loan and show, including tape-measure and aluminum-rod Yagis. There were active, passive, and slide attenuators, plus field-strength meters."

Both beginners and seasoned radio-athletes turned out at the annual "Antennas in the Park" foxhunt and cookout at Tri-City Park in Placentia, California. Your author put out five transmitters on one 2 meter frequency in an international-rules course, and five other transmitters for beginners on five other 2 meter frequencies. There were also three hidden foxes on the 70 cm band, courtesy of KF6QCQ and the SuperSystem UHF repeater network. To top it all off, I deployed an 80 meter CW foxbox to demonstrate the ease of RDF on that band.

It's no surprise that the top four finishers in the international course were in training for USA's National ARDF Championships to be held two months later in Albuquerque. They were Marvin Johnston, KE6HTS; Scott Moore, KF6IKO; Jay Thompson, W6JAY; and David Jacobs, K9KBX (photo G). All completed the course in under 52 minutes, almost a half hour faster than the next finisher.

At least two of the other international course entrants were credited with only four foxes instead of five, because they mistakenly punched their cards at the 80 meter transmitter, thinking it was on 2 meters. That's interesting, because the nearest 2 meter box was at least 600 feet away from the 80 meter fox. Heads up, guys!

Putting out a large number of transmitters can be a lot of work. The foxhunters of Portland, Oregon share the load. Dale Hunt, WB6BYU, e-mailed about their NFW 2001 session in Powell Butte Nature Park.

"We handed everyone a transmitter to hide, they did, and then we started hunting them," he wrote. "In addition to the usual 2 meter foxes, there was an 80 meter transmitter to try."

This was a pure practice and demonstration session, with no timing, scoring, or prizes. According to WB6BYU, "Everyone used something different to hunt, and some tried more than one type of RDF gear. Two of the hunters are still in high school. They went out together at a relatively leisurely pace, partly due to all of the separate pieces and cables they were carrying."

Start Planning Now

Have these examples given you some good ideas for radio-signal chasing in your own town? If so, start planning for this year's National Foxhunting Weekend. Maybe your club members will want to try a mobile hunt, or they might prefer something all on foot, or a combination of the two. If your club has done 2 meter hunts, how about having one on the 440 MHz band for a change of pace? (*Signals behave differently on 440 than on 2 meters, so it can be a new challenge for everyone.—ed.*)

No matter what type, your hunt should be appropriate for the skill level of the members, be they experts or complete beginners. Make sure it's well promoted, fun, and fair for all. Above all, make it as safe for everyone as possible. (*With today's added focus on security and watching out for suspicious activity, "foxes" should be sure to have their FCC licenses with them at all times, and to secure any necessary permission before hiding a transmitter. You may also want to notify the police department responsible for the area of your*

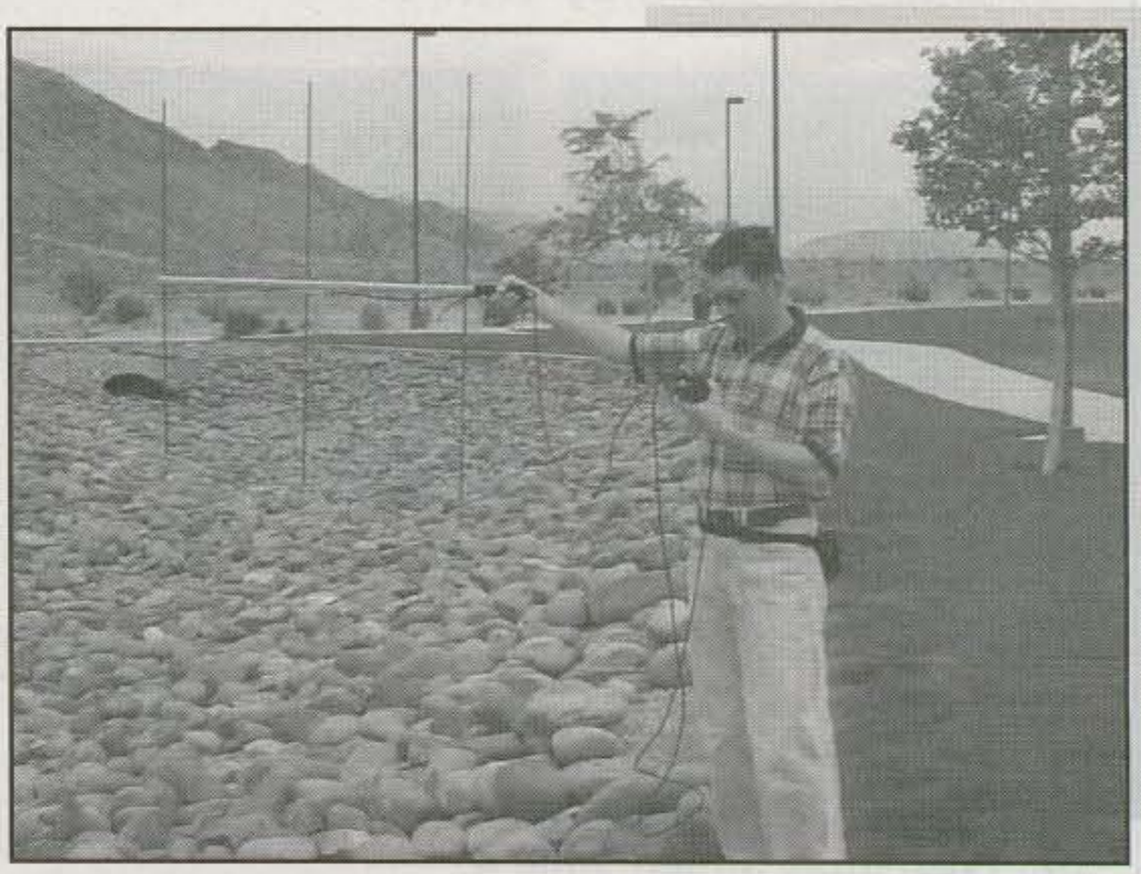


Photo E– Shawn Adair, KB7AWG, had to make some last-minute fixes to the active attenuator he built the night before, but soon he was foxhunting with his arrow-shaft Yagi. (Photo by Byon Garrabrant, N6BG)

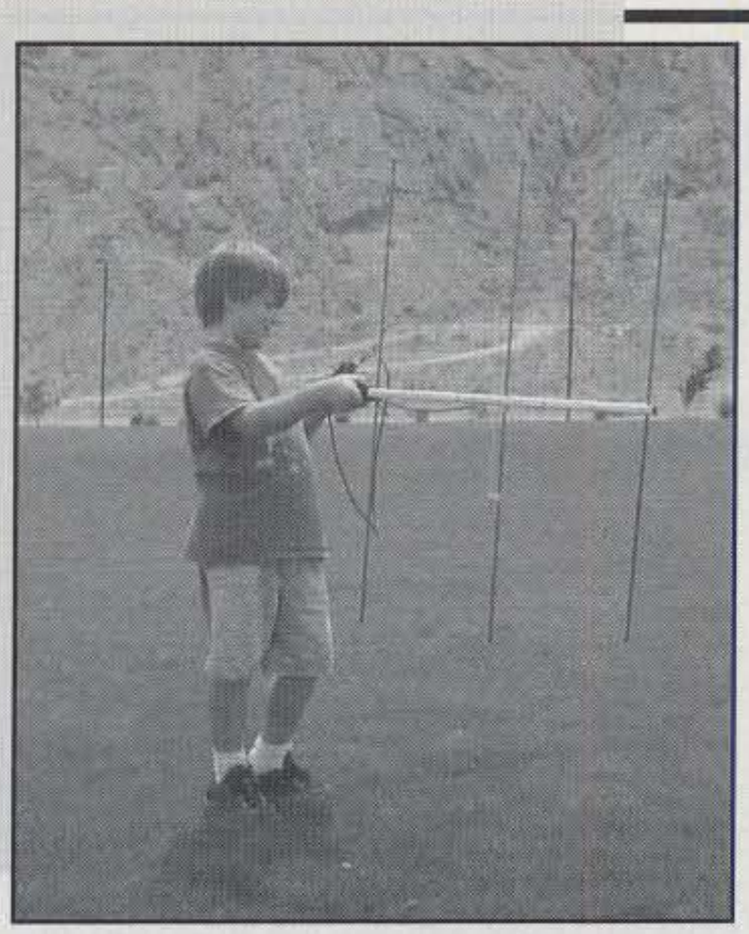


Photo F– Scott Garrabrant, KD7GMY, used to sleep in the back of his parents' van on mobile T-hunts in southern California. Now he does on-foot fox-hunting in Las Vegas. (Photo by Byon Garrabrant, N6BG)

hunt that there will be people out with radios and direction-finding antennas on a particular day. It may save unnecessary hassles with law enforcement. —ed.)

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 HTs, computers, and QSL cards.

Afterwards, write up the results and send them to me so that we can regale *CQ*'s readers in a future issue. Tell me the date of the hunt, what kind (mobile or on foot), number and frequency of transmitters, how the hunt was scored to determine the winners, plus the full names and accurate 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 <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. Also at my site you'll find suggestions for simple RDF equipment to get you and your club started. Happy Hunting! ■

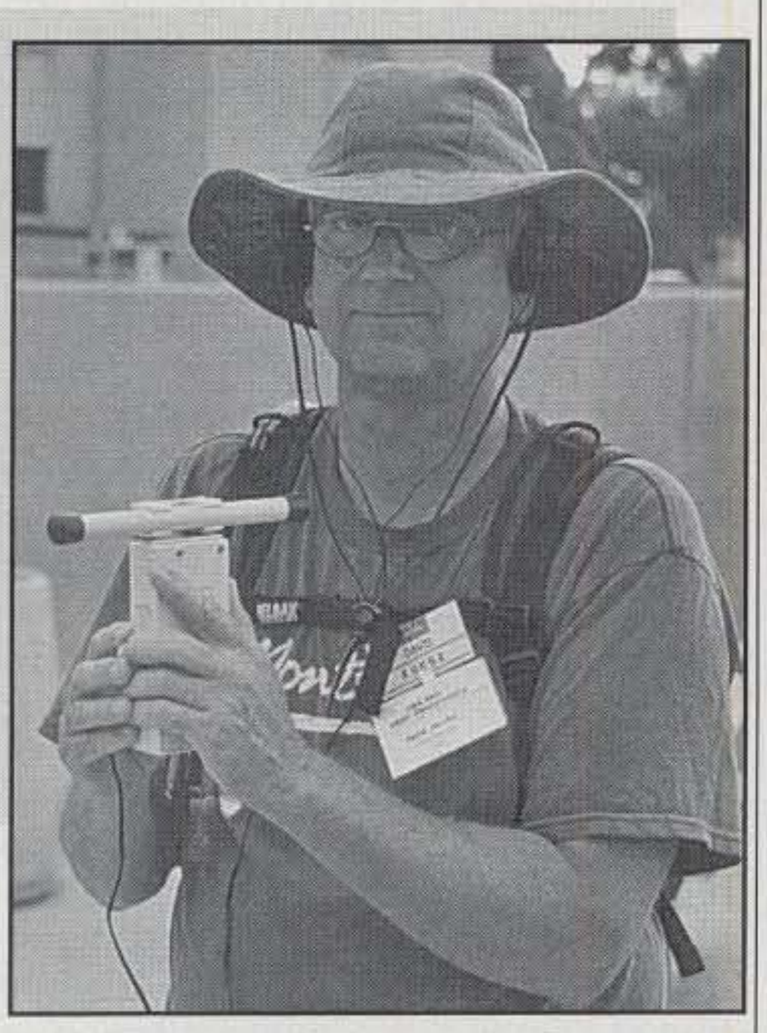
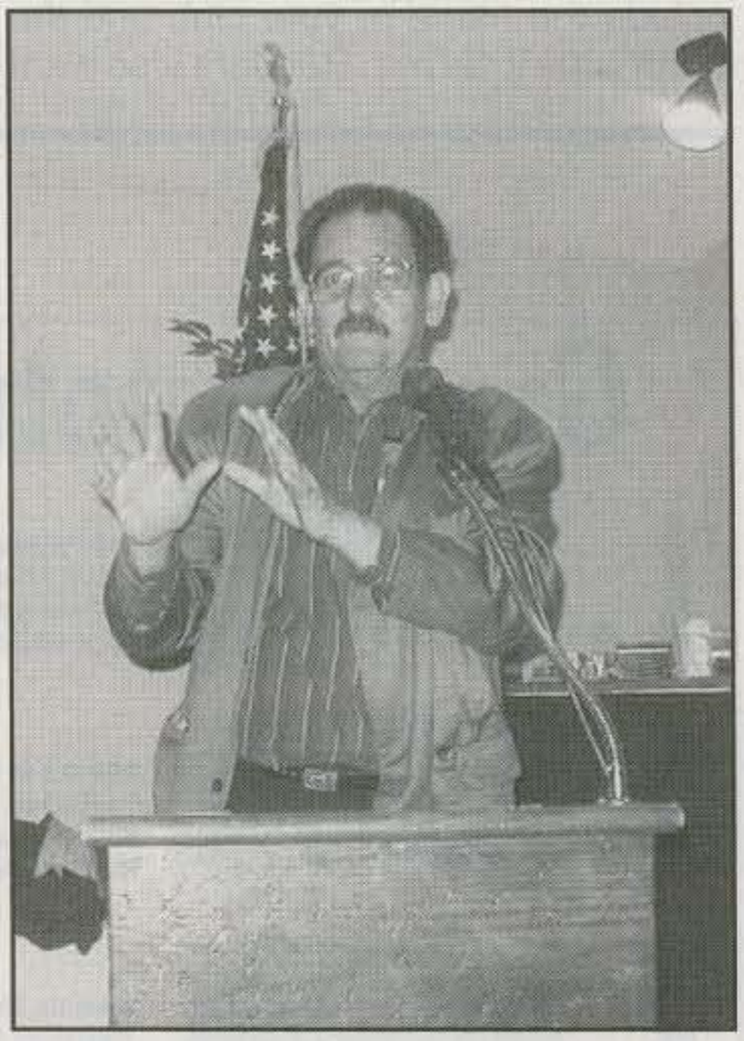


Photo G– Dave Jacobs, K9KBX, learned radio-orienteering at "Antennas in the Park" and other southern California practice sessions, then went to the 2001 USA ARDF Championships in Albuquerque. (Photo by Joe Moell, KØOV)

"The Miracles Ham Radio Can Accomplish"
CO2KK's Visit to the U.S.

Arnie Coro, CO2KK, is perhaps Cuba's best-known ham—an active DXer, QRPer, VHFer, and host of "DXers Unlimited" on Radio Havana (in addition to being a college professor and CQ's "Antennas" Editor). Even so, when the Colorado QRP (low power) Club invited Arnie to speak at its annual banquet this past February, political QRO (high power) was needed to make it happen. Thanks to the efforts of various hams in high places, plus a U.S. Senator, Arnie not only was able to attend the Colorado QRP Club banquet, but also to visit his son and the CQ offices. But the whole trip almost fell apart at the last minute due to red tape. Here are two accounts of the trip from different perspectives, one from Arnie himself and the other from the Colorado QRP Club's Rich High, WØHEP.

—W2VU



Arnie Coro, CO2KK, speaks to a packed house at the Colorado QRP Club's annual banquet in February. (WØDM photo)

With My Friends in Colorado

By Arnie Coro, CO2KK
e-mail: <co2kk@cq-amateur-radio.com>

After months of planning and going through an unbelievable number of e-mail messages and paperwork, almost by miracle I found myself at the podium of an outstanding amateur radio event, The Colorado QRP Club 2002 Annual Banquet!

Leaving Havana early Friday evening, February 15th, put me on my way to the banquet that was to be held in Denver just a few hours later on Saturday night. My U.S. visa had been stamped on my passport that very same Friday morning (I was originally supposed to leave on Thursday.), and as the charter Boeing 737 was getting into take-off position at the end of runway 06, I thought, once again, about the miracles ham radio can accomplish.

After an overnight (no sleep) stay at the home of relatives in Miami, Saturday morning found me on the way to Ft. Lauderdale International Airport to catch a plane leaving not for Denver, but for Chicago, where I was to take a connecting flight. This was needed, as WØHEP's previous travel arrangements had to be cancelled, and everything rescheduled, when the visa did not come on time for the planned Thursday trip.

The layover at Chicago's Midway was much longer than expected, and I thought that everyone in Denver would be having a nice dinner while yours truly was stranded due to an airline delay. Finally, the Denver-bound flight took off, as I nervously looked at my watch. Yes, we are going to make it, I thought, and a little tailwind helped us land at the Mile High City's airport with about a two-hour delay. WØHEP was there waiting for me with a very worried face, as the flight number had been removed from the information board one-half hour earlier, something he interpreted as a cancelled flight.

"We made it, Arnie!" Rich said, but he was still very nervous, although one could see how happy he was. "Just got a few minutes left before the banquet starts," he said, as we walked into the parking lot. Then a last-minute hitch hit us. Rich had left his headlights on, and we had a totally dead car battery. Fortunately, the weather was nice. Rich called Club President Dick Schneider, ABØCD, and a few minutes later a service truck came with jumper cables to start the car. Finally, we were on our way to the banquet.

Yes, we had made it, and from then on it was one of my life's most rewarding experiences to participate in the CQC 2002 Annual Banquet. Faces and calls came together, and once again the magic of radio was making headway. The event started right on time. Rich, WØHEP, and Dick, ABØCD, addressed the hall that was filled to capacity, and then they gave me the chance to tell the story about the trip, part one of what ended up being a three-part banquet speaker's address.

QRP is alive and well, not only in Colorado, but all across the USA and the world we all know! Some QRPers drove 900 miles to be there to meet me, and yes, it was very enjoyable to talk about our radios, antennas, DX QSOs and some very funny anecdotes, such as my QRP-by-accident, first-ever contact on 6 meters way back in November 1959, something I learned when CO2GX, my Elmer on VHF, came in and checked that the 6146 screen voltage was *zero,* effectively reducing the power output to 4.5 watts, when I thought that the homebrew *Handbook* rig was delivering no less than 30 watts out into the 2-element Yagi made from TV antennas.

After my speech, an almost endless stream of books, kits, CDs, paddles, and a lot of other nice gifts moved from the organizer's table to many of the participants' seats, making a lot of people happy, thanks to the help of manufacturers, amateur radio organizations, and individuals. I really never thought that at a small club's annual meeting so many of those attending would end up winning a nice prize!

For me, the biggest and most rewarding prize of all was once again having the opportunity to meet so many nice people, radio amateurs, many of whom I had talked to for years, and that I now

could see right in front of me in a unique eyeball QSO! Of course, we stayed up late, well after the nice dinner had ended, drawing schematics, showing some of my simple wire antennas, and autographing issues of *CQ* magazine.

An Off-Air QRP Adventure

By Rich High, WØHEP
Colorado QRP Club
e-mail: <w0hep@arrl.net>

The adventure started at the club's December newsletter assembly and board meeting. We still had not come up with a good program for the annual banquet being planned for February. We have had some very good programs, and it is always difficult to top the previous program. I suggested we might have a speaker who was not from our club—in fact, who was not from the U.S. I suggested Arnie Coro, CO2KK, host of "DXers Unlimited" on Radio Havana Cuba. Arnie is a constant ambassador for QRP, homebrewing, antenna construction, and everything else that the Colorado QRP Club stands for.

It is easy to figure out who was chosen for the project of getting Arnie to Denver. I accepted. The first job was to contact Arnie to see if he would be interested. He not only was interested in coming, but sounded a bit excited about the prospect of speaking to our club. The problem would be the paperwork involved in getting him here. My contact at the U.S. State Department was very encouraging, but we needed to act quickly. First was the official letter of invitation to Arnie. This was not easy. There's no direct-mail service from the U.S. to Cuba, and the phone service was so poor it took me over 40 attempts to get a few faxes to Havana. Part of December and most of January were spent waiting for the Cuban approval and passport.

We made tentative airline arrangements for the U.S. part of the trip, but could not complete the package until the passport and visa were in Arnie's hands. Making the arrangements for him to fly to Miami from Havana was indeed another problem. Making the reservations and making the payment from the U.S. side is impossible. Wiring money through Western Union is one of the quickest answers, but also has its problems. We did receive some help from one of Arnie's friends, who is a former talk-show host in Denver and currently a talk-show host in Chicago. He sure saved our day. Since the passport did not come as soon as we had hoped, we postponed the airline reservations for too long and found the fare had increased by over $1000! Again, a friend of Dick Schneider, ABØCD, the club president, saved the day. She got us flights unavailable through normal channels and saved us money as well. We cancelled some of the flights while we were waiting for Arnie to receive his U.S. visa.

Finally on Thursday, February 14th, only two days before the banquet, we pulled out all the stops. I had sent a note via e-mail to my contact at the State Department a few days earlier, and this morning I sent one to a key person at the U.S. Interests (USINT) Office in Havana. Dick also sent e-mails to another key person at the USINT Office, as well as one to Senator Ben Campbell of Colorado. We don't know exactly what happened, but within a few hours the wheels of government were rolling, and by the end of the afternoon Arnie received a call that he should appear early Friday morning to personally receive his visa. We had tentative airline reservations for Saturday morning just in case he got his visa on Friday. Now all we had to do was be sure Arnie could get a flight out of Havana that day. We had his e-ticket waiting, and he only had to pick up a fax in Miami that night to present to the airline.

As Arnie explains, the trip to Denver had us all biting our nails. Except for a very short stop at my home, we went directly from the airport to the dinner. The dinner was great. Arnie's program was a smash hit. He is a great speaker and funny, too!

Without a doubt, Arnie is one of amateur radio's top ambassadors. He loves amateur radio, QRP, and Cuba, and it shows. He made us very much aware of the struggles Cuban amateurs have getting on the air. We certainly have a new sense of appreciation for the efforts these enthused individuals have gone through to put Cuba on the air. Arnie also presented a one-hour program the next day at a local swapfest.

The efforts involved in bringing Arnie to Denver, the almost daily emotional roller-coaster ride, and the gray hair all were worth it. I would do it again! How we will top this one is a big question. For those of you involved with planning club activities, don't give up. The sky is the limit. Be creative and go for it. ■

Math's Notes

What's New And How To Use It

BY IRWIN MATH, WA2NDM

Battery Accessories

Now that spring is definitely here, if you have not thought of battery-operated projects for the great outdoors it is time. To better utilize these versatile power sources, we have decided to present a few interesting circuits to make your designs just a bit more flexible.

The first of these is a method to eliminate the need to observe the correct polarity of a battery. In many circuits, connecting a battery with the wrong polarity can cause severe damage. Fig. 1 is the simplest method of preventing this. A diode such as a 1N4002 connected in series with the input leads will allow current to flow only in the desired direction, not the other way. Reversing battery polarity simply will not allow anything to work. Such a circuit costs virtually nothing, and its only drawback is a 0.7 volt drop across the diode. Low-current applications will be fine, but higher current ones may cause excessive dissipation in the diode (current × 0.7V = watts dissipated in the diode). This even may mean that you need a higher wattage diode. Be careful, however, as such a diode may have an even higher voltage drop.

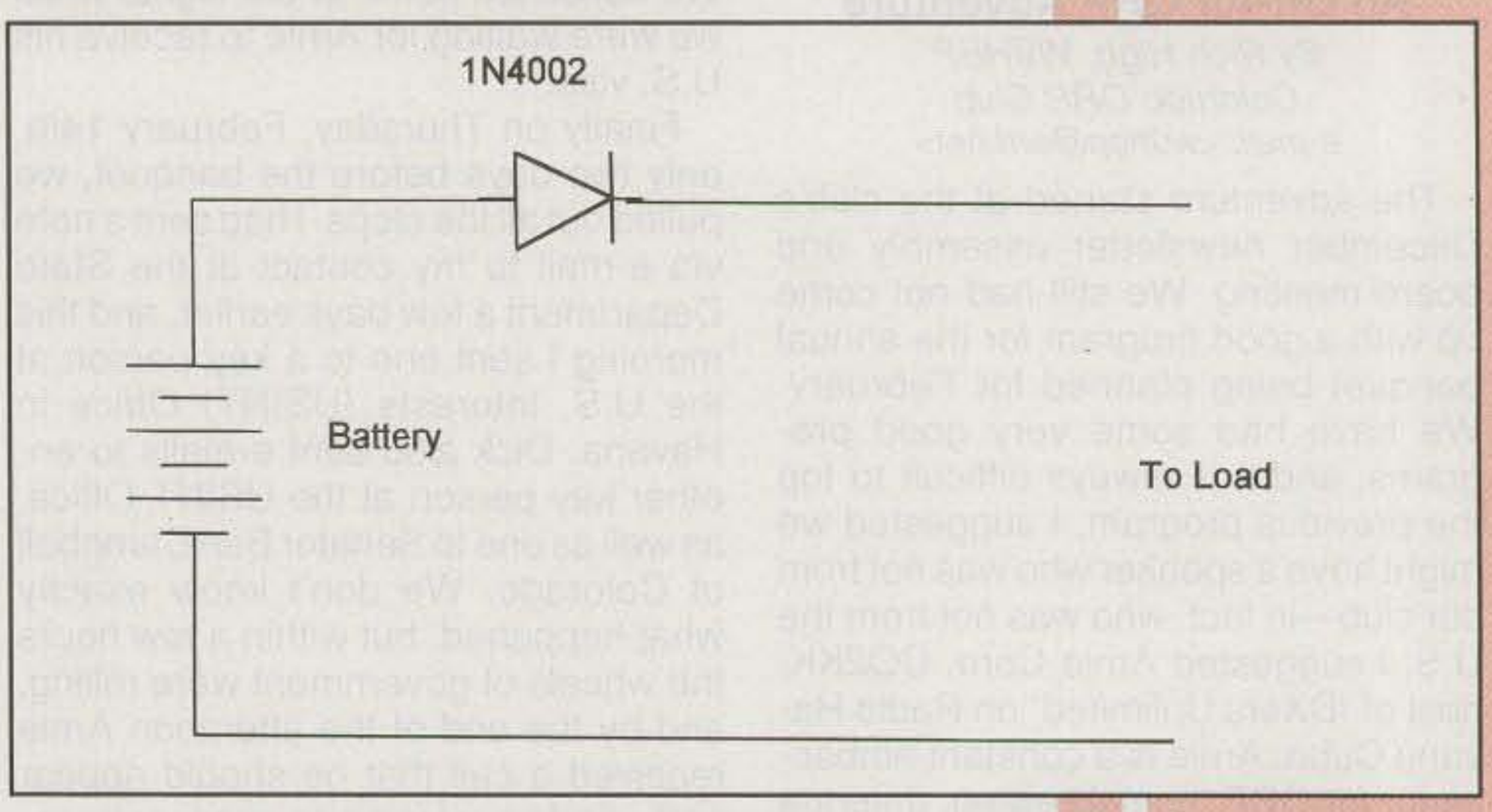


Fig. 1– Ultra-simple reverse-polarity protection.

Fig. 2 shows the use of a full-wave bridge to "steer" the battery polarity where you wish it to go. This circuit will allow any battery-polarity connection but will cause a voltage drop equal to two diodes, or about 1.4 volts. As in the first case, for low-power circuits all is fine and cost is low. Where higher current is required, be sure to consider power dissipated in the diodes.

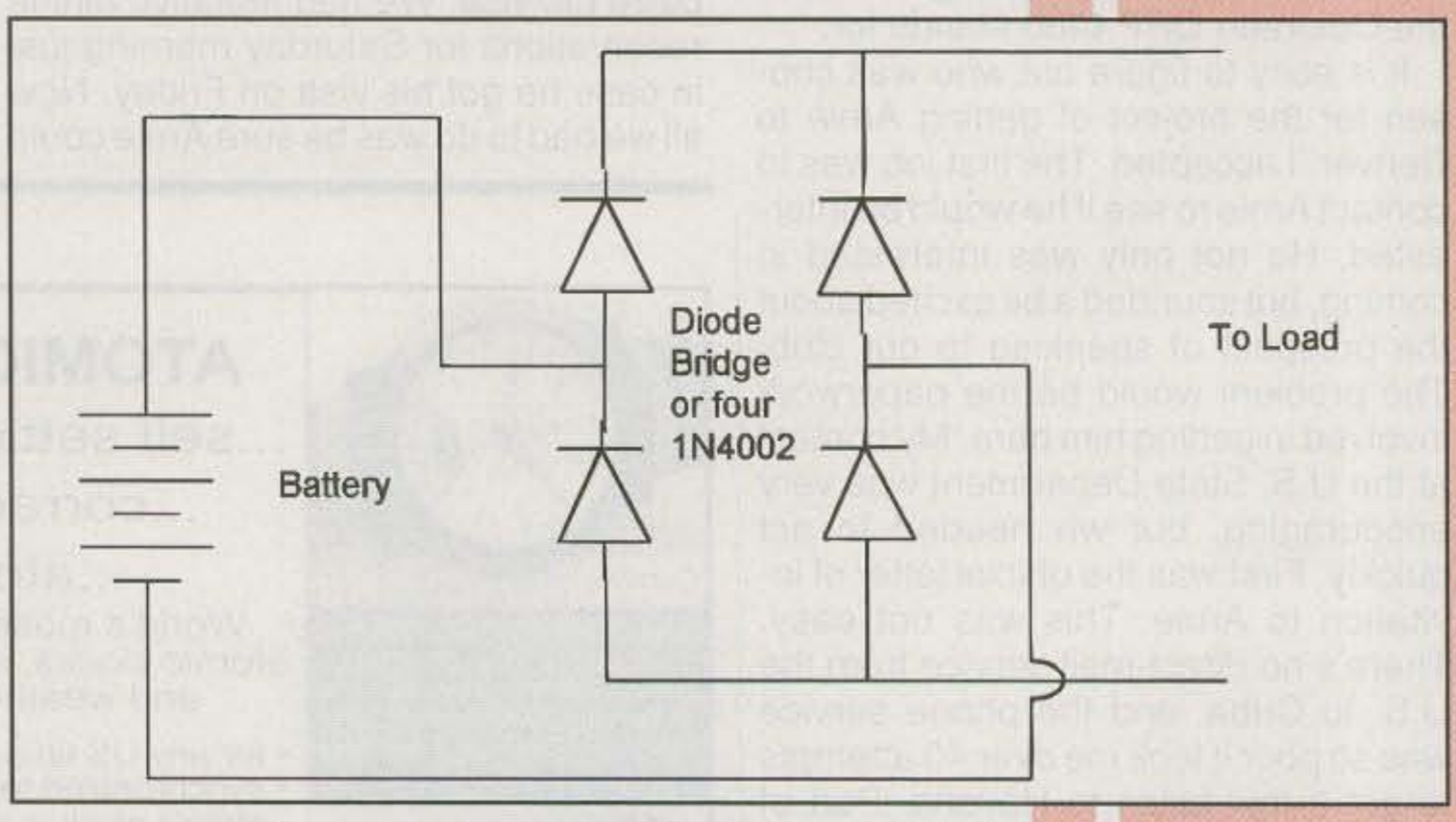


Fig. 2– Automatic-switching reverse-polarity protection.

Fig. 3 shows a way to achieve automatic polarity switching with virtually no diode drop to contend with. Here a double-pole-double-throw (DPDT) relay is connected to the input in a sort of bridge circuit. Correct polarity connections will not operate the relay, since the series diode will be reverse biased. Wrong polarity connections forward bias the diode causing the

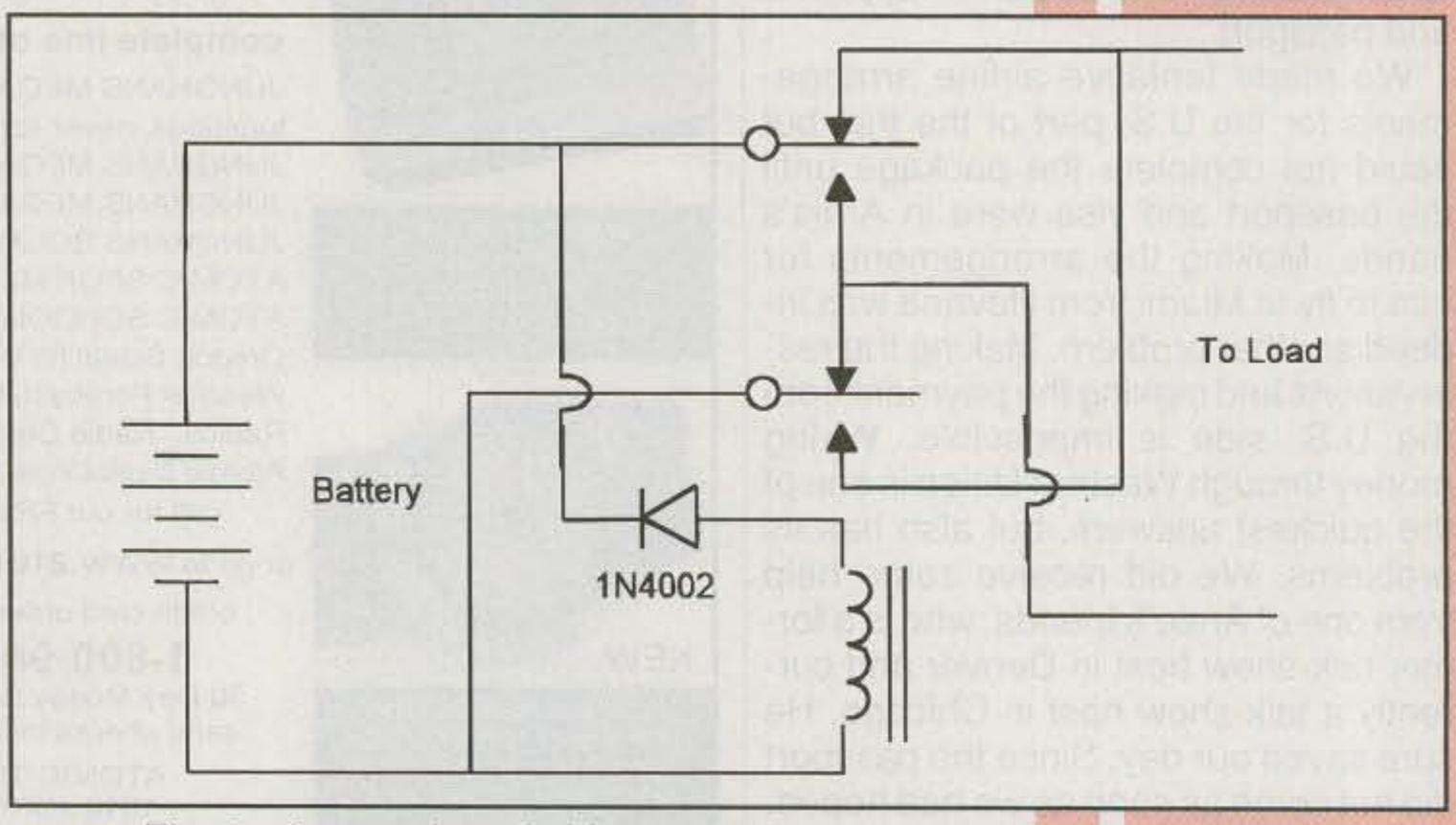


Fig. 3– Automatic-switching, zero-drop reverse-polarity protection.

c/o CQ magazine

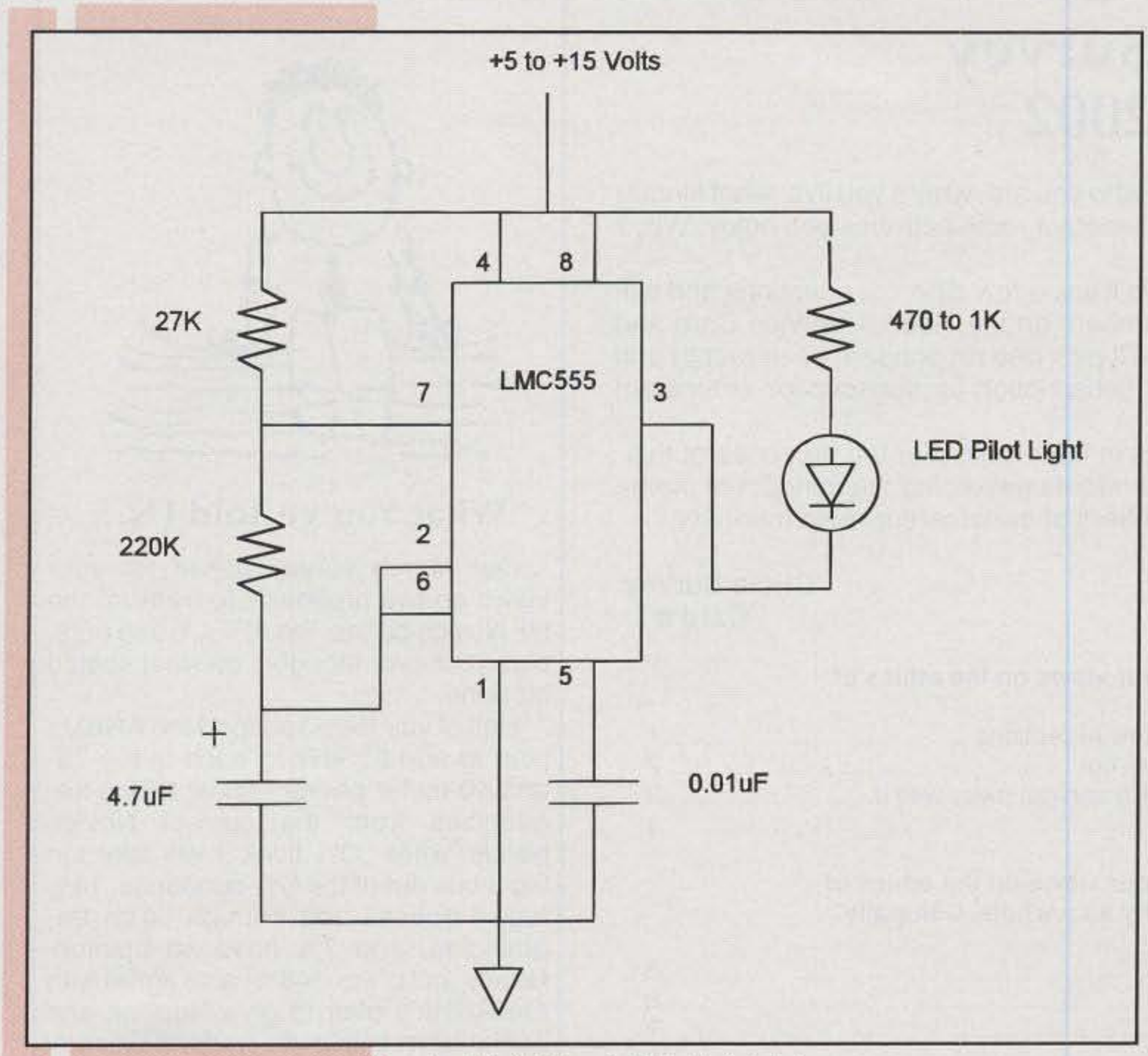


Fig. 4– A blinking LED pilot light.

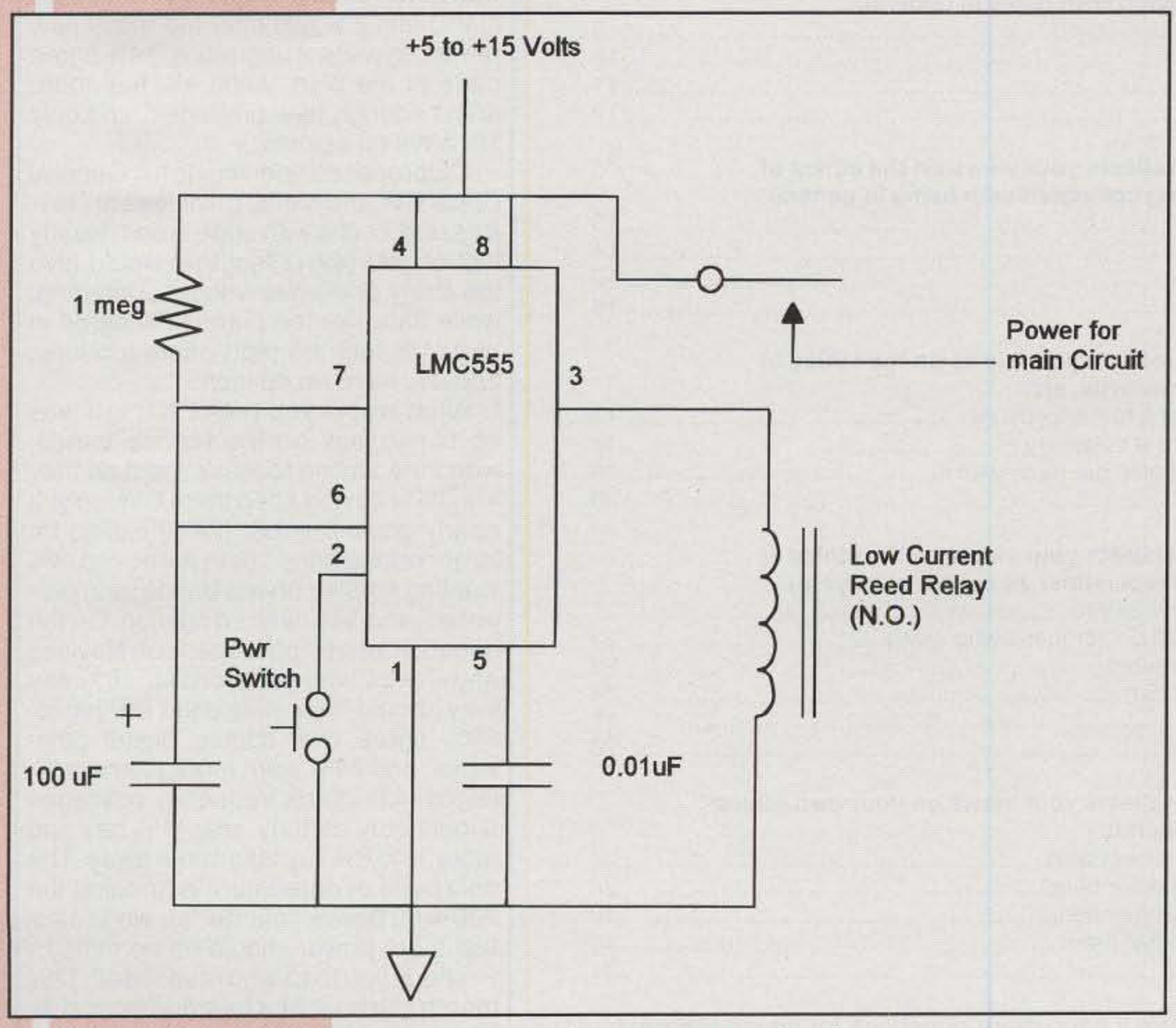


Fig. 5– An automatic power-saver circuit.

relay to pull in and connect the input. Voltage drop across the contacts is minimal, and high currents can easily be handled by the appropriate choice of relay. You will have the additional current drawn by the relay coil, however, so allow for this in low-current circuits.

When one builds battery-operated equipment, options such as pilot lamps usually are not included due to the extra current these "frills" draw. Fig. 4 is a way to have your cake and eat it, too. Borrowing from the cell-phone industry, the use of a pulsing LED pilot lamp can provide an indication that the circuit is on without drawing much current. Here a simple LMC555 timer (the low-current CMOS version of the popular LM555) is connected in a one-shot circuit with a 1 second time interval and a 0.1 second "pulse" (approximately). Operating current during the timing interval is less than a milliampere, and the "high-current pulse" of 10 ma or so, when it comes, only lasts for a fraction of a second, so the average current drawn from the battery is still less than a milliampere. You can play with the values to get desired LED brightness, blink interval, and average current drain for your exact needs.

Borrowing from the calculator industry, fig. 5 is the ultimate in battery-saving solutions. In this circuit a timer starts when power is first applied to a circuit and then turns off the entire circuit when a predetermined time interval has passed. Again the LMC555 is used, but this time as a timer. If you set the time interval properly, you can obtain several minutes of operation before you need to push the "on/off" button again. For even more versatility, pulses from the operating circuit can automatically reset the timer via pin 2. When these pulses stop, the circuit turns itself off.

I sincerely hope at least one of these applications helps you in your next project or at the very least gives you something to think about when planning a battery-operated project.

73, Irwin, WA2NDM

Reader Survey
May 2002

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 Reader Service Card and returning it to us. As a bit of an incentive, we'll pick one respondent each month and give that person a complimentary one-year subscription (or subscription extension) to *CQ*.

This month, we'd like your views on ethics in ham radio. For the purposes of this survey, we'll define ethics as the rules or standards governing the conduct of members of a particular group, in this case, members of the amateur radio fraternity.

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

1. ...which statement most closely reflects your views on the ethics of hams as a group.
Most hams are highly ethical people, with just a few exceptions 1
Many hams are highly ethical but just as many are not 2
Most hams will behave unethically if they think they can get away with it....3
Don't know/No opinion 4

2. ... which statement most closely reflects your views on the ethics of hams as compared with the ethics of society as a whole. Generally speaking, hams are...
More ethical than society as a whole 5
About the same as society as a whole....6
Less ethical than society as a whole....7
Don't know/No opinion 8

3. ... which statement most closely reflects your views on the ethics of hams operating in contests compared with hams in general...
Contesters' ethics are higher....9
Contesters' ethics are about the same....10
Contesters' ethics are lower....11
Don't know/No opinion 12

4. ... which statement most closely reflects your views on the ethics of DXers (especially those in pile-ups) compared with hams in general...
DXers' ethics are higher....13
DXers' ethics are about the same 14
DXers' ethics are lower 15
Don't know/No opinion 16

5. ... which statement most closely reflects your views on the ethics of hams in relation to QSL cards for awards, etc.
Most are highly ethical people, with just a few exceptions 17
Enough would cheat that strict rules are a necessity 18
Most would cheat if they thought they could get away with it....19
Don't know/No opinion 20

6. ... which statement most closely reflects your views on the ethics of hams in their dealings at flea markets (either as sellers or buyers):
Most are honest and will deal truthfully with you 21
Most are honest but you've got to watch out for those who aren't 22
You've got a 50/50 chance of being cheated 23
Most will take advantage of you if they can....24
Most will cheat you if they can....25
Don't know/No opinion 26

7. ... which statement most closely reflects your views on your own ethics compared to those of hams in general:
I am generally more ethical than most other hams 27
My ethics are about the same as most other hams....28
I am sometimes less ethical than most other hams 29
I am generally less ethical than most other hams 30
You really think I'd tell you if I cheat?....31

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

What You've Told Us...

Our March survey asked for your views on two proposals to "refarm" the HF Novice bands, the ARRL's and ours, plus your own thoughts on what should be done.

Half of you (50%) support the ARRL's plan to add 25 kHz to each of the 75- and 40-meter phone bands, taking frequencies from the current Novice bands, while 30% think it will take too big a bite out of the CW subbands, 14% feel it doesn't add enough voice frequencies, and 7% have no opinion. Nearly half of you (48%) also agree with the ARRL's plan to give Novices and Technicians with code credit all General Class CW privileges on 80, 40, 15, and 10 meters, subject to the current 200-watt power limit, while just over one-third (34%) feel it would offer too many new privileges without upgrading, 14% agree parts of the plan, while 4% feel there aren't enough new privileges, and only 1% have no opinion.

CQ proposed opening up full General Class CW and digital privileges to Novices and Techs with code credit. Nearly half of you (49%) feel that would give too many privileges without upgrading, while 36% like the plan, 11% agree in part, 1% feel the plan offers too little, and 3% have no opinion.

What would you prefer? There was no consensus on the Novice bands, with 29% saying to leave them as they are, 25% saying keep them CW-only, a nearly equal number (24%) calling for larger phone bands than proposed, 8% wanting smaller phone bands than proposed, and 14% with no opinion. On the question of HF privileges for Novices and Techs with code credit, 46% say they should have only code privileges, 39% agree with adding digital privileges, and 24% want more phone privileges; 43% think frequency privileges should stay as they are, 41% say add more, and 8% say take some away. The only point of agreement is keeping the 200-watt power limit (84%), while 12% feel more power should be permitted.

Thank you to all who responded. This month's winner of a free one-year subscription to *CQ* is John Holmes, W9ILY, of Oak Lawn, Illinois.

World Of Ideas

BY DAVE INGRAM, K4TWJ

A Look At The World Around Us

Mobiling 2002: More Ideas and New Goodies

Hi ho, gang! The season for big-time HF mobiling and vacationing returns once again, and this year everyone seems to be joining the action. Yes, and the size and power of today's mobile setups are secondary to their "use anywhere, any time" or emergency-preparedness aspects. Whether your interest is hamming while commuting or biking, DXing from a parking lot or mountaintop while parked, or just being survival ready for whatever comes our way, putting together a good 2002-style mobile setup truly has its rewards. In light of these facts, this month's column has views and details on some exciting new treats and clever ideas. Ready for expanded radio enjoyment in the great outdoors? Check our following treats and then let the good times roll!

Super Antennas Revisited

Did you notice the brief discussion of W6MMA's new Super Antennas in our December 2001 "QRP" column? The article mainly focused on the antennas' flexibility for portable QRP operations, but they also work great for mobiling. In fact, the W6MMA antennas are so trim, sleek, and sexy looking that they add sheer class to any car's appearance. My own vehicle, for example, was a plain four-door family sedan before I jazzed it up with a Super Antenna. Then it turned into an attention-grabbing Camaro (photo 1). Would Doctor Dave jest? Give one a try. You too will be favorably impressed!

In looking closer at the W6MMA Super Antennas, we see they are available in a manually-tuned coil MP1 version and an electrically/remotely-tuned coil MP2 version. Both versions cover 40 through 6 meters (plus 80/75 meters with an optional add-on coil), both handle up to 150 watts, and both are comprised of a base mast, center coil, and upper whip section. All three sections are fitted with standard mobile antenna 3/8-24 threaded ends for interchangeability with optional upper and lower sections that make the antenna tall or short to fit one's needs. Base mast sections are available in 30 and 48 inch heights. A 5-inch-retracted/44-inch-extended collapsible whip is also available for easy-stow mobiling or portable operating (photo 2). Study those photos for a few minutes and you will see you can configure a Super Antenna to be as short as 3.5 feet in height (nice for slipping into parking decks) or as tall as 7 feet (perfect for radiating a big signal from open ground).

Whether sized up or down, a Super Antenna can effectively be supported by a trunk-lip or hatch-back mount such as the Diamond K-400. The main point to remember is ensuring the coil and upper whip extend above the car's roof line for best signal-radiating results. In my case, a 30 inch mast section on a custom-frame mount supports the antenna. With

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

Photo 1– Red hot and cooking best describes the appearance and performance of the new tall version of the W6MMA Super Antenna. It stands 9 feet high from street to tip, covers 40 through 6 meters, and gives my Camaro real globe-spanning horsepower.

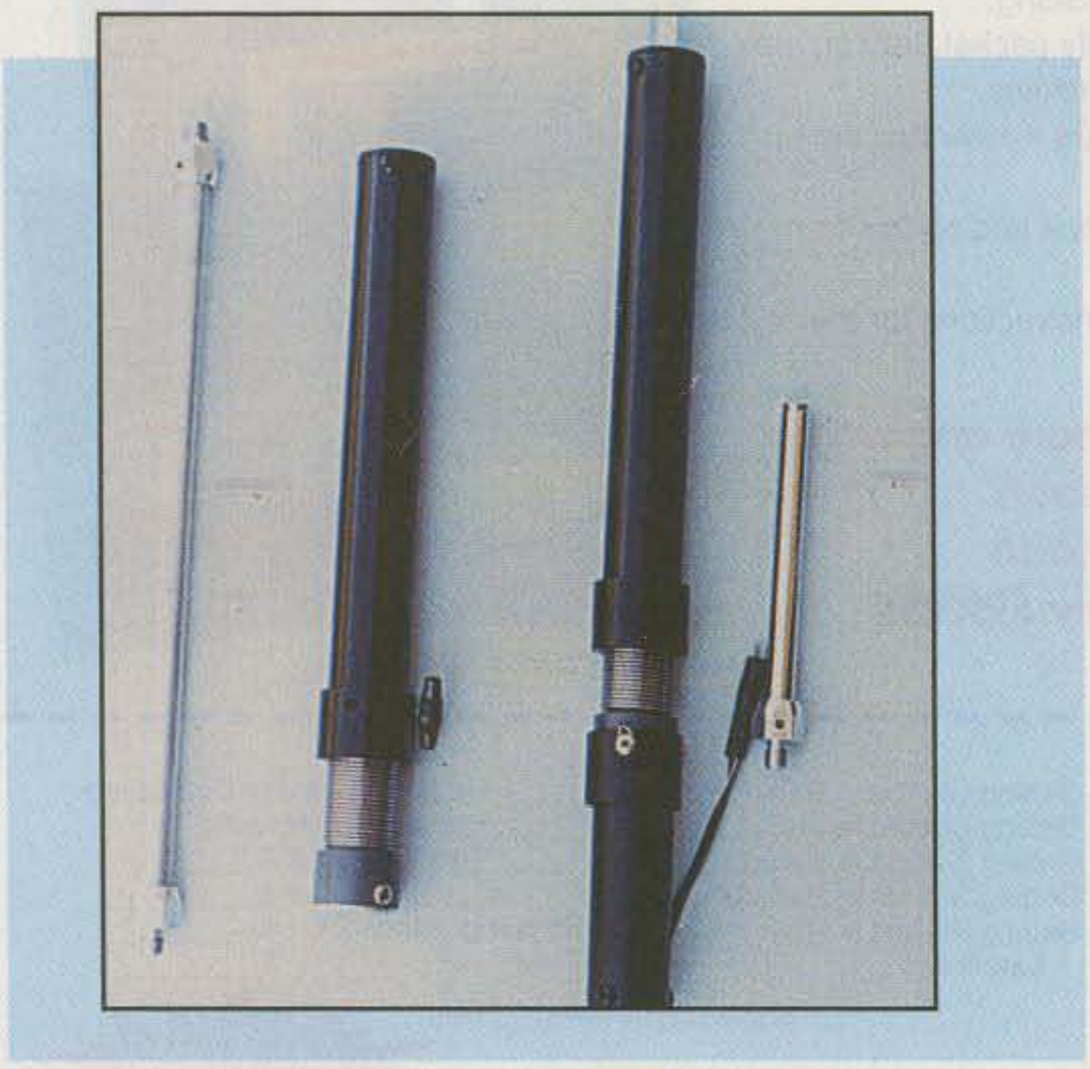


Photo 2– The sections used to make a break-down and carry-anywhere version of the W6MMA Super Antenna include (left to right) 12 inch base mast, 12 inch MP1 or 18 inch MP2 coil, and 44 inch/5 inch pull-up whip. (Discussion in text.)

Photo 3– The front and back sections of a WorldPack can be folded down to make a stand for operating portable in any environment. (Photo courtesy PowerPort)

this setup I can go portable when leaving the car by just removing the coil and teaming it with an optional 12 inch mast and pull-up whip.

Performance-wise, I find the W6MMA Super Antenna works out exceptionally well compared to other mobile antennas of similar size/height. Possibly that is due to the coil's upper aluminum cover (which is painted black) acting like an unnoticed capacity hat and adding length to the top whip while reducing the amount of inductance or coil required for resonance.

Tuning the antenna is also easy (and it can be tuned/set to any MARS, CAP, CIA, or marine frequency between 7 and 30 MHz if desired). A sliding coil cover-position chart supplied with the antenna shows approximate settings. Then you fine tune it to a desired frequency range using your rig's SWR monitor for guidance. The electric/remote-operated MP2 coil works terrific here, especially if you like changing bands right from an car's front seat. You just apply 9 volts from a battery or 13 volts from the car's cigarette lighter/accessory socket to the MP2 motor and watch for signals to peak on your transceiver's S-meter. If you overshoot that mark, just reverse battery voltage to drive the coil in the opposite direction. Then fine tune the coil while watching the rig's SWR monitor. It is cool as ice!

Want to know more about these hot and upcoming antennas? Check with Vern Wright, W6MMA, of Super Antennas, 1606 Pheasant Way, Placerville, CA 95667; phone 530-622-6668, or on the web: <www.superantennas.com>.

Beach-Bag Mobile

Earlier I mentioned going portable with a Super Antenna separated into a 12 inch mast, 12 inch coil, and 44 inch pull-up whip for carrying or assembled to produce a 5.5 foot radiator for operating. The WorldPack from Cutting Edge Enterprises holds a TS-50, IC-706, or FT-100 in its upper section and an 8 amp rechargeable battery (also from Cutting Edge) in its lower section. A Super Antenna is then cabled to the transceiver and secured in side loops on the WorldPack, and a 32 foot counterpoise wire is laid on the ground. The Pack's front and rear sections can also fold down to produce a mini-stand (photo 3); it can be worn "backpack style" or carried "bag style" by a top strap.

The WorldPack is well padded and lined with soft nylon to protect your rig

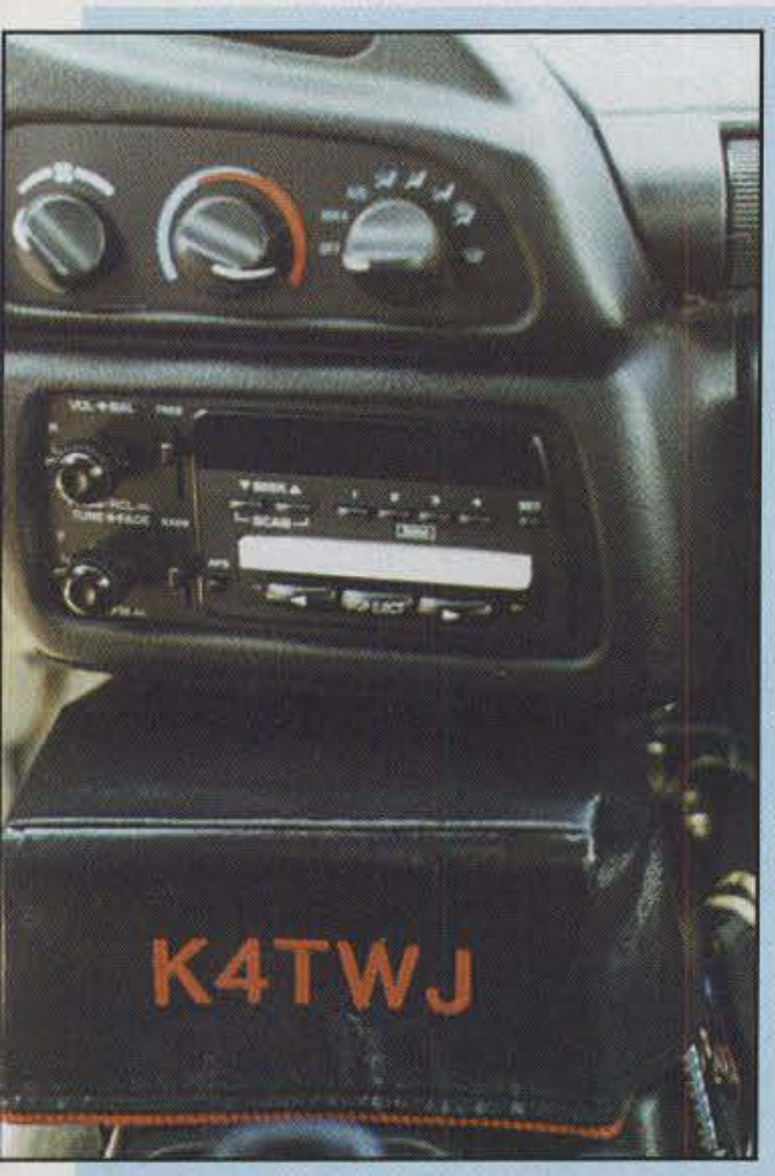


Photo 4– A custom rig cover made by Judy Vermeer, KØIDS, doing its duty protecting my mobile transceiver from direct view and possible theft while adding a personal touch of glamour to the vehicle's interior. Judy makes covers for most transceivers, power supplies, and amplfiers.

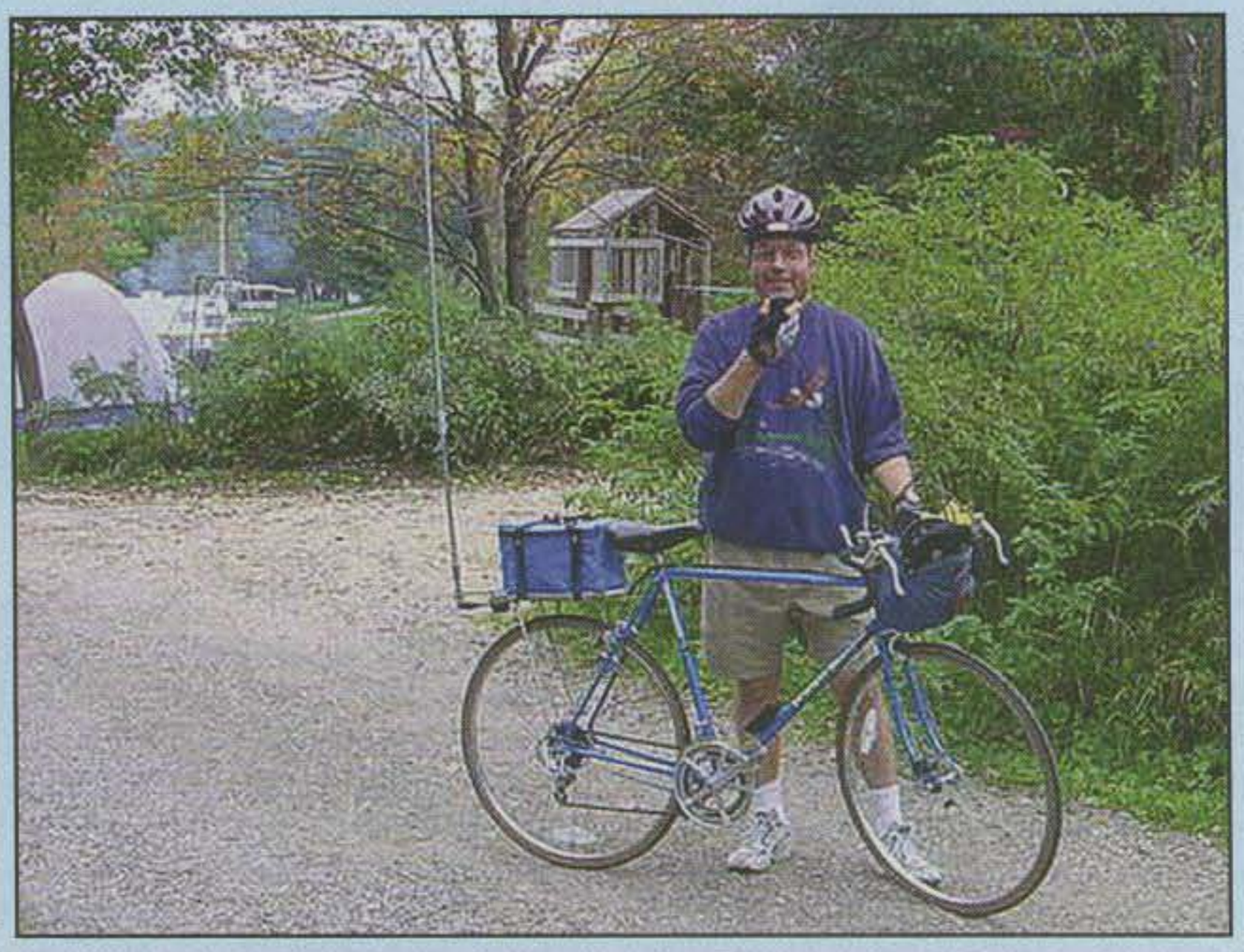


Photo 5– Gene Santoski, K9UTQ, enjoys some prime-time hamming from a scenic bike trail near his home in Wisconsin. Rig setup consists of a Yaesu/Vertex FT-817 connected to a Hustler mobile antenna on the bicycle's luggage rack and powered by a 2.3 amp/hour gel cell. Now that's living the good life!

from abuse. It is a real rig saver for travelers, and it is available from Cutting Edge Enterprises/PowerPort, 6230 Highland Avenue, Santa Cruz, CA 95060; phone 1-800-206-0115, or on the web: <www.powerportstore.com>.

Great Cover-Ups

Aside from dust, dirt, and moisture, what would you say is the most harmful threat to your mobile transceiver? The obvious answer is theft, and that unfortunate loss typically results from leaving your vehicle unattended with its prized radio gear in full view of prowling eyes. What to do? Covering your rig so it does not scream with temptation is a simple, yet quite effective idea. Using a large winter coat in summer, a bright beach tower, or a pile of newspaper is not the best solution, however, as it usually draws curious attention to whatever is hidden under the cover.

A more viable solution is using a dark, custom-size cover to complement your vehicle's interior while allowing your rig to disappear into the shadows—out of sight and out of harm's way, so-to-speak. Judy Vermeer, KØIDS, makes some neat looking, custom rig covers that fill that need perfectly (photos 4 and 5). Judy primarily makes rig covers for home stations, and she leaves their back section(s) open so the cover will slip over a rig from its front and not interfere with rear cable connections. As such, they make great slide-on cover-ups for mobile rigs. The covers are made of black vinyl with a white cotton backing, with or without rope-type bottom trim, plus your call letters can be monogrammed on the front (a nice option).

Judy can sew covers for almost any modern transceiver, power supply, and/or linear amplifier, plus if you tell her the dimensions of your unusual size or classic rig, she can make a cover for it, too. You might even talk her into adding a plain rear flap to your mobile rig's cover so you can use it normally for interior enhancement or turn it backwards for camouflage and security.

Since most transceivers spend over 50 percent of their time switched off, keeping them covered and in like-new condition is always beneficial. Few people make covers today, however. In fact, Judy may be the only one sewing them. Need a good cover-up? Check with Judy Vermeer, KØIDS, at P. O. Box 74, Leighton, IA 50143; phone 641-626-3175, or on the web: <nn0c@iowatelcom.net>.

Bicycle Mobile Magic

Looking for something a bit different or off the beaten path in mobile operations? Want roll-out fun and emergency preparedness to boot? Well, friend, you are a prime candidate for the captivat-

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New Dual-Band Handheld
HTX-420

Feature-rich, 2M/70cm transceiver with up to 5W on 2M. SAME weather alert plus digital compass. 100-ch. memory, 50 CTCSS enc/decode, 16-key DTMF with 6, 16-digit autopatch memory. TX Ham band or 142–149.88 and 420–470MHz for MARS/CAP. Lighted display and keypad, battery volt meter, condition indicator. 7.2V Li-ion pack and charger, and empty "AA" battery tray. #19-1108, $269.99. Available in June.

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ing world of bicycle mobiling—and not with just a belt-clipped 2 meter talkie, but with a big-time HF transceiver. Far out idea? Not at all, especially if you live in an antenna-restricting neighborhood or condo and commute on freeways that demand extreme concentration for sheer survival. Rather than continuously bucking the odds or (heaven forbid!) giving up in discouragement, you can ham it up from some marvelous outdoor sites while bicycle mobile and enjoy being someone special on the air at the same time. Occasional bike rides are also good exercise, so give it a go!

Need a couple of encouraging views and ideas to get you started bicycle mobiling? Take a cue from Gene Santoski, K9UTQ, shown in photos 6 and 7 with his recently devised setup. Gene runs 5 watts with a little Yaesu/Vertex FT-817—on SSB, no less—and in only a few times out (thus far!), he has worked stations from coast to coast and from Canada to South America. His transceiver nestles safely in a Worldpouch padded nylon case from Cutting Edge Enterprises (1-800-206-0115), which in turn is protected in the bike's front carry bag. A 2.5 amp gel cell in the Worldpouch top pocket powers the rig, while the FT-817's internal battery pack

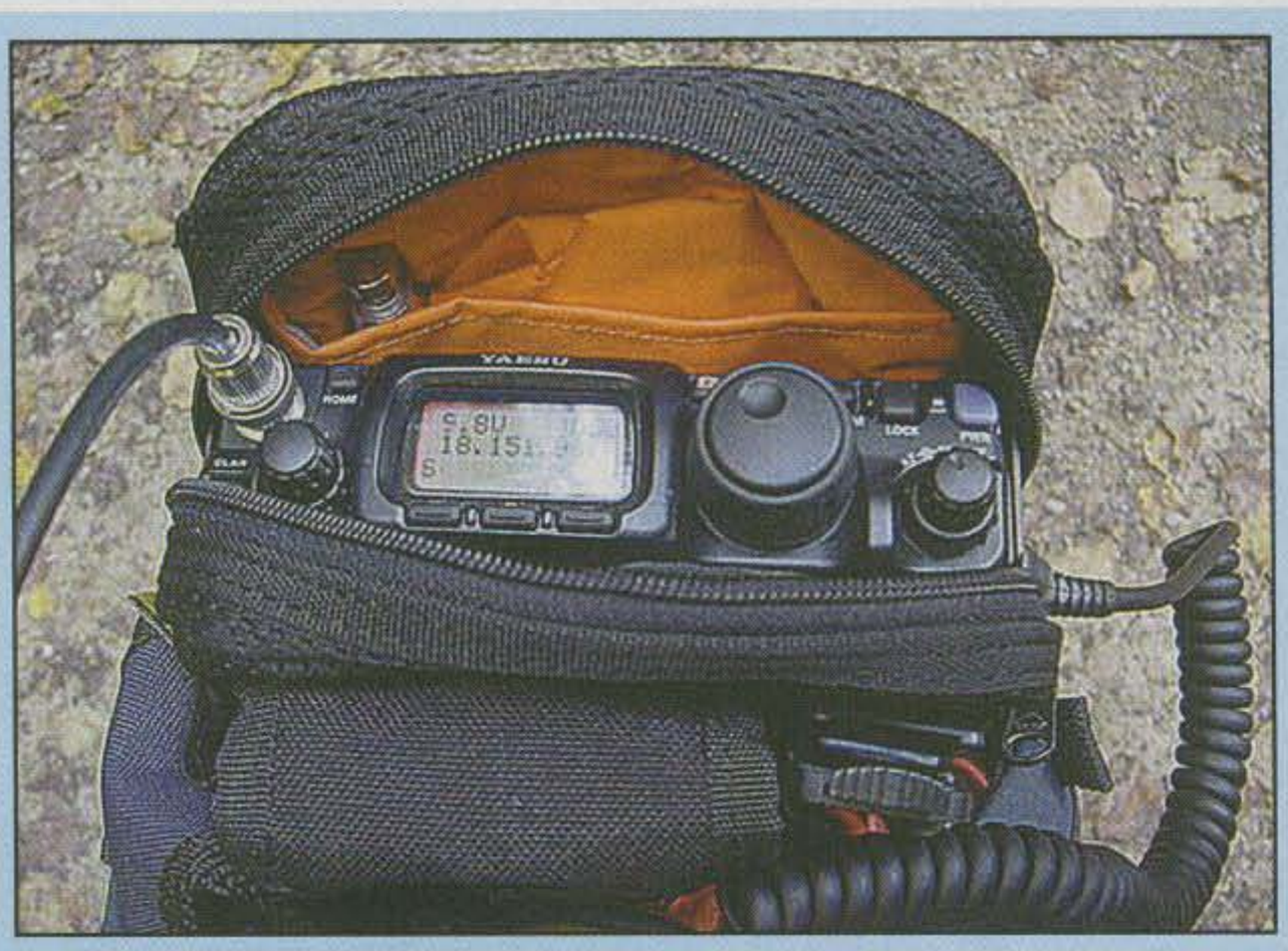

Photo 6– Rider's-seat view gives more insight into the bicycle mobile setup of K9UTQ. The FT-817 is protected in Worldpouch from Cutting Edge Enterprises/PowerPort, which sits in the handlebar bag on the bike. By disconnecting the BNC antenna plug on the front, the rig can be used in other portable applications.

serves as backup power if and when needed. A standard Hustler mobile antenna is supported by a truck-type mirror mount attached to a luggage rack on the back, and coax cable routed from the transceiver to the antenna is taped to the bicycle's frame for safety. The coax shield also connects to the bicycle's frame, producing an effective counterpoise and ensuring good signal-radiating capabilities. Gene mainly works 17 meters on weekends and occasional late afternoons. Listen for him (listen carefully, as he is running QRP) and give him a call.

When you really get into two-wheel hamming, incidentally, consider joining the Bicycle Mobile Hams of America (BMHA). This group is very enthusiastic and helpful, and they have a very interesting quarterly newsletter devoted to bicycle mobiling. BMHA also holds a quite informative forum at the Dayton Hamvention® every year (complete with show-and-tell displays of bike mobiles), plus they support some exciting bike rides during the year. Membership in BMHA is $10 annually. Like to join or want more info? Contact BMHA, c/o Mike Nickolaus, NFØN, 316 E. 32nd St., South Sioux City, NE 68776-3512, or via <www.LaFetra.com/BMHA/>.

If you are a serious bicycle mobileer and in good physical condition, you also might like to give the famed annual Ride Around Wyoming a go. This year it will be a spectacular six day, 376 mile tour through some beautiful, historically significant areas. The tour, which is usually held in June, is complete with baggage truck, repair van, lodging, meals, and more. Details are available by sending an SASE to R.A.W. c/o Bob Faurot, 18 Paradise Dr., Sheridan, WY 82801, or by phoning 307-672-6323.

Conclusion

That winds down our views for this time, friends, and we trust it increased your interest in HF mobiling and/or standalone portable operations for emergency preparedness. We are living in some very uncertain times, and having a dependable HF setup ready for service any time and in any situation is an asset of the best kind. Stay prepared, stay safe, and have a ball HF'n to the max! 73, Dave, K4TWJ

E-mail Note

During recent months between 5,000 and 20,000 of you apparently sent me e-mail messages. The system became hopelessly overloaded, and the server unknowingly locked up or deleted an undefined number of those e-mails. My e-mail is still bottlenecked and out of control. Until further notice, please send/resend your notes/messages via postal mail (and include an SASE if you wish a *brief* reply). When possible, many related messages/topics will be addressed through my columns here in *CQ*. Although a full task force would be necessary to answer all messages, I am sincerely interested in hearing what every one of you has to say. Rest assured your messages will be read! Thanks for your understanding.

—Dave, K4TWJ

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Beginner's Corner

BY PETER O'DELL, WB2D

For the Newcomer to Ham Radio

Your First Mobile Installation

Putting a radio in a car is almost as old as ham radio itself. Here are some tips for the first timer to make it smooth and easy.

Social critics often comment on the love affair Americans have with their automobiles. However, to the average ham the car often becomes a rolling ham station. If you have a commute that lasts more than 15 minutes, the time behind the wheel starts to be a significant block of time on a weekly or monthly basis. Why not use that time for something more worthwhile than chuckling at some DJ's humor?

Just for the record, let's limit the discussion to FM operation and FM antennas. Still, we are left with a myriad of choices. Most new hams start out with a handheld—period. If you are more than a few miles from the repeater while driving, the limitations quickly become apparent. Sure, it can be less expensive to buy an out board amp and antenna to boost the effectiveness of the handheld, but you may not be satisfied with the ergonomics of operation or the need to constantly hook up and unhook the handheld. Plus, a lot of the newer handhelds use antenna connectors that require a special adapter to connect to coax. Also, if you have to make a sudden stop, the handheld is probably going to become a UFO—Unrestrained Flying Object—that you have to duck from or retrieve from a far corner. Besides, it's not good for the radio. Therefore, unless they live in a high-crime area, a permanently installed mobile rig sooner or later shows up in most hams' cars.

Positioning The Radio

Finding the right spot for the radio is an art form. The "cockpit" of a car varies considerably from one model to another. With somewhere around 25 different manufacturing companies selling cars in this country, there's a lot of variation. Of course, too, not all radios are the same size, plus some have detachable heads while others offer almost total control from the microphone. There is no right answer that fits every situation.

*123 NW 13th Street, Suite 304-2, Boca Raton, FL 33432
e-mail: <wb2d@cq-amateur-radio.com>

One of the advantages of a detachable head is that you can mount the "box" that contains the radio under a seat, in the trunk, or under the dash. The Alinco DR-610T VHF/UHF FM dual-band mobile/base transceiver allows you to do just that. (Photo courtesy Alinco)

One of the great advantages of the detachable head is that you can mount the "box" that contains the radio under a seat, in the trunk, or up under the dash. The only limitation is your imagination. The downside is the cable connecting the head to the "box" and the extra expense.

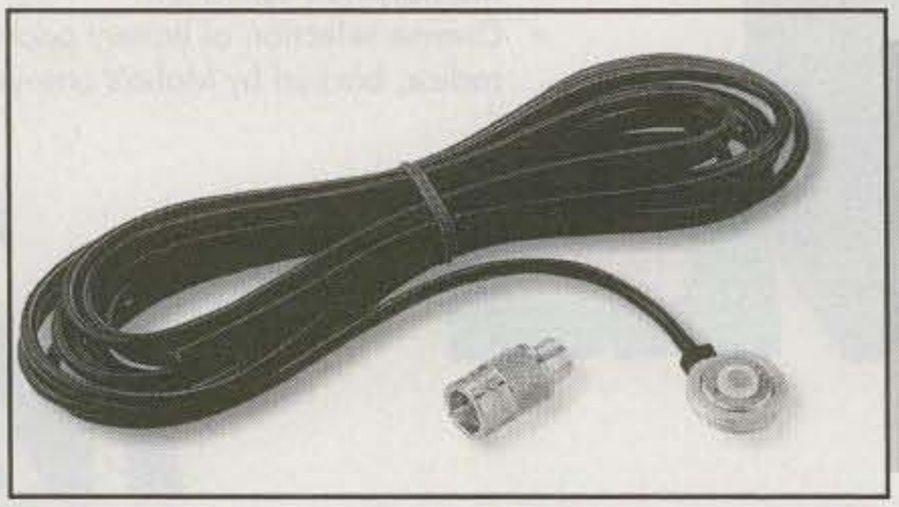
I think the right answer is what you are comfortable with and what works in your car. How do you find that? Take the radio with you and sit in your driveway while pretending you are operating. Have a friend sit in the car with you and see what it's like when you have a passenger along. While sitting there for a few minutes, close your eyes and imagine you are in heavy traffic and you want to grab the mic for a minute. Can you find it easily without taking your eyes off the road? Can you read the frequency/memory-channel information with only a quick glance? Think through all the things you will be doing and choose your mounting position accordingly. Also, the old carpenter's adage *measure twice and cut once* applies.

Allow yourself enough time to do the job. A long time ago, in a land far, far away, when I worked for a Motorola Service Station (repair shop), it took about two hours to install one of the trunk-mounted radios with a remote head. It was something I did several times each week. I had all the tools I needed, and I had a parts box with deep drawers. Granted, your installation may not be as complicated as one of those installations, but still, allow a whole afternoon. Pick a day when the weather is nice, too.

Antennas

Mobile antennas come in all sorts of shapes and sizes. My experience has been that the type of antenna is usually of less importance than its placement. In general, from the perspective of coverage, the best place for the antenna is the center of the roof of the automobile. The second best location—for a passenger car—is the center of the trunk lip.

I've never understood it, but there are some people who do not want to drill a hole or two in their new car. When I worked for Motorola, we installed most of the Motorola two-way radios sold in the area. That was fun! Almost every company owner or president wanted a radio in his car to keep in touch with his



Both mechanically and electrically, the NMO is one of the best style antenna mounts on the market. The model shown here is the NMOK from Larsen Antennas. (Photo courtesy Larsen Antennas)

10 Bands -- 1 MFJ Antenna!

Full size performance . . . No ground or radials

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.

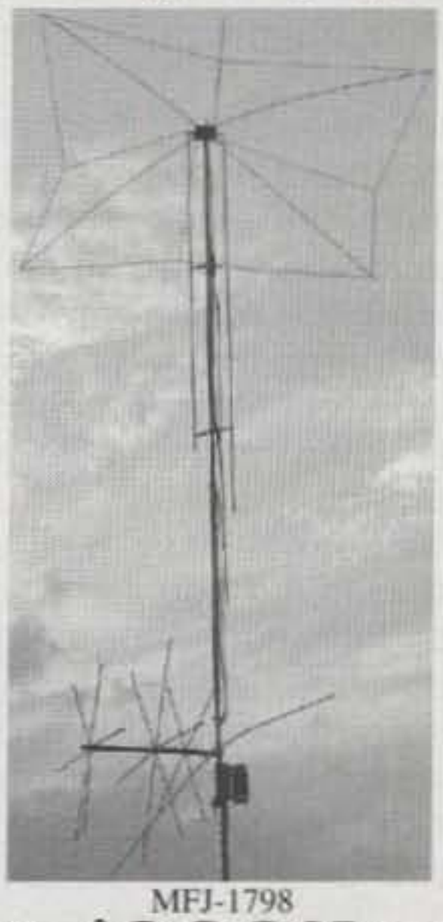
Full size performance also gives you exceptionally wide bandwidths so you can use more of your hard earned frequencies.

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.



MFJ-1798
$289.95
Ship Code F

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.

Separate Full Size Radiators

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.

This forms a very large equivalent radiator and gives you incredible bandwidths.

Radiator stubs provide automatic bandswitching -- absolutely *no loss* due to loading coils or traps.

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
$379.95
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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.

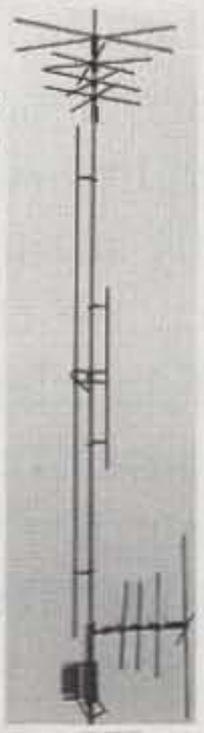
MFJ's G5RV Antenna

$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



MFJ-1796
$209.95
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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.

MFJ-1793, $189.95. Like MFJ-1792 but has full size 20 Meter 1/4 wave also.

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employees. These guys drove big Cadillacs and Lincolns in those days. It was a thrill to take a brand-new, expensive car with the sticker still in the window and drill a 7/8 inch hole in the roof. It felt like something that belonged in *The Blues Brothers.* They went along with it because they wanted to squeeze the last drop of performance out of their radio system, and that meant putting the hole in the roof.

When you are installing an antenna this way, you'll have to loosen the head liner and route the antenna feedline between the inside roof and headliner to the edge of the roof. From there, channel the feedline through one of the vertical columns or behind some trim so that it comes down the front/side of the car near the radio.

RG-58-size coax is lossy at all VHF/UHF frequencies, so you will want to keep the coaxial cable as short as possible. Route the cable to the radio location, make sure you have enough cable to easily connect to the radio, give yourself another six to eight inches, and then cut off the rest of the cable. When you put on the PL-259, make sure you have done a great job soldering the center pin and all four of the holes in the barrel. At best, UHF connectors are bad, but a poorly installed one becomes a nightmare. This is especially true in a car with vibration, heat, humidity, and all the other naturally occurring characteristics of this environment.

Most antenna manufacturers offer several different antenna mounts. The NMO style has been my favorite for years. When I worked for Motorola, I seldom saw those mounts go bad (leaks, rusting, etc.). Not so with the other style connectors. Mechanically and electrically, the NMO is one of the best style mounts on the market. The one drawback is that it does require a 7/8 inch hole, which is a little bigger than some of the others, but it is solid.

Finally, there is the question of which particular antenna to use. My first choice would be a simple quarter-wave antenna. These antennas are inexpensive, durable, and unobtrusive, and the performance factor is good when mounted in the center of the roof. Also, if you are dealing with a vehicle other than a passenger car (minivan, SUV, truck, etc.), antenna height on a vehicle can be a problem. When I had a 5/8-wave on the top of my car, I "took out" several fluorescent bulbs in a parking garage. Not a good idea.

If you are not willing to drill a hole (coward!), then I would suggest either a magnetic mount in the center of the roof or a trunk-lip mount near the center of the trunk lid. In either of these cases, I would be more inclined to go with a 5/8-wave antenna. The gain antenna may make up for some of the deficiencies in the mount. If you choose to go with a magnetic mount, make sure it's a strong one. You are dealing with some powerful forces. At 70 mph your antenna is starting to function more like a sail than a toothpick.

Power Cables

Getting power to the radio safely and noise free can be one of the most difficult steps in a good mobile installation. In most cases, the battery is located in the engine compartment. My theory is that you should tap the positive line as close to the battery as possible. There also is a firewall between the engine and the passenger compartment of the car. This means that your power line must come through the firewall.

Since most cars have the fuse box somewhere inside the passenger compartment, you might ask why not just tap power from the fuse box. You can, but you may find yourself receiving complaints of "alternator whine" or "windshield-wiper whine." In the early days of digital control of automobile engines and accessories, it was not uncommon for people to complain about all sorts of strange "behavior" associated with keying the transmitter. It is less likely today, but it is still possible that your radio could interfere with the operation of your car.

The above having been said, my advice stands: Make your connection as close to the battery (inside the engine compartment) as possible. Since the firewall is made of metal and insulation, it can be somewhat tricky to route the power cable. Incidentally, the car/truck chassis usually provides a very good ground, so there is no need to run a negative lead to the battery. Just find a good metal brace or the firewall itself. Find a large bolt or drill a hole and use a large sheet-metal screw. Either way, a large star washer helps to lock the tap in place and provide solid contact. However, I have known of a case or two where some really strange problems disappeared by routing the negative lead directly to the battery.

Look carefully at the way the automobile manufacturer gets wiring through the firewall. You probably will find the wires grouped together and molded into a rubber plug that fits exactly into a hole in the firewall. You also may notice a few isolated wires passing through other rubber plugs. Since you probably do not have the manufac-

turer's resources at your disposal, a custom rubber plug is out of the question. However, an ordinary rubber grommet runs a close second! If you are lucky, you may find some pre-existing holes with rubber plugs in them. Pop out the plugs and replace with an appropriate-size grommet. Why the need for the grommet? The sharp edge of the metal might cut through the insulation of the power wire over a period of time, creating a short, which brings up another issue: You must have a fuse in the line between the firewall and the battery, or you run a real risk of starting a fire in your car.

How do you actually get the wire through the firewall? You have pretty tight quarters under the dashboard of most cars. The easiest way I know of is to start with a short piece of stiff wire such as a coat hanger or the whip of a discarded antenna. Once you have the stiff wire through the firewall, form a small hook in the firewall end of the stiff wire. Hook the end of the power feed to the stiff wire and tightly tape the two together, then pull the stiff wire through the firewall with the power feed trailing behind.

The size of the wire that you should use is dependent on the number of amps your radio will draw. However, I come from the "brick outhouse" school of engineering, so I would run number 8 or 10 stranded copper wire to the battery tap. Overkill? Probably, but then I seldom get complaints of whine on my signal. Also, if I should want to run two rigs in the car sometime—it could happen—I already have sufficient power in the passenger compartment.

What is the best way to attach a power feed to positive near the battery? If you have a battery with the posts on top, it is pretty simple to unscrew the nut from the battery terminal and attach your wire there with a spade lug. However, many of the newer cars have the side-terminal style battery. Electrical-supply stores sell copper compression fittings that make for a very secure tap. You just need to disconnect the positive lead to the battery and scrape about an inch of insulation off at least six to eight inches from the terminal. Put the fitting onto the wire and add the end of the radio power feed. Use a screw driver to tighten the fitting as tight as you can make it. Then use a lot of electrical tape to make sure the tap is well insulated. Failure to adequately insulate the tap could result in a short. In that case, a destroyed battery would probably be the good news.

Finally, one of the best additions that you can make to a mobile installation is an external speaker. Without it, your receive audio is probably blasting into the floor of the car. "You can't work'em if you can't hear'em" is as true on FM as on the low bands. Also, if your rig has "weak" audio or your car is exceptionally noisy, you can find external speakers with built-in audio amplifiers. Loud is good.

With a few hours of preparation and work, you can have a mobile installation that will last as long as you keep the car. I think it is well worth the investment.

73, Pete, WB2D

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.

Radio Classics

BY JOE VERAS, N4QB

Vintage Gear and Its History

Mobile Operation in the '50s

Fortunately, cars were much larger in the 1950s and '60s. With model names such as *Roadmaster* and *Imperial,* and drinking gasoline as if it cost no more than 25 or 30 cents a gallon (*it didn't!*), they offered the amateur ample interior space for the collection of equipment required for mobile operation in those days.

With imported automobiles an uncommon sight on American roadways and only a few low-volume, domestic ventures into either rear-engine or front-drive technology, front engine/rear drive was the norm for cars of the era. The legacy of that setup was the transmission hump and the driveshaft tunnel.

Ooops! I almost forgot. Just so you don't think you've mistakenly picked up your copy of *Autoweek,* let's put in some stuff about ham radio. The big benefit of that transmission hump intruding into the floor space of the front passenger compartment was that it made an *excellent* place to mount radio equipment. These days, when the interior of the typical 21st century car almost defies you to find space to mount an ICOM 706, Kenwood TS-50, or Yaesu FT-100, the cavernous spaces available to amateurs of the 1950s are difficult to imagine. Remember, though, radios were much larger then.

Those of you with good memories, or lots of magazine storage space and a tolerant spouse, will recall the May 1952 issue of *CQ* was devoted to mobile operation. Although a few essentials remain the same in this segment of the hobby, fifty years of change and progress have moved us far beyond the world portrayed on those pages. As is the case today, the most popular types of mobile operation half a century ago involved the voice modes. Among these, AM dominated. If the car salesman persuaded you to check off the *Radio & Heater Option,* you already owned half of an AM ham receiver. In the '50s and '60s many mobile operators used the car's broadcast receiver as an IF strip and audio chain, with a converter ahead of it supplying tuning for the ham bands.

Converters and Receivers

Gonset's line-up of converters included single-band models and others covering several, or all, of the HF ham bands (photo 2). One of the company's converters enabled your car radio to receive 6 meters; another let it tune the shortwave broadcast bands. Whether you chose a converter from the Gonset line or another brand, the *real hot setup* was to mount it to the steering column, putting the tuning knob within easy reach as you motored down the road. Of course, the *real* hotrodders had a "suicide knob" mounted on the steering wheel itself. Remember those?

An alternative to the Gonset-type, tunable converter was the crystal-controlled, fixed-tuned converter. These offered more stable HF oscillators and used the car's broadcast radio as a tunable IF. Convenience and simplicity carried a penalty, however. The tunable converters generally used the high end of the broadcast band, say 1500 kHz, as an IF frequency; the higher the IF, the better the image rejection. This frequency could be altered slightly to dodge local BC interference. The fixed-tuned converters were forced to employ the car radio's full tuning range from around 500 to 1500 kHz, with image rejection suffering at the low end. In addition, strong BC stations bled through as one tuned past their frequencies on the dial.

Photo 1– The Elmac A-54, manufactured in 1952–53 by the Multi-Products Company, ran 50 watts input power on AM and CW. (Photos by Joe Veras, N4QB)

What advantages did the fixed-tuned converter offer besides simplicity? I can think of a couple: How many 1950s ham receivers offered push-button tuning of your favorite net frequencies? Owners of upscale GM automobiles could use their BC radio's *Wonderbar* automatic, signal-seeking tuning to scan for good, solid S-9 plus QSOs. One such fixed-tuned converter was made and marketed by *CQ*'s technical guru (at that time) Bill Scherer, W2AEF. His two-tube *Converterette* came in models for the 75, 40, 20, 15, and 10 meter bands; it sold for $12.50. International Crystal Manufacturing introduced its transistorized *Mobilette* converter in early 1961. The fixed-tuned units covered any one amateur band from 75 through 6 meters and cost $22.95. It is not clear why all fixed-tuned converters seem to have acquired a diminutive name form.

A better approach was a receiver dedicated to amateur operation from the antenna jack to the speaker terminals. Compared to the converter/BC-radio combination, the ham band receiver generally offered superior IF selectivity, noise limiting, and audio more suited to communications. On the downside, the separate receiver required more space and its own power source. Converters generally could rob what

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Alinco's top of the line "Intelligent Receiver" tunes from 100 KHz ~ 2.15 GHz with excellent sensitivity and a triple conversion front end. Receives WFM, NFM, AM, USB, LSB, CW and FM stereo*, 2000 memory channels with alpha-numeric labeling, download free computer control software from the Alinco web site. Flash Tune™ locks onto and monitors strong local signals! On board "Help" feature, digital recorder, frequency counter, CTCSS search & decode, Channel Scope™ spectrum activity display, Ni-Cd battery & quick charger included. BNC antenna port with new, wide-range "ducky" antenna included.

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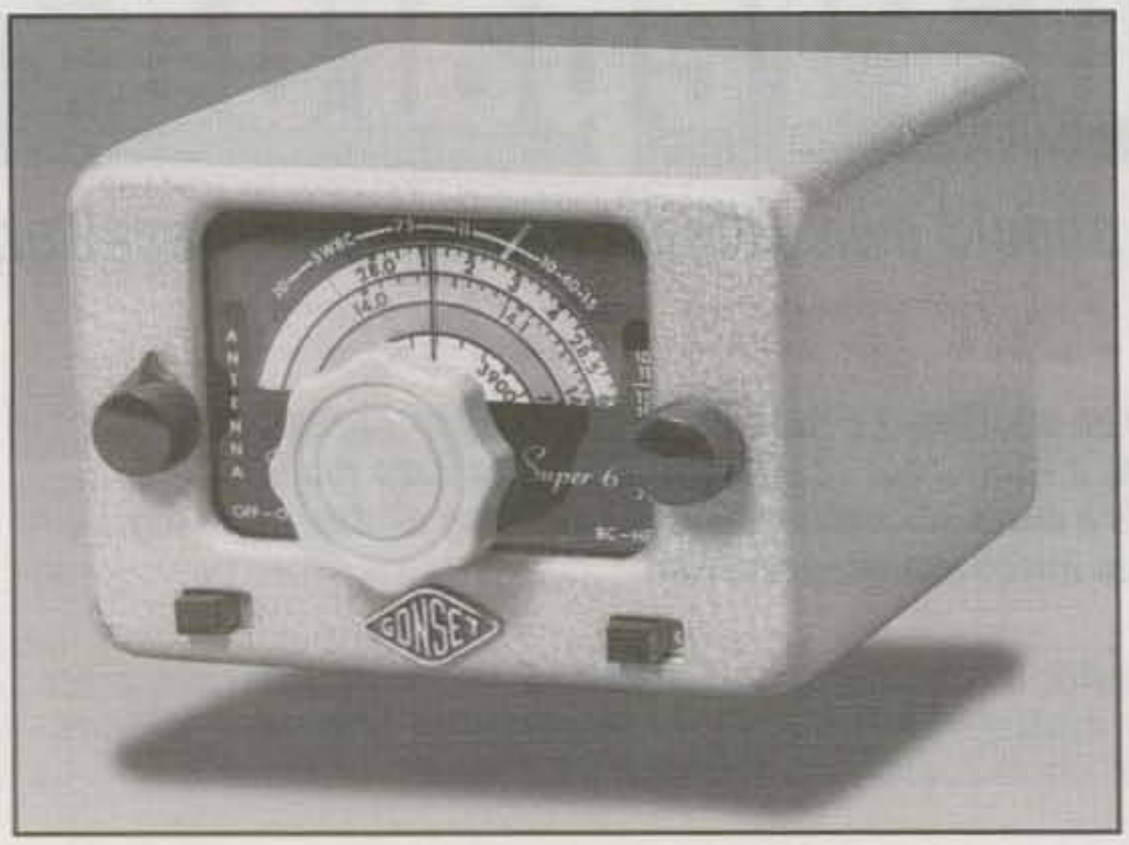

Photo 2– Gonset Super 6. Whether strapped to the steering column or mounted beneath the dashboard, Gonset converters were a mainstay of early mobile operation.

voltage they needed from the car radio. A number of companies turned the power-supply problem into a selling point. Transmitters, and sometimes receivers, were sold without internal power supplies of any kind. A rough-duty, under-the-hood unit was available for mobile operation, and a nicely-finished, matching 115 volt AC supply (often with a built-in speaker) was sold for home use. Manufacturers such as Morrow and Harvey-Wells touted their mobile gear as the ideal compact home station that could also easily be taken on the road.

The Power Source

A dramatic difference between mobile operation today and that of a half-century ago is the ease with which we connect modern gear to a source of power: Just make some stout, well-fused connections to the car battery; that's about it. The cigarette-lighter receptacle even gets pressed into service occasionally; gotta use it for something, since people don't smoke anymore. Mobile gear in the '50s required hundreds of volts, not 12. Most cars had 6 volt electrical systems until around 1953, when the change to the current standard began. A belt-driven DC generator furnished power for the system, a less efficient setup than today's alternators.

Essentially, two types of power sources were available: the vibrator power supply and the dynamotor. The vibrator supply used a set of vibrating contacts to make and break a circuit (about 100 times per second), routing the car's electrical system voltage through the primary of a transformer. On alternating contacts, the polarity reversed. This caused a square-wave alternating voltage to be induced in the transformer's secondary . . . the voltage determined by the step-up ratio of the transformer. The square-wave AC could then be rectified and filtered as in any other high-voltage supply.

The dynamotor was an electric motor-driven, DC, high-voltage generator. Its motor and generator windings were wound on a common shaft. It drew power from the car's electrical system. A dynamotor supply operated in the 50–60% efficiency range. A good vibrator supply did somewhat better. A decade or two after the Second World War, the surplus PE-103A dynamotor was a popular choice for ham mobile installations. It could operate from either 6 or 12 volts and supplied 500 volts at 150 milliamperes . . . up to 275 mils for short bursts.

Limited power-supply capacity meant the mobile amateur had to budget the current available on the B+ line carefully. He had not only the final amplifier to consider, but also the modulator and the rest of the transmitter. If he employed a receiver, rather than a converter, some of its stages probably drew current during the transmit cycle as well. The order of the day was usually modest power. Instant-on filaments were popular, although that part of the tube could be run directly from the car's electrical system instead of through the power supply.

Elmac, Morrow, and Regency

The Elmac A-54 portable transmitter (photo 1), manufactured in 1952–53 by the Multi-Products Company of Hazel Park, Michigan, ran 50 watts input power on AM and CW. A pair of 6L6s modulated the 807 final on phone. An early version covered 75, 20, and 10/11 meters; 40 meters was added to later production runs. Depending on the exact model (besides the different frequency coverage, models were available for both low- and high-impedance microphones), the A-54's price varied between $139 and $153. Ever mobile-minded, the Multi-Products Company also made garage-door openers.

The Morrow Radio Company of Salem, Oregon devoted nearly its entire amateur product line to mobile gear. Early products included receivers and converters. By the mid-'50s the company was making matching receiver and transmitter pairs . . . elegant, compact designs not likely to detract from the appearance of a top-of-the-line automobile. Photo 3 is of a Morrow MB-5/MB-560-A combo. The 13-tube MB-5 receiver was a double-conversion set covering 80–10 meters. It had no filters, depending instead on its 200 kHz 2nd IF for basic phone selectivity. It lacked a power supply and cost $224.50 when introduced in 1955. The VFO-

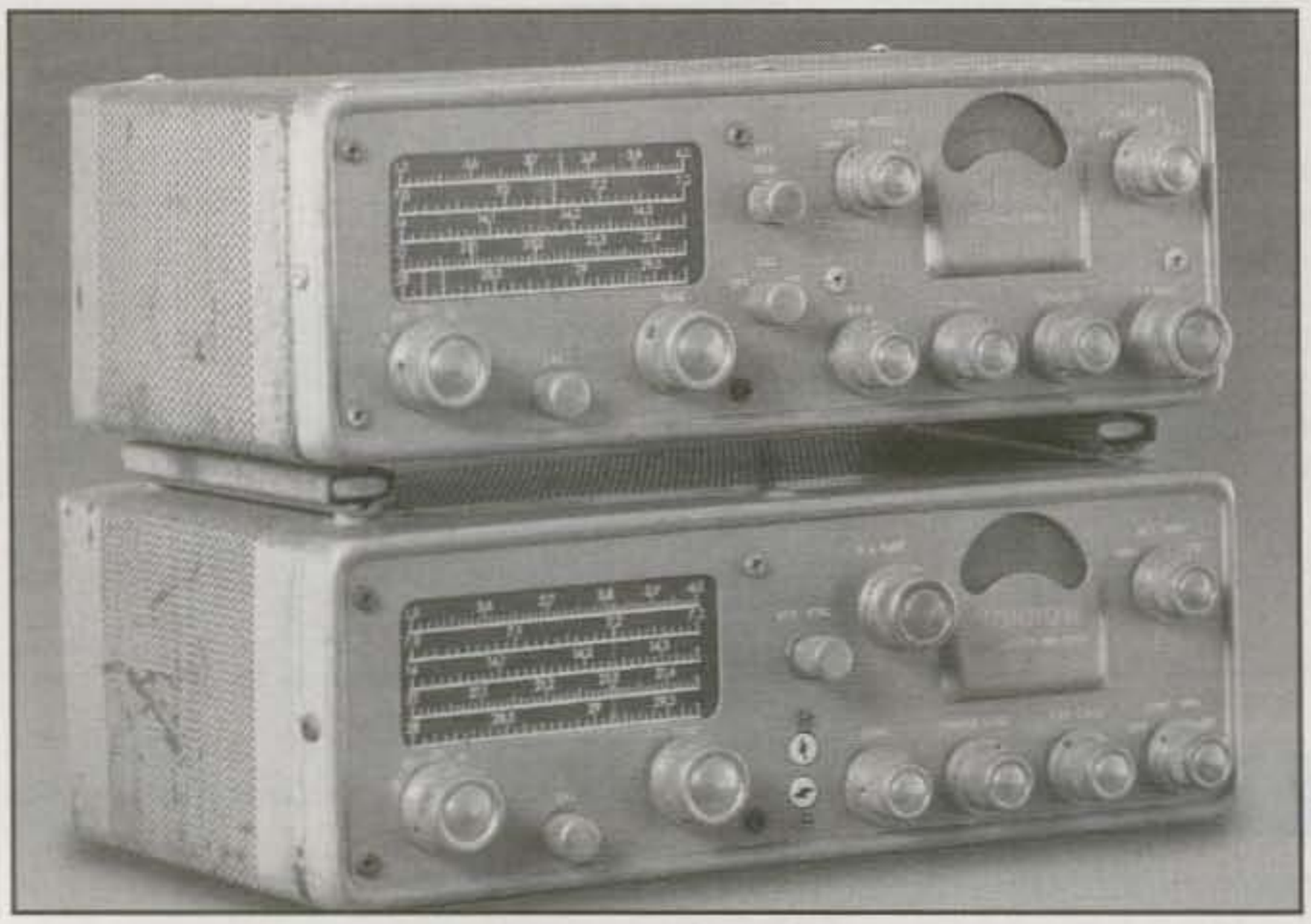

Photo 3– Morrow MB-5 & MB-560-A. Morrow's twins provided a compact station for home or mobile use. ←

controlled MB-560-A transmitter covered 80–10 meters. Power output was 50 watts with a 6146 final on 80–15, slightly less on 10. Morrow debuted the 560 in 1955, but changed the tube line-up and designation to the MB-560-A a year later. Its price, less power supply, was $214.50. Morrow remained in business until 1962.

Perhaps the most astonishing thing to make an appearance in the mobile station was Regency's ATC-1 converter. It covered 80–10 meters, was fully transistorized, ran on three penlight batteries, and hit the market in *1957*! The first time I saw one I was still a Novice, and even a regular old broadcast-band transistor radio was quite a novelty. Little did I realize I would be spending my weekends nearly fifty years later poking around ham radio flea markets hunting for radios with *tubes* in them. The ATC-1, the subject of photo 4, cost $79.50.

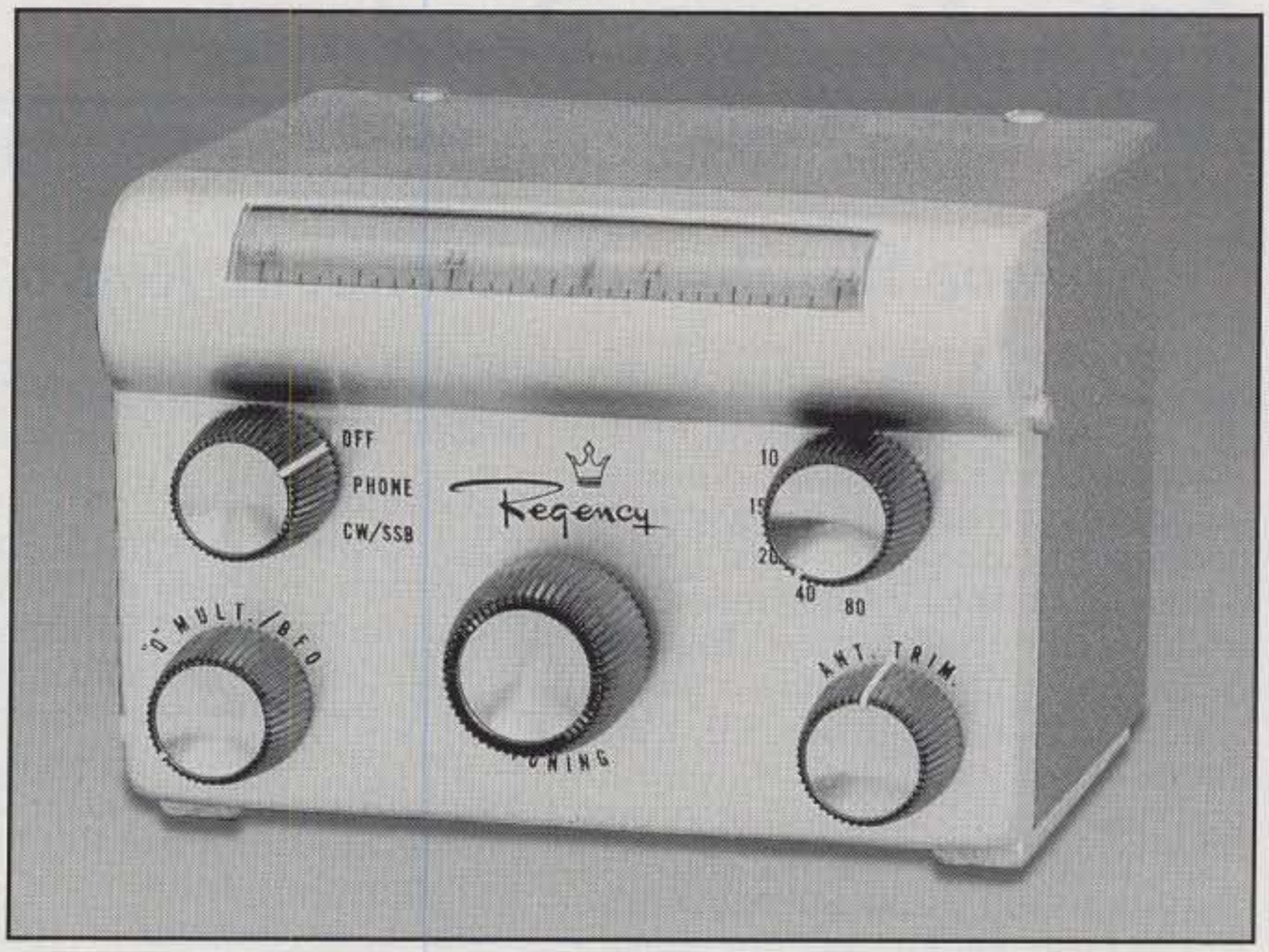

Photo 4– Regency ATC-1. Regency's all-transistor, 80–10 meter converter was an ahead-of-its-time mobile accessory in 1957.

Mobile Antennas

Not every area of mobile operation has experienced dramatic change. Despite all the stories beginning "Once upon a time," the laws of physics have not been repealed and basic antenna theory is still valid. Amateurs of the 1950s lacked computer-modeling programs, and computers for that matter, but they seem to have had a firm grasp on what worked. Reports of "miniature miracle" antennas were scarce. Common-sense designs such as the Webster Bandspanner and Master Mobile, or their homebrew equivalents, predominated. Two decades later, in the '70s, nonsense and fable seemed to penetrate even the amateur ranks during the CB craze. Digging through ham literature of the 1950s, I failed to find a single instance of a mobile op who mounted two antennas for the same HF band on the back of his car and tried to phase them for pattern or gain advantage. Unless your on-the-air conversation is sprinkled with colorful phrases such as "What's Yer Twenty? – Come Back," I suggest you don't either.

Finding a place to put the antenna was a simpler task in the old days. Cars were made out of real metal. Except for the stunning Chevrolet Corvettes, which first appeared in 1953, there was no plastic and certainly no carbon fiber. Bumpers were made for mounting antennas, not for absorbing 5 mile-per-hour collisions. They were chrome-plated, steel, bolted-to-the-frame, and rock solid. The old bumpers were also quite handy for those who preferred to park by ear rather than by the traditional method taught in driver's ed class.

Gonset 2 meter Communicator

Mobile radio today most often means VHF, FM, and repeaters. Was there a 1950s counterpart? Yes and no. No repeaters, and not much FM, but Gonset's original 2 meter Communicator made its appearance in 1953 ready for mobile operation. The self-contained unit housed a crystal-controlled transmitter capable of 5–7 watts of AM output and a receiver with a tuning range from 144–148.3 MHz. The internal power supply operated from either 6 volts DC or 115 volts AC. It sold for $209.50.

In Closing . . .

All of the equipment in this month's cruise through mobile operation in the '50s is AM gear. Of course, the Collins landmark KWM-1 mobile sideband transceiver arrived on the scene in 1957, and there were others before the decade was out. For the most part, however, AM remained the dominant mode during this time period. Even though a great deal of mobile gear was produced, by both large and small companies, space allows me to mention only a few pieces in this column. In a way, I feel neglectful . . . as if I have failed to show you all the photos of my grandchildren I carry around in my wallet. I'm sure we can drive down this road again sometime, though.

As always, I'm indebted to those supplying equipment for the photographs. The Elmac A-54 belongs to Jimmy Long, W4ZRZ. Herman Cone, N4CH, owns the Regency ATC-1, Gonset Super 6, and the Morrow twins. Thanks, guys!

Spring should have made an appearance nearly everywhere by the time this column appears. As I write it, though, we are experiencing the final stages of a dreary, drizzly Alabama winter . . . a great time to catch up on one's reading. A book I've enjoyed recently and recommend to you is Ben Stearns' excellent biography *Arthur Collins, Radio Wizard*. Mr. Stearns worked for the Collins Radio Company and later the Collins Radio Group of Rockwell International. Much of that time he held the position of Public Relations Manager. His unique insight into the life and personality of Art Collins, and the workings of the company, make reading this book a valuable experience. It is available from the author on the web at: <www.artcollinsradiowiz.com> or by telephone: 1-888-542-6149.

Speaking of websites, you might like to check out my own at <www.n4qb.com>. Besides things about vintage radio, I feature stuff about some of my other interests. (*What?!* You don't spend 24 hours a day thinking about ham radio? Well . . . Noooo). Thanks also, more than I can express, to those of you who have e-mailed, written, and called with concern about my driving misfortune. I'm feeling much better. In fact, with May coming up on the calendar, I'm looking forward to seeing many of you at Dayton.

73, Joe, N4QB

Washington Readout

BY FREDERICK O. MAIA, W5YI

Regulatory News In The World Of Amateur Radio

Europe Weighs in on Amateur Radio Issues before WRC-2003

Last month we looked at the process by which the U.S. reaches its official positions on amateur-radio-related matters likely to be considered at next year's World Radiocommunication Conference. Preliminary proposals from Europe's regional telecommunications organization put forth a slightly different, and in some cases more radical, view of changes needed in the international rules for amateur radio. Among these are a provision giving a stronger position to countries that wish to retain a Morse Code requirement for HF licensing and a proposal to re-align the 40 meter band to 6950– 7250 kHz, with 7000–7200 exclusive worldwide amateur frequencies and the bottom and top 50 kHz segments shared with fixed and land-mobile services (but not with broadcasting). Details follow...

A Regional Telecommunications Organization—What is it?

The various countries of the world are busily working toward arriving at their positions on the agenda items for the upcoming World Radiocommunication Conference (WRC) to be held in Caracas, Venezuela from June 9 to July 4, 2003. The ITU (International Telecommunications Union) WRC-2003 agenda includes a number of items of direct interest to the amateur radio community.

There are dozens of specialized telecommunications organizations promoting the needs of various interests such as aviation, broadcasting, maritime, satellite, and other radiocommunication services, including amateur radio. Ham radio interests are represented by the International Amateur Radio Union (IARU), a federation of national amateur radio societies.

Many countries are also formed into Regional Telecommunications Organizations to facilitate the development of telecommunications in their geographical areas. By agreeing on the text and voting as a bloc, they feel they have a better ability to influence the outcome of a vote. The primary regional organizations are:

ITU Region 1 – CEPT

European Conference of Postal and Telecommunications Administrations. David Hendon, Chief Executive of the United Kingdom's Radiocommunications Agency, is the President of CEPT. Region 1 includes Europe, Africa, ex-USSR countries, Middle East (excluding Iran, which is in ITU Region 3), and Mongolia.

CEPT, established in 1959 by 19 countries, has now expanded to 44 Member States essentially covering the whole geographical area of Europe. It represents a large and very powerful bloc of nations.

ITU Region 2 – CITEL

Inter-American Telecommunications Commission. The chairman is Marc Girouard of Canada. Region 2 includes North, Central, and South America, including Hawaii, Johnston, and Midway Islands.

CITEL has 34 Member States (including the United States) and over 200 Associate Members from the private sector. It operates under the auspices of the Organization of American States (OAS) with headquarters in Washington, DC. Its goal is to further telecommunications in the Americas.

ITU Region 3 – APT

Asia-Pacific Telecommunity. The chairman is R. N. Agarwal of India. Region 3 includes the rest of Asia and Oceania. Established in 1979, the Asia-Pacific Telecommunity with 31 Member States is a treaty-based regional communications development cooperation organization whose membership includes most of the governments of the Asia-Pacific region. It is headquartered in Bangkok, Thailand.

CEPT Meeting Held in Oslo, Norway

A Conference Preparatory Group (CPG) meeting for WRC-2003 (CPG03) held by the CEPT between February 19 and 22, 2002 resulted in a 184-page document outlining various European preliminary positions on issues before WRC-2003.

CEPT's CPG is the working group charged with developing a coordinated European position (called a *European Common Proposal,* or ECP) for WRCs.

The following briefs and ECPs on WRC-2003 Agenda Item No. 1.7 and 1.23 were approved. (Some text has been edited for space and clarity.)

Agenda item 1.7 – to consider issues concerning the amateur and amateur-satellite services

1.7.1 possible revision of Article S25; Issue

The current content of Article S25 does not fully reflect the nature of the radio amateur service as we know it today. Accordingly the requirements of operational and technical skills of persons seeking to obtain a radio amateur license need to be updated. Also some other provisions of S25 need to be streamlined.

The mandatory requirement for testing of Morse code skill for those seeking to operate an amateur station below 30 MHz is expected to be the central topic of this agenda item. Morse code skill is nowadays not required in any other service. Therefore provisions should be made in S25 so that administrations may waive the mandatory Morse code requirement.

Preliminary CEPT position

[1. Morse Code:] In order to give administrations the possibility to waive the requirement for mandatory Morse code testing of those seeking to operate an amateur station below 30 MHz CEPT should propose a modification of S25.5 with the following text: Administrations shall determine whether or not a person seeking a license to operate an amateur station shall prove that he is able to send and receive correctly texts in Morse code signals. However there is still a need to verify the technical and operational qualifications of persons seeking to obtain a radio amateur license.

Editor's Note: *It is rumored that CEPT included a method in which a demonstration of Morse code proficiency could still be required, since the Russian Federation is against removal of the Morse code examination requirement.*

[2. Other issues:] Article S25 further contains a number of texts that were developed in the early days of radio communications. Several of these texts are not required any more. CEPT proposes modifications in particular for the following issues:

S25.1 – the prohibition of international amateur communications and its notification to the ITU by an administration;

S25.2 and addition of S25.2.A – the con-

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Is your CW rusty? MFJ-461 **$79.95**

Relax and place this tiny pocket size MFJ Morse Code Reader near your receiver's speaker . . .

Then watch CW turn into solid text messages as they scroll across an easy-to-read LCD display.

No cables to hook-up, no computer, no interface, nothing else needed!

Use it as a backup in case you mis-copy a few characters - - it makes working high speed CW a breeze - - even if you're rusty.

Practice by copying along with the MFJ-461. It'll help you learn the code and increase your speed as you instantly see if you're right or wrong.

Eavesdrop on interesting Morse code QSOs from hams all over the world. It's a universal language that's understood the world over.

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MFJ *AutoTrak*™ automatically locks on, tracks and displays CW speed up to 99 Words-Per-Minute.

Simply place your MFJ-461 close to your receiver speaker until the lock LED flashes in time with the CW.

Four Display Modes

1. Bottom line scrolls and fills with text, then that entire line is displayed on top line until bottom line refills -- makes reading text extra easy! Automatically displays speed in WPM.

2. Same as **1**, without speed display -- gives you maximum text display.

3. Top line scrolls, bottom line displays speed in Words-Per-Minute.

4. Both top and bottom lines scroll.

Two-line LCD display has 32 large 1/4 inch high-contrast characters.

MFJ Instant Replay

The last 140 characters can be instantly replayed. This lets you re-read or check your copy if you're copying along side the MFJ-461.

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Consistently get solid copy from MFJ's high performance *PLL* (*phase-lock loop*) modem. Digs out weak signals. Even tracks slightly drifting signals.

Of course, nothing can clean up and copy a sloppy fist, especially weak signals with lots of QRM/QRN.

Computer Interface

The MFJ-461's serial port lets you display CW text full screen on a bright computer monitor -- just use your computer serial port and terminal program.

More Features

When it's too noisy for its microphone pickup, you can connect the MFJ-461 to your receiver with a cable.

Battery saving feature puts MFJ-461 to sleep during periods of inactivity. It wakes up and decodes when it hears CW.

Uses 9 Volt battery (not included).

True Pocket Size

Fits in your shirt pocket with room to spare - smaller than a pack of cigarettes. Tiny 2¼x3¼x1 in. 5½ ounces.

No Instruction Manual needed!

Super easy-to-use! Just turn it on -- it starts copying instantly!

Accessories

MFJ-26B, $4.95. Soft leather protective pouch. Clear plastic overlay for display, push button opening, strong, pocket/belt clip secures MFJ-461.

MFJ-5161, $14.95. MFJ-461 to computer serial port cable (DB-9).

MFJ-5162, $5.95. Receiver cable connects MFJ-461 to your radio's external speaker 3.5 mm jack.

MFJ *Pocket* Morse Tutor

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Learn Morse code anywhere with this tiny *MFJ Pocket-sized Morse Code Tutor*™! Practice copying letters, numbers, prosigns, punctuations or any combination or words or QSOs. Follows ARRL/VEC format. Start at zero code speed and end up as a high speed *CW Pro!* LCD, built-in speaker.

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...jects to the pro-
...incorporation of ITU-R
...erence. An ECP *[European
...n Proposal]* has been developed to
...lect the CEPT position.

Background

a) Morse code – Two years before WRC-97 administrations all over the world were approached with a request that the mandatory requirement of Morse code skill for radio amateurs should be removed. The same proposal was renewed before WRC-2000.

At the time of WRC-97 the radio amateur

...de requirement. However,
...paring the agenda for WRC-2003,
...supported the proposal that revision of Article S25 should be on the agenda.

The CEPT proposal to remove the mandatory requirement of Morse code skill does not mean that the use of Morse code as a means of communication should be abolished. It is expected that even after the removal of this requirement many amateurs will continue to use Morse code.

b) Other changes to S25 – The existing text of S25.1 may be considered to be unnecessary. In the past a number of administrations have notified the ITU that they do not allow radio amateurs to communicate with radio amateurs of other countries. However, such countries have afterwards issued licenses for radio amateurs who are allowed to establish contact with foreign amateurs. been abrogated, probably simply because they were forgotten.

CEPT considers that if a country wishes to prohibit international communications from its own radio amateurs, that can be done solely by the decision of that administration, and the support of the Radio Regulations is not needed. The same relates to the international third party communications mentioned in S25.3.

For these reasons CEPT proposes the suppression of S25.1 and S25.4. A modification to S25.3 is further proposed so that an amateur station may be used for transmitting [international] communications on behalf of third parties unless prohibited by the administration concerned.

The term "plain language" used by S25.2 is confusing nowadays because "plain language" does not seem to cover the use of different digital codes and protocols. A modification to S25.2 and an addition (S25.2.A) are intended to clarify this issue. The text in S25.2.A enables administrations to allow encoding of transmissions to meet a particular operational need. Such operational needs may occur when amateur stations are taking part in emergency communications on behalf of national authorities. Encoding is also needed when controlling amateur satellites.

The IARU has proposed that S25.6 should incorporate by reference recommendation ITU-R M.1544. CEPT should not support such a mandatory reference to ITU-R M.1544. CEPT may consider to propose the following text added to the present S25.6:

[The operational and technical qualifications may be verified taking into account the conditions under which the amateur station is going to be operated and the guidelines on theoretical knowledge in the most recent version of recommendation ITU-R M.1544.]

CEPT proposes to remove the S25.7 dealing with the maximum power of radio amateur stations. CEPT considers that it is up to national administrations to set the power levels for its radio amateur stations. CEPT also proposes to remove S25.8 dealing with frequency stability and spurious emissions.

Radio amateurs have contributed successfully to disaster mitigation communications. In order to encourage the training and abilities of radio amateurs for such events, CEPT proposes the addition of a new regulation S25.9.A.

1.7.2 – review of the provisions of Article S19 concerning the formation of call signs in the amateur services in order to provide flexibility for administrations; Issue

Article S19 limits the issuance of amateur call signs. For example, S19.49 prohibits certain call sign combinations commencing with a digit. S19.68 is also considered too restrictive as it does not allow administrations to issue special call sign combinations for special occasions.

Preliminary CEPT position

• Suppress S19.49. This would remove the restriction for some country identifiers.

• Modification to S19.68 to allow four trailing characters in amateur radio call signs.

• Further an addition to S19.69 (S19.69.A) is proposed to allow administrations to waive the requirement for not more than four trailing characters in special occasions.

• Addition of S19.82A to cover the identification of amateur and experimental stations using radiotelephony.

Background

Many administrations have occasionally issued temporary call signs that are not in accordance with the Radio Regulations, e.g. QQ2000ZZZ. CEPT proposes to modify S19.68, to allow four trailing characters. This would expand the number of possible call sign combinations considerably in routine call signs. Nevertheless, the call sign type QQ2000ZZZ would still not be allowable. The addition of S19.69A allows the temporary use of more than four trailing characters in special occasions such as international or national championships, conferences, anniversaries, celebrations, etc. One example is the millennium change to year 2000. The word *temporary* should be regarded to mean not more than one year.

CEPT proposes to add S19.82A regarding the insertion of amateur and experimental stations into section IV (identification of stations using radiotelephony). Apparently amateur and experimental stations have been missing from this section because of omission.

Draft ECP on Agenda Item 1.7 – Amateur Services

Source: document CPG03(2002)09

DRAFT
EUROPEAN COMMON PROPOSALS
ARTICLE 25
Amateur services
Section I – Amateur service

To be eliminated (Suppressed).

25.1 § 1 Radiocommunications between amateur stations of different countries shall be forbidden if the administration of one of the countries concerned has notified that it objects to such radiocommunications.

25.2 § 2 1) Transmissions between amateur stations of different countries shall be limited to messages conforming to amateur service activities as defined in No. S1.56.

25.2.A 2) Transmissions between amateur stations shall not be encoded for the purpose of obscuring their meaning, except with the authority of the relevant administration granted to meet a particular operational need.

25.3 3) An amateur station may be used for transmitting [international] communications on behalf of third parties unless prohibited by the administration concerned.

To be eliminated (Suppressed).

25.4 3) The preceding provisions may be modified by special arrangements between the administrations of the countries concerned.

25.5 § 3 1) Administrations shall determine whether or not a person seeking a license to operate an amateur station shall prove that he is able to send correctly texts in Morse code signals.

25.6 2) Administrations shall take such measures as they judge necessary to verify the operational and technical qualifications of any person wishing to operate the apparatus of an amateur station. [The operational and technical qualifications may be verified taking into account the conditions under which the amateur station is going to be operated and the guidelines on theoretical knowledge in the most recent version of recommendation ITU-R M.1544.]

Editor's Note: *Both France and Sweden wanted the above section in brackets deleted since it might be interpreted that these guidelines represent a firm obligation in some countries.*

To be eliminated (Suppressed).

25.7 § 4 The maximum power of amateur stations shall be fixed by the administrations concerned, having regard to the technical qualifications of the operators and to the conditions under which these stations are to operate.

25.8 § 5 1) All the general rules of the Constitution, the Convention and of these Regulations shall apply to amateur stations. In particular, the emitted frequency shall be

6.950–7.500 MHz – Allocation to Services		
Region 1	**Region 2**	**Region 3**
6.950–7.000 MHz (All ITU Regions)	Amateur Fixed Land Mobile	— — —
7.000–7.200 MHz (All ITU Regions)	Amateur Amateur Satellite	— —
7.200–7.250 MHz (All ITU Regions)	Amateur Fixed Land Mobile	— — —
7.250–7.500 MHz (All ITU Regions)	Broadcasting	—

Table I– CEPT envisions the above 7 MHz allocations to the Amateur and Shortwave Broadcasting services.

as stable and as free from spurious emissions as the state of technical development for such stations permits.

25.9 2) During the course of their transmissions, amateur stations shall transmit their call sign at short intervals.

25.9.A Administrations are advised to take the necessary steps to allow amateur stations to prepare for and meet communication needs in the event of a disaster.

Section II – Amateur-satellite service

25.10 § 6 The provisions of Section I of this Article shall apply equally, as appropriate, to the amateur-satellite service.

25.11 § 7 Space stations in the amateur-satellite service operating in bands shared with other services shall be fitted with appropriate devices for controlling emissions in the event that harmful interference is reported in accordance with the procedure laid down in Article 15. Administrations authorizing such space stations shall inform the Bureau and shall ensure that sufficient earth command stations are established before launch to guarantee that any harmful interference which might be reported can be terminated by the authorizing administration (see No. 22.1).

40 Meter Realignment

Revised draft CEPT Brief on
WRC-03 agenda item 1.23

Agenda item 1.23: To consider realignment of the allocations to the amateur, amateur-satellite and broadcasting services around 7 MHz on a worldwide basis, taking into account Recommendation 718 (WARC-92).

Issue

This allocation and compatibility problem remains unresolved for decades. The ITU Recommendation 718 itself has already been awaiting implementation for 9 years. There is a need to satisfy this Recommendation and reasons stated therein such as different allocations in ITU Regions, large disparity in power levels between amateur and broadcasting services and consequential incompatibility. In addition, other reasons are:

- to meet the ITU objective of harmonization of allocations on a world-wide basis;
- to ensure globally harmonized, satisfactory spectrum access around 7 MHz for the amateur, broadcasting, fixed and mobile services;
- to remove the long lasting uncertainty concerning the future of this part of the spectrum, to facilitate planning and efficient spectrum utilization and to prevent proliferation of provisional solutions under RR No 4.4.

Preliminary CEPT Position

1. CEPT supports the realignment. The realignment should involve the minimum necessary shift in allocation blocks in order to limit the economic impact on users.

2. The sharing of frequency bands by amateur and broadcasting services on a regional or inter-regional basis is undesirable and should therefore be avoided.

3. CEPT supports a globally harmonized allocation of 300 kHz to the amateur service that could partly be shared with the fixed and land-mobile services.

4. CEPT supports a globally harmonized allocation of a block of 250 kHz to the broadcasting service.

5. CEPT supports the view that consequential changes in the allocations around 7 MHz shall take into account the need of the fixed and mobile services operating in this frequency range and shall be made only on a balanced basis between all services involved in the process. Within this process, the upgrading of the secondary land mobile service to a primary status should also be considered.

Background

The historically harmonized allocations around 7 MHz suffered from rapidly growing political tensions at the Cairo 1938 Conference and these have been arranged differently in ITU Regions. This caused loss of spectrum by the amateur service in Regions 1 & 3 and led to interregional incompatibility between services. Further differences arose at the Atlantic City 1947 Conference. Attempts for harmonization at WARC-79 and WARC-92 failed to solve this problem to the satisfaction of any service. There is an existing incompatibility problem reflected in Recommendation 718 (WARC-92) and Resolution 641, and unsatisfied spectrum requirements.

The present spectrum situation around 7 MHz is highly unsatisfactory. To satisfy this agenda item, elements below shall be taken into consideration:

- inadequate amount of spectrum available to the amateur service in Regions 1 & 3;
- incompatibility between the amateur service in Region 2 and the broadcasting service in Regions 1 & 3 between 7100 and 7300 kHz;
- inadequate amount of spectrum for the broadcasting service in

the range 4–10 MHz in general including an inadequate amount of spectrum for the broadcasting services around 7 MHz in ITU Region 2;

· the "generic" fixed/mobile spectrum requirements of governmental users in the range 4–12 MHz, including the importance of land-mobile service for military use.

The fixed, land mobile and amateur allocations around 7 MHz support many important activities, including those with a humanitarian and disaster relief dimension. The characteristics of these services are such that some sharing of allocations may be feasible. The needs of the broadcasting service should also be respected.

The amateur community stated its requirement as 300 kHz globally harmonized exclusive allocation, preferably 7000–7300 kHz; it is also inclined to accept partial shift of allocation, not excluding some sharing, to facilitate the realignment process. This requirement is stimulated by the ongoing process of relaxing the Morse-code proficiency requirement (inter alia CEPT REC T/R61-02) and consequential large increase in amateur population entitled to use HF bands.

The continued feeling of dissatisfaction at the provisional character of the spectrum situation around 7 MHz does not motivate users towards effective long range spectrum planning. It also triggers interim provisional solutions, such as local arrangements under No. S4.4 that could complicate the implementation of future realignment.

Based on WARC-79 & WARC-92 experience and the global nature of the issue, the widest possible consensus prior to WRC-03 is essential. There are ongoing studies in response to Recommendation 718 (WARC-92) in both ITU-R (SG8 & SG6), CEPT (WGFM PT40) and Regions 2 & 3. Progress of these studies is promising.

From these studies it can be derived that:

1. Any solution requiring sharing of spectrum between amateur and broadcasting services is not desirable, since experience has shown that this is unacceptable in the long run;

2. Some movement in frequency of the allocation to the amateur services around 7 MHz may be acceptable;

3. A reduction of the amount of contiguous spectrum allocated to the broadcasting service in the 7 MHz band is unacceptable to broadcasters, but there is flexibility with regard to theactual location of this band, taking due account of the availability of receivers for the broadcasting service;

4. Attention should be given to the spectrum requirements of the land-mobile service below 7 MHz;

5. The band 6 765–7 000 kHz has been identified as essential for supporting fixed service operations of all types;

6. Sharing between the amateur service and the fixed and mobile services is feasible;

7. The realignment should involve the minimum necessary shift in allocation blocks in order to limit the economic impact on users;

8. Dynamic frequency sharing or real time frequency management is a useful tool for providing communication circuits that are not otherwise possible because of interference constraints.

[The frequency realignment around 7 MHz will inevitably result in changes to the allocations for the broadcasting, fixed and mobile services in the range 6–8 MHz. In order to make the changes acceptable to these services, and to ensure an orderly transition, an implementation date needs to be defined such that the majority of the changes can be accommodated within the normal timescales applied to the maintenance and renewal of equipment and infrastructure. There will also be substantial implications regarding receiver design. Without making any assumptions of the location and extent of the broadcasting band above 7 300 kHz, it is clear that many receivers will no longer provide adequate tuning coverage for the new broadcasting band. The present circumstances do however provide a perfect opportunity to associate the band allocation changes with the advancement of digital modulation techniques for broadcasting. Although modern transmitters can be adapted to accommodate digitally modulated emissions, this is not possible for modern receivers—meaning that owners will have to consider replacement.]

CEPT envisions the following 7 MHz allocations to the Amateur and Short Wave Broadcasting Services (see Table I).

What is the Overall Impact?

With CEPT on board for the elimination of the international code requirement (with or without language making it easier for individual countries to retain it), there is very little question about the general course of that issue. Plus, the CEPT position on 40 meters may draw considerable support from amateurs in Regions 1 and 3, who currently have only 100 kHz. Here in Region 2, we may lose 100 kHz of theoretical exclusivity, but we'll gain 100 kHz of real space on which to communicate with our fellow hams in the rest of the world.

At the World Radiocommunication Conference next year, each country gets one vote, regardless of its size or population. CEPT represents 44 countries in Europe, and its positions therefore will carry a great deal of weight. Nothing is cast in stone prior to the conference, however, and it is a virtual certainty that there will be plenty of negotiating and wheeling-and-dealing as different countries and groups of countries try to get support for their various positions. There will also almost certainly be "swapping" of positions—we'll support your view on this issue if you support ours on this other issue—so the specifics won't be clear until the final votes are taken. 73, Fred, W5YI

Public Service

BY BOB JOSUWEIT, WA3PZO

Public Service and Emergency Communications

The Message . . .

Over the past few months we have written about the versatility of the Amateur Radio Service. The Amateur Radio Service has justified its frequencies and the right to put up large antennas by (1) engaging in experimentation that has advanced the radio state-of-the-art, (2) providing emergency communications in times of natural or man-made disasters, (3) providing trained radio operators in times of national emergencies, and (4) encouraging international cooperation and goodwill by allowing direct communications between and among people on an international basis. Today, the important thing is that they actually be carried out. As Dale N. Hatfield, WØIFO, Chief, Office on Engineering and Technology, Federal Communications Commission, said two years ago, it will be even more important for all segments of the amateur community to "walk the walk" not just "talk the talk."

If you haven't been involved with public-service events, this may be the time to do so. The spring season generally sees amateur radio groups providing communications for a variety of walk-athons, bike races, and other community events. You may be interested in helping out with emergency communications. If your area doesn't have an active ARES or RACES group, look into the Citizen Corps. In the first six weeks more than 18,000 people registered via their website <http://www.citizencorps.gov>. Many Americans heard and are responding to President Bush's call to volunteer for two years. Many of the programs are operating in some communities. Some of the programs are expanding nationwide and adding elements that will support the goal of reducing the threat of terrorism.

The Neighborhood Watch program kicked off its expansion efforts in March. The Community Emergency Response Team (CERT) Train-the-Trainer courses are scheduled to be rolled out this month. Others will be launched in August. According to a Citizens Corps newsletter, "You can call your local sheriff's department or emergency management office and ask them about bringing these programs to your community. You can even offer to volunteer to help get them started!"

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

What Makes Hams Unique?

The simple answer is that amateur radio operators are trained communicators. We have the ability to get a message to its destination from just about anywhere and in just about any circumstances. We can get a radio signal around the corner or around the world. Some amateurs would define efficiency as being able to make five QSOs in a minute, exchange a contact number, a signal report, and grid square or zone. Others would consider it efficient to get the location of an accident passed on to a net control station in as few words as possible. Each group would be correct, depending on the type of event in which you are participating.

Important, although informal, messages are passed during a race. (Photo by Ron Notarius, WN3VAW)

Common Messages

There are several types of messages that amateurs are asked to pass to other stations. Let's take a look at them and define the differences and similarities.

Greetings. Every time we pick up the microphone we are conveying a message to the other person—a simple "Hello! My name is Bob," and at the end a final "73."

Parades and "A-thons." At a basic level radio operators are stationed along the route of the parade, the walk-a-thon, or the marathon, reporting who is in the lead and if there are any problems or needs along the route. Most of the messages are sent to the event coordinator reporting the progress of the event. Here the event coordinator may keep a running log of who the lead runner is or what time a runner passed a street intersection. There may be a request for additional supplies at a certain check point. If there is a request for supplies, make sure you indicate who is making the request; this could be the check-point manager or other race official.

Search-and-Rescue type missions. These events involve both on-foot and mobile stations. Message traffic involves reports of location and results of searches. Here it is important for a net control station or someone who is able to monitor the radio traffic to keep a running log of what information is being passed, and in the case of an official request, indicate who made it.

Shelter or Emergency Operations Center. Here the messages tend to be more formal in nature. Whether they follow the ARRL National Traffic System format or a local emergency management format, all messages tend to have the same basic information. The message should contain:

- A message or record number for reference.
- A precedence indicating the importance of the message. This could be routine, priority, or emergency.
- A station of origin so that any replies can be referred to that station.
- A place of origin so that the receiving station will know where the message came from. This could be the county emergency operations center or the local school being used as a shelter.
- Finally, there is a time and date of origin. The time is important in an emergency situation so that events can be put in a proper sequence.

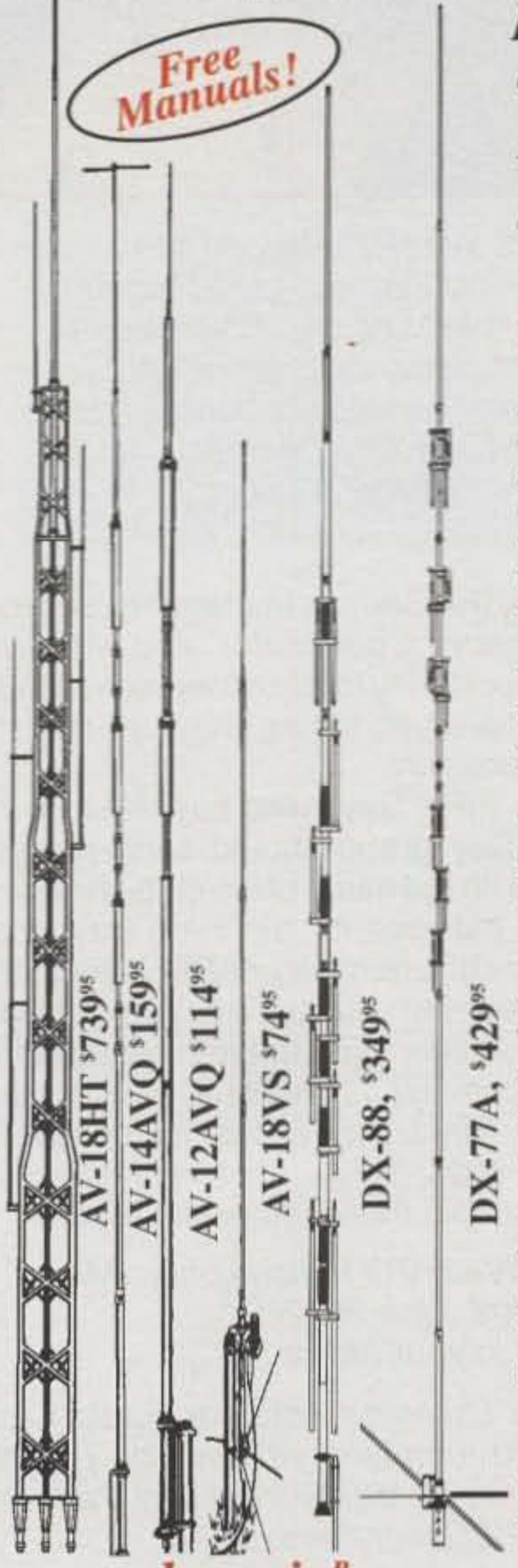
In many cases various groups have created standardized message forms which involve check boxes or specific message formatting to make message copying and handling easier.

Don't Speculate!

When it comes to emergency or official messages, make sure you have the correct information. This is not the time to speculate or guess if you wrote down a message correctly. The difference between 100 and 1000 units is a lot. Just think how easy it is to put 100 bottles of

hy-gain HF VERTICALS...

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



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All hy-gain multi-band vertical antennas are entirely self supporting -- no guys required.

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

All handle 1500 Watts PEP SSB, have low SWR, automatic bandswitching (except AV-18VS) and include a 12-inch heavy duty mast support bracket (except AV-18HT).

Heavy duty, slotted, tapered swaged, aircraft quality aluminum tubing with full circumference compression clamps is used for radiators. Includes all stainless steel hardware. Recessed SO-239 prevents moisture damage. Hy-gain verticals go up easily with just hand tools and their cost is surprisingly low. Two year limited warranty.

AV-18HT, $739.95. (10, 12, 15, 20, 40, 80 Meters, 160 Meters optional). 53 ft., 114 lbs.

Standing 53 feet tall, the famous *Hy-Gain HyTower* is the world's best performing vertical! The AV-18HT features automatic band selection achieved through a unique stub-decoupling system which effectively isolates various sections of the antenna so that an electrical 1/4 wavelength (or odd multiple of a 1/4 wavelength) exists on all bands.

Approximately 250 kHz bandwidth at 2:1 VSWR on 80 Meters. With the addition of a base loading coil (LC-160Q, $99.95), it also provides exceptional 160 Meter performance.

The 24 foot tower is all rugged, hot-dip galvanized steel and all hardware is iridited for corrosion resistance. Special tilt-over hinged base for easy raising and lowering.

AV-14AVQ, $159.95. (10,15,20,40 Meters). 18 ft., 9 lbs. The Hy-Gain AV-14AVQ uses the same trap design as the famous Hy-Gain Thunderbird beams. Three separate air dielectric Hy-Q traps with oversize coils give superb stability and 1/4 wave resonance on all bands. Roof mount with Hy-Gain AV-14RMQ kit, $79.95.

AV-12AVQ, $114.95. (10, 15, 20 Meters). 13 ft., 9 lbs. The AV-12AVQ also uses Thunderbird beam design air dielectric traps for extremely Hy-Q performance. This is the way to go for inexpensive tri-band performance in limited space. Roof mount with AV-14RMQ kit, $79.95.

AV-18VS, $74.95. (10,12,15,17,20,30,40,80 Meters). 18 ft., 4 lbs. High quality construction and low cost make the AV-18VS an exceptional value. Easily tuned to any band by adjusting feed point at the base loading coil. Roof mount with Hy-Gain AV-14RMQ kit, $79.95.

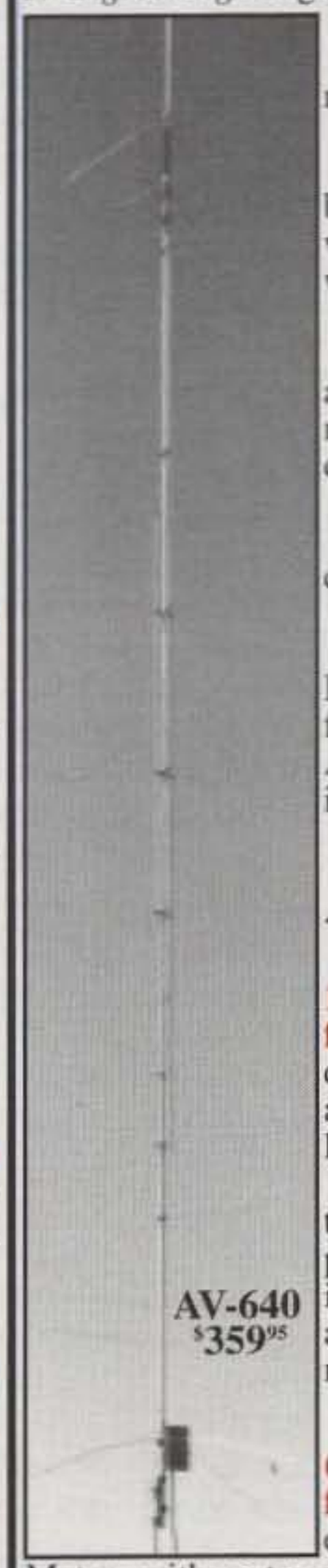
DX-88, $349.95. (10, 12, 15,17,20,30,40,80 Meters, 160 Meters optional). 25 ft., 18 lbs. All bands are *easily* tuned with the DX-88's *exclusive* adjustable capacitors. 80 and 40 Meters can even be tuned from the ground without having to lower the antenna. Super heavy-duty construction. DX-88 OPTIONS: 160 Meter add-on kit, KIT-160-88, $179.95. Ground Radial System, GRK-88, $81.95. Roof Radial System, RRK-88, $89.95.

DX-77A, $429.95. (10, 12, 15, 17, 20, 30, 40 Meters). 29 ft., 25 lbs. *No ground radials required!* Off-center-fed Windom has 55% greater bandwidth than competitive verticals. Heavy-duty tiltable base. Each band independently tunable.

Model #	Price	Bands	Max Power	Height	Weight	Wind Surv.	Rec. Mast
AV-18HT	$739.95	10,15,20,40,80	1500 W PEP	53 feet	114 pounds	75 MPH	------
AV-14AVQ	**$159.95**	**10,15,20,40**	**1500 W PEP**	**18 feet**	**9 pounds**	**80 MPH**	**1.5-1.625"**
AV-12AVQ	$114.95	10/15/20 M	1500 W PEP	13 feet	9 pounds	80 MPH	1.5-1.625"
AV-18VS	**$74.95**	**10 - 80 M**	**1500 W PEP**	**18 feet**	**4 pounds**	**80 MPH**	**1.5-1.625"**
DX-88	$349.95	10 - 40 M	1500 W PEP	25 feet	18 pounds	75 mph no guys	1.5-1.625"
DX-77A	**$429.95**	**10 - 80 M**	**1500 W PEP**	**29 feet**	**25 pounds**	**60 mph no guys**	**1.5-1.625"**

hy-gain[R] PATRIOT

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



No ground or radials needed

Effective counterpoise replaces radials and ground.

Automatic bandswitching

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

Sleek and low-profile

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

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Handles 1500 Watts key down continuous for two minutes.

Built-to-last

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

hy-gain[R] warranty

Two year limited warranty. All replacement parts in stock.

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

AV-620, $269.95. (6,10,12,15,17,20 Meters). 22.5 ft., 10.5 lbs. The AV-620 covers all bands 6 through 20 Meters with no traps, no coils, no radials yielding an uncompromised signal across all bands.

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Often an operator can be overcome by the devastation caused by a disaster. It's important to pass the message in a clear and concise manner. (FEMA photo by Liz Roll)

CQ's WA3PZO helped carry the Olympic Flame to Lake Placid for the 1980 Winter Olympics. In 2002 hams helped with public-safety communications at the Salt Lake City Olympic Games. (WA3PZO photo)

water in a car, but you might need a small truck to carry 1000 bottles.

Remember, many people may be listening to what you are saying. Any speculation or incorrect information might cause unnecessary concern or panic.

If you have to pass along an estimate or approximate number as part of your message, make sure you are qualified to make the estimate. It is always better to have an official make the estimate. For example, you see three empty cots at a shelter and you pass along a message that there are three empty cots available. What you may not know is that there are three volunteers working outside of the building, and they will be coming in to get some rest as soon as their work is done.

Remember your job is to pass the message exactly as written. Pass it as quickly and accurately as possible. Do *not* make any changes. If you are using an NTS message form, there is a spot for a word count. When you are receiving the message, make sure you are receiving the same number of words that are supposed to be in the message.

Leave Out the Extras

One way to get the message through in an efficient manner is to keep the message clear and concise. As a rule of thumb, it is not a good idea to use contractions such as doesn't, don't, couldn't, etc. In a noisy or stressful environment the words may be missed. It is much better to say does not, do not, or could not.

At the same time, remember you are supplying communications from one of several locations in the event. Other operators may also have important messages to pass. Keep messages to the point. Do not add unrelated comments. There is an appropriate time to chat, and the middle of an event generally is *not* that time. Let the net control station decide if there is time for some unrelated comments. In addition, you can shorten the time it takes to send a message by leaving out the "ahh's," "well, like," or other time-filling words we occasionally add while we are having a conversation.

Communication Skills Aren't Everything

No matter how good you are at passing and receiving messages, there are factors that can be eliminated or improved upon to allow the message to get through more efficiently. In many cases you can think of this as the difference between an open highway and a center-city traffic jam.

Noise can make it difficult to pass or receive a message in an efficient manner. On the HF bands noise could be the static or background noise on the air. It could be static crashes from an approaching storm or interference from other stations nearby. If you are operating in a crowded room or have other equipment nearby, it could be distracting background noise. If you are using Morse Code, the speed at which a message is being sent might be too fast for the receiving station.

As amateurs we have the capability of using many bands, each with different characteristics. Choose the band you are using wisely. If there is noise on HF and you are in VHF range, use the local repeater if it is available. If room noise is an issue, move the station to a quieter area, use headphones, or use a noise-canceling microphone.

Practice

Hopefully you will have a chance to practice message handling by checking into a local or section net. Maybe you will be able to help your club with a fun event such as a run or walk. If you don't, you will have the opportunity during Field Day in June to pass a message to your ARRL Section Manager or Section Emergency Coordinator. You will have the opportunity to learn to work with high noise levels on the air and at your operating position.

The Field Day rules say the club or Field Day group should send a message with the name of the club, the number of participants, the Field Day location, and the number of ARES operators involved with your station. You can also send or receive up to ten messages for additional bonus credits. Check out the ARRL Field Day Rules for complete information.

A sample message would read:

21 R WA3PZO Philadelphia, PA
1500Z June 25, 2002
(Fill in your SM or SEC)

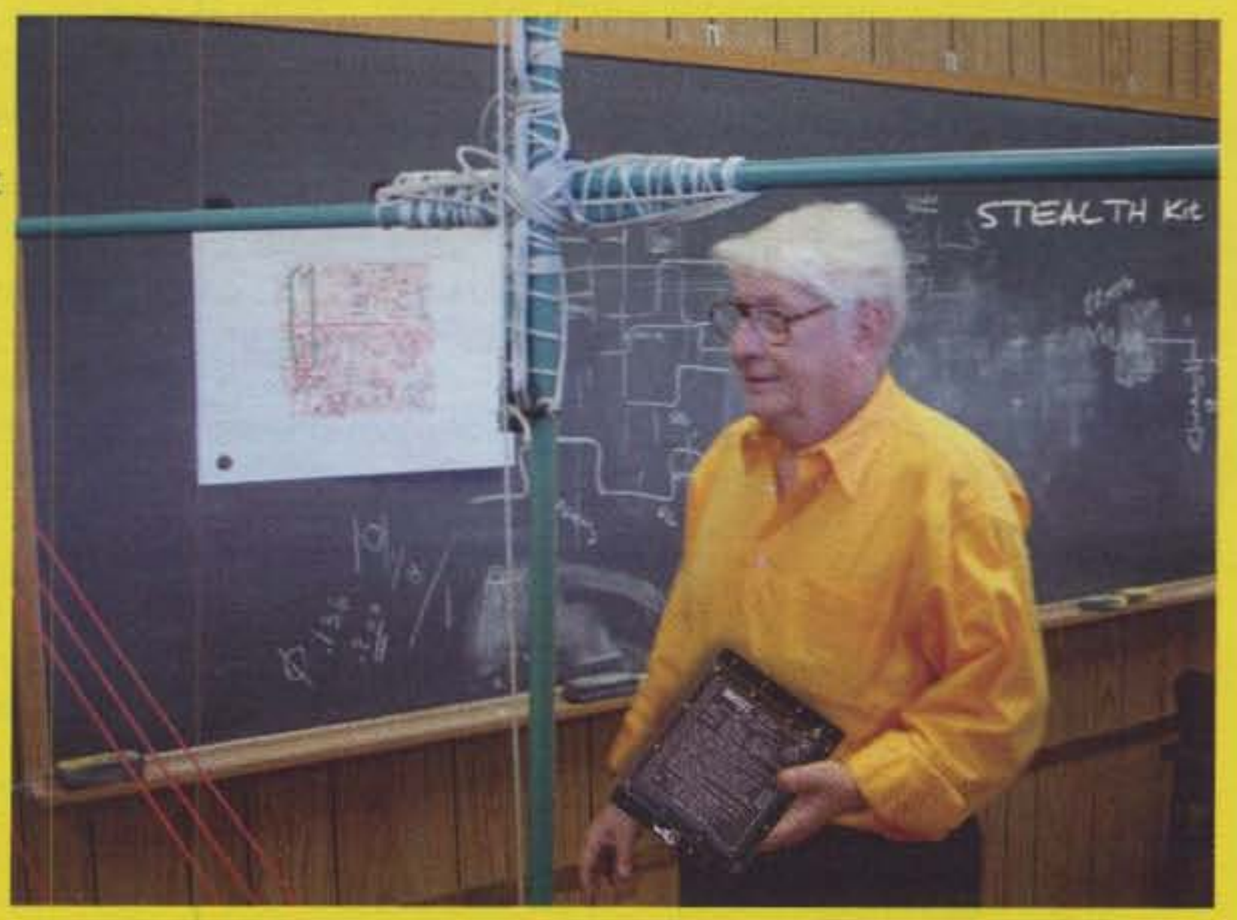
The Lakeside Amateur Radio Club has 20 members who will be participating in Field Day from City Park. All are ARES members.

Olympic Support

The 2002 Winter Olympics are history. After months of planning and coordination, amateur radio assisted with security and other communications supporting the Winter Games. The amateurs and MARS operators involved assisted numerous local and federal agencies capable of reaching several Olympic venues 24 hours a day. Utah ARRL Section Manager Mel Parkes, AC7CP, said, "Amateur radio will be there should any of the primary frequencies fail or become unavailable."

The planning efforts began more than a year before the games were to begin. A special public-safety organization—Utah Olympic Public Safety Command (UOPSC)—was created by the various local and national public-safety organi-

A letter from Pierre Goral, President of SGC



We are very excited to introduce our newest product, the STEALTH Kit, into the HF market. With the STEALTH Kit, SGC is providing an all-in-one, convenient antenna solution that is perfect for emergency use, when an urgent communications command center must be setup in minutes. The STEALTH Kit contains everything a novice or professional needs to erect an antenna in any location—and provides performance equivalent to most dipole antennas!

The introduction of this new antenna kit eliminates much of the mystery of HF "magic". The STEALTH Kit (**S**mart **T**uning, **E**mergency **A**ntenna **L**oop, **T**actical **H**F Kit) provides a solution of how to achieve clear HF communications quickly and easily.

And, in keeping with its' name, the STEALTH Kit is an ideal antenna solution for restricted areas, such as condominiums and gated communities where dipoles and towers are forbidden. Or, use it in city apartments where access to roofs or large open areas is restricted. It is also a great antenna solution when you are on vacation. Whether in an RV or a hotel room, the STEALTH Kit is a "Grab and Go" box - filled with everything you need to complete your communications center.

We are proud of the STEALTH Kit as it provides an antenna system that is automatic, easy to install and easy to use. Any location, any radio and any situation - the STEALTH Kit is the perfect choice for a quick and convenient antenna solution.

Since 1971, SGC has been designing and manufacturing a wide range of HF SSB communications products. Our goal is to provide reliable equipment, which is competitively priced and which fits the need of the radio user. Please visit our booth in Dayton this year to see the STEALTH Kit in action and find out what everyone is talking about.

Pierre Goral

KI7UA

The STEALTH Kit

Kit includes all of the following items:

- SG-237 Smartuner
- SG-237 Manual
- STEALTH Kit Manual
- 80' (25m) of loop antenna wire
- 30' (9m) of nylon support rope with clip
- 4 antenna mounting clips and ropes
- 2 spare antenna mounting clips
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Web: www.sgcworld.com

zations to provide the security necessary for the international event. Section Emergency Coordinator John Mabey—along with Davis County EC Hall Blankenship, KC7RAF; Kirk Boman, KDØJ; Ed Cole, KB7EC; and Mike Youngs, KK7VZ—headed up the amateur radio effort to provide emergency backup communication for the Olympic Security Command.

More than 200 amateur radio volunteers supported the security effort. According to Parkes, hams staffed a number of Olympic Security Command centers, assisting local and national public-safety organizations.

MARS also there... Steve Carver, State MARS Director for Utah, reported that MARS operators from all three services provided support to the National Guard mission. At the two state buildings MARS operators were available to assist with whatever communications tasks were needed, and they were available to accompany liaison officers to civilian command posts if needed to ensure good communications. Members in areas far removed from the Olympic venues were asked to monitor HF frequencies from their home stations to relay traffic from perimeter security teams if needed.

Specifically, MARS members volunteered their radio communications skills by working at the Utah National Guard headquarters and the State Capitol EOC. Due to security concerns, an operations plan was not distributed, and most information was passed during a few "in person" training sessions held prior to the Olympics.

The basic mission was to provide onsite support with operators at two locations with equipment already installed, and be ready to provide operators as needed for the civil liaison officers. The Utah National Guard headquarters in Draper, Utah normally was manned with two MARS operators from 0800 to 2000Z each day for the 17 Olympic days. The State Capitol EOC was manned 24 hours a day by one operator for the first and last three days, as these had been considered the Olympics' highest threat times.

During the opening and closing ceremonies the Army MARS Utah State MARS Director accompanied the civil liaison officers to the temporary police command post near the ceremonies. Almost all communications were handled by telephone, with the radio equipment only used for periodic radio checks.

Wrap Up

Did you pick up on the last sentence above stating that communications were handled by telephone? This shows trained communicators handling the communications regardless of what medium or frequency was being used to pass the message. There are numerous examples where hams have applied their communication and net skills on non-amateur frequencies to help provide communications for an organization. One example involved a radio club helping at a golf tournament and using business radio frequencies. The operators used their skills to pass traffic for the sponsoring organization.

This month I want to thank the ARRL and Bill Sexton, N1IN, for providing information. The summer months could be interesting. Since many areas are experiencing a drought, there is a possibility of brush fires. The National Weather Service has indicated that there is another El Niño in progress. We all hope for a quiet summer, but now is the time to make sure you are ready to serve at a moment's notice.

Drop us a note and let us know how your group is serving in the public interest. Until next time . . .

73, Bob, WA3PZO

Celebrating 20 Years Of Perfecting The Sound Of Amateur Radio

The absolutely best sounding audio in ham radio comes from the labs at K9EID. Twenty years experience in amateur radio and even more in concert sound, home theater and the entertainment business now brings these great additions.

PRO-SET *PLUS!*

- Dual switchable elements HC-4/HC-5
- Boom swings left or right
- **Stereo Speaker "Phase Reversal" switch**
- Highly efficient tuned speaker cavities
- Heavy duty cable system terminates into our famous AD-1 adapters
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This is the best competition headset on the market today!

The New Benchmark For DX And Contest Operators - Worldwide!

the CLASSIC

- Back panel switch selects with the new Heil "Studio One" element or the communications quality HC-5
- 'Soft Touch' PTT on the back panel
- Complete with your call letters
- Removable base for inverted boom mounting
- Terminates into our CC-1 cable system
- Exact replica of the 1930 RCA-74B housing (no Chinese plastic copy here, folks!)

The Classic Studio Mic of the 1930's Using Today's Technology From Heil!

the ICM

Due to the low level inputs of older ICOM Rigs, Bob Heil has designed a new high quality electret. His 'IC' is the answer for your pre 'PRO' ICOM rig. The new Heil 'ICM' is the Final Answer. Using the new Heil 'IC' high performance electret provides plenty of drive and beautiful response. Just plug it in and enjoy!

- Beautiful new Heil platinum finish
- Attached spin cable
- Soft touch PTT switch
- Fits all Heil booms and shock mounts
- Low cost - high quality for your ICOM

The Salvation for the Early ICOM User!

the Dual Switch

- LARGE, ergonomically correct footpad
- Dual switches - one for your exciter and one for the amplifier
- Amp switch always keys up first
- Solid chrome bar hinge - no screws

It Solves Your Keying Interface Problems!

the Traveler

- Up/Down and PPT in line switches
- Various 3' interface allows the Traveler to be used on virtually any transceiver
- Lightweight and comfortable
- Increases quality over any stock hand mic
- Left or right boom position

Models: Traveler 817, Traveler 706, Traveler ICOM 8

Additional Patch Cables $20.00

High Performance Heil 'IC' Electret

Limited Edition

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Goldline Microphone

Serial numbered and signed by Bob Heil. Only 200 Available At Dayton Booth 106. Don't miss this golden collector's item!

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What's New

BY KARL T. THURBER, JR., W8FX

A New Column for A New Century

Goodies Galore

This month your "What's New" columnist will focus on new radio gear, radio shack accessories, antennas and accessories, software and computers, and books. Without further delay, let's take a look at our May crop of "goodies galore."

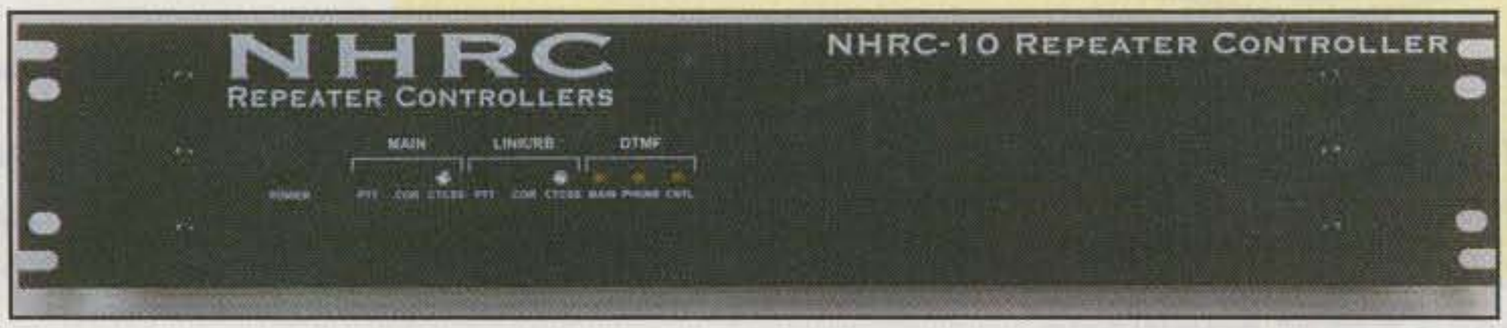

Photo A– NHRC LLC has introduced the new NHRC-10 Advanced Repeater Controller. A front view illustrating the optional rack-mounted cabinet is shown here. The NHRC-10 uses the newest technology available to provide maximum functionality with the fewest parts and at a very attractive price. (Photo courtesy NHRC LLC)

New Repeater Controller

NHRC-10 Advanced Repeater Controller. NHRC LLC designs, develops, and markets repeater controllers and related accessories for the amateur radio and land-mobile radio sectors. Recently, NHRC introduced the NHRC-10 Advanced Repeater Controller (see photos A and B). Representing current state-of-the-art in repeater controller designs, the NHRC-10 uses the newest technology available to provide maximum functionality with the fewest parts and at a very attractive price.

The NHRC-10 features true speech, including four ID messages and three tail messages you can record yourself. There's a six-slot mailbox for announcements and messages; a full-duplex autopatch; a second radio port for a remote base, link radio, or slaved repeater; provisions for a dedicated control receiver to be connected; specific voice messages for various tests; more than 70 control-operator settings; and much more. The NHRC-10 is $449, the optional rack-mounted cabinet is $89, and the digital output board is $59.

For more information, contact NHRC LLC, 444 Micol Road, Pembroke, NC 03275 (603-485-2248; e-mail: <info@nhrc.net>; web: <http://www.nhrc.net>).

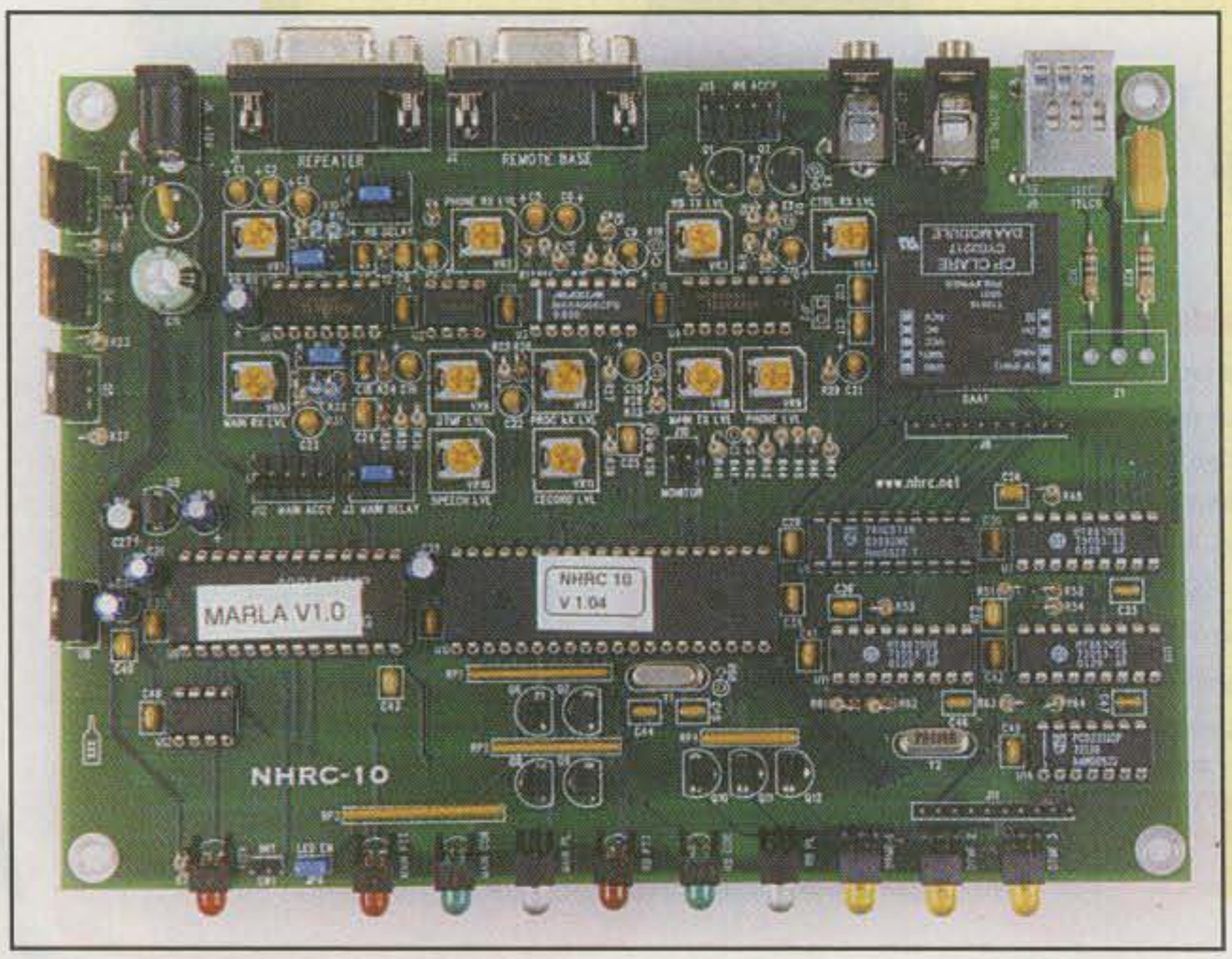

Photo B– Here's a top view of the circuitry of the NHRC-10 Advanced Repeater Controller. The NHRC-10 features a number of state-of-the-art features and superior functionality, as described in the text of this month's column. (Photo courtesy NHRC LLC)

Accessories for the Shack

MFJ-1275 Sound Card Radio Interface. MFJ Enterprises has announced the MFJ-1275 Sound Card Interface to support the new and popular PSK-31 and other digital modes (photo C). With the new MFJ interface between your transceiver and computer, you can enjoy all digital modes. You can operate PSK-31, packet, APRS, AMTOR, RTTY, SSTV, CW, and more; you can even use the unit as a contest voice

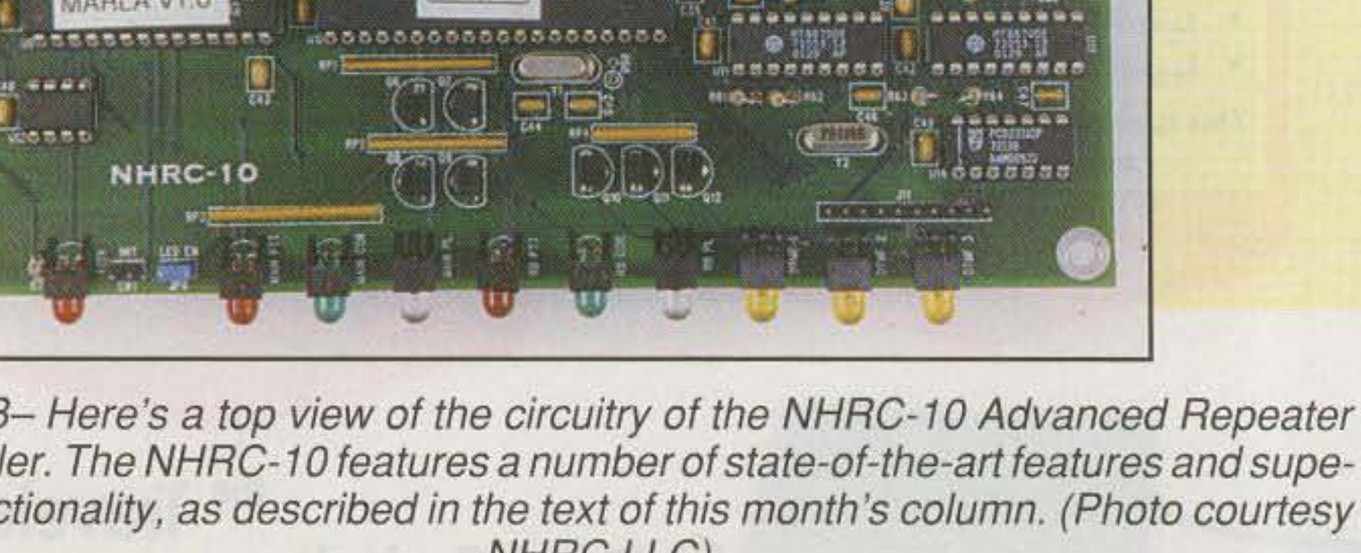

Photo C– MFJ Enterprises has announced the MFJ-1275 Sound Card Interface for PSK-31 and other digital modes. With the new interface between your transceiver and computer, you can enjoy all digital modes—PSK-31, packet, APRS, AMTOR, RTTY, SSTV, CW, and more. (Photo courtesy MFJ Enterprises)

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- HEAVY DUTY DESIGN
- LOW PROFILE, LIGHT WEIGHT PACKAGE
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PROTECTION FEATURES:

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SPECIFICATIONS:

INPUT VOLTAGE: 115 VAC 50/60HZ
OR 220 VAC 50/60HZ
SWITCH SELECTABLE

OUTPUT VOLTAGE: 13.8VDC

AVAILABLE WITH THE FOLLOWING APPROVALS: UL, CUL, CE, TUV.

MODEL SS-18

DESKTOP SWITCHING POWER SUPPLIES

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

CUSTOM POWER SUPPLIES FOR RADIOS BELOW

EF JOHNSON AVENGER GX-MC41
EF JOHNSON AVENGER GX-MC42
EF JOHNSON GT-ML81
EF JOHNSON GT-ML83
EF JOHNSON 9800 SERIES
GE MARC SERIES
GE MONOGRAM SERIES & MAXON SM-4000 SERIES
ICOM IC-F11020 & IC-F2020
KENWOOD TK760, 762, 840, 860, 940, 941
KENWOOD TK760H, 762H
MOTOROLA LOW POWER SM50, SM120, & GTX
MOTOROLA HIGH POWER SM50, SM120, & GTX
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
UNIDEN SMH1525, SMU4525
VERTEX — FTL-1011, FT-1011, FT-2011, FT-7011

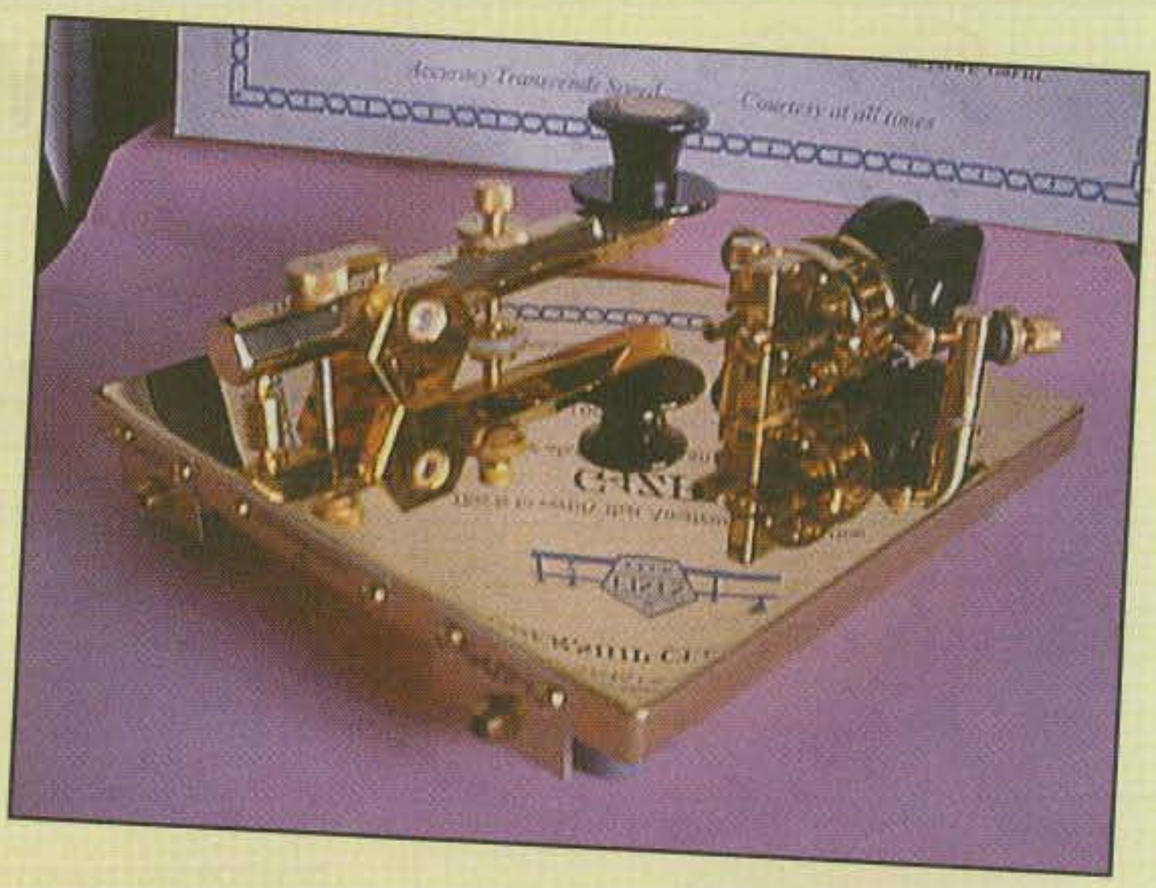
NEW SWITCHING MODELS

SS-10GX, SS-12GX
SS-18GX
SS-12EFJ
SS-18EFJ
SS-10-EFJ-98, SS-12-EFJ-98, SS-18-EFJ-98
SS-12MC
SS-10MG, SS-12MG
SS-101F, SS-121F
SS-10TK
SS-12TK OR SS-18TK
SS-10SM/GTX
SS-10SM/GTX, SS-12SM/GTX, SS-18SM/GTX
SS-10RA
SS-12RA
SS-18RA
SS-10SMU, SS-12SMU, SS-18SMU
SS-10V, SS-12V, SS-18V

CIRCLE 134 ON READER SERVICE CARD

*ICS – Intermittent Communication Service

Photo D– Gordon Crowhurst, G4ZPY, proudly offers the attractive Millennium Duo, actually two Morse keys on the same base. One is a VHS Twin Paddle Iambic Key, the other a Straight Key. Both keys are mounted on a 6 inch square, 3/8 inch thick base made of solid brass. The entire assembly is 24-carat gold plated, and weighs in at about 2 kilograms. (Photo courtesy G4ZPY Paddle Keys International)



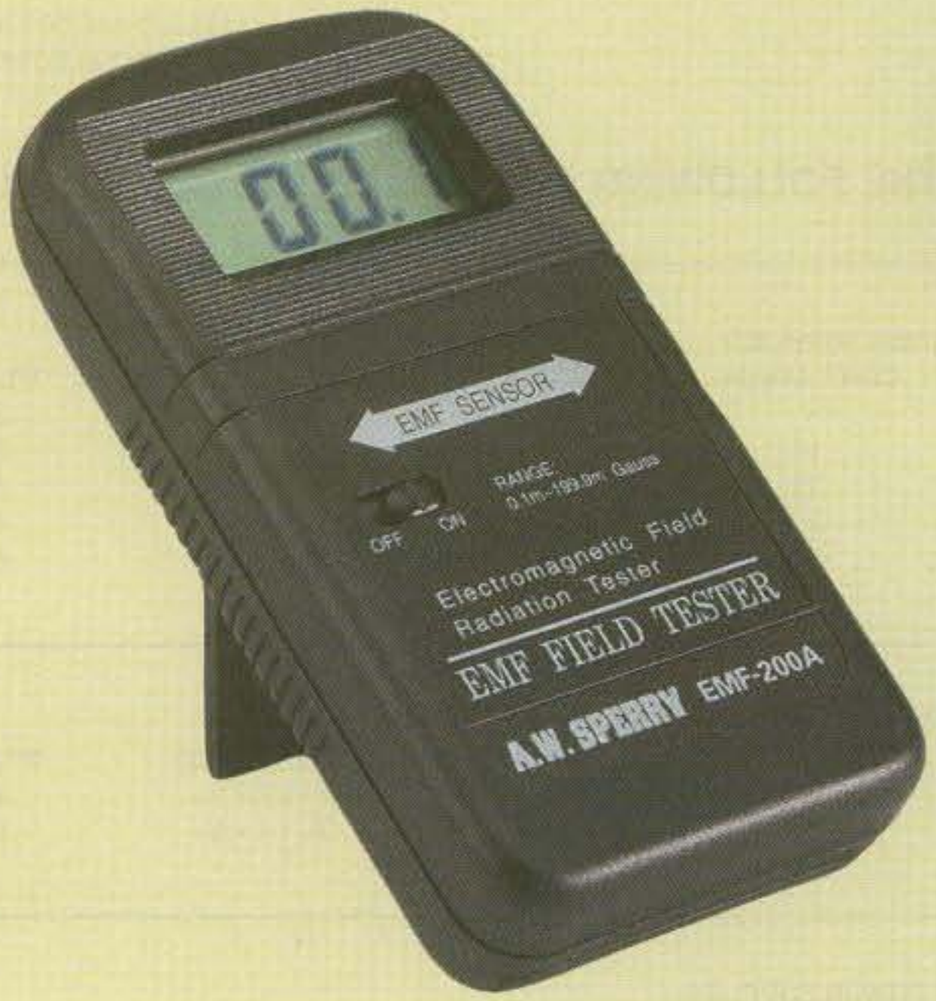


Photo E– Scientifics® has announced an easy-to-use, handheld Professional Single-Axis Electromagnetic Field (EMF) Sensor for EMF field testing. The large LED display reads 0.1 to 199.9 mG over the ELF range of 30 to 400 Hz, with a claimed accuracy to within 4 percent ±3 digits at 50/60 Hz. (Photo courtesy Scientifics®)

keyer or CW contest memory keyer! The new unit provides fully automatic operation with audio and push-to-talk (PTT) control. It matches sound-card audio, eliminates ground loops, and provides microphone override. The unit is designed to work with all transceivers with 8-pin round or modular microphone plugs. Perhaps one of the nicest features of the MFJ-1275 is that everything you need is included—software, audio cables, and power plug. You also can easily override any digital mode and transmit microphone audio at any time from the mic's PTT switch. The MFJ-1275, for round mic plugs, is $89.95; the MFJ-1275M, for modular mic plugs, is the same price.

For your nearest dealer, or to order, contact MFJ Enterprises, Inc., 300 Industrial Park Road, Starkville, MS 39759 (1-800-647-1800; e-mail: <techinfo@mfjenterprises.com>; web: <www.mfjenterprises.com>).

New from G4ZPY Paddle Keys International. A high-quality line of Morse keys is offered by Gordon Crowhurst, G4ZPY. Manufactured from top-quality materials, his keys are well-known for being sturdy, attractive, and reliable.

Recently, Gordon introduced the Millennium Duo (photo D), actually two Morse keys on the same base. One is a VHS twin paddle iambic key, the other a straight key. The latter key has a gold half-sovereign coin inlaid in the knob. Both keys are mounted on a 6 inch square, 3/8 inch thick base made of solid brass. The entire assembly is 24-carat gold plated and weighs in at about 2 kilograms; each key is numbered on a small plaque. Connections to both keys are made through 3.5 mm jack sockets; matching jack plugs are supplied.

The price for the made-to-order Millennium Duo is £560, and it should be ordered directly from Gordon in England. He accepts both Visa and Master Card, international money orders, checks, and even cash (if sent via registered mail), but contact him first for the financial and shipping details: Gordon Crowhurst, G4ZPY Paddle Keys International, 41 Mill Dam Lane, Burscough, Ormskirk, L40 7TG, England (tel. 0044 1704 894299; e-mail: <g4zpy@lineone.net>; web: <http://website.lineone.net/~g4zpy/index.htm>).

Scientifics® Electromagnetic Field Sensor. Scientifics® has announced an easy-to-use, handheld Professional Single-Axis Electromagnetic Field (EMF) Sensor, No. 30819-91 (photo E). Used to detect and measure the level of ELF magnetic field radiation from power lines, PCs, electronic equipment, kitchen appliances, and more, it features high-resolution measurement. The large LED display reads 0.1 to 199.9 mG (milli-Gauss) over the ELF range of 30 to 400 Hz, with a claimed accuracy to within 4 percent ±3 digits at 50/60 Hz. The $99.95 unit takes samples every four seconds and is powered by a single 9 volt battery (not included). Also available is a new 100-page Scientifics® catalog which features over 1500 scientific and educational products for engineering enthusiasts.

For more information or a catalog, contact Scientifics®, Dept. A011-C999, 60 Pearce Avenue, Tonawanda, NY 14150-6711 (1800-728-6999; e-mail: <cons_order@edsci.com>; <http://www.scientificsonline.com>).

Antennas and Accessories

Multiple- and Single-Band Antennas for the FT-817. MFJ Enterprises has announced several multiple- and sin-

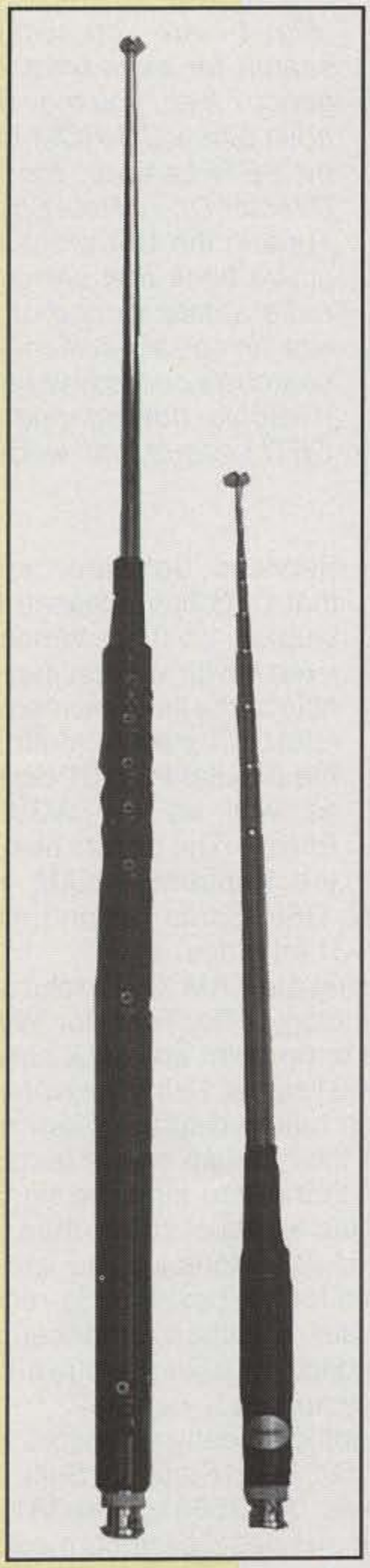


Photo F– MFJ Enterprises offers several Walkabout multiple- and single-band antennas for the Yaesu FT-817 and other QRP rigs, a sampling of which are shown here. More details on the new antennas are found in the text. (Photo courtesy MFJ Enterprises)

gle-band antennas for the popular Yaesu FT-817 Multi-Mode Portable Transceiver and other QRP rigs (photo F). First, the MFJ-1899T Walkabout antenna covers 80 through 6 meters. According to MFJ, the 10-section telescoping whip is 52 inches when fully extended and 7 inches when collapsed. You change bands by plugging the "wander lead" into the appropriate socket on the base loading coil. The whip unscrews from the 12 inch base coil,

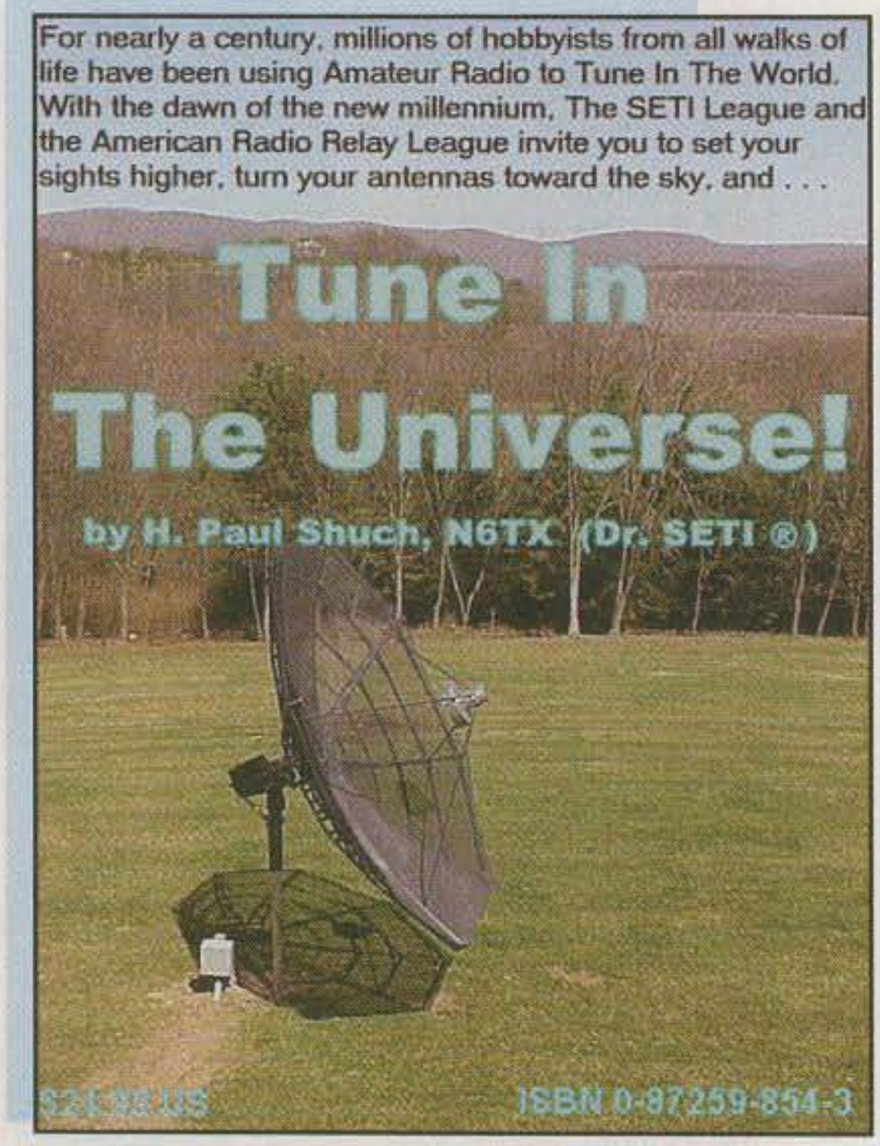


Fig. 1– Are you involved in the search for extra-terrestrial intelligence? If so, you may be interested in a new CD-ROM-based book by SETI League, Inc. Executive Director Dr. H. Paul Shuch, N6TX. Tune in the Universe! *is an interactive book that seeks to involve radio amateurs and other hobbyists in a scientifically credible search for our cosmic companions. (Graphic downloaded from The SETI League, Inc. website)*

which handles 25 watts; BNC connectors are used. The price is $129.95.

The MFJ single-band Walkabout antennas for the FT-817 and other QRP rigs let you work DX no matter where you are. Nine single-band whips cover 6 through 80 meters, ranging in price from $29.95 to $49.95, depending on band. Each of the 10-section telescoping whips is 51 inches when fully extended, collapses to 5 1/2 inches, and screws into the base loading coil. The single-band whips handle 25 watts and have BNC-type connectors.

For more information, contact MFJ Enterprises, Inc., 300 Industrial Park Rd., Starkville, MS 39759 (phone 1-800-647-1800; e-mail: <techinfo@mfjenterprises.com>; web: <www.mfjenterprises.com>).

Software and Computers

Updated PacTerm for Windows® Software. Rick Ruhl, W4PC, of Creative Services Software, announced that CSS has released PacTerm version 1.5.3 for Windows® (an even newer version may be available by the time you read this). The latest program update supports the popular PSK-31 digital mode, as well as the AGW Packet Engine. The update also supports the Kantronics KAM XL Multi-Mode DSP Controller and its internal PSK-31 interface.

Using the KAM XL's exclusive "Zoom technology," PacTerm for Windows is able to do point-and-click tuning of the PSK-31 signal. Using the KAM XL's bar-graph tuning display, users need only click their mouse on the number of the LED that's lit to tune the signal. There are four levels of zoom; then the point-and-click buttons let you fine-tune the signal for the best PSK31 reception. A number of other enhancements are included, and a liberal software upgrade policy applies.

Contact Creative Services Software, Inc., 503 West State St., Suite 4, Muscle Shoals, AL 35661 (256-381-6100; e-mail: <sales@cssincorp.com>; web: <http://www.cssincorp.com>).

From the Bookshelf

Tune in the Universe! Are we alone in the universe? Indeed, many inquisitive

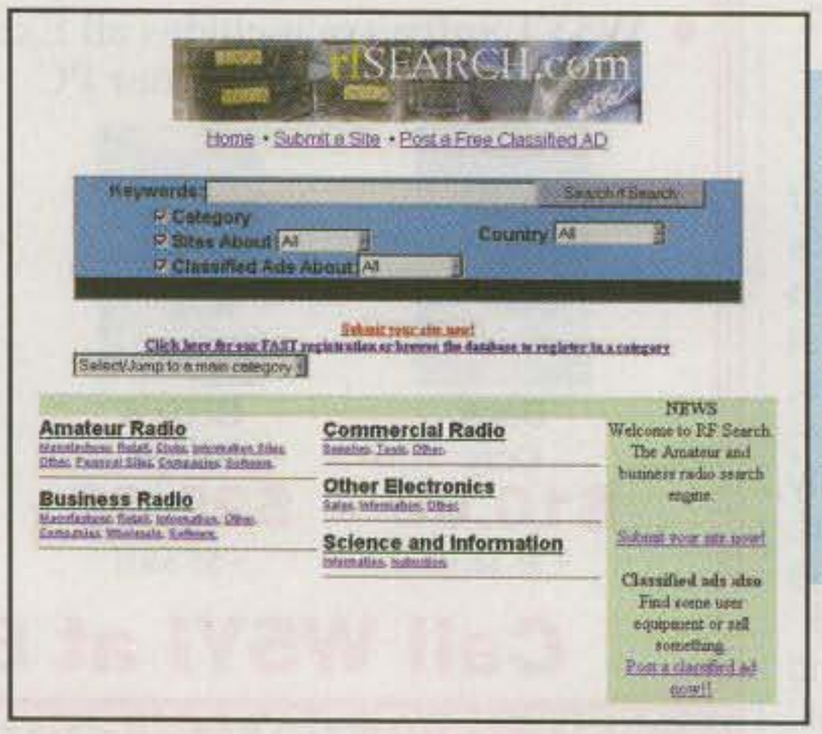


Fig. 2– Besides its website at <http://www.artsci.com>, Artsci also offers the rather extensive rfSEARCH.com "amateur and business radio search engine" at <http://www.rfsearch.com>. With it you can search for and access many other useful resources. Check out both sites! (Graphic from the Artsci rfSEARCH.com website)

radio amateurs are involved in the ongoing search for extra-terrestrial intelligence, popularly referred to as SETI. If you're one of these folks, or are a prospective searcher, you may be interested in a new CD-ROM-based book by SETI League, Inc. Executive Director Dr. H. Paul Shuch, N6TX.

Tune in the Universe! (fig. 1) is appropriately subtitled "A Radio Amateur's Guide to the Search for Extra-Terrestrial Intelligence." It's an interactive book on CD-ROM, which can be read on any PC with ordinary web-browser software. Its sections are part history, part tutorial, and part memoir, with a mix of photos and songs to entertain as well as educate. It's an easy-to-use guide that seeks to involve radio amateurs, amateur astronomers, and other hobbyists in a scientifically credible search for our cosmic companions, an especially important undertaking since Congress terminated NASA's SETI funding in 1993. The new book is richly illustrated with color images and drawings.

The book is published by the ARRL at $24.95 plus $5 s/h. Contact the American Radio Relay League (ARRL), 225 Main Street, Newington, CT 06111-1494 (phone 1-888-277-5289; e-mail: <pubsales@arrl.org>; web: <http://www.arrl.org/catalog>).

For further information about the ongoing search for intelligent alien life and membership in the SETI League, contact The SETI League, Inc., 433 Liberty St., P.O. Box 555, Little Ferry, NJ 07643 (1-800-TAU-SETI; e-mail: <join@setileague.org>; web: <http://www.setileague.org>).

Artsci Radio/Tech Modifications. New editions of *Artsci Radio/Tech Modifications,* the *Mod 14 A Edition* and the *Mod 14 B Edition,* have been released by Artsci Publishing's Bill Smith, N6MQS. The two books are indispensable tools for amateur radio operators and radio repair technicians who are serious about enhancing their radio transceivers and scanners. The two-volume set contains modification information for all makes of handie-talkies, mobiles, and base stations. Also, alignment controls for many of the radios are presented in graphic line drawings.

Modifications are described that increase radio receive and transmit frequency coverage, and they are accompanied by concise, easy-to-follow instructions. The new editions are priced at $19.95 each plus $5 s/h per order.

For more information on these books and other popular Artsci publications, contact Artsci, Inc., P.O. Box 1428, Burbank, CA 91507 (818-843-4080; e-mail: <bills@artsci.net>; web: <http://www.artscipub.com>).

We should mention that the Artsci website has links to a number of Artsci and non-Artsci web pages and websites. Notable are the Artsci online amateur repeaters database, an amateur chat room, equipment classified ads, a directory of amateur radio equipment manufacturers, and more. Artsci also sponsors the extensive rfSEARCH.com "amateur and business radio search engine." With it, you can search for and access many other useful resources, including amateur, business, and commercial radio; scientific topics; and other very useful sources of information. Browse to <http://www.rfsearch.com> (fig. 2).

Two New Releases from antenneX. Jack Stone, proprietor of antenneX Online Magazine, sent us for perusal two interesting new books he offers online. One of the new books is Igor Grigorov, RK3ZK's *Urban Antennas, Volume 1.* The book explains how the increasing urbanization of the world's

population has affected amateur radio operating conditions. The book also describes the problems of operating from close or restricted environments, especially in Igor's part of the world.

The 221-page, 9-chapter book gets down to specifics, with coverage of diverse topics such as invisible, underground, multi-purpose, and urban CB antennas, and more. While the original text was written in Russian, great care has been taken to ensure maximum readability. The book is available as a softcover book ($29.95), a CD-ROM based e-book ($24.95), and an e-book download from the antenneX website ($22.95). The e-books are in the form of popular Adobe® Acrobat® PDF files and use the free Adobe Acrobat Reader software to view them.

The second antenneX book is L. B. Cebik, W4RNL's *LPDA Notes, Volume 1: Pure LPDAs*. The book, the first in a two-part series, acknowledges that log periodics number among the least understood antennas in the amateur community. The W4RNL book looks at the basic properties of pure log-periodic dipole arrays (LPDAs), with special emphasis on the types of antennas usually created by radio amateurs. The 206-page, 10-chapter book covers LPDA fundamentals, cures for underperforming LPDAs, and practical HF LPDAs. Accurate computer modeling is used to look systematically at LPDA designs, especially those smaller, shorter, and sparser versions likely to be used by amateurs. The book is available in the same formats and at the same prices as the RK3ZK book above.

The website is sponsored by antenneX Online Magazine, P.O. Box 271229, Corpus Christi, TX 78427-1229 (1-888-855-9098; e-mail: <info@antennex.com>; web: <http://www.antennex.com>).

World Radio TV Handbook (WRTH) 2002. Are you (like me) a shortwave listener (SWL) at heart? If so, the *WRTH* may be for you, as it's recognized as a sort of "SW bible," an ultimate guide for the serious radio listener. It's an authoritative, encyclopedic station adjunct that long has been recognized as the most up-to-date publication covering the world's long-, medium-, and shortwave radio and television stations.

The *WRTH,* edited by David Bobbett, contains reviews of receivers, names and addresses of key broadcasting personnel, propagation predictions, and world maps showing current political boundaries with broadcasting sites indicated. The 680-page book includes frequency schedules and charts, as well as broadcaster information updated by dozens of experienced contributors. It also offers hour-by-hour guides to international broadcasts in English, French, German, and Spanish, plus details of TV broadcasters, arranged alphabetically by country. There are 72 pages in color, including some 80 color illustrations.

The $24.95 *World Radio TV Handbook* is issued annually, and the 2002 edition is available from booksellers and electronic retailers, or contact Watson-Guptill Publications/Billboard Books, 770 Broadway, 7th Floor, New York, NY 10003-9595 (fax 646-654-5487; e-mail: <info@watsonguptill.com>; web: <http://www.watsonguptill.com>).

Wrap-Up

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

Overheard: If you're an inveterate ragchewer, great. However, don't think that you need to express your opinion on each and every subject you may come across on the air!

73, Karl, W8FX

Manufacturer Previews at Charlotte Hamfest

The Charlotte Hamfest in North Carolina each March is the last major hamfest before Dayton, and this year at least three amateur radio manufacturers used the opportunity to roll out previews of equipment they're planning to have on display at the Hamvention® this month.

Ten-Tec's new Orion HF transceiver, introduced at the Charlotte Hamfest in early March.

Two of the six new mics being introduced at Dayton by Heil Sound were shown for the first time at Charlotte. (Heil Sound photos)

The just-introduced Ten-Tec Model 516 HF QRP transceiver.

Two New Rigs from Ten-Tec

Ten-Tec introduced two new radios—the high-end Orion, designed to compete with ICOM's IC-756-ProII and Yaesu's FT-1000-D and -MP, plus a new QRP (low power) radio, the Model 516. The $3300 Orion has a distinctly non-Ten-Tec look and features two fully-independent receivers (each with its own knob), along with dual 32-bit digital signal processors, over 1000 IF-DSP bandwidth filter choices (590 on each receiver), adjustable receive filter shape factors, and programmable AGC response time for the main receiver. In addition, according to Ten-Tec, you can put both receivers on the same frequency using separate antennas and control them with a single knob for true diversity reception on 160–10 meters.

The Model 516 also covers 160–10 meters and has a power output that can vary along with your personal definition of QRP, from 1 to 20 watts. The rig will operate on AM, FM, CW, and SSB, and includes a general-coverage receiver from 500 kHz to 30 MHz, plus 30 built-in IF-DSP filters. It's also plug-and-play ready for PSK-31 and other computer-based digital modes, with no interface needed, and the software is flash-ROM updatable for instant upgrades. A price hadn't been set as of Charlotte.

Six New Heil Mics

Heil Sound, which is celebrating its 20th anniversary in the ham radio business, will be introducing six new microphones at Dayton, and company president Bob Heil, K9EID, was on hand in Charlotte with two prototypes. One, at the low end of Heil's price spectrum for base mics, is an under-$100 microphone custom-designed for enhancing the transmit audio of older ICOM radios. The second Charlotte preview mic is an exact replica of an old-time broadcast mic, but with a push-to-talk switch and an element designed for amateur two-way communications. Purchasers will be able to customize the mics with their callsigns (Heil will send the stick-on letters when the warranty card is sent in.). Bob is also introducing a new type of microphone cable, which runs the audio lines inside coax-style shielding, plus two control lines outside the shield. The idea is to minimize interaction between control and audio wires.

ICOM's IC-V8000

Finally, ICOM had its IC-V8000 75-watt 2-meter FM transceiver on display for the first time in Charlotte. This radio is clearly intended for heavy-duty usage, as its most prominent features beyond the front panel are the huge heat sink (essentially the rest of the radio) plus the cooling fan on the back. The V-8000 is also the first amateur rig to include a built-in weather alert and weather channel scan, plus over 200 memory channels and a new level of memory-management flexibility called Dynamic Memory Scan. Details on this radio may be found in ICOM's ads.

ICOM's new IC-V8000 high-power 2-meter FM rig made its first hamfest appearance at Charlotte as well.

What About the Others?

Several other manufacturers indicated that they plan significant new product introductions and/or announcements at Dayton, so stay tuned...

— W2VU

How It Works

BY DAVE INGRAM, K4TWJ

Theory 'n Practice

Solar Power—The Easy Way

As you will recall, our previous "How It Works" column discussed "ground floor" details of battery packs, amp-hour ratings, and charging techniques. This time let's delve further into that subject and look at solar-power and solar-charging concepts. As a special treat and aid for easy understanding, I will also explain how to plan and assemble a simple solar charger to fit your own daily and emergency preparedness needs. Overall, I think you will find this "hands-on" approach to learning quite enjoyable and beneficial. Let's begin with a quick look at the three main sections that make up a solar charger.

Panels, Regulators, and Battery Packs

Converting photonic energy from the sun into electrical energy to charge a battery pack requires using one or more solar panels such as that shown in photo A. These panels are available in a wide variety of shapes and sizes, but the "average" panel (if such actually exists!) is usually around 9 by 12 inches and produces between 14 and 20 volts at 400 to 600 ma in normal sunlight. These variations result from energy differences between bright/sunny and cloudy days and a panel's position with respect to the sun, and must be held within specific limits to avoid damaging a battery from overcharging. A simple regulator circuit fills that need, and a reverse current-protecting diode on its output line prevents the battery pack from discharging back through the regulator during low or no sun times.

Homebrewing a regulator circuit is usually easy. Sometimes one can even be "borrowed" from a small power supply (photo B). Interfacing a solar panel and a regulator with a battery pack requires understanding cells and their related charge rates, however, so more details on those items follow.

NiCd and NiMH Cells

As you probably know, NiCd cells have been the heart of rechargeable battery packs used in amateur radio gear for many years. They are quite versatile, can be recharged over 1000 times, and can also deliver current equal to twice their milliamp-hour rating for up to 30 minutes before requiring recharging. NiCd cells have also proven to be detrimental to the environment and are being phased out by newer, more stouthearted NiMH cells. A quick side-by-side comparison of these two types of cells best explains their main differences.

The typical maH rating of AA-size NiCd cells such as those used in FM talkie battery packs is 650 maH. A fully-charged NiCd pack thus could power a talkie drawing 1300 milliamps of current on transmit for 30 minutes straight before requiring recharging. (This unnecessarily long transmission is cited only for simple explanation.) As a comparison, the typical maH rating of AA-size NiMH cells making up a battery pack is 1600 maH. A fully-charged NiMH pack could power the same 1300ma-on-transmit talkie for a full hour and still have energy left for emergency needs before requiring recharging. In other words, NiMH cells can store more than twice the

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

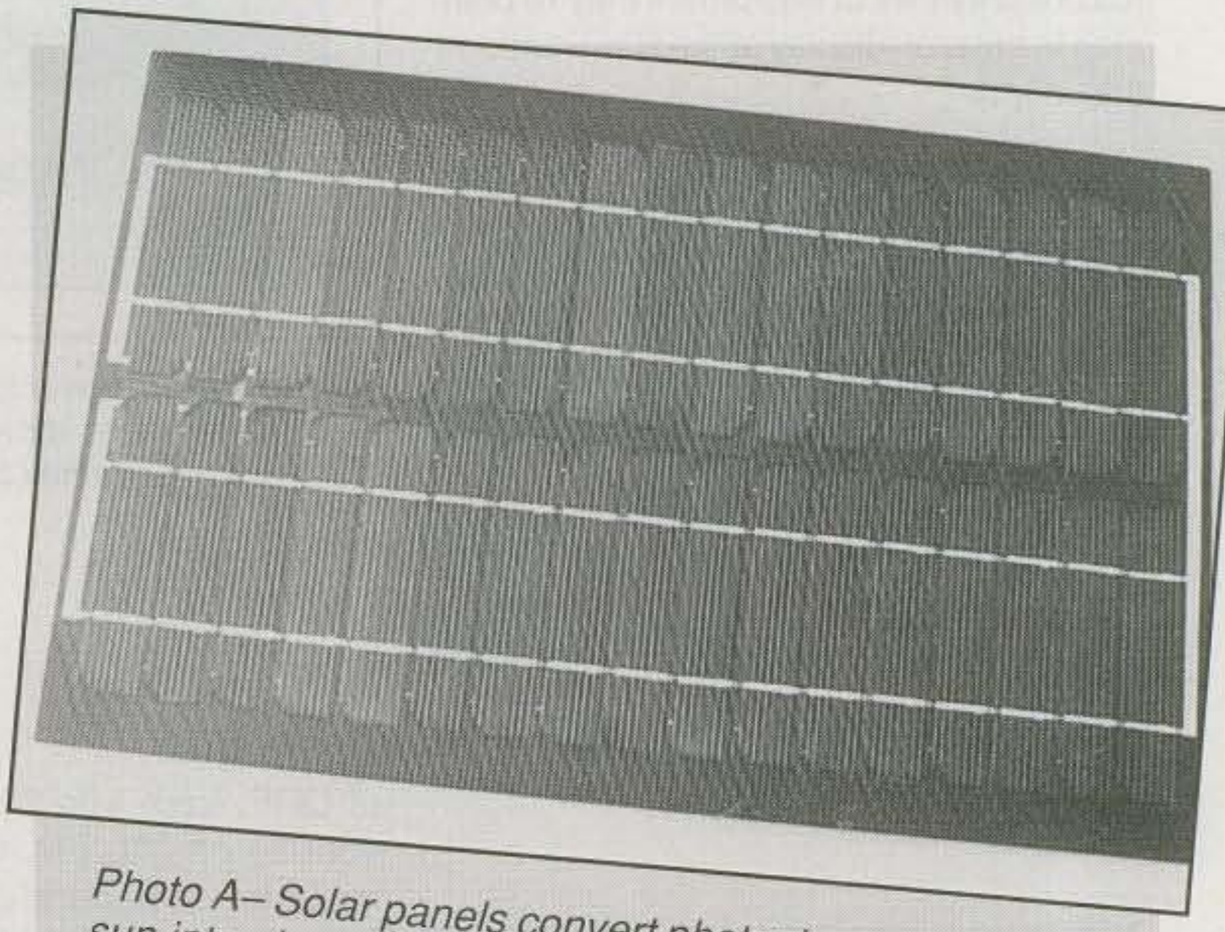


Photo A– Solar panels convert photonic energy from the sun into electrical energy that can be stored until needed in rechargeable battery packs. They can be wired in series to produce more voltage or connected in parallel to produce more output current.

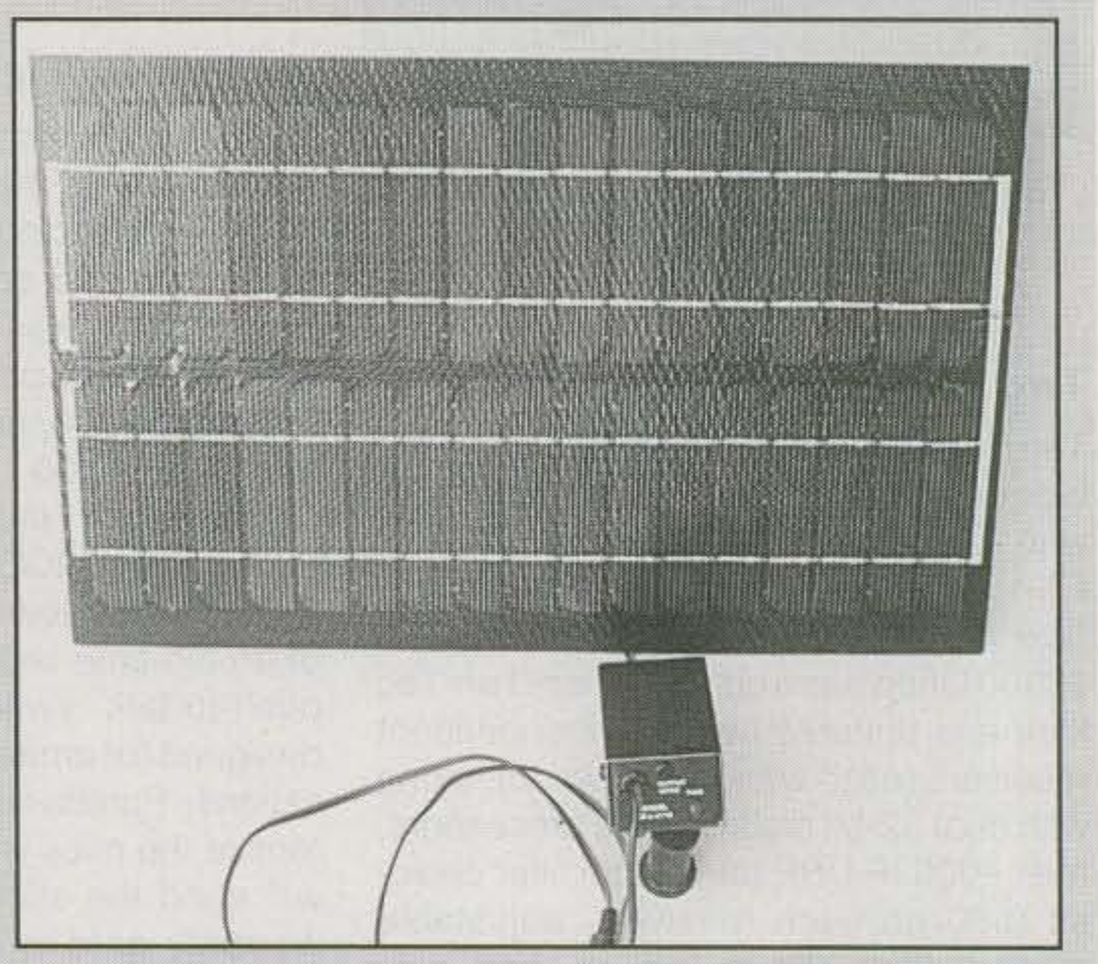


Photo B– A complete solar charging setup consists of one or more solar panels, a regulator unit/circuit, and the battery pack(s) to be charged. Here I mated a 18 to 20 volt solar panel with the regulator unit from a small MFJ-4110 wall-adapter power supply to produce a "quick and easy" charger to charge an auxiliary 9.6 volt battery pack for an FT-817 external to the transceiver. (Discussion in text.)

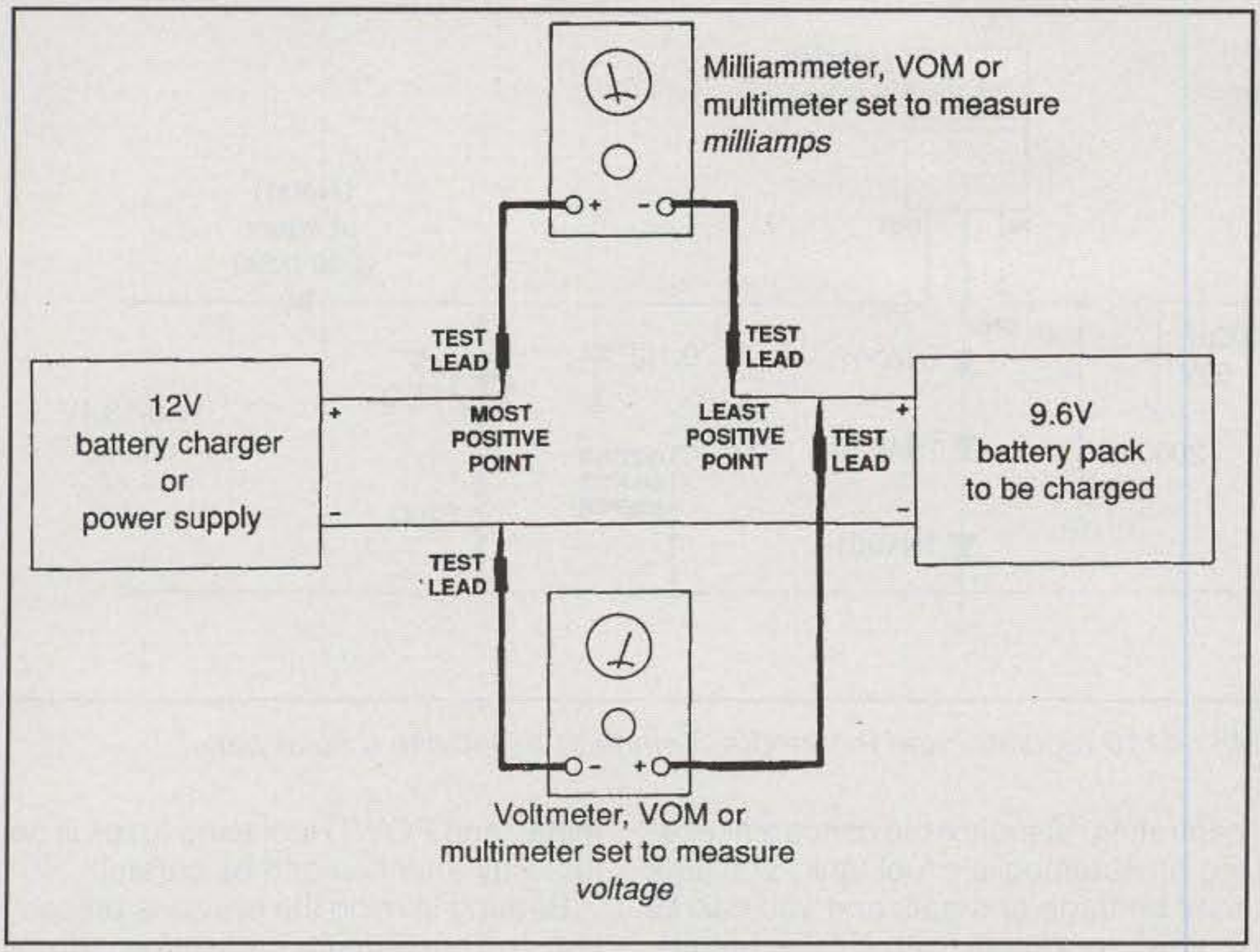
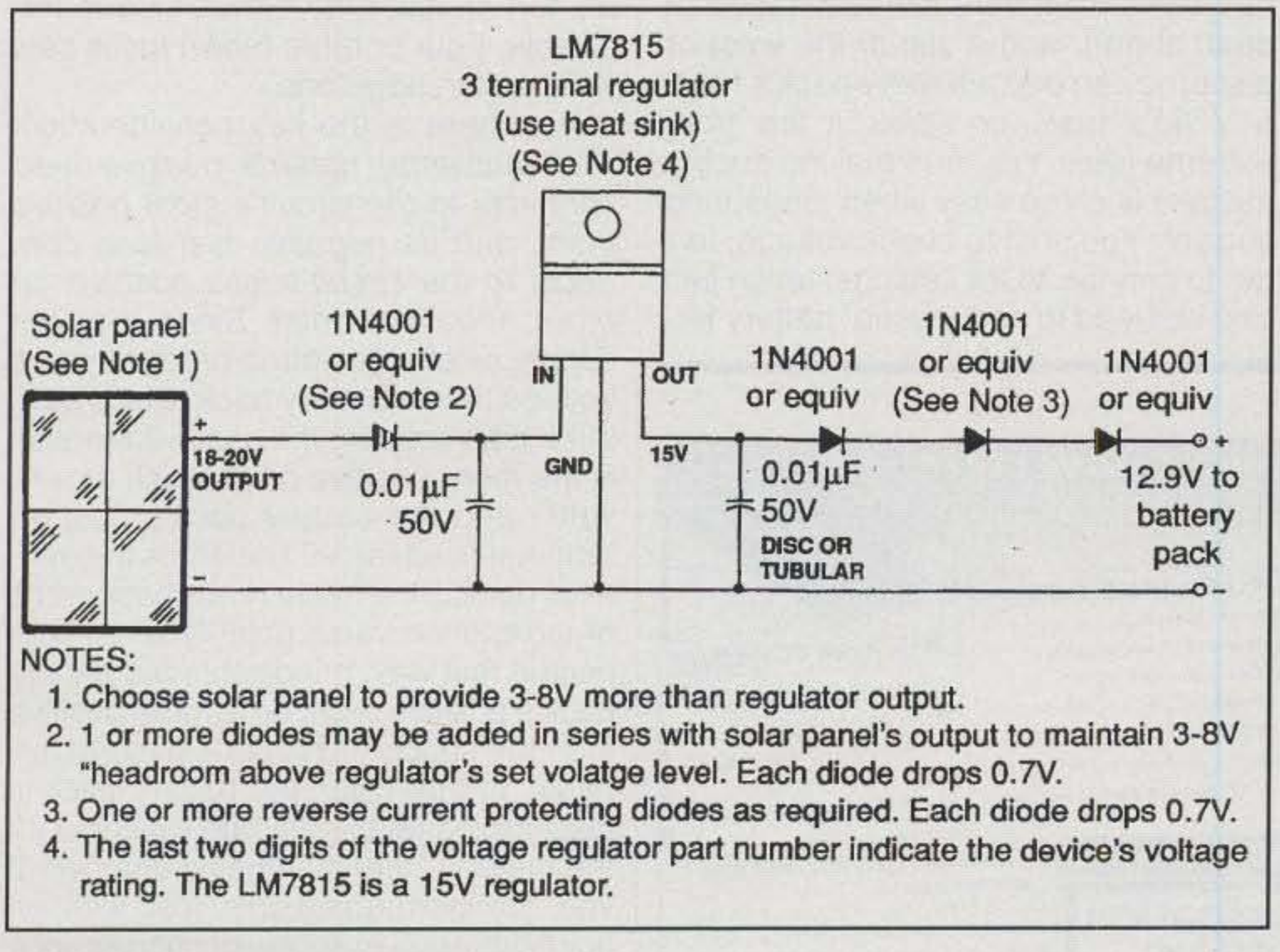


Fig. 1– Illustration of how a milliammeter is connected in series with a positive power lead to measure current, and how a voltmeter is connected in parallel with both positive and negative power leads to measure voltage. (Discussion in text.)

electrical energy of NiCd cells, and they are more environmentally friendly. NiMH cells can also be recharged just like NiCd cells, but since their capacity is 2 to 2.5 times greater, charging time or current must be increased accordingly. More specific details on charging follow.

Regular versus Rapid Charging

Generally speaking, NiCd and/or NiMH battery packs can be charged at a reg-



NOTES:
1. Choose solar panel to provide 3-8V more than regulator output.
2. 1 or more diodes may be added in series with solar panel's output to maintain 3-8V "headroom above regulator's set volatge level. Each diode drops 0.7V.
3. One or more reverse current protecting diodes as required. Each diode drops 0.7V.
4. The last two digits of the voltage regulator part number indicate the device's voltage rating. The LM7815 is a 15V regulator.

Fig. 2– Circuit diagram of a basic solar charging system. A three-terminal "LM" regulator is available in a wide range of output voltages. The number of 1N4001 diodes may be varied to produce desired charge voltage/current as discussed in the text.

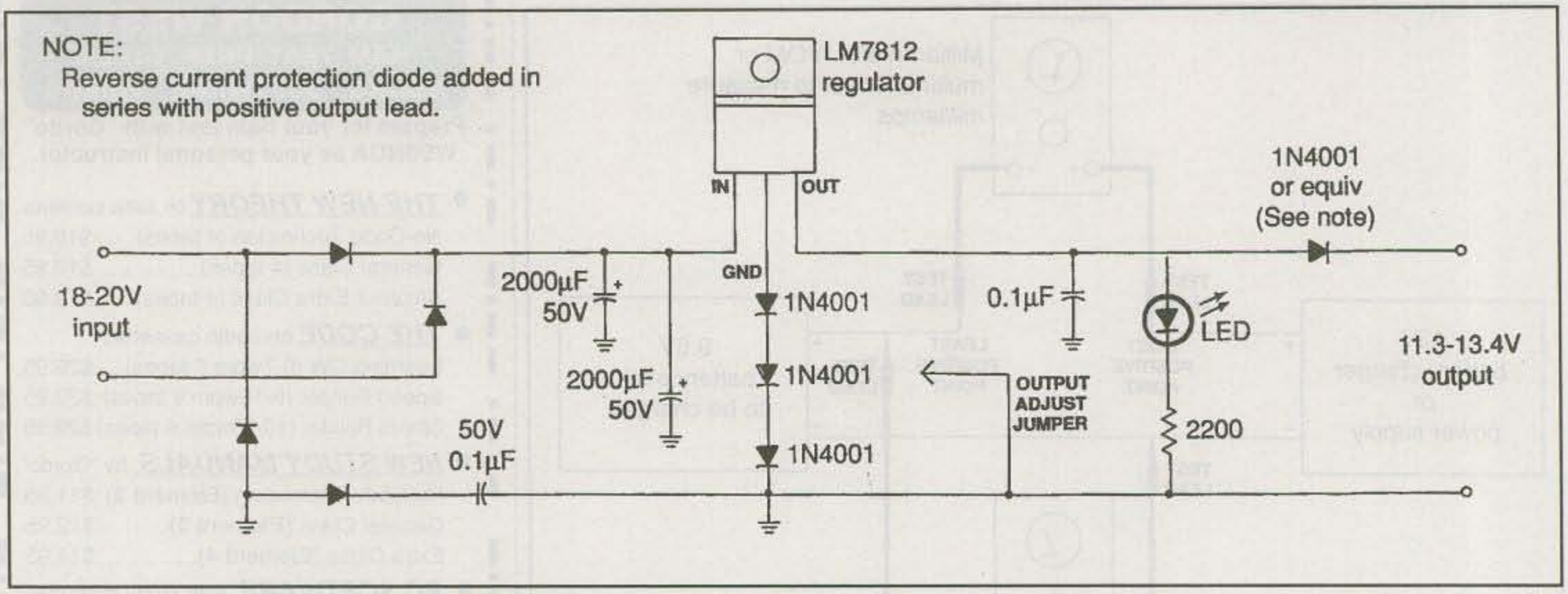


Fig. 3– Circuit diagram of the MFJ-4110 regulator and the mod(s) I made to use it with a solar panel.

ular or rapid rate, with the regular rate preferred for the first few charge/discharge cycles and every 10 to 15 cycles thereafter. A regular rate is defined as applying one tenth of a pack's full maH rating for 10 hours plus 2 to 4 additional hours to overcome charging losses. A rapid rate is defined as applying a pack's full maH rating for 1 hour plus 10 or 15 minutes to overcome losses. These figures can also be juggled or fluctuated somewhat, provided we do not exceed the rapid-charge rate or the cell's total capacity. As an example, 1600 maH NiMH cells can be charged at the rate of 400 ma for 5 hours, 1600 ma for 1 hour, or 800 ma for 2 1/2 hours, or 200 ma for 10 hours. The "end results" of a full recharge are the same. Likewise, NiCd cells of 650 maH rating can be charged at 200 ma for 3 3/4 hours, or 400 ma for 1 3/4 hours, or 100 ma for 7 1/2 hours (all times approximate). Yes, I mixed the sequence of those figures—mainly to keep you thinking and concentrating. Visualize the concept like filling an automobile's fuel tank: The tank may be large or small, and you can fill it slowly or rapidly with similar results. You can also travel farther using a larger fuel tank. It's simple math.

Measuring Charging Current

We have defined how much current will be required to charge a particular battery pack; now let's consider how to measure and set that level of current. My first thought here is "be careful." I say that because unlike a voltmeter, a milliammeter or a VOM set to read current will exhibit very low resistance (a dead short!), and a slip of the wrist or test prod can pop a battery pack's fuse, a VOM's fuse, or spark a fire from extreme heat. Yes, and making such a mistake is oh so easy when measuring current: You shift to check voltage, forget to change VOM settings, touch just one test lead to an "unused" battery terminal, and POW! Replacing fuses is no fun. Pay attention and be careful!

Bearing in mind the previous precaution, the hook-up for measuring current (and voltage) from a charger or power supply to a battery pack (or rig) is shown in fig. 1. A milliammeter or VOM set to read milliamps must be inserted in series with only one of a circuit's two wires (the positive wire). This calls for interrupting or breaking the charge line and using clip leads or plugs to make a circuit-interrupting adapter for the meter. This is also when you will most appreciate my precaution of watching exposed wires and loose leads to avoid a short circuit. One blown fuse is forgivable. Four or more blown fuses sets you back to page one.

Now here is the key consideration: *The (milliamp) meter's positive lead connects to the circuit's most positive point, and its negative test lead connects to the circuit's less positive (or more negative) point.* Since a power supply or charger must produce more voltage than a battery pack to charge it, the supply's/charger's positive terminal is the more positive point (such as +12 volts) and the battery pack's positive terminal (such as +9.6 volts) is the negative point. If the meter reads backwards or indicates reverse polarity when connected this way, it indicates the battery pack's positive terminal is more positive than the supply's/charger's positive terminal. In that case, the battery pack is discharging (at the ma rate indicated on the meter) rather than being charged. If you are performing this test with an adjustable power supply or charger, incidentally, you can increase its output voltage until attaining a desired output/charge current. Are you absorbing all of these helpful notes, friends? Now let's

put our knowledge to good use in planning a custom charger.

Homebrewing a Solar Charger

As previously discussed, a solar charger consists of a solar panel, a voltage regulator circuit, and a battery pack or packs to be charged. Also as discussed, the normal charging process involves applying current equal to approximately one tenth of the pack's milliamp-hour rating to the pack for 10 hours, plus a couple of extra hours to overcome charging losses.

The trick is to ensure all three items work comfortably cool within those guidelines. This is accomplished by first *selecting a solar panel producing an average output of 3 to 8 volts more than a selected regulator's output and then selecting a regulator that produces 2 to 5 volts more than a selected battery pack's full-charge voltage*. Since one or two (or possibly three) reverse-current or discharge-protecting diodes may be included in a regulator's output line, their .7 volt drop (each) should also be considered when estimating regulator output. We now could add a charge timing circuit with flasher, buzzer, or auto-shutoff and a temperature sensor for deluxe operation, but let's keep this project simple and easy to understand.

Let's now put some figures to the previous facts. Let's assume you wish to charge a spare out-of-transceiver 9.6 volt/1600 maH NiMH battery pack for an FT-817 (which, incidentally, will measure around 10.4 volts full charge). Let's also assume your solar panel produces around 20 volts in full sunlight. Selecting an LM7815/15 volt three-terminal regulator (and then adding two or three 1N4001 50 volt/1 amp diodes in series with the regulator's output lead) should produce a charging current between 160 and 220 ma (fig. 2). Use your multimeter/milliamp meter to measure charging current, then add or delete 1N4001 diodes until obtaining a desired charging current. I suggested using 1N4001 diodes here only because they are readily available and low in cost. We only use the diodes to pass charging current into the battery pack and to adjust output voltage/charging current from the regulator. Any silicon diode with a voltage and current rating above 35 volts and 2 amps can be substituted here. All silicon diodes exhibit the same .7 volt drop across their wires. Now let's "tweak" the homebrewed charger's design with some final notes.

The previously mentioned three-terminal regulator is an inexpensive solid-state device that looks like a small power transistor. It will get quite warm during operation, so mount it to a large heat sink for cooling. As an alternative, mounting it to the side of a metal box makes a good heat sink (remember to insulate the regulator from the box with a mounting kit and heat-sink compound). I will leave physical design and assembly of a battery clip or charging plug to your creative ingenuity. A couple of screws with their tips extending through perfboard or a thin piece of wood and held to a battery pack's terminals with a rubber band is one idea. You probably can dream up some much better ideas.

Finally, you may recall at the beginning of this column I mentioned "borrowing" a regulator from an MFJ-4110 wall adapter-type power supply for use with my solar charger. The supply's mating wall transformer plugs into the regulator box, so I just unplug it, plug in the solar panel's cable, and add a reverse current-protecting 1N4001 diode to the three-pin regulator's output (fig. 3). If charging current for a battery pack is too high, I simply would add more reverse-current-protecting diodes in series with the regulator's output lead.

I trust you enjoyed our study of battery chargers, and I also hope it inspired you to homebrew a basic charger to fit your own needs. Chargers make good weekend or first projects, allow us to apply acquired technical knowledge to a circuit design, and also let us express personal creativity in physical layout of the unit. If desired, you can even alter the project to make a mobile charger for battery packs. Just assemble a suitable voltage- regulator unit using the design criteria we discussed and plug it into your car's cigarette lighter/accessory socket. Yes, and even if you do not build any type of charger right now, you have acquired some good knowledge on measuring current, which is one of the most often used methods of determining if a rig or circuit is functioning. That, dear friends, is knowledge you will find helpful for an entire lifetime!

73, Dave, K4TWJ

E-mail Note

During recent months between 5,000 and 20,000 of you apparently sent me e-mail messages. The system became hopelessly overloaded, and the server unknowingly locked up or deleted an undefined number of those e-mails. My e-mail is still bottlenecked and out of control. Until further notice, please send/resend your notes/messages via postal mail (and include an SASE if you wish a *brief* reply). When possible, many related messages/topics will be addressed through my columns here in *CQ*. Although a full task force would be necessary to answer all messages, I am sincerely interested in hearing what every one of you has to say. Rest assured your messages will be read! Thanks for your understanding.

—Dave, K4TWJ

Contesting

BY JOHN DORR, K1AR

News/Views Of On-The-Air Competition

The Changing Face of Multi-Operator Contesting

May's Contest Tip of the Month

Here's a great little tip for working pile-ups. When there are a lot of guys calling, one's natural tendency is to jump right into the fray and start calling with them. Very often, and even when operating from a big station, I'll pause just a second or two in the timing of my calls before sending (or talking). The result, more often than not, is the "Alpha Radio" or "Radio" will be hanging out there all by itself because the other guys finished saying their callsigns before I did. This technique really helps in breaking pile-ups. The key isn't always being the loudest guy; it's being the one who's in the clear!

Calendar of Events

Apr. 27-28	SP RTTY Contest
Apr. 27-28	Helvetia Contest
Apr. 27-28	Florida QSO Party
Apr. 27-28	Nebraska QSO Party
May 4-5	ARI Int'l DX Contest
May 4-5	IPA CW Contest
May 4-5	MARAC County Hunters CW
May 4-5	Indiana QSO Party
May 4-5	New England QSO Party
May 11-12	CQ-M DX Contest
May 11-12	Nevada QSO Party
May 18-19	Baltic DX Contest
May 25-26	**CQ WW WPX CW Contest**
June 1-2	WW South American CW Contest
June 8-9	RSGB Jubilee Contest
June 15	Kid's Day Event
June 15-16	All Asian CW DX Contest
June 23-24	ARRL Field Day

Like everything else in life, things change with time. How many of our kids have never seen a vinyl LP record? Can they imagine a day without video games or MTV? Of course, over the years contesting has changed, too. The face of equipment has changed completely. Packet radio has had a huge, and in my opinion mostly negative, impact on contesting. The size of the biggest antennas keeps going up. The number of participants is rising, all against the backdrop of an aging group of hams. Serious single operators can't compete without the use of two radios and a full 48 hours of operating time. The list goes on.

This month I'd especially like to focus on the new world order of multi-operator contesting. In particular, multi-ops have taken an interesting turn in strategy that some of you who specialize in single operating may not even realize. Also, some of you more traditional multi-operator types may be surprised to note what your competition is doing. Let's take a look.

Extra Receivers/ Spotting Stations

Except for the very elite, it used to be that a multi-operator station would only have one working station per band. Thus, if you were multi-multi, you'd walk into the shack and see six stations ready for action (if you were even that lucky!). A multi-single setup would likely have two stations—one for running and the other one for chasing multipliers.

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e-mail: <K1AR@contesting.com>

Today's top-tier multis have brought equipment layouts to a new level. Now it's common for the large multi-multi stations to have more than one transceiver on a given band. Those station owners who are especially clever have installed antennas that maximize one's ability to listen on the same band while the other station is transmitting, thus improving the ability to find new stations and/or multipliers. This scenario is even more common with the multi-2 and multi-single operations. With less transmitting going on, the logistics of setting up spare receivers becomes much easier. Now you literally can have a gang of operators, the majority of whom are "manning the phone," if you will, meaning they are relentlessly tuning the bands for new QSOs/multipliers and passing that information along to the run/multiplier transmit stations, or working it themselves. In today's world of networked computer logging, almost anything is possible. How effective was your computer network in 1975?

Packet vs. No Packet

There has been a lot of debate, especially in recent months, about the virtues of packet. I'll save that discussion for a later time. However, in this year's ARRL CW DX contest an interesting event took place. The N2RM crew pitted itself against our K1AR team in the Multi-2 category. It was pretty much business as usual, with one significant exception: N2RM did not use packet. Instead, in the shack Bob's crew had an elaborate spotting system set up which fed internally generated spots to the main stations. From an operator's point of view, they were getting spots as always; it's just that the spots they were receiving weren't coming from the external packet network. Not only did N2RM avoid those hideous packet pile-ups for most of the weekend, but as you can see below, the results speak for themselves. The multipliers at RM were only a tad down from our totals (and I mean only slightly; they actually beat us on 15 meters!), and QSOs were up. Hats off to the RM team for proving a significant point. Although the multis of this generation have become convinced that life without packet is like life without water, RM proved otherwise. There will be much more on this in a future column.

K1AR

Band	QSOs	Mults
160	82	47
80	535	81
40	1151	94
20	1616	118
15	1688	123
10	1728	123
Total	**6800**	**586**

Final Score: 11,954,400

N2RM

Band	QSOs	Mults
160	115	45
80	655	80
40	1107	93
20	1640	116
15	1628	124
10	1788	118
Total	**6933**	**576**

Final Score: 11,980,224

Passing

The art of passing stations is not a new operating technique in contesting. It's not even particularly unique to multi stations. For years we've been trying to get rare or needed multipliers to move from one band to the next in an attempt to raise our scores. Frankly, it has to become tedious for a casual operator who happens to live in a rare QTH to constantly be asked to move to another band. I often wonder how many rare multipliers never even bother to oper-

ate contests or avoid calling the big stations for that very reason.

In years past, if a 9K2 called you, you would search through your dupe sheets (remember them?) and discover on what other bands you needed that particular multiplier. Of course, today's logging programs make that task easy. Your ability to successfully move a needed multiplier to another band is usually tied to how convincing you sound and how serious the guy on the other end is. However, what is emerging as a new operating technique in recent years is the sport of passing needed QSOs. In this past ARRL SSB contest (and perhaps equally so in the CW contest) we literally worked hundreds of stations on other bands simply by directing them to our other transmit frequency. Perhaps we eventually would have worked some of them through the normal course of operating the contest, but I doubt the numbers would compare to the proactive approach. This is without a doubt the easiest method a multi-op station can employ to help its score. You also don't need one more antenna to do it!

Band Edge/Frequency Management

This one is an oldie and a goodie. Sitting on the band edge, especially in phone contests, has become one of mankind's crowning achievements—at least in contesting. Some multi-ops are famous for this being a key element of their strategy. It's always fun when a single-op somehow manages to sneak in there and steal the show. For multi-multi stations in particular who are spending an entire weekend working out each and every band, it's critical that they have the ability to hear the weakest of stations calling. That's why the band edge has become so strategic to their operating plan—especially on 20 and 15 meters. I've also noted of late that everyone wants to operate in the low end of the CW band. Maybe it's psychological; maybe it actually means something to spend more time on 14002 than on 14034. I'm not really sure. Nevertheless, this is new world we live in.

Working the Bandmap

For those of you who have not weaned yourself away from packet (or even if you have, as in the test case of N2RM), a common technique used at today's multis (and single operator assisted setups as well) is to work the spotted bandmaps when one's rate slows down. I can remember years ago when it was

taboo for stations to put out common spots on the packet network. People would jump all over the guy about the fact that "We don't need England on 15 meters; stop using up valuable network bandwidth." Now that the bandwidth issue has gone away and logging-program authors have figured out how to leverage this information, the practice has totally changed. In this past ARRL DX contest season I had rates well over 100 QSOs/hour (admittedly in bursts) that were created simply by dancing around the bands, pointing and shooting at spots that came up on the screen. No one could have imagined such an operating technique as recently as 10 years ago.

Given more time and space, there are plenty of other examples I could document that reflect today's changing multi-operating scene. For the most part, these changes have been positive. They've resulted in operating being more fun, more to do for those who aren't "at the rig," and new and interesting ways to leverage emerging technology and antenna techniques. One concern, however, is that the barrier of entry for winning is perhaps higher than ever for multi-ops. I'm not sure that's fundamentally changed in a meaningful way from years past, but top-tier multi-operating is certainly not for the casual observer.

No matter where you sit, never forget that the main reason we do all of this is for fun. Get creative in your station layouts. Borrow equipment from others. Not everything requires the need to get out your checkbook. Give it some thought; you may surprise yourself as you prepare for this fall's contest season!

New England QSO Party

Although for space reasons we stopped publishing rules quite a while ago (thank you, Mr. Internet), there's a new contest being launched in New England that I'd like to highlight this month. It's actually the bringing together of a number of state QSO parties with a new date. The marketing department stayed up all night, spending hours working the name, and came up with a clever conclusion for this one: *The New England QSO Party.* Here's a brief summary of the rules:

Date: First full weekend of May (May 4–5, 2002).

Object: To contact as many New England stations in as many New England counties as possible. (New England stations work anyone.)

Contest Period: 2000Z Saturday until 0300Z Sunday (4 PM ET Saturday until 11 PM ET Saturday) and 1100Z Sunday until 2400Z Sunday (7 AM ET Sunday until 8 PM ET Sunday).

Categories: Single-operator high power, low power, and QRP categories, plus multi-operator single transmitter; same four categories for mobiles. Single-operator stations using assistance during the contest (packet or internet spotting nets, etc.) will compete in the multi-single category.

Contest Exchange: Send signal report and state/province (DX stations send signal report and "DX."). New England stations send signal report, county, and state.

Valid Contact: Work New England stations once per band/mode. New England stations work anyone. CW contacts must not be made in the phone band segments. Mobiles can be worked again in new counties. County-line QSOs should be logged as two separate QSOs. Crossmode, crossband, and repeater QSOs are not permitted.

QSO Points: Count one point per phone QSO, two points per CW (includes digital modes) QSO.

Multiplier: Stations outside of New England use counties as multipliers for a total of 67 (CT/8, MA/14, ME/16, NH/10, RI/5, VT/14). New England stations use states (50), Canadian provinces (14), and DXCC countries (maximum of 20) as multipliers.

Scoring: Total score is QSO points times the multipliers. Mobiles count QSO points per county and multipliers from all counties (counted once).

Suggested frequencies: CW — 3540, 7040, 14040, 21040, 28040; Novice/Tech — 3705, 7130, 21130, 28130; SSB — 3880, 7280, 14280, 21380, 28380; VHF — 50.150, 144.205, 146.55, 223.5, 432.150, 446.0.

Reporting: Logs should indicate times in UTC, bands, modes, calls, and complete exchange. Multipliers should be clearly marked in the log. New England stations put your club's name on the summary sheet. Entries must be submitted within 30 days after the contest and sent to NEQP, P.O. Box 3005, Framingham, MA 01705-3005, or via e-mail to <logs@neqp.org> (Cabrillo format preferred). Send a large SASE for a printed copy of the results.

Awards: Certificates will be awarded to the top scorers (25 QSOs minimum) in each New England county, U.S. state, Canadian province, and DXCC country. A number of special plaques will also be awarded to top scorers (check the website for a current list, as it has not yet been finalized).

More information: The New England QSO Party website is at <http://www.neqp.org>. Check there for information on planned fixed-station and mobile activity from New England counties, contest software information, county abbreviations, plaques to be awarded, and information on New England state county awards. NEQP results will be posted on the website when they are completed. Questions can be addressed to <info@neqp.org>.

Final Comments

That's it for this month. As a reminder, I encourage you to submit your responses to this year's *CQ* Contest Survey published last month. In case you missed it, you can find the questions and submit your responses via the internet at: <http://hamgallery.com/survey>. It will only take a few minutes to complete it. See you next month!

73, John, K1AR

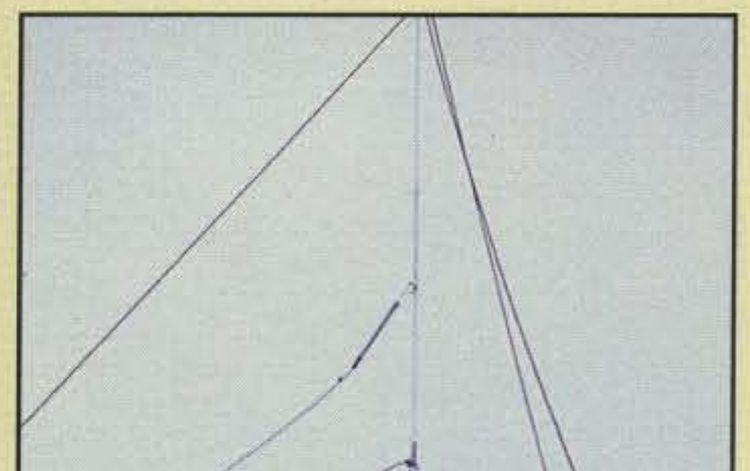
DX

BY CARL SMITH, N4AA

News Of Communication Around The World

Operating Procedures

On South Sandwich Bob, K4UEE, says their constant companions were the snow, the wind, and all those penguins!



Bob, K4UEE, stands beside one of the 1/2-wave vertical dipole antennas used on South Sandwich.

You know, I've talked about this subject a number of times in the past year or so, and frankly it's getting old even for me. However, after listening for two weeks to two different DXpeditions and all of the chaos, I've just got to do it again!

Some years ago, a book was written by Bob Locher, W9KNI. In his book Bob talked about how to work DX. Many years and a lot of technology have passed since the last edition of this book. Now we have the internet and packet clusters and radios with dual receivers and *big* amplifiers with *huge* antennas, etc., etc. What we don't seem to have is much *common sense*—at least the rude/crude attitudes and language during some of these DXpeditions would make it appear so.

I am appalled at what I hear on the bands today. Oh, freedom of speech and all that. Yeah, sure, and it certainly shows, doesn't it?

What happened to all of the DXing Elmers out there? Those self-respecting members of the DX community who should have been showing/teaching the new DXer how to operate. Did they just disappear? Have the Elmers of this world gone away? If they are gone, where did they go and *why*? Come on, old timers; you guys and gals who have been chasing DX for the past 25 or 30 years know this isn't the way it is supposed to work.

I'm going to quote a little bit of a magazine article written by a European after a Pacific DXpedition:

"*What has to be written and said over and over again:* Several comments on the operation of the expedition. The relationship of an expedition to the rest of the world is like the relationship of a conductor to his orchestra. The higher the standard of the expedition and the more disciplined behavior of its callers, the smoother and more efficient the operation will run. If an expedition requires a split, then it is essential that its

The Braveheart *sits an anchor at South Georgia during the VP8GEO DXpedition.*

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

Six to eight foot seas and winds gusting to 55 knots made for a perilous departure from South Sandwich.

The Team of VP8GEO, the South Georgia DXpedition (left to right): John, VE3EJ; Ralph, KØIR; Lew, W7EW; Dermot, EI5IQ; Trey, N5KO; Bob, K4UEE; Dick, PA3FQA; Wes, W3WL; Bernie, HB9ASZ; George, K5TR; Declan, EI6FR; and James, 9V1YC.

frequency remain undisturbed; otherwise there are needless duplicated contacts. Please, do not tune a transmitter to an expedition frequency, do not give them comments, and do not call. That way you will help your colleagues who are actually in contact with the expedition. If the expedition gives a directional call or makes a contact and the contact is taking place, do not call either on the frequency on which the expedition is receiving (this disrupts the expedition) or anywhere else (this disturbs your local colleagues). I would call station 'JA3ABL,' and the band would be totally silent. 'JA3ABL?' I asked. JA2ABL answered, and we made the contact. Incredible operational discipline! After the Japanese, first eastern and then western Siberia came through. The operation was still perfectly disciplined. An Austrian station called me, but I could not copy the number in the callsign. Although I called 'OE2U?' there was a buzz of OK and OM stations calling continuously on his frequency. I did not give in to them, and wishing to complete the contact, I repeatedly asked 'OE2U?' which was only my guess amongst all the interfering signals. After an unsuccessful five minutes I gave up; sent a 'QRM QRT.'

"Once you have a completed contact with an expedition, duplicate contacts are not necessary and only deprive others of an opportunity for a contact. The most important thing regarding expedition operation is to *listen,* listen, and listen again to operator instructions and *follow* the operational style of the expedition. Listen to their traffic rhythm, how they retune after completing a QSO, and how many times the expedition can be called.

"The retuning of an expedition in a pile-up depends on the density of the pile-up. *Until my experience on Christmas Island,* I called expeditions just above or below the frequency on which the previous contact was made. But, in the intensive pile-ups that I worked while there, I learned that such an intensive and broad accumulation of signals only builds up on the frequency of the previous contact, making it impossible to read even the strongest station. I had to look for a frequency on which a call was readable, which in dense traffic was at the end of the pile-up (or at its beginning). In such traffic, the successful ones were those who managed to

The WPX Program

SSB

2820	KK5PM	2822	EA5TN
2821	RN3BC	2823	EA7BGW

Mixed

1889	JL6IPK	1891	JA5BAW
1890	IV3ARJ	1892	K6JRY

CW: 900 W4GP.

SSB: 400 EA5TN. 850 W4GP, N9DI. 1850 W9JDX. 3450 F2VX.

MIXED: 500 JA3BAW, K4IJQ. 1000 K6JRY. 1250 IV2ARJ. 1350 W4GP. 1500 W2EZ. 4950 W2FXA.

15 meters: LZ1CY
20 meters: N9DI

No. America: E4/G3WQU
So. America: LZ1CY
Oceania: LZ1CY

Award of Excellence 160 Meter Bar: KX1A
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, YBØTK, K9QFR, 9A2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MC, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IV4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBP, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, KZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, S53EO, DF7GK, I7PXV, S57J, EA8BM, DL1EY, KØDEQ, KU0A, DJ1YH, OE6CLD, VR2UW, 9A9R, UAØFZ, DJ3JSW, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RAØFU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A, IZ5BAM, W4GP.

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, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR1QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N8JV, ONL-4003, W5AWT, KBØG, F6BVB, YU7SF, DF1SD, K7CU, I1POR, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, WBØDD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA5CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, KØDEQ, DJ1YH, OE6CLE, HB9BIN, N1KC, SM5DAC, S51U, RAØFU, UAØFZ, CT4NH, W1CU, EA7TV, LY3BA, RW9SG, K1NU, W1TE, UA3AP, OK1DWC, KX1A, IZ5BAM, W4GP.

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

The WAZ Program

10 Meter SSB

531 .....W6XA

20 Meter SSB

1092.....EA3DDI

10 Meter CW

174 .....W6XA

40 Meter CW

222 .....W6XA

6 Meters

25 .....IK1GPG (25 zones)
26.....W1AIM (26 zones)
27 .....K1LPS (25 zones)
28 .....W3NZL (28 zones)
29 .....K1AE (25 zones)

160 Meters

175 .....W7UT (40 zones)

All Band WAZ SSB

4750 .....W6XA
4751 .....HL1AEY
4752.....IK2WZQ
4753.....G4VXT
4754 .....F6BAT
4755.....IK2ZJN
4756 .....IK2CEG
4757.....DK1ML
4758.....JA7BSD
4759 .....W4RBO
4760 .....KD3RR
4761 .....HK6PSG
4762 .....KZ2K
4763.....DS2AGH
4764.....EA1GL

Mixed

8122.....WI5A
8123.....EA2AFV
8124.....9A2KL
8125.....JG2NMY
8126 .....JI5DWP
8127 .....K2BLA
8128.....N1SV
8129.....DK2NG
8130 .....JA8BLD
8131 .....WA2YJF
8132.....W2JDH
8133.....NØHF

All CW

301 .....JA7TJ
302 .....W6IYS
303.....DL4NBE
304 .....W6XA
305.....HL1AEY

RTTY

133.....W8PT

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>.

5 Band WAZ

As of March 15, 2002, 591 stations have attained the 200 zone level and 1258 stations have attained the 150 zone level.

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

WI5A Z32ZM G3LZQ WØBV W8LU

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)
KC7V, 199 (34)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W6SR, 199 (37)
W3NO, 199 (26)
K4UTE, 199 (18)
HB9DDZ, 199 (31)
RU3FM, 199 (1)
HB9BGV, 199 (31)
N3UN, 199 (18)
OH2VZ, 199 (31)
K2UU, 199 (26)
W1FZ, 199 (26)
UT4UZ, 199 (6)
SM7BIP, 199 (31)
PY5EG, 199 (23)
SP5DVP, 199 (31 on 40)
K7FL, 199 (23)
W1DIG, 199 (24)
KY7M, 199 (34)
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)
LA7FD, 198 (3, 4)
K5PC, 198 (18, 23)
VE3XO, 198 (23, 23 on 40)
K4CN, 198 (23, 26)
KF2O, 198 (24, 26)
W6BCQ, 198 (37,34on40)
G3KMQ, 198 (1, 27)
N2QT, 198 (23, 24)
OK1DWC, 198 (6, 31)
W4UM, 198 (18, 23)
US7MM,198 (2, 6)
K2TK, 198 (23, 24)

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

YT1AD (195 zones)
SV8CKM (154 zones)
IK6EIW (163 zones)
ZL2AL (182 zones)
JT1CO (191 zones)

Endorsements:

W5BOS (200 zones)
K7FL (200 zones)
KY7M (199 zones)
K2TK (198 zones)
EA7GF (192 zones)
UA6MF (200 zones)
RU9TU (191 zones)
ES1FB (180 zones)

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

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

find the least occupied frequency, irrespective of where we were working.

"During a contact, it did not bother me when friends communicated the fact that they were on the band by flashing their suffix just before completion of a contact. What is bothersome is undisciplined and aggressive calling throughout a contact, making the contact with a weaker station more difficult, reducing the tempo of operation and reducing the chances of making a contact with the expedition. Following the orchestra analogy, Europe reminds me of an orchestra where the musicians all play from their own personal score, independent of the conductor and fellow-players, resulting in total chaos.

"There is no point in calling an expedition that you cannot hear. Even if you get through, how will you know, and if you repeat the call you risk a rebuke from the expedition. When writing my log for the dispatch of QSL cards, I noted a case of up to five contacts by the same station, on one band, on the same mode—four amateurs were deprived of the chance to make contact. This happened mostly on low bands.

"Some of the new amateurs do not know the principles of expedition operation. They cannot get their bearings, and because they are used to using cluster spots, they cannot even listen. The veterans often set a bad example for others by allowing themselves to get caught up in an aggressive and inconsiderate style of operation. They are try-

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	EA2IA 333	W8XD 332	I4LCK 330	N4CH 327	I5XIM 325	KE5PO 322	N1HN 313	KH6CF 301
K2FL 333	F3AT 333	WØHZ 332	VE7CNE 330	I1JQJ 327	K5UO 325	K6CU 321	CT1YH 313	K9HQW 299
K9BWQ 333	DJ2PJ 333	WØJLC 332	4N7ZZ 330	YU1TR 327	N5HB 325	N4OT 321	K9OW 313	F6HMJ 296
K2ENT 333	K2JLA 333	N5FG 331	K3JGJ 330	I4EAT 327	YU1AB 325	HA5DA 321	N7WO 312	WG7A 295
N7FU 333	W7CNL 333	PT2TF 331	KZ4V 329	DL8CM 327	IK2ILH 325	VE7DX 320	K9DDO 312	W9IL 294
K3UA 333	YU1HA 333	K6LEB 331	K7LAY 329	SM6CST 327	W4UW 325	HA5NK 319	W3II 312	KD8IW 288
K9MM 333	PA5PQ 333	N4JF 331	K9IW 329	N4KG 327	N5FW 325	W7IIT 318	KF8UN 308	EA3BHK 282
K2OWE 333	DL3DXX 333	VE3XN 331	WB4UBD 329	IT9TQH 326	9A2AA 325	K1FK 318	PY4WS 308	YC2OK 282
N4MM 333	IT9QDS 333	W1WAI 331	NØFW 329	K7JS 326	K8LJG 325	SM5HV/HK7 317	IKØADY 307	UA9SG 279
W4OEL 333	N7RO 332	K2JF 331	G3KMQ 329	I2EOW 326	K4JLD 325	G3KMQ 317	W6YQ 306	XE1MD 278
W7OM 333	K6GJ 332	WA4IUM 331	N4AH 329	NC9T 326	LA7JO 324	K8JJC 315	YT1AT 304	EA2CIN 278
F3TH 333	K4IQJ 332	W6DN 330	K8PV 327	OK1MP 325	W6SR 323	WG5G/QRPp 315	LU3DSI 302	I3ZSX 276
WB5MTV 333	K4CN 332	W2UE 330	W4QB 327	W4LI 325	9A2AJ 323	OZ5UR 315	F5OIU 302	G3DPX 275
W2FXA 333	G4BWP 332	KA7T 330	K1HDO 327	WA8DXA 325	KUØS 322	HB9DDZ 314	YU7FW 301	

SSB

K4MZU 333	N5FG 333	OE2EGL 332	K1UO 331	KE4VU 328	K6BZ 326	NI5D 322	KD5ZD 312	KK4TR 293
K2TQC 333	DJ9ZB 333	K4JLD 332	YV5IVB 331	K1HDO 328	W4WX 326	PY2DBU 322	W5GZI 311	K7ZM 292
K2FL 333	EA2IA 333	KSØZ 332	VE2GHZ 331	K5UO 328	W6SR 326	N3RX 321	WZ3E 311	OA4EI 292
W6EUF 333	XE1L 333	N5ZM 332	KX5V 331	KF8UN 328	N4KG 326	EA8TE 321	VE3CKP 311	KØOZ 291
K2JLA 333	W6BCQ 333	WB4UBD 332	I8LEL 331	EA3EQT 328	W5LLU 326	XE1CI 321	CT1YH 311	KE4SCY 291
K6GJ 333	XE1AE 333	WB3DNA 332	W2CC 331	KB2MY 328	W9HRQ 326	W6MFC 321	LU3HBO 310	I3ZSX 290
K2ENT 333	4N7ZZ 333	CT1EEB 332	W9SS 330	AE5DX 328	W4QB 326	DL3DXX 320	SV3AQR 310	N8SHZ 290
K6YRA 333	KE5PO 333	K4CN 332	W7FP 330	W2JZK 328	K8PV 326	WA4ZZ 320	HA6NF 310	W4PGC 288
K4MQG 333	PY4OY 333	K9PP 332	WDØBNC 330	KZ4V 328	DL6KG 326	KØFP 320	HB9DDZ 310	YV5NWG 287
K7LAY 333	VE1YX 333	W6SHY 332	K3UA 330	W2FKF 328	W4LI 326	EA1JG 320	EA3BHK 307	N5WYR 286
IK1GPG 333	XE1VIC 333	I8KCI 332	K8CSG 330	KD8IW 328	IKØIOL 325	EA7TV 320	N1ALR 306	RW9SG 286
K5OVC 333	IN3DEI 333	VE4ACY 332	W6DN 330	I1EEW 327	K1EY 325	SV1RK 320	XE1MDX 305	VE7HAM 285
NØFW 333	I4LCK 333	LU4DXU 332	WA4IUM 330	SV1ADG 327	YV5AIP 325	K3LC 320	EA5OL 305	F5RRS 284
OZ5EV 333	VE3XN 333	W5RUK 332	EA3KB 330	DL8CM 327	K9IW 325	N4CSF 320	WB2AQC 305	CT1CFH 284
K9MM 333	OE7SEL 333	VE3MRS 332	ZL3NS 330	W2FGY 327	WA4JTI 325	N4HK 320	N1KC 305	WØIKD 283
ZL3NS 333	W2JZK 333	VE2WY 332	VE4ROY 330	I1JQJ 327	NI5D 325	WA4DAN 319	KE4SCY 304	EA3CYM 283
N4MM 333	EA4DO 333	VE7WJ 331	YV1CLM 330	F9RM 327	KC4MJ 325	CE1YI 318	KC4FW 304	WN6J 281
OZ3SK 333	VE3MR 333	K9OW 331	K9HQM 330	XE1MD 327	K7HG 324	YV4VN 317	K3BYV 303	F5JSK 281
N4CH 333	K5TVC 333	PT2TF 331	LA7JO 330	I4EAT 327	AC7DX 324	EA5GMB 317	YC2OK 303	YU1TR 280
IØZV 333	PA5PQ 333	W8KS 331	WS9V 329	W3GG 327	KØHQW 324	W5OXA 317	WB2NQT 303	KK5UY 280
YU1AB 333	W4UW 332	W8AXI 331	I2EOW 329	AA6BB 327	ZL1BOQ 324	CT1AHU 316	VK3IR 303	KA5OER 280
W7OM 333	K9BWQ 332	W3AZD 331	K2JF 329	SM6CST 327	WØULU 324	N5HSF 316	W2GZI 302	AC6WO 278
KZ2P 333	KØKG 332	OE3WWB 331	ZL1AGO 329	W9OKL 327	EA3BKI 323	K6RO 316	N5QDE 302	EA3CWT 278
K7JS 333	W4NKI 332	DL9OH 331	N5FG 329	WD8MGQ 327	K4JDJ 323	K7TCL 315	KD4YT 302	VE2DRN 277
DU9RG 333	VE2PJ 332	N2VW 331	DU1KT 329	CX4HS 327	W9IL 323	WR5Y 315	SV3AQR 302	XE2NLD 277
W4UNP 333	YV1KZ 332	YZ7AA 331	4Z4DX 329	IØSGF 327	WW1N 322	LU5DV 315	YT7TY 300	9A9R 277
N7BK 333	YV1AJ 332	YV1JV 331	VE7DX 329	IT9TQH 327	F6BFI 322	CP2DL 314	SV2CWY 300	W6UPI 276
N7RO 333	W2FXA 332	WA4WTG 331	N5ORT 329	IT9TGO 327	K6CF 322	K9YY 313	4X6DK 300	VE2AJT 275
IK8CNT 333	W8ZET 332	N4JF 331	CT1EEN 329	DK5WQ 327	LU7HJM 322	YT1AT 313	K6GFJ 299	Z31JA 275
VK4LC 333	WØYDB 332	EA1JG 331	K3JGJ 329	UY5XE 327	K5NP 322	NØMI 313	4X6DK 297	G4URW 275

RTTY

K2ENT 331	NI4H 321	K3UA 315	KE5PO 297	I2EOW 291	EA5FKI 284	W4QB 280	YC2OK 280	PA5PQ 272
WB4UBD 325	W2JGR 316	G4BWP 307	W4EEU 291	I1JQJ 289				

ing to *make their mark* at any cost, even at the expense of fellow DXers.

"I would like to ask decent European operators to help get Europe back to 'ham-spirit and proficiency' through their personal example and the tactful education and enlightenment of their colleagues."

This comes from an experienced DXer and is heard repeatedly from DXpeditioners returning from their trips. Time and time again we read the same thing, and yet we don't seem to be reaching those people who are causing the problems. Who are these people? Where are these people? Are they living underground until a DXpedition comes on the air? I don't think so! They are right out there every day and I'm sure at least some of you know who they are.

The time is *now*, DXers. Take up the challenge, pick up that ball, let's find some way to communicate with these people. Impress upon them that we have had it with their selfish games and want no more of them. If they have worked everything, if they have achieved every goal in their lives, I truly feel sorry for them. They certainly don't have any respect for you and me, and obviously they have little or no respect even for themselves. The NOW generation has to learn how to live in this world with the rest of humanity, and it's high time they started doing it.

Every DXpedition that I can recall reading about has praised the Japanese operators on their operating discipline and courtesy. Why is it that only one place on Earth has this distinction? Perhaps some of our readers have thoughts on this, and I would like to hear from them. I congratulate our DXer brothers in Japan for the honor of being known as the best, most courteous operators. Wouldn't it be nice if others could be so honored?

Think about this, fellow DXers. If you

CQ DX Awards Program

SSB

2367	UY5XE	2369	N8SHZ
2368	KK5PM	2370	AC6WO

SSB Endorsements

320	VE2WY/332	275	KK4TR/293
320	W2CC/331	275	N8SHZ/290
320	UY5XE/327	275	AC6WO/278
320	DK5WQ/327	Mobile	AC6WO
320	WØULU/324		

CW Endorsements

320	N5HB/326	320	K4JLD/325

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.

truly enjoy the hobby and the challenge of DXing, you must do your part to see that it remains a fun and enjoyable aspect of amateur radio. Are you up to that challenge? Let's hope at least some of you are!

Upcoming DXpeditions

By next month we should know how the North Korea operation by Hrane, YT1AD, turned out. He is due to start up from there on March 5. *(It didn't happen, see News - W2VU)*

The much anticipated operation from the all-time new one, Ducie Island, is set to begin in mid-March.

In mid-April a team will activate Mellish Reef – VK9M for ten days. They operated for about four days last year on a research trip so they could better plan the longer operation in April.

Hrane, YT1AD, will be taking a team to Baker Island – KH1 at the end of April for a ten-day run at dropping this one on the Most Wanted listings. It currently ranks #11 worldwide on *The DX Magazine*'s list.

Dayton 2002

Are you ready for some fun at Dayton this year? Sure you are, and we'll be looking forward to seeing a lot of you there. Drop by the *CQ* booth, or stop off at booth # 313 to say hello. I'll be at both places, but mostly at #313.

Until next time, I urge you to give serious thought to my main topic this month. It is our hobby, and we should strive to make our aspect of it the best it can be. With your help we can make a difference. 73 and Good DXing,

73, Carl, N4AA

QSL INFORMATION

1Z90CW – pirate
2CØWGK via GW4LFO
3AØAA – pirate
3A2HA – pirate
3B8ST via DL1BDF
3B9R via K7ZD
3CØN via DJ6SI
3D2CH via JF2GYH
3D2CW via DK7PE
3D2EH via K8VIR
3D2HI via JA1KJW
3D2MS via JF3ELH
3D2OH via JR2KDN
3D2RW/R via ZL1AMO
3D2SM via N4QCJ
3D2WD via DL6DK
3D6BG via G4GEE
3DAØBW via 7Q7BW
3GØY via DK7YY
3G1B via VE2AQS
3M3B via YV3BKC
3V8J via I5JHW
3V8RL via DL6RL
3W4DK via OK3IA
3XØHME via F5MGX
3XY2A via ON4QY
3Y2GV via LA6ZH
3Z2UKB via SP2UKB
3Z9JPG via SP9KAG
4B1PAZ via VE7DP
4D9RG via DU9RG
4E9RG via DU9RG
4J1FM via AHØW
4KØGZ via UW3GZ
4K1AH via UA4HOV
4K1YAR via UA3YAR
4K1ZI via RB5JBU
4K3DX via YL2DX
4K3SS via RA3SD
4K4BEU via UL7BJ
4K500R via GW3CDP
4K7FA via OE3SGU
4LØG via DL7BO
4L1BW via 4Z5CU
4L6VV via UA6EZ
4M1A via YVIJV
4M5X via W4SO
4M9X via YV5ARV
4N1AU via YU1DZ
4N4AO via 9A2AJ
4N4EVC via DJØQJ
4N6HN via YU6KOP
4N7R via YU7KWX
4N7V via YU7AJJ
4O79WARC via YU2DX
4S7/DK2SC via DJ3FW
4S7DGG via GØLUH
4S7GS via DK8KL
4S7MR via KZ8Y
4U/F6FNL via F6ITD
4U1WB via KK4HD
4U9ITU via 4U1ITU
4X/SM7PKK via SM6CAS
4X/VE1BAG via VE1RU
4X1EL via 4X6IL
4X1VF via K1FJ
4X50FR/SK via 4Z1PF
4X50WB/SK via 4X6YY
4X90BS via 4Z4UT
4Z5FW via RW6HS
4Z5JQ via K2OVS
5BØA via 9A2AJ
5B4ADA via YU4YA
5B4EZ via OE3EPW
5H1X/2 via KQ1F
5H3BH via SMØAJU
5H3GW via AK1E
5H3KG via I1IMC
5K130P via HK6DOS
5K4LRM via HK4LRM
5L2BY via DH3BHF
5L7A via DL2GA
5NØGDE via VE6EEE
5NØWRA via DF3FN
5N2AHQ via WB4UDS
5N2SYT via IKØPHY
5N3BHF via OE6LAG
5N6MRE via K4ZKG
5N9KWO via NØUN
5RØA via F6FNU
5R9GN via IK2GNW
5T30MTN via 5T5HH
5U7NAS via 3A2AH
5V7FA via F6FNU
5WØFN via HB9HFN
5WØSJ via 3D2SJ
5W1BM via DF2RG
5W1BU via WA6YIE
5W1IK via JA3RCT
5W1JJ via K6VNX
5W1KM via JR3OIB
5X1MW via W4PFM
5X4B via DL8AAM
5Z4CS via JE1JKL
5Z4FK via WD6ERA
5Z4JA via JA8CDT
5Z4XW via SM5XW

(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>.)

Awards

BY TED MELINOSKY, K1BV

News Of Certificate And Award Collecting

We begin this month with a couple of county hunting topics. The first is with regard to signal reports. A recent discussion on the K3IMC forum concerned signal reports, and what is or isn't acceptable for USA-CA. Interestingly, the official rules of the program do not even mention signal reports, nor does the *USA-CA Record Book* contain a column for a signal report. A common-sense interpretation would be that the two stations involved feel comfortable enough to have conveyed enough information so that they feel the card represents a real contact. The RS/T system implies that the minimum signal report would be on the order of 22 or 33, but it's not in the rules.

Another question was what kind of signature is needed on the QSL card. Again, the rules do not delve into such details. The rules do say, however, that the decisions of the Award Custodian (that's me) in administering the rules and their interpretation are final. I say that any signature, initial, scrawl, or individualized rubber-stamp marker on the card that claims to be the identification of the signer is satisfactory for USA-CA Award's purposes.

Richard Darwicki, N6PE
USA-CA All Counties #1035

This month we hear from Rick, N6PE, who attained USA-CA All Counties #1035 on November 14, 2001.

I knew there had to be a reason why I kept every one of my log books and QSL cards. How else could I bore you with all of this? The first log entry is for March 3, 1959 from Trenton, New Jersey, a futile CQ on 3.724 as WV2DZW. Then I'll never forget the day WV2DDI came back to me on 80 CW; my homrbrew 6L6 transmitter actually worked!

October 1959 shows CQs and even a few contacts from an apartment in California using a 60 watt bulb dummy load as an antenna. I haven't been able to get my mother to admit it, but I think she is part gypsy. We moved nine times in one year before I managed to get the great CW contest call WA6JZZ in late 1959. Try sending it twice in a pile-up.

With all the moving, most of my ham interest went toward designing and building equipment, not operating. My favorite homebrew was a very compact QSK transmitter with a VFO and dual 6164's that covered 80 through 10 meters. Somewhere along the line I have dabbled in almost every phase of hamming—Oscar, ATV, RTTY, etc.

It wasn't until 1970, after being married for five years, that my wife and I moved into our first house. The 50 × 100 foot lot wasn't much help as far as an antenna farm went. I managed to put up a rooftop 40/80 short vertical with 60 radials and a tribander on a 35 foot tower. CW was always less intrusive to my non-ham XYL and the kids. Headphones made life easier on everyone. Almost all of the log entries are on CW, until some SSB contest contacts in 1973.

Then it happened. February 1, 1974 shows a run of 16 aeronautical mobile contacts complete with "county" and state. The hook was set. In the days that follow there were QSOs with the likes of K9DCJ, WØGV, KØIFL, K7LTV, W5UUM, and even WB6CKU. The quest was on. All the old QSLs were reviewed for county names, and tons of SASEs went out. The basic USA-CA Award with 500 and 1000 county stickers began to gather dust on my wall in September 1976.

In 1975 we moved to a much larger lot and house. The city I live in has a 35 foot height limit, so the same old tower is still standing. It appears that from about 1978 to 1987 most of my operating was on 14.336 or in one contest or another—a lot of the state QSO parties, ARRL Sweepstakes, 160 meter contests. The new call of N6PE accounted for the 1500–2500 stickers on the now-yellowed USA-CA Award. In the mid '80s my mobile rig was stolen and county hunting stalled.

My job from 1988 to 1999 involved limited daily travel and only occasional trips of over 50 miles. As far as I can remember, I did not replace the mobile rig until around 1996. Because of the limited travel and west coast conditions, about the only mobile operation I did was on my lunch hour. It was very discouraging. Propagation always seemed poor at local noon, and by the time I left at night everyone had disappeared from the net.

I quit my job to start the new millennium working from home and decided to finish the 200-plus counties I needed. My work involves having the computer online most of the time, and the RF always blows away the DSL modem. Anyway, that's my excuse for not helping more on the net, but I did put in my time back in the '80s as a west coast assistant.

My sincere thanks to all the mobiles, net control stations, and fixed stations I bugged for skeds. July 23, 2001 found Jeff, N4EWK, giving me the last one for the "whole ball of wax," and I put away the mic. This year I may be back on the CW net and stop in on the SSB net and bug everyone. Thanks again, ladies and gentlemen. —*N6PE*

65 Glebe Road, Spofford, NH 03462-4411
e-mail: <k1bv@cq-amateur-radio.com>

USA-CA Special Honor Roll

Robert D. Bailey, K3AQH
USA-CA All Counties #1037
February 16, 2002

Richard Weil, KWØU
USA-CA All Counties #1038
February 25, 2002

USA-CA Honor Roll

500

K6QWH	3181
OK1CZ	3182
K3AQH	3183

1000

K6QWH	1589
K3AQH	1590

1500

K6QWH	1328
K3AQH	1329
9A5I	1330

2000

K6QWH	1228
K3AQH	1229

2500

K6QWH	1149
K3AQH	1150

3000

K3AQH	1059

The total number of counties for credit for the United States of America Counties Award is 3077. The basic award fee for subscribers is $6.00. For nonsubscribers it is $12.00. To qualify for the special subscriber rate, please send a recent CQ mailing label with your application. Initial application may be submitted in the USA-CA Record Book, which may be obtained from CQ Magazine, 25 Newbridge Road, Hicksville, NY 11801 USA for $2.50, or by a PC-printed computer listing which is in alphabetical order by state and county within the state. To be eligible for the USA-CA Award, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated June 1, 2000. A complete copy of the rules may be obtained by sending an SASE to Ted Melinosky, K1BV, 65 Glebe Road, Spofford, NH 03462-4411 USA. DX stations must include extra postage for airmail reply.

Italy's ARI 75th Anniversary Awards Program

The Associazione Radioamatori Italiani (ARI) is celebrating its 75th anniversary during 2002. To help publicize this event, they are sponsoring two awards for contacting Italian stations during the year. For each award the following general rules are in effect:

The cost of each award is 6 Euros, $US5, or 10 IRCs for Europeans, and 7 Euros or $US6, or 12 IRCs for others. Using the form you can download at <http://www.ari.it>, send your application with the list of contacts before the end of March 2003 to: I2MQP, ARI 75 years Award Manager, c/o ARI, Via Scarlatti 31, 20124 Milano, Italy. The first award listed below will be somewhat easier to earn than the second, but if you are active in the DX world during the year and make an effort to work a lot of the 300 watt maximum-power stations all over the bands, you have a good chance of achieving the province award.

This Associazione Radioamatori Italiani sponsored award is for contacting Italian amateur radio stations during 2002, the 75th anniversary year of the association.

ARI 75th Anniversary. Contact Italian amateur stations during the anniversary year of 2002 and earn a total of 75 points using the following point schedule: 1 point per contact for European stations; 3 points per contact for stations outside Europe. Each Italian station may be contacted only once, regardless of band or mode. Contacts with special stations IY1TTM, IY4FGM, IYØGA, IYØTC, or IYØTCI and II2ARI count 3 points for Europeans and 5 points for stations outside Italy. You can use a maximum of three special stations toward the award.

The Worked All Italian Provinces award also commemorates the ARI's 75th anniversary in 2002.

Worked All Italian Provinces 2002. The ARI WAIP 75th anniversary award recognizes the accomplishment of making contacts with Italian amateur stations during 2002. Contact Italian stations in different provinces. European stations have to contact 50 different provinces and two of the special stations. Stations outside Europe have to contact 30 different provinces and one special station. The list of the 103 valid provinces can be found on the application form.

The Worked EI Counties Award is issued for contacting at least 20 of the counties in Ireland.

The WAI Award, sponsored by the Galway VHF Group on behalf of the Irish Radio Transmitters Society, is issued

Awards from Ireland

John Desmond, EI7GL, was kind enough to send samples of two especially handsome Irish awards for this column. In addition, I've included an award offered by the Galway VHF group for island hunters.

Worked EI Counties Award. Work or hear (SWL okay) at least 20 of the following counties after 1 January 1982: Carlow, Dublin, Laois, Mayo, Sligo, Wicklow, Cavan, Galway, Leitrim, Meath, Tipperary, Clare, Kerry, Limerick, Monaghan, Waterford, Cork, Kildare, Longford, Offaly, Westmeath, Donegal, Kilkenny, Louth, Roscommon, and Wexford. Look for the rarer Irish counties to be activated each St. Patrick's Day (17 March) by the IRTS. Endorsement available for all 26 counties. Hams with an Irish ancestry (SWL okay) may join IRTS as honorary members. Send an SASE to W2ORA for details. For the award send GCR list and

IR£3 or 10 IRCs to: IRTS Award Manager, Box 462, Dublin 9, Ireland.

Worked All Ireland Awards Program. These awards are sponsored by the Galway VHF Group on behalf of the Irish Radio Transmitters Society. SWL okay. Contacts must have been made since 1 May 1995. All bands and modes. No use of repeaters. Application forms are required and may be obtained from the sponsor. WAI books are needed and are available from Dave Moore, EI4BZ, Booneen Carrigtwohill, Co. Cork, Ireland. Cost is £6.00 including postage. Send GCR list with official form to: WAI Awards Manager, Steve Wright, EI5DD, 18 Sylva Avenue, Fairlands, Newcastle, Galway, Ireland.

WAI Award. Requires working Irish stations in grid squares, similar to the WAB award in England. A detailed explanation is found in the rules/record book. The four levels have grid requirements as shown in Table I.

Islands Awards. EI's need to work 12 different Irish islands, and all others need 7. There are endorsement stickers for every added 10, up to 52 for EI and 47 for overseas. (An island is defined as an offshore piece of land not connected to the mainland by a bridge or causeway).

Level	EI/GI	Overseas	Counties	Islands
Basic	175	150	15 (at least 3 in GI)	1
Bronze	250	200	22 (at least 5 in GI)	3
Silver	420	350	32	6
Gold	600	500	32	9

Table I– Grid requirements for the four levels of the Worked All Ireland Award.

KM5EW Maidenhead Grid Squares Awards Series

While there are a number of foreign awards based on working stations located in the Maidenhead Grid Squares, and this is a familiar concept to VHFers, Warren Rowe, KM5EW, has introduced an interesting USA series of awards based on this system. For additional information on grid squares, visit <http://www.qsl.net/hb9dsu>.

The USA Grid Locator Award is one example of the Maidenhead Grid Awards series offered by KM5EW.

General Requirements. Make contacts in Maidenhead grid locators on HF bands on or after 1 January 2000. SWL okay. No use of repeaters or cross-mode contacts. Maritime-mobile contacts are accepted, but no aeronautical-mobile contacts. All contacts must be made within a 50 mile radius. The ARRL World Grid Locator Atlas and North American Grid Locator Map will be the guidelines for the entire series. Send GCR list and fee of $US5 for W/VE and $US8 for others. Endorsement stickers are $US1 and $US2, respectively. Do not send IRCs or postage stamps. Apply to: Warren Rowe, KM5EW, P.O. Box 2457, Temple, TX 76503.

USA Grid Locator Award. Basic award for confirming contacts with 300 USA grid locators. Endorsements for 400, 500, 600, and 700 grids.

Worked All Alaska Grids Award. Confirm contacts with all grid locators within the state of Alaska. Only the locators including the town of Unalaska in the Aleutian Islands and eastward will be used in the award series.

Worked All California Grids Award. Confirm contacts with all grid locators within the state of California.

Worked All Texas Grids Award. Confirm contacts with all grid locators within the state of Texas.

Interstate 35 Grid Award. Confirm contacts with all 23 grid locators through which Interstate 35 passes, from Laredo, Texas to Duluth, Minnesota.

Internet Site of the Month

LA8QJA has assembled a pretty complete and well-organized site showing the awards of the Scandanavian countries. It's worth bookmarking <http://krypinn.org/la8qja/ham/Award.htm>.

Need publicity for your club's awards series? We're always willing to help out. Feel free to contact me at the e-mail address shown at the beginning of this column. 73, Ted, K1BV

VHF Plus

BY JOE LYNCH, N6CL

All About The World Above HF

Mobile Hamming—A Driving Distraction?

It's spring, time to put together your summer VHF contest stations. For many of us, your editor included, it's time to look at improving the Rover station. Considering what I discovered last year in one of my university classes, it may also be time to look at a major note of caution.

Background

This past year I took a graduate course in cognitive psychology at the University of Tulsa. As part of the course requirements, I had to construct an experiment that would demonstrate knowledge and applicability of the course content. Because of my interest in my hobby, I chose to study amateur radio use while operating a motor vehicle.

This experiment was pioneer work (To my knowledge, there has been no other formal investigation of the relationship between ham radio use and operating a motor vehicle.), so I had to rely on empirical data associated with cellular telephone use while operating an automobile.

By design, cellular telephones provide their users with two-way communication. Much contemporary press has been devoted to the problems associated with the use of cellular telephones while driving. Since mobile amateur radio operation is a form of two-way communication that take place in a manner similar to cellular communication in an automobile, it was hypothesized that because some level of distraction has already been proven concerning the use of cellular telephones while driving, some level of amateur radio operation also can be distracting to a person who is simultaneously driving an automobile.

A landmark study involving cellular-telephone use while driving was the subject of an article published in the February 13, 1997 issue of the *New England Journal of Medicine en*titled "Association between Cellular-Telephone Calls and Motor Vehicle Collisions."[1] 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 while driving and being involved in an accident. As part of their study, each person's cellular-telephone calls on the day of the collision and during the previous week were analyzed through the use of detailed billing records. They discovered that a total of 26,798 cellular-telephone calls were made during the 14-month study period.

The findings were astounding! Among them was that people who operate cellular telephones while operating an automobile were four times as likely to be involved in an accident as people who were not operating a cellular telephone. This statistic is on par with driving drunk!

The article also pointed out that it was not the physical operating of the cellular telephone that was at fault, because they found that there was no significant difference between those who operated a handheld phone and those who operated hands-free (something that New York State should note!). The significance was in what the operators were doing, or rather not doing, with their brains at the time of the accident. They were *not* concentrating on their driving.

The one redeeming feature of the *NEJM* report was that the article didn't recommend banning the use of cellular telephones, because 39 percent of the time they were used by the motorists to phone in the accidents after they were involved them!

The article is not without controversy. In a July 10, 1997 letter to the editor of the *NEJM*, Dr. Peter J. Cohen points out that the authors of the study may have picked the wrong control or independent variable, that of talking while driving. Indeed, there is contemporary evidence that talking with someone while driving actually contributes to alleviating the effects of driver fatigue.

Moreover, within a November 1997 report produced by the U.S. Department of Transportation entitled "An Investigation of the Safety Implications of Wireless Communications in Vehicles," the writers state, "Voice communications, if sufficiently frequent and simple to perform, appear to enhance driving performance with fatigued drivers." Many of us hams, particularly those of us in the trucking industry, know this aspect of driving and talking to someone else to be true and frequently employ ham radio as a way to keep awake on long journeys behind the wheel.

Considering the commonality of cell phones and amateur radio communications, in your editor's opinion, it is easy to make transferable applications between amateur radio operators and cell-phone users.

As we know, a significant number of us operate a radio while driving, and if we are honest with ourselves, we will admit that 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, for amateur radio purposes we can assume statistics similar to those cited in the article for cellular-telephone users. We need to be aware of this danger both to ourselves and to those around us on the road. When we operate a radio while in motion, we clearly increase our risk of being in an accident and of potentially involving others.

Of course, not all amateur radio related activity is equally distracting. In an effort to identify levels of distraction, I have outlined the most common levels of involvement, 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, as with any car radio.
3. Limited amateur radio communications. The operator/driver is engaged occasionally 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

VHF Plus Calendar

May 4	Last quarter Moon.
May 5	Poor EME conditions.
May 7	Moon apogee.
May 12	New Moon. Poor EME conditions.
May 16	Highest Moon declination.
May 17-19	Dayton Hamvention. (See text for details.)
May 19	First quarter Moon. Very good EME conditions.
May 23	Moon perigee.
May 26	Full Moon. Poor EME conditions.
May 29	Lowest Moon declination.

• *EME conditions courtesy W5LUU*

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[1]Specific references available from the author.

would most often take place during a contest or intense band opening, and would be the category into which a Rover operation would likely fall.

Design and Overview

For my class experiment I 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. I felt that if I could demonstrate involvement at the earliest possible level (that of passive listening), then I could postulate involvement at each subsequent level.

In an internet-posted paper entitled "A Review of the Cocktail Party Effect" author Barry Aarons states, "Segregation that is learned, or involves attention, is considered to be based on a higher level of central processing. Anything that is consciously 'listened for' is part of a schema." He goes on to state that his research findings indicate that "...only a limited number of things can be attended to simultaneously, so there is a limitation on our ability to process schemas."

Assuming that the "cocktail party effect" has application in my findings, I proposed that an experiment be constructed that would engage the participant physically, visually and auditorially. I proposed that the participant should be looking at and doing something that would require some level of skill, such as completing a number of addition problems during a period of 90 seconds. During the first session of the experiment the participant would hear nothing. During the second session, the participant would hear a taped amateur radio conversation, having been informed beforehand that a question would be asked concerning its contents. For the location of the experiment, I proposed using an amateur radio club meeting, thereby testing a number of participants at the same time.

It is my premise that we only can concentrate on one activity at a time. Therefore, the activity of doing the addition problems would be interrupted by the activity of being engaged in the monitoring of the amateur radio conversation. 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.

Participants and Methodology

Members of the Tulsa Amateur Radio Club became willing participants during their monthly meeting on April 17, 2001. Permission was obtained from the club's board of directors to present the experiment as part of the entertainment section of the meeting.

The experiment was devised to measure a skill done both in silence and while the participants listened to a tape of an actual amateur radio conversation. The silence segment of the experiment was done to simulate driving an automobile while one's amateur radio station is either not present or turned off.

The segment performed during the time that the tape was playing was done to simulate driving an automobile while one's amateur radio station is turned on and the vehicle operator is engaged in listening to the radio to the extent that he or she is casually listening, but with some intentionality.

Both written and verbal instructions were given to the participants. These written and verbal instructions are covered below and elsewhere in this article.

Tasks and Materials

The task of the experiment consisted of calculating a number of simple two-by-three addition problems, such as 268 + 714. The participants were given 90 seconds to complete 24 problems, and then were asked to answer a single question at the end of the second exercise. Approximately 30 seconds were given to complete this final task.

The experiment was administered, both before and after my speech (I agreed to

New 241 GHz DX Record, Again and Again

The following is from Brian Justin, WA1ZMS:

I'd like to report what looks to be a new world, as well as North American DX record for the 241 GHz band. On February 23, 2002, Pete, W4WWQ, and I (WA1ZMS/4) set several new DX records for the band. We first worked over a distance of 3.8 km, then 6.1 km, and finally 7.3 km, at which point we ran out of signal margin for the WX conditions at the time. (The former world record was 2 km by DB6NT and the NA record was 1 km by W2SZ/4.)

The details of the claimed 7.3 km record are as follows: Feb. 23, 2002 at 19:45 UTC; WA1ZMS/4 located at 37-22-56N 79-14-43W (FM07ji) and W4WWQ/4 located at 37-21-13N - 10-15W (FM07ji), a location-to-location distance of 7.3 km. The weather at time of QSO was: temperature 8.3 degrees C, dew point 2.8 degrees C, relative humidity 46 percent, pressure 1017 millibars, and calculated loss of 1.70 dB/km.

The stations used were improved versions of the ones used in December 2001 for the former North American DX record. The improvements involved the phase locking of the 80.6 GHz Gunn sources back to homebrew ovenized crystal oscillators. This allowed the use of FSK-keyed CW and the use of a narrow-band receiver IF. The IF receivers were an ICOM R-7000 and a Yaesu FT-817. The IF freq. was 439.7 MHz +/- some frequency drift. The ovenized crystal oscillator frequency is effectively multiplied some 2220 times to get to 241 GHz! The stations were able to maintain better than 2 kHz stability over several minutes. Frequency drift was still a problem, however, and with weak signals several repeats of the exchanges were needed to complete the 6.1 and 7.3 km QSOs. If drier WX comes along, better DX may be achieved.

For this QSO I'd like to thank Pete, W4WWQ, for his roving efforts, WA4RTS for the loan of an R-7000 in place of his being able to assist with this weekend's QSOs, and Jeffrey Hesler of VDI.

Then on March 11, 2002 Brian again notified the world that he had set another new world record on 241 GHz:

I'd like to give the very latest update on our efforts at 241 GHz because some cold and dry WX again came our way. On March 11, 2002 at 02:25 UTC, WA1ZMS/4 worked W4WWQ over a new distance of 11.4 km.

The details are: WA1ZMS/4 37-33-04N 79-03-45W FM07ln and W4WWQ 37-33-56N 79-11-26W FM07jn. The mode used was FSK CW and gear was the same equipment that's been used of late for other 241 GHz QSOs. This time some additional performance was tweaked out of the RX IF amps.

The point-to-point distance: 11.4 km, and the 6-digit-grid to 6-digit-grid: 13.1km. I'd love to claim 13 km, but I know the point-to-point distance is correct and is really the true distance.

The weather at time of QSO: temperature 5.6 degrees C, dew point –15 degrees C, relative humidity 21 percent, pressure 1025 millibars, and the calculated loss .647 dB/km.

I can honestly say that this looks like the limit of what we can do for DX with the gear I have without a major redesign (i.e., more power, bigger dish antenna, new RX harmonic mixer, etc.). Once more, I'd like to thank Pete, W4WWQ, for going out again in the cold at night, and Dave, KD4EMU, for going roving with me.

give a talk to the club in exchange for the members' participation in my experiment.) to all qualified (see below) attendees who wished to participate. The variation was that the silence test session was done first during the "before" session and second during the "after" session. The before and after session each had a different question to answer. However, both questions related to the content of the taped amateur radio conversation. Participation was limited to licensed amateur radio operators who also are licensed drivers.

As a prelude to the experiment, I introduced my wife, Carol, W6CL. I referred to her by name and callsign, adding that she is a net control station for a traffic net on Monday mornings. I purposely introduced her and identified her role for the purpose of introducing a false cue to the answer to the question in part three of the experiment. In the tape my wife was in conversation with the net control station operator who was taking her place, and they were discussing his having taken her place. The question for the first session was to give the callsign of the net control operator, who was *not* my wife. The question for the second session was to give the *name* of the net control operator, who again was not my wife.

Results

A total of 16 persons participated, 14 during the first session and two during the second session. Of the 16 participants, two from the first group were discarded and the whole second session was not graded for the following reasons. One person in the first group subtracted the numbers instead of adding them during the first session, but then correctly performed addition during the second session. I determined that despite both verbal and written instructions to the contrary, this person failed to follow the instructions, thereby fatally tainting his results.

The second person whose results were discarded was not a licensed amateur radio operator, but participated in the experiment despite my instructions to the contrary. I determined that because this person was not an amateur, her lack of experience in hearing amateurs converse on the air would inhibit her ability to re-

Current Conferences

Dayton Hamvention: As always, expect a great time at the Dayton Hamvention®, May 17–19. Around our booth will be piles and piles of the new *CQ VHF* magazine. Please be sure to stop by and pick up your copy, and then once you are satisfied that it is a winner for your special ham radio interests, subscribe to it. I will see you at our booth personally to sign you up.

The VHF forum will be from 1–4 PM on Saturday in Room 2. There will be plenty of other forums of interest to the weak-signal operator as well.

Dayton Weak Signal Banquet 2002: Tom, WA8WZG; Tony, WA8RJF; Herman, N4CH; and the Weak Signal Group that meets Monday nights at 0200 UTC on 3.843 MHz would like to invite everyone who is coming to the Dayton Hamvention@ to their 10th annual banquet. They have reserved a room that will seat 125 on Friday night, May 17, at the Holiday Inn North, Waggoner Ford Rd. exit off I-75, from 6-11 PM. There will be a cash bar starting at 6 PM as well as plenty of room to mix and mingle with VHFers from all over the country and the world. There will be over 50 prizes drawn starting at 9:00 PM. Also, there will be a guest speaker and a noise-figure-measuring setup, so bring your preamps through 24 GHz to tweak.

The cost of a ticket to attend this function, which includes a two-entrée sit-down dinner, is only $35 per person, and attendance is limited to 125. Spouses are welcome and are eligible for the prize drawings. You may order your tickets by sending $35 plus an SASE to Tom Whitted, WA8WZG, 4641 Port Clinton East Rd., Port Clinton, Ohio 43452. Please include the names, calls, and e-mail addresses of all ticket purchasers.

If you need more information or you would like to donate a prize, contact Tom at <wa8wzg@wa8wzg.com>. This is one of the largest gatherings of VHF Weak Signal enthusiasts in the U.S., so get your tickets early and plan for an enjoyable evening at the Hamvention®!

spond to the question asked at the end of the experiment.

Even though the methodology of testing the second group was considered by this author to be sound, the entire results of the second group were not considered, because the number of participants was deemed to be too small to be significant.

Scoring

Of the 14 participants scored, 13 were male and one was female. The age range was 34–70 with a median of 46.62 for the males and the lone female was 53, making a total median age of 47.07. The lone female participant is, for this number of participants, approximately consistent

Current Contests

Spring Sprints: As mentioned last month, the East Tennessee DX Association will again be sponsoring the Spring Sprints. The following are the dates and times of the two contests for this month:

The Microwave Sprint will be on Saturday, May 4, from 6 AM until 1 PM local time. This includes all amateur frequencies above 903 MHz. Please include band data in summaries and logs. Note: Use of the Liaison Frequency is encouraged.

The 50 MHz Sprint will be from 2300 UTC Saturday, May 11th, until 0300 UTC Sunday, May 12th. Logs may be e-mailed to <springsprints@etdxa.org>. Paper logs are to be sent to: ETDXA, Jeff J. Baker, KG4ENR, 8218 Foxworth Trail, Powell, TN 37849 USA. Complete rules can be found at <http://www.etdxa.org>.

with the male-female ratio of licensed amateur radio operators in the U.S.

The results of the experiment indicated a positive correlation with the hypothesis. Of the 14 participants scored, 12 showed a decrease in performance between the silent session and the session in which they listened to the tape. One participant showed no change, and another showed a slight increase in performance.

Regarding the false cue and the answer to the question in part three of the experiment, none of the participants correctly identified the net control station's callsign. Five of them incorrectly identified the callsign as W6CL, which, as indicated above, is my wife's call. One person partially identified my wife's call. Four did not answer the question, and three identified callsigns that were not heard on the tape. No correlation of the collected data was made for this part of the experiment, as the goal was to see the effect of listening to the conversation on the math problems, not to determine how accurately the person could copy names or callsigns while doing math.

Discussion

Based on the results obtained, I believe this small sample demonstrates possibilities for development into a full-scale experiment. While the number of participants was small, the results were, for the most part, consistent among participants, which indicates that a larger pool of participants would refine the results accordingly into a more accurate representation of the actual predictable decline as hypothesized. I would, however, make some small changes in any future experiment:

1. I would eliminate the false cue. While I do not believe it tainted or invalidated the results, the false cue presented data which are irrelevant to the hypothesis of the experiment.

2. I would match the mode of communications on the tape more closely to the participants' preferred mode of operating while driving. Most of the Tulsa participants primarily operate FM in their automobiles, yet the tape was of single sideband (SSB) communications, which might be difficult to comprehend if you are not used to hearing it.

3. I would increase both the number of math problems (from 24 to 36 or 48) and the time allotted (from 90 seconds to two or three minutes). In the initial experiment, one participant completed all 24 problems in the allotted time and another completed 22. Plus, there was a difference of one or less among four of the participants. More problems over a longer period should result in greater differences among the participants both in the number of problems completed and the number of correct responses.

(*Editor's note: Consideration should also be given to separately testing two control groups, one which is administered the math test twice without the tape, to screen out fatigue in the second round; and one which is asked only to hear the tape and answer the question, to screen out the difficulties noted above with possible problems in copying the conversation regardless of other simultaneous activities.*)

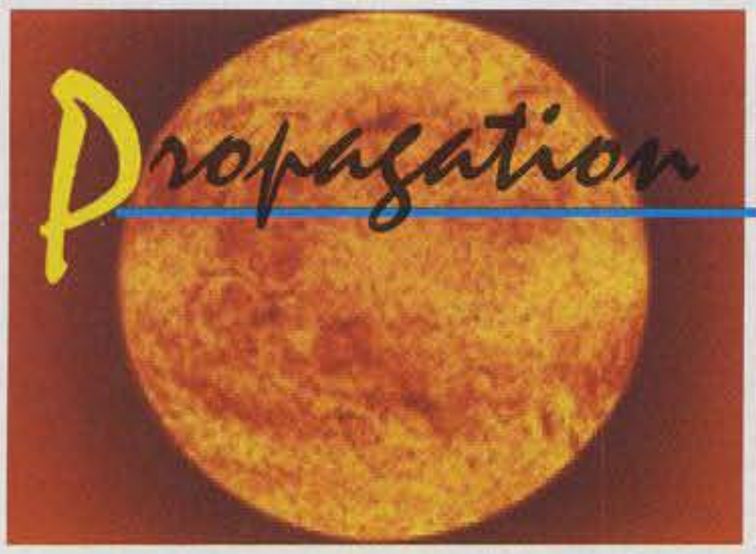
And Finally . . .

As the editor of this column, I am concerned with all of the safety aspects of our hobby, and I have taken an interest in the problems associated with driving and operating an amateur radio station. Having known operators who have been involved in "close calls" (near accidents) and having been in an automobile accident in which I cannot deny that amateur radio operations may have had a role, I know from contemporary evidence and first-hand knowledge that there is some correlation.

Unfortunately, there is much denial within the amateur radio community concerning the problems associated with operating while driving. It is hoped that a study developed from this genesis can positively contribute to amateur radio operators' increased awareness of these problems and thus motivate many hams to take appropriate caution when operating their radios while driving.

I wish to thank the Tulsa Amateur Radio Club—in particular its president, George Huffstetler, Jr., AC5WX, and its board of directors—for their approval of my solicitation of their members to participate in the experiment.

For those of you whom I will not see at Dayton, until next month...73, Joe, N6CL



Propagation

BY TOMAS HOOD, NW7US

The Science Of Predicting Radio Conditions

What is a CME?

Just what is a CME? On the surface of the sun (the corona), regions where the corona is less dense than the surrounding area are called *coronal holes*. These large-scale features are "open" magnetic-field regions which are sources for high-speed streams of solar electrons, protons, and ions (plasma). When the "open" magnetic regions experience catastrophic disruptions, they eject plasma away from the sun. This is known as a *coronal mass ejection (CME)*.

It once was thought that CMEs were initiated by solar flares. Although flares accompany some CME, it is now known that most CMEs are not associated with flares. CMEs can occur at any time during the solar cycle, but their occurrence rate increases with increasing solar activity and peaks around solar maximum. Since the sun completes a full rotation every 28 days, the same CMEs may recur every month. The exact processes involved in the release of CMEs are not known, but we do know a great deal about how they affect the Earth and propagation.

Let's look at the relationship between coronal material and magnetic fields. The corona is so hot that the gases in it lose some of their electrons in the powerful collisions between atoms. This plasma is a mixture of positively charged ions and negatively charged electrons. An example of plasma is neon light. Because plasmas are electrically conductive, they can steer, or be steered by, magnetic fields. The CME drags a piece of the sun's magnetic field with it. These loops of magnetic force are stretched and dragged into interplanetary space by the inertia of the expanding plasma and the solar wind. When these magnetic forces impact the Earth, they are either diverted by or combined with the Earth's magnetic field.

The speed of a CME ranges from less than 50 to about 2000 kilometers per second. As the CME moves outward from the sun, it generates a shock wave that can accelerate particles in interplanetary space to high energies. When a CME or its shock wave passes the Earth, geomagnetic storms are triggered. The majority of large and major geomagnetic storms are generated by the encounter with both the interplanetary shock and the CME that drives it. CMEs' ability to disturb the Earth's magnetosphere is a function of their speed, the strength of their magnetic field, and the presence of a strong southward magnetic field component. Strong southward magnetic lines are most prevalent during the two yearly equinoxes.

The Earth's magnetosphere is formed from two essential ingredients: the Earth's magnetic field (which has much the same form as that of a bar magnet and is from pole to pole) and the solar wind. When the CME combines with the Earth's magnetic field, it alters the shape and intensity of this shield around the Earth. The Ionosphere is affected by these changes, either by an increase of ionization, or a decrease or even a depletion of ionization. Depressions in ionospheric density cause major communications problems because radio frequencies that previously had been refracting off the ionosphere now punch through. The maximum usable frequency (MUF) can be decreased by a factor of two during an ionospheric-storm event. Storm effects are more pronounced at high latitudes.

If the CME is directed toward Earth and arrives after the two- to three-day journey, and the magnetosphere is oriented in a southerly direction, aurora is possible. Propagation off aurora is an exciting activity. At the same time, we bemoan the loss of communication caused by the degraded ionization of the ionosphere. Hang in there, though! While CME events affect us year-round, they are not as common as solar flares and their related x-ray radiation (which may ionize the *D*- and *E*-layers, causing higher absorption of HF signals) and solar wind.

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for May 2002

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 7-9, 12, 15-17, 20, 23	A	A	B	C
High Normal: 1-3, 5-6, 10-11, 13-14, 18-19, 24-25, 28-30	A	B	C	C-D
Low Normal: 4, 22, 31	B	C-B	C-D	D-E
Below Normal: 26, 27	C	C-D	D-E	E
Disturbed: 21	C-D	D	E	E

Where expected signal quality is:

A—Excellent opening, exceptionally strong, steady signals greater than S9.

B—Good opening, moderately strong signals varying between S6 and S9+, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and 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, 2nd, and 3rd; fair to good (C-B) on the 4th; good (B) on the 5th and 6th, etc.

Cycle 23 Observations

A moderately active season is at hand. About a month after the vernal (spring) equinox, geomagnetic activity is on the seasonal decline. Days in the Northern Hemisphere are longer, causing a thinning of the ionosphere and a lowering of the MUFs. We have passed the second peak of solar Cycle 23, and the average 10.7 cm solar flux is falling well below the 200 mark.

The Royal Observatory of Belgium, the world's official keeper of sunspot records, reports a monthly-observed mean sunspot number of 108.0, a 10.7 cm monthly-observed mean solar flux of 205.1, and an observed monthly mean *Ap*-index of 9 for February 2002. The sunspot low for the month was 78 on February 17. The sunspot high of 159 occurred on February 3.

It is clear that Cycle 23 is in a gradual decline. More often this spring 10.7 cm solar flux values have begun to dip below 170, after staying above 200 for

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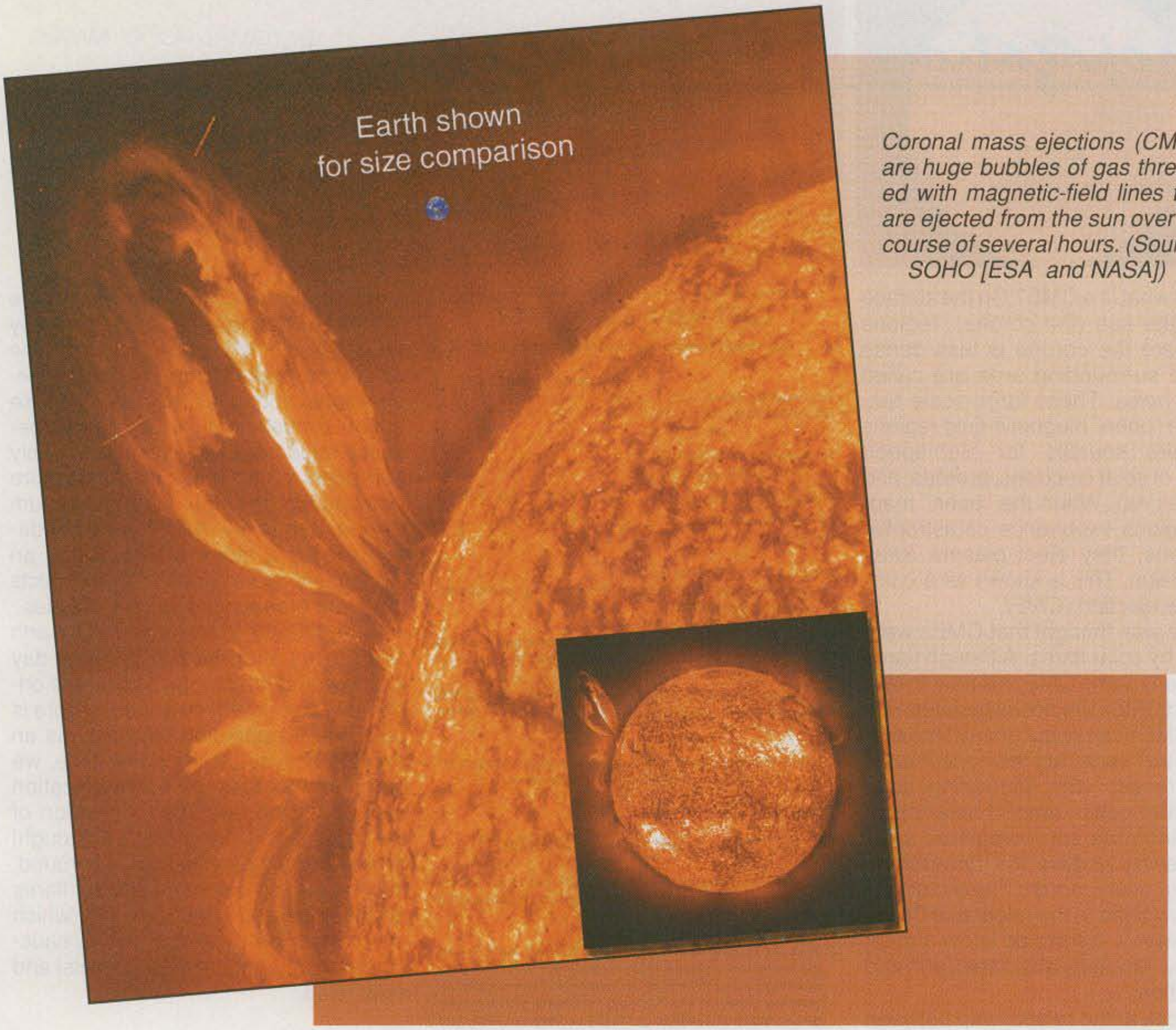


Coronal mass ejections (CMEs) are huge bubbles of gas threaded with magnetic-field lines that are ejected from the sun over the course of several hours. (Source: SOHO [ESA and NASA])

long periods during the cycle's second peak in fall and winter 2001. Overall, expect good conditions for May.

A smoothed sunspot level of approximately 93 and a 10.7 cm solar flux of about 160 are expected in May 2002. The geomagnetic *Ap* is expected to be a bit lower than the last few months. Aurora and geomagnetic storms are less likely to occur during May, but since Cycle 23 is still very much active, expect an occasional coronal mass ejection and x-ray event.

On the Bands

It is spring, and as we move closer to summer, DX signals on 10 meters are weaker and openings sparse. As the days grow longer in the Northern Hemisphere, the sun heats up and thins the ionosphere. With less ionization, the maximum frequency refracted is lower than we would expect for daytime paths. By June this thinning causes a real reduction in the MUF. Ten meters will have less *F*-layer propagation between east and west until September. North and south short- and long-path propagation is still strong on 10 meters, but in shorter windows. Ten-Ten International members will enjoy the sporadic-*E* openings that increase in May, bringing many short-skip contacts in the evenings on 10.

Fifteen meters will continue to provide great DX in May, but will degrade by June. It will rebound faster than 10 meters around August. The DX will be found on lower bands and on nighttime paths. When the 10.7cm flux is high, especially above 120, nighttime conditions on 15 meters are excellent. Daytime paths are best when they terminate in areas where it is night. This enhances propagation to remote parts of the world and lengthens the DX window. If the flux is about 150, expect long-path openings in the morning to the west and southeast for a few hours after sunrise. North and south long-path DX openings during May are rare on 15 meters and declining on 20. If the flux drops below 120, 20 meters will be your best bet. Static levels also increase noticeably during May, and signals may sound weaker on DX openings during the daylight hours. Nighttime openings on 15, 17, and 20 meters will be more quiet and reliable.

Peak worldwide conditions are expected on 17 and 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. During this nighttime window 40 meters should provide good openings toward Europe, Africa, and the east. Some DX should be possible on 80 and 160 meters, but signals are expected to be mainly weak and covered by seasonal noise.

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.

From midnight to local sunrise look for openings to most areas of the world on 20, 30, and 40 meters, with some DX possible on 80 and 160 as well. Twenty will remain the most consistently reliable night-path band. Look for the Far East and long-path openings to southern Africa and the Indian Ocean, and perhaps even to some rare islands. Russian and European signals will be strong from the evening hours onward during their local morning peaks. Exotic Pacific and Asian stations will be strong during pre-dawn hours. Australian stations might be workable on 80 meters during sunrise hours.

There is a very useful utility online at <http://havana.iwsp.com/radio/mufluf.html>. If you have a Java-enabled web browser, you may also find <http://havana.iwsp.com/radio/muflufjava.html> useful. Either one allows you to enter current or future solar or geomagnetic data, your location and the target location, and then create a MUF/LUF prediction.

CQ Short-Skip Propagation Chart
May & June 2002
Band Openings Given In Local Standard Time At Path Mid-Point (24-Hour Time System)

Band (Meters)	*Distance From Transmitter (Miles)*			
	50-250	*250-750*	*750-1300*	*1300-230*
10	Nil	08-10 (0-1) 10-14 (0-2) 14-18 (0-1) 18-22 (0-2) 22-00 (0-1)	08-10 (1) 10-14 (2) 14-18 (1-2) 18-22 (2) 22-00 (1) 00-08 (0-1)	08-10 (1-0) 10-22 (2-0) 22-23 (1-0) 23-08 (1-0)
15	Nil	07-10 (0-1) 10-14 (0-2) 14-18 (0-1) 18-22 (0-2) 22-01 (0-1)	07-10 (1-2) 10-14 (2-3) 14-18 (1-3) 18-20 (2-3) 20-22 (2) 22-01 (1)	07-10 (2-0) 10-17 (3-1) 17-20 (3-2) 20-22 (2-1) 22-23 (1) 23-07 (1-0)
20	10-21 (0-1)	07-10 (0-2) 10-13 (1-3) 13-18 (1-4) 18-20 (1-3) 20-21 (1-2) 21-23 (0-2) 23-07 (0-1)	07-08 (2) 08-10 (2-3) 10-13 (3-4) 13-18 (4) 18-20 (3-4) 20-21 (2-4) 21-23 (2-3) 23-01 (1-2) 01-07 (1)	07-08 (2) 08-10 (3-2) 10-16 (4-3) 16-21 (4) 21-23 (3) 23-01 (2) 01-07 (1)
40	08-10 (1-2) 10-12 (2-4) 12-18 (3-4) 18-20 (2-4) 20-22 (1-3) 22-00 (0-2) 00-08 (0-1)	08-10 (2-4) 10-15 (4-2) 15-16 (4-3) 16-20 (4) 20-22 (3-4) 22-00 (2-3) 00-08 (1-2)	08-09 (4-3) 09-10 (4-2) 10-15 (2-1) 15-16 (3-1) 16-19 (4-2) 19-22 (4) 22-00 (3-4) 00-03 (2-4) 03-05 (2-3) 05-08 (2)	08-09 (3-1) 09-10 (2-1) 10-16 (1-0) 16-19 (2-1) 19-22 (4-3) 22-03 (4) 03-05 (3) 05-07 (2) 07-08 (2-1)
80	08-11 (4) 11-19 (4-3) 19-22 (4) 22-00 (3-4) 00-06 (2-3) 06-08 (3-4)	08-10 (4-1) 11-16 (3-0) 16-18 (3-1) 18-19 (3-2) 19-20 (4-2) 20-00 (4) 00-06 (3-4) 06-08 (4-3) 10-11 (4-0)	08-09 (1) 09-10 (1-0) 10-16 (0) 16-18 (1-0) 18-20 (2-1) 20-23 (4-3) 23-03 (4) 03-06 (4-3) 06-08 (3-2)	08-09 (1-0) 09-18 (0) 18-20 (1-0) 20-21 (3-1) 21-23 (3-2) 23-03 (4-3) 03-06 (3-2) 06-08 (2-1)
160	06-09 (4-1) 09-10 (2-0) 10-19 (1-0) 19-21 (3-1) 21-23 (4-2) 23-06 (4-3)	06-09 (1) 09-19 (0) 19-21 (1-0) 21-23 (2-1) 23-01 (3-2) 01-04 (3) 04-06 (3-2)	08-09 (1-0) 09-21 (0) 21-23 (1) 23-01 (2-1) 01-04 (3-2) 04-07 (2) 07-08 (1)	08-21 (0) 21-01 (1) 01-04 (2) 04-06 (2-1) 06-07 (1) 07-08 (0-1)

ALASKA
May & June 2002
Openings Given in GMT

To:	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Eastern USA	Nil	20-02 (1)	22-00 (1) 00-02 (2) 02-04 (3) 04-05 (2) 05-06 (1) 10-12 (1) 12-14 (2) 14-16 (1)	Nil
Central USA	Nil	21-04 (1)	22-02 (1) 02-03 (2) 03-05 (3) 05-06 (2) 06-07 (1) 12-13 (1) 13-15 (2) 15-16 (1)	08-12 (1)
Western USA	Nil	20-23 (1) 01-03 (1) 03-05 (2) 05-06 (1)	00-02 (2) 02-04 (3) 04-07 (4) 07-08 (3) 08-09 (2) 09-15 (1) 15-18 (2) 18-00 (1)	07-09 (1) 09-14 (2) 14-15 (1) 11-13 (1)*

HAWAII
May & June 2002
Openings Given in Hawaiian Standard Time

To:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	Nil	12-15 (1) 15-17 (2) 17-19 (1)	13-15 (1) 15-17 (2) 17-19 (3) 20-04 (2) 04-08 (1)	19-20 (1) 20-23 (2) 23-02 (1) 21-23 (1)*
Central USA	Nil	12-15 (1) 15-18 (2) 18-20 (1)	15-16 (2) 16-17 (3) 17-19 (4) 19-20 (3) 20-22 (2) 22-04 (1) 04-05 (2) 05-07 (3) 07-09 (2) 09-15 (1)	19-20 (1) 20-21 (2) 21-01 (3) 01-02 (2) 02-04 (1) 20-21 (1)* 21-00 (2)* 00-03 (1)*
Western USA	13-17 (1)	09-12 (1) 12-15 (2) 15-17 (3) 17-18 (2) 18-20 (1)	06-08 (4) 08-16 (3) 16-19 (4) 19-20 (3) 20-22 (2) 22-05 (1) 05-06 (3)	18-19 (1) 19-20 (2) 20-22 (3) 22-02 (4) 02-04 (3) 04-05 (2) 05-07 (1) 19-20 (1)* 20-22 (2)* 22-02 (3)* 02-04 (2)* 04-05 (1)*

**Indicates best times to listen for 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2) or higher.*
For 12 meter openings interpolate between 10 and 15 meter openings.
For 17 meter openings interpolate between 15 and 20 meter openings.
For 30 meter openings interpolate between 40 and 20 meter openings.
Propagation charts prepared by George Jacobs, W3ASK.

VHF Conditions

May should be a good month for ionospheric openings on the VHF bands. An increase in sporadic-*E*, with some continued trans-equatorial propagation, occasional *F*-layer propagation, and moderate auroral activity will keep the VHF enthusiasts happy. Solar activity will continue to be high enough such that one or two *F*-layer DX openings should be possible on 6 meters. They will not last long, however. Look for them when the 10.7 cm flux approaches the 200 level. The best time to look for these openings is during the afternoon hours 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 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. Short-skip openings between about 1200 and 1400 miles may also be possible on 2 meters.

A seasonal decline in trans-equatorial (TE) propagation is expected during May. An occasional opening may still be possible on 6 meters 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. These TE openings will be north-south paths that cross the geomagnetic equator at an approximate right angle.

Auroral activity is generally lower than in March and April due to the change in the orientation and position of the Earth and magnetosphere in relation to the solar wind. Last year on May 8 the Earth entered a solar wind stream that stirred up a minor G1-class geomagnetic storm. Intermittent storm conditions persisted through May 10, 2001, causing extended aurora conditions. Some aurora can be expected this May, as well. Watch for *Kp* values above 6, which occur on days of Below Normal and Disturbed HF conditions. Refer to the Last-Minute Forecast for those days in May that are expected to be in these categories. Point your antenna north when this condition exists, and try your skill at backscatter operation. You will find that CW is the modulation and mode of choice, as the

signals you will hear on aurora will be raspy and very distorted. For a live viewing of aurora conditions, check out <http://aurora.n1bug.net/>, as well as my propagation page, <http://hfradio.org/propagation.html>.

May has one major meteor shower, the *Eta Aquarids.* The *Eta Aquarids* peak near dawn on May 5, but start around April 21, 2002. This shower has a peak rate of 20 per hour, or one every three minutes on average. However, it might be more prominent in the Southern Hemisphere. Another shower, the *Alpha Scorpids,* starts around April 20, and peaks on April 28 and again around May 19.

Minor showers include the *Epsilon Aquilids* (May 4–27, peaking May 17/18), *eta Aquarids* (April 19–May 28, peaking May 6), *May Librids* (May 1–9, peaking May 6/7), *Eta Lyrids* (May 3–12, peaking May 8–10), *Northern May Ophiuchids* (April 8–June 16, peaking May 18/19), *Southern May Ophiuchids* (April 21–June 4, peaking May 13–18), *Epsilon Arietids* (April 25– May 27, peaking May 9/10), *May Arietids* (May 4–June 6, peaking May 16/17), *Omicron Cetids* (May 7–June 9, peaking May 14–25), *Sagittarids* (April 15–July 15, peaking May 20), and *May Piscids* (May 4–27, peaking May 12/13).

Most meteor showers are at their best after midnight. After midnight you're on the leading edge of the Earth and you're meeting the meteors head-on. Before midnight you're on the trailing edge of the Earth and the meteors have to catch up to you. As a result, not only are more meteors seen in the pre-dawn hours, but their impact speeds encountering the Earth's atmosphere are much higher and the meteors are generally faster and brighter. This causes greater ionization, which is what you use to refract your radio signal.

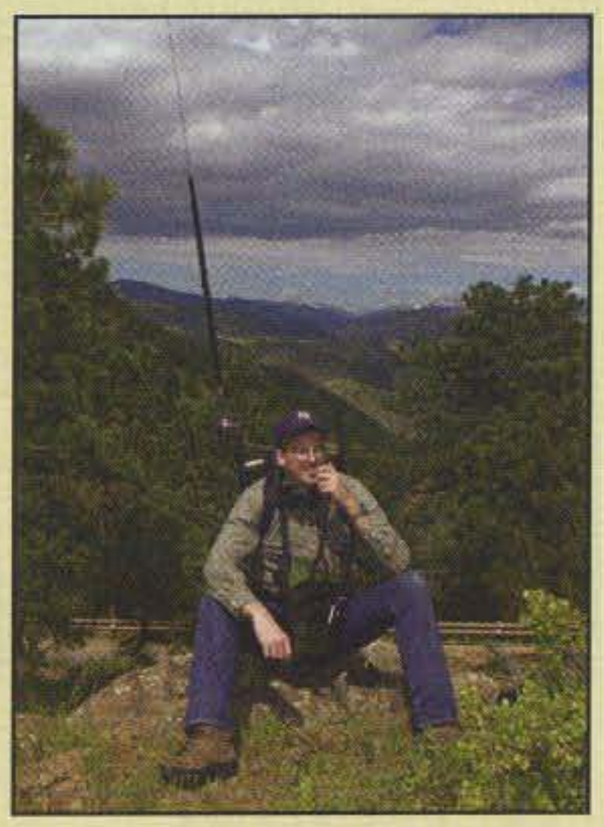
Field Day is Almost Here

There are new rules for ARRL Field Day 2002. Stations across Region 2 are now encouraged to participate, with the exchange being the same as for W/VE participants, with the addition of "DX" as the ARRL Section. This means that participants will want to pay attention to propagation and antenna design and azimuth. I will look at this a bit next month.

I'd love to hear from you about your experiences, insights, and studies of propagation. You may e-mail me, write me a letter, or catch me on the HF amateur bands. See you on the air!

73, Tomas, NW7US

On the Cover



Jeff Francis, NØGQ, of Lakewood, Colorado highlights our Mobile Special this month by going foot-mobile into the Rocky Mountains outside Golden, Colorado. Jeff is a member of HFPack, an organization of hams who enjoy backpacking with HF ham radio. He's been a member of the group since it was started by Bonnie Crystal, KQ6XA, as an internet mailing list about a year and a half ago. It has grown steadily since then.

Jeff's backpack-mobile setup includes a Yaesu FT-817 transceiver powered by a 5 amp-hour gel cell battery, an LDG Z-11 automatic antenna tuner, and an Outbacker Perth Plus antenna for HF operation; plus a VHF station with a Kenwood TH-D7A handheld tied into a GPS (Global Positioning System) receiver and a 2-meter vertical. He runs APRS™ (Automatic Position Reporting System) through the TH-D7A, digipeating the signal through a 50-watt TM-D700 mobile transceiver in his pickup truck (both come with APRS software built in). This is very helpful in backcountry hiking, as it's possible for others to know where he is at all times. Jeff describes his backpack-mobile station in detail in the October 2001 issue of *CQ*.

Our mobile special also includes an article on operating from a canoe trip on the Upper Missouri River in the remote Montana backcountry, the joys of going mobile to give out counties for the USA-CA award, and even a look back at mobiling a half-century ago. There's more, so be sure to check out the whole issue for tips on hamming on the go.

(Cover photo by Larry Mulvehill, WB2ZPI)

Zero Bias *(from page 6)*

Will all of these kids become hams, shortwave listeners or scanner enthusiasts as a result of this "cluster"? Some might, and that would be great. But even those who don't—and who might grow up to include elected officials, other policymakers, corporate executives or your neighbors—will have a basic understanding of and appreciation for the radio hobby. They are more likely to be our friends because they know something of what we do and why we do it. But more than that, they will forever have in their attics that little jumble of wires and parts that they put together themselves, and that magically pulls radio signals out of the air. A little magic goes a long, long way.

Europe's 40-Meter Plan

In this month's "Washington Readout" column, editor Fred Maia, W5YI, explains the amateur-related proposals being considered by European countries for next year's World Radiocommunication Conference. Of significant interest is the compromise they're proposing for 40 meters. Anyone who's ever operated on 40 at night knows the band is a battleground between hams in the Americas and international broadcasters in the rest of the world, because of shared allocations between 7100 and 7300 kHz.

The Europeans are suggesting that the whole 40-meter band be slid down 50 kHz, to occupy 6950–7250 kHz, with a worldwide *exclusive* amateur allocation between 7000 and 7200. The top and bottom 50-kHz segments, 6950–7000 and 7200–7250, would be shared worldwide with the fixed and land-mobile services. The international broadcast band would then begin at 7250. We believe this is a plan that everyone can live with, especially if the broadcasters have agreed to it, and we hope the United States delegation to WRC-03 will give it serious consideration.

Let's give the situation a closer look. Right now, only 7000–7100 kHz is an exclusive amateur allocation worldwide. In the United States, only CW and digital modes are permitted here, although other countries permit voice as low as 7030. Reality is that, at night, when 40 opens worldwide, 7100–7300 is often close to unusable for amateur contacts. During SSB DX contests, while US hams may spread out over 150 kHz of spectrum, the people they want to work are squeezed into 50–70 kHz. And those frequencies don't even match up with each other!

The most common way to work DX on 40 is by using "split" frequencies, with the US ham listening below 7150 (the bottom of the US phone band) and the DX station listening above. This works, but with some big drawbacks: 1) since you're generally not listening to your transmit frequency, chances of causing unintentional interference are increased; 2) it is highly inefficient from a spectrum-use perspective, as two frequencies are occupied for QSOs that, on any other band, would require only one; and 3) the DX station still has to pick out your signal from in between the very loud signals of "local" international broadcasters. Clearly, sharing spectrum between amateurs and high-powered broadcasters doesn't work.

On the other hand, we have successfully shared frequencies for decades with the fixed service (commercial shore stations, for example) and to a lesser extent with land-mobile (primarily military on HF). There would certainly continue to be the potential for inter-service interference, but not to the extent that we see it between hams and broadcasters. Here in the US, frequencies between 6950 and 7000 kHz would almost certainly be CW and digital only, and these modes are easier to squeeze between other signals than are SSB voice signals. Peaceful coexistence would be quite easy here. This leaves only the 50 kHz segment between 7200 and 7250, on which voice stations would have to share with land-mobile users, presumably also using voice (although data is a strong possibility as well). We all may have to bend a bit to get along, but it can most likely be made to work.

Of course, some nets would have to relocate, but unlike broadcasters whose transmitters are crystal-controlled and whose antennas are optimized to a specific frequency (read considerable expense to change frequencies), most hams can QSY simply by spinning their VFO dials, and most ham antennas will work just as well on 7240 as they do on 7290. Some of us with older radios might be squeezed out of any "new" frequencies below 7 MHz until we buy new radios. Others of us may be able to get software "patches" to open up 6950–7000 for transmitting.

Those inconveniences aside, the net effect, worldwide, would be a doubling of exclusive amateur frequencies on 40 meters, an actual doubling of frequencies available to hams outside the Americas, a 50% reduction in the frequencies on which US hams would have to deal with inter-service interference, and an end to the need for split-frequency operation for DX contacts. Is it everything we could want? No. Is it an acceptable compromise? Absolutely. Will it make 40 meters a better place to operate? Unquestionably. We urge those responsible for establishing the US position on 40 meters to carefully consider the European plan and —unless they can come up with something better that's acceptable to all parties —to support it next year at WRC-03.

73, Rich, W2VU

Mobile Special

This month's issue is a mobile special, covering hamming from cars, canoes, and on foot. "Radio Classics" Editor Joe Veras, N4QB, points out in his column on mobiling in the '50s that exactly 50 years ago this month, in May 1952, *CQ* also featured a mobile special! *CQ* helped popularize mobiling a half century ago, and we continue that effort today as ham radio on the go enjoys a resurgence. Please check out our various features and columns devoted this month to mobile hamming.

modes, moonbounce, and amateur television. The ARRL also cautioned the FCC against writing rules specifically to accommodate one company's product or one type of device.

KE4IQB NASA Nomination Withdrawn

NASA says the White House has withdrawn the nomination of Marine Corps Major General and former astronaut Charles F. Bolden, KE4IQB, to be the space agency's next Deputy Administrator. Bolden, the first African-American astronaut to obtain a ham license, is currently Commanding General of the 3rd Marine Aircraft Wing, based in San Diego. The NASA announcement did not say why Bolden's nomination was withdrawn, but suggested that the Defense Department objected to losing him from an active military command during the war on terrorism. NASA Administrator Sean O'Keefe said the agency was disappointed that Bolden would not be returning at this time.

"However," he added, "at this critical juncture in our nation's history, we must understand how vital it is for America to focus all its military resources on the immediate national security imperatives ... Given the ongoing war on terrorism and the imperative expressed by the Secretary of Defense that all uniformed military personnel serve to advance the President's objective to win the war, we fully support the President's decision." There was no immediate word on who would be named to the number two post at NASA instead of Bolden.

Kenwood Plans Dayton Webcast

For the second year, Kenwood Communications is planning to bring some of the sights and sounds of the Dayton Hamvention® to the World Wide Web, with its second annual Dayton webcast on May 17–19, featuring live interviews with various "movers and shakers" in amateur radio. A full list of scheduled interviews is available on the web at <http://www.kenwood.net/amateur/hamvention>. Questions e-mailed in advance may be used in the interviews.

FCC Tells Utility to Cure QRM

A major utility in the northeast has been told by the FCC to identify and fix the source(s) of power-line QRM to four New Jersey amateurs. In a letter from Jack Forsythe, the Chief of the Consumer Information Network Division of the FCC's Consumer Information Bureau, GPU Energy of Morristown, New Jersey, was advised of its responsibilities under FCC rules and that the complaints had come to the Commission because they were unable to be resolved using "your usual complaint resolution process." The utility was asked to respond within 30 days with specific steps it plans to take, and to advise the Commission if it felt the problems couldn't be resolved within 90 days.

In other enforcement actions, the FCC concluded a probe of five amateur exam sessions in Georgia during 2000 and 2001, and decided to call in eight examinees for retests on their code exams. Ten Volunteer Examiners had their credentials revoked by the ARRL/VEC as a result. In addition, two amateurs in New York were warned about operating a repeater with an input outside the 2 meter amateur band; an Iowa ham received two warning notices about out-of-band operation on VHF and alleged interference to a repeater; and a ham in Alabama who was relicensed as a Technician after his General Class license was cancelled last September has had the new license set aside while the FCC investigates reports that he continued to operate during the time in which he had no license.

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.

RTTY Results *(from page 16)*

Number groups after callsigns denote the following: QSOs, Points, Zones, Countries, US/VE, Final Score. Certificate winners are listed in boldface.

SINGLE OPERATOR ALL BAND, HIGH POWER

CT9L	**2211**	**6613**	**99**	**291**	**172**	**3,716,506**
TI5U	**2431**	**6268**	**102**	**254**	**209**	**3,541,420**
UP5P	**1863**	**5228**	**113**	**312**	**94**	**2,713,332**
K4JA	**1775**	**4378**	**103**	**286**	**174**	**2,464,814**
VE3XD	**1457**	**3861**	**99**	**241**	**177**	**1,996,137**
LV5V	**1463**	**4308**	**82**	**224**	**151**	**1,968,756**
W1GF	**1469**	**3510**	**97**	**274**	**171**	**1,902,420**
TK5EP	**1467**	**3672**	**92**	**249**	**138**	**1,758,888**
K4GMH	**1396**	**3256**	**94**	**246**	**191**	**1,728,936**
UA9CDV	**1435**	**4043**	**92**	**281**	**50**	**1,710,189**
HA8IE	**1218**	**3031**	**105**	**288**	**129**	**1,582,182**
RK4FF	**1425**	**3265**	**103**	**291**	**90**	**1,580,260**
WW7OR	**1385**	**2933**	**119**	**225**	**179**	**1,533,959**
LZ2WF	**1324**	**3200**	**90**	**279**	**108**	**1,526,400**
RZ3AZ	1474	3360	96	278	78	1,518,720
EM1HO	**1285**	**3805**	**69**	**190**	**138**	**1,510,585**
VA3DX	1068	2705	103	256	180	1,457,995
W3FV	**1178**	**2832**	**89**	**244**	**161**	**1,399,008**
RX9SR	1178	3312	86	250	57	1,301,616
ZL2AMI	**1136**	**3385**	**73**	**161**	**131**	**1,235,525**
N4GN	1085	2402	100	232	177	1,222,618
YU7YG	**1098**	**2632**	**100**	**266**	**95**	**1,213,352**
K7WD/KHØ	**1238**	**3264**	**81**	**194**	**88**	**1,184,832**
UW5U	**1101**	**2601**	**90**	**266**	**96**	**1,175,652**
JA1BWA	**907**	**2516**	**102**	**228**	**104**	**1,091,944**
SM5FUG	**997**	**2373**	**99**	**276**	**80**	**1,079,715**
YO9HP	**1032**	**2482**	**91**	**239**	**90**	**1,042,440**
VA7CC	**1040**	**2572**	**74**	**152**	**166**	**1,008,224**
RA3WA	993	2299	99	275	61	1,000,065
W7TI	**1087**	**2062**	**89**	**153**	**212**	**936,148**
WØGJ	**1101**	**1899**	**98**	**176**	**212**	**922,914**
N2BJ	**925**	**1901**	**102**	**216**	**151**	**891,569**
KW4DA	904	1978	88	209	149	882,188
OK2BXW	**773**	**1985**	**97**	**224**	**108**	**851,565**
OZ1AA	**915**	**2224**	**70**	**202**	**102**	**831,776**
K5ZD	**782**	**1717**	**85**	**216**	**154**	**781,235**
W1RY	791	1877	77	208	131	780,832
YL7A	**874**	**2040**	**81**	**231**	**68**	**775,200**
K2PS	**833**	**2048**	**76**	**193**	**106**	**768,000**
JA2ZJW	**805**	**2254**	**75**	**179**	**85**	**764,106**
SM6WQB	832	1961	81	233	72	756,946
F6BEE	**683**	**1804**	**86**	**191**	**114**	**705,364**
RV9B8	670	1827	93	261	31	703,395
9M6US	**692**	**2055**	**83**	**168**	**68**	**655,545**
K7ZUM	885	1740	81	129	159	642,060
VK6GOM	**709**	**2094**	**65**	**145**	**92**	**632,388**
VE7CF	772	1752	72	107	155	585,168
MØSDX	**641**	**1570**	**79**	**200**	**79**	**562,060**
NN6XX	747	1512	81	138	137	538,272
WØDET	708	1448	81	137	145	525,624
VE3GLA	586	1396	73	159	139	517,916
LA7CL	**638**	**1515**	**74**	**193**	**58**	**492,375**
N8KM	**609**	**1285**	**73**	**145**	**139**	**458,745**
DJ3NG	**612**	**1444**	**71**	**170**	**65**	**441,864**
OK2PCL	485	1324	75	170	84	435,596
WA8RPK	614	1261	70	151	123	433,784
DL3BRC	563	1344	75	180	58	420,672
JA6JAP	**534**	**1464**	**72**	**159**	**49**	**409,920**
W2YE	566	1190	69	151	123	408,170
EA5DFV	**554**	**1382**	**55**	**137**	**96**	**398,016**
EU1SA	**522**	**1290**	**79**	**181**	**39**	**385,710**
OM3IAG	**494**	**1209**	**71**	**169**	**63**	**366,327**
OH1XT	**536**	**1307**	**62**	**142**	**76**	**365,960**
WØHW	554	1000	75	135	149	359,000
YL2KF	509	1196	69	186	32	343,252
F8BQQ	468	1183	69	145	72	338,338
K9DJ	**557**	**1161**	**60**	**120**	**109**	**335,529**
UV5U	517	1179	69	180	31	330,120
HB9DCM	**394**	**1038**	**78**	**162**	**72**	**323,856**
MIØBME	**606**	**1317**	**48**	**148**	**38**	**308,178**
VK4WPX	**398**	**1174**	**64**	**109**	**84**	**301,718**
W6KNB	501	903	77	110	145	299,796
WØTY	494	884	70	122	135	289,068
UAØAGI	456	1184	70	159	14	287,712
K7JJ	471	849	77	109	139	275,925
LA2IJ	**343**	**854**	**76**	**168**	**64**	**263,032**
N2FF	414	895	64	126	100	259,550
I1WBW	**536**	**1171**	**42**	**157**	**20**	**256,449**
WD4DDU	298	758	67	136	51	192,532
XE1V	**342**	**793**	**37**	**70**	**111**	**172,874**
LX1NO	**316**	**775**	**50**	**110**	**57**	**168,175**
WAØSXV	359	612	68	77	126	165,852
SM7BJW	284	698	52	138	40	160,540
SM4GVR	285	689	53	133	40	155,714
IK1FVO	335	731	44	137	16	144,007
DK1WI	307	728	44	95	50	137,592
KE7GI	366	583	51	76	101	132,924
W6JOX	286	516	53	82	116	129,516
I2OKW	233	625	53	98	45	122,500
DL3JPN	238	590	54	122	24	118,000
K3PP	248	537	52	86	65	109,011
UT5EQU	334	745	34	99	7	104,300
W7QF	209	458	59	93	64	98,928
KF9YR	231	406	57	76	87	89,320
W7DPW	249	423	46	58	104	87,984
RA3BB	240	554	42	103	10	85,870
K2NV	183	486	39	85	28	73,872
F5YJ	194	463	42	96	18	72,228
K8PYD	158	435	59	92	11	70,470
UA4LY	242	529	36	93	0	68,241
N8RA	164	317	48	73	67	59,596
RA3TT	221	520	31	78	4	58,760
DL7UFN	143	385	50	67	35	58,520
4U1WB	**194**	**322**	**33**	**48**	**84**	**53,130**
AA9RR	119	319	49	92	16	50,083
UT5UGR	144	318	38	95	3	43,248
OHØHEY	**149**	**390**	**23**	**56**	**20**	**38,610**
W8XC	136	284	36	57	42	38,340
WL7M	**113**	**288**	**41**	**59**	**33**	**38,304**
KØDU/6	173	331	26	30	47	34,093
DK6CQ	98	279	41	53	23	32,643
CP1FF	**129**	**366**	**22**	**49**	**15**	**31,476**
KE5OG	103	220	36	42	30	23,760
WG7Y	161	204	22	23	67	22,848
KØCOP	86	231	25	51	9	19,635
YO3CEN	76	174	29	56	0	14,790
WM3T	75	180	23	42	15	14,400
NA2M	73	136	30	34	33	13,192
K1RO	63	143	27	38	22	12,441
JE6IBJ	33	94	21	32	0	4,982
SM5EIT	26	75	19	21	3	3,225
AA2IZ	43	60	10	11	21	2,520

OPS: CT9L (DJ6QT), **TI5U** (JH8KYU), **UP5P** (UN5PR), **LV5V** (LU5VV), **WW7OR** (W7GG), **EM1HO** (UX2HO), **UW5U** (UY2UA), **4U1WB** (op).

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P40MM	**2873**	**8568**	**108**	**302**	**241**	**5,577,768**
W2UP	**1813**	**4240**	**116**	**304**	**209**	**2,666,960**
ZX2B	**1748**	**5189**	**92**	**253**	**163**	**2,636,012**
AA5AU	**1855**	**3837**	**113**	**295**	**227**	**2,436,495**
ZC4DW	**1823**	**5200**	**90**	**266**	**66**	**2,194,400**
9A6A	**1471**	**3594**	**111**	**299**	**129**	**1,937,166**
LY6M	**1311**	**3204**	**112**	**310**	**100**	**1,672,488**
S51MM	**1277**	**3104**	**98**	**278**	**116**	**1,527,168**
EA1AKS	**1372**	**3358**	**80**	**217**	**146**	**1,487,594**
RU3QW	**1429**	**3202**	**100**	**295**	**61**	**1,460,112**
EY8MM	**1280**	**3511**	**90**	**254**	**26**	**1,299,070**
YU7AM	**1064**	**2580**	**99**	**281**	**101**	**1,240,980**
4Z5CP	**1192**	**3391**	**80**	**229**	**48**	**1,210,587**
CN8NK	**1124**	**3366**	**60**	**182**	**117**	**1,208,394**
ON4ADZ	**956**	**2335**	**107**	**287**	**115**	**1,188,515**
N2WK	**1039**	**2293**	**94**	**233**	**183**	**1,169,430**
F6AUS	**1044**	**2580**	**84**	**249**	**106**	**1,132,620**
VU2WAP	**1012**	**2849**	**90**	**226**	**52**	**1,048,432**
WX4TM	**1055**	**2231**	**88**	**204**	**164**	**1,017,336**
YO3APJ	**900**	**2188**	**98**	**271**	**83**	**988,976**
ER6A	**968**	**2331**	**86**	**234**	**80**	**932,400**
OSØTIB	942	2272	80	216	98	895,168
RG9O	**978**	**2657**	**76**	**226**	**20**	**855,554**
EA1MV	886	2052	85	234	84	826,956
LY3BH	819	2039	89	234	80	821,717
DK3VN	**822**	**1968**	**84**	**237**	**92**	**812,784**
WA1EHK	**783**	**1804**	**89**	**215**	**144**	**808,192**
J49XB	**995**	**2278**	**81**	**212**	**57**	**797,300**
ON5MF	860	2028	81	211	92	778,752
ZS6RVG	**812**	**2426**	**56**	**134**	**130**	**776,320**
N6HC	**929**	**1728**	**89**	**159**	**188**	**753,408**
YV5AAX	**732**	**2181**	**58**	**139**	**146**	**748,083**
YO3JF	**857**	**2162**	**73**	**179**	**73**	**702,650**
W9HLY	**769**	**1650**	**86**	**174**	**155**	**684,750**
RX9JM	803	2211	73	209	27	683,199
OK2PMS	736	1764	84	233	65	673,848
YB5QZ	**800**	**2375**	**70**	**176**	**31**	**657,875**
VE2AXO	**689**	**1729**	**77**	**173**	**127**	**651,833**
GØURR	**774**	**1807**	**75**	**187**	**85**	**627,029**
OH7MN	**818**	**1904**	**71**	**209**	**46**	**620,704**
MMØBQI/P	**734**	**1686**	**77**	**230**	**48**	**598,530**
VE4COZ	**698**	**1609**	**76**	**136**	**142**	**569,586**
WB8K	**650**	**1331**	**88**	**182**	**153**	**563,013**
OH4BB	674	1603	76	222	53	562,653
OK1DDO	630	1518	86	217	58	547,998
OK2SG	532	1336	95	245	68	545,088
JL6HKJ	**618**	**1717**	**69**	**178**	**69**	**542,572**
HSØ/G3NOM	**673**	**1845**	**72**	**190**	**30**	**538,740**
W4UEF	**621**	**1359**	**83**	**182**	**128**	**534,087**
ZL2BR	**545**	**1606**	**78**	**144**	**110**	**533,192**
SM6BSK	**600**	**1428**	**82**	**228**	**52**	**516,936**
I2SVA	**606**	**1565**	**77**	**168**	**83**	**513,320**
AE5P	693	1284	84	161	154	512,316
9K2USA	**677**	**1984**	**45**	**148**	**63**	**507,904**
WD4GBW	609	1484	57	163	107	485,268
UT5HA	**567**	**1360**	**88**	**229**	**35**	**478,720**
NØCDA	**805**	**1508**	**72**	**125**	**116**	**472,004**
SP3RBG	**523**	**1308**	**98**	**211**	**44**	**461,724**
SN3E	568	1337	74	213	52	453,243
JK1OLT	**491**	**1355**	**89**	**166**	**78**	**451,215**
DL9NDS	565	1387	77	184	61	446,614
W3MEL	**609**	**1322**	**66**	**142**	**125**	**440,226**
EW1EA	**587**	**1384**	**79**	**204**	**34**	**438,728**
KGØUS	631	1237	68	129	130	404,499
5B4AGE	**597**	**1727**	**56**	**146**	**32**	**404,118**
RW4PL	597	1369	65	202	24	398,379
4X1RF	581	1690	52	138	43	393,770
VE3BUC	**471**	**1154**	**70**	**154**	**117**	**393,514**
4Z8BB	571	1672	49	134	51	391,248
WK6I	589	1137	75	132	137	391,128
CO3JO	**518**	**1255**	**63**	**122**	**116**	**377,755**
JS1OYN	541	1486	68	144	40	374,472
GW4KHQ	**574**	**1270**	**66**	**202**	**21**	**367,030**
OK1FAV	487	1216	75	167	55	361,152
GUØSUP	**438**	**1083**	**77**	**186**	**66**	**356,307**
4X6UU	476	1370	60	170	28	353,460
W4UK	616	1140	62	122	126	353,400
RU3AT	509	1180	74	191	34	352,820
W3SE	571	1073	72	105	149	349,798
EI4DW	**456**	**1134**	**68**	**156**	**80**	**344,736**
F6FTB	446	1113	75	173	60	342,804
VE7FO	**520**	**1190**	**66**	**85**	**134**	**339,150**
G4WFQ	**498**	**1210**	**61**	**166**	**53**	**338,800**
VK4DZ	**458**	**1349**	**67**	**116**	**60**	**327,807**
VE3HG	415	1060	67	149	89	323,300
DL2YCA	493	1113	66	174	47	319,431
LU5DT	**423**	**1233**	**56**	**127**	**76**	**319,347**
JA7EMH	**440**	**1197**	**72**	**159**	**34**	**317,205**
UA3SAO	491	1153	65	172	36	314,769
VK2DPD	**397**	**1164**	**70**	**138**	**60**	**311,952**
RAØFA	488	1242	69	135	41	304,290
RW3LB	442	1044	71	171	49	303,804
YL800GC	564	1244	59	160	25	303,536
SP2EXE	428	1039	72	163	55	301,310
RAØALM	488	1280	56	156	22	299,520
F2AR	464	1056	57	177	44	293,568
W3ZV	428	887	73	143	114	292,710
NØAJ	505	967	61	116	125	292,034
UAØCW	429	1134	72	137	46	289,170
AC6JT	535	898	68	100	154	289,156
HL3AHQ	**464**	**1213**	**65**	**136**	**36**	**287,481**
K6TA	411	906	76	121	112	279,954
KF2XF	426	965	54	142	83	269,235
N8KR	426	831	63	129	126	264,258
K7ON	489	929	66	104	109	259,191
YL2NN	433	985	59	170	30	255,115
DM3HZN	401	963	54	143	54	251,343
YU1KT	417	990	59	142	39	237,600
DL4MFP	341	840	70	155	54	234,360
W9GM	421	793	66	119	109	233,142
HB9AWS	**386**	**939**	**59**	**142**	**47**	**232,872**
VK5GN	**372**	**1108**	**47**	**101**	**62**	**232,680**
N3UN	336	741	74	148	87	228,969
IZØCIV	393	957	55	140	44	228,723
CX2AQ	**396**	**1169**	**38**	**85**	**72**	**227,955**
IK6UBY	412	946	51	138	47	223,256
W5UQ	411	754	65	109	122	223,184
W4OV	348	847	59	125	65	210,903
SP9LKS	364	868	63	145	31	207,452
AA6TY	390	732	68	97	117	206,424
RA9JX/9	355	934	55	151	14	205,480
UA9CR	412	1117	44	133	6	204,411
UA9AX	316	878	61	145	19	197,550
VE7XF	291	713	69	109	99	197,501
DL4NN	335	808	64	143	36	196,344
UT4EO	345	816	66	153	20	195,024
RZ9CX	339	911	56	146	11	194,043
ON4KGL	351	844	56	122	49	191,588
F8BBN	332	815	57	126	42	183,375
W6ZL	364	673	65	84	117	179,018
OK1AXB	301	732	67	147	30	178,608
UT5UML	326	781	60	135	31	176,506
K6EP	365	623	66	85	132	176,309
VE2OWL	**339**	**730**	**46**	**68**	**126**	**175,200**
KØCIE	411	724	51	82	108	174,484
SM5UFB	385	844	45	135	20	168,800
JH5OXF	302	792	63	123	27	168,696
K2YG	313	625	60	115	94	168,125
VE3GSI	276	664	60	107	86	167,992
W4AUI	377	621	55	95	118	166,428
DL2AL	307	744	62	125	36	165,912
JA1XUY	284	763	64	119	31	163,282
OZ5MJ	**252**	**655**	**69**	**128**	**45**	**158,510**
KSØM	309	576	63	104	100	153,792
JO3JYE	**324**	**878**	**52**	**93**	**30**	**153,650**
SP2MKZ	330	824	51	129	4	151,616
EA6LP	**288**	**702**	**46**	**112**	**53**	**148,122**
K8SIA	351	585	52	87	114	148,005
DL5ASE	296	690	54	126	32	146,280
RU3WR	307	702	56	148	3	145,314
RN4SS	342	737	46	145	6	145,189
RW9QA	281	777	46	132	7	143,745
LZ5ZI	**314**	**720**	**54**	**123**	**18**	**140,400**
N9QQK	301	614	51	100	70	135,694
N8BJQ	268	590	57	104	67	134,520
MØBEX	288	676	50	112	36	133,848
UT5JDS	230	551	59	154	22	129,485
NM5RY	360	515	53	65	129	127,205
OK1FHI	257	628	60	120	22	126,856
JA1XRH	252	645	67	102	26	125,775
DJ1OJ	271	641	60	135	0	124,995
OK2BMC	292	677	48	122	14	124,568
YL2CA	274	640	50	133	11	124,160
ZD7KA	**231**	**688**	**41**	**95**	**44**	**123,840**
EA3FAJ	288	659	53	134	0	123,233
DJ2YE	238	581	55	114	42	122,591
SV1DKR	**342**	**753**	**39**	**88**	**34**	**121,233**
SP6NVK	266	643	54	114	19	120,241
EA3EFQ	255	611	47	114	35	119,756
LX2RH	285	652	47	108	26	118,012
CT1AOZ	**227**	**544**	**52**	**115**	**50**	**118,048**
LX2RH	285	652	47	108	26	118,012
PA3BFH	**250**	**604**	**48**	**110**	**32**	**114,760**
WB4YEX	305	591	37	73	84	114,654
DL5IAM	294	641	45	120	12	113,457
DK8EY	231	559	55	119	28	112,918
SM6SRW	220	559	52	107	41	111,800
N1MEO	244	471	55	93	82	108,330
YBØUNC	**208**	**616**	**53**	**85**	**36**	**107,184**
OK1OX	229	551	55	112	25	105,792
K2QMF	231	589	42	97	37	103,664
WA2LXE	262	472	53	82	84	103,368
W8NP	361	714	26	67	51	102,816
K4LQ	202	525	52	111	31	101,850
SP8FHJ	229	547	49	110	20	97,913
IK2NCF	221	532	46	104	31	96,292
JR1KSK	203	540	63	88	26	95,580
JF2SKV	227	538	58	91	21	91,460
WN1OTV	231	460	44	82	72	91,080

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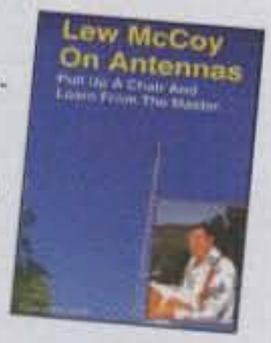

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W1TO	205	445	52	91	60	90,335
DL8SDC	197	530	49	84	37	90,100
ISØBRQ	**282**	**629**	**33**	**87**	**18**	**87,630**
NN5T	205	425	56	84	63	86,275
DM3XI	170	434	61	107	27	84,630
SP6GWZ	203	516	49	102	10	83,076
LA5TFA	**275**	**596**	**29**	**93**	**16**	**82,248**
IK2WYI	193	489	44	78	46	82,152
OH2LO	200	491	45	102	17	80,524
VA6MM	**190**	**432**	**43**	**53**	**86**	**78,624**
KE5K	190	367	62	74	76	77,804
W6FFH	228	400	43	49	99	76,400
K6BIR	226	386	45	58	93	75,656
K8IR	206	396	46	73	70	74,844
SP4BOS	216	490	41	102	5	72,520
N6VH	202	349	53	55	90	69,102
UA9CBP	186	505	36	91	7	67,670
OK2VXH	176	488	46	79	26	67,648
WO6M	212	393	47	53	72	67,596
W4TIJ	213	379	45	69	64	67,462
K6ZJ	237	334	43	46	112	67,134
OK2CJM	185	438	44	80	27	66,138
KØRY	155	384	55	81	34	65,280
WN3C	180	408	39	79	42	65,280
IK2LOL	186	464	34	63	42	64,496
YO5BRZ	181	413	46	108	0	63,602
NØIBT	215	374	40	51	79	63,580
K5HDU	196	343	43	67	74	63,112
HB9HFD	176	423	41	84	24	63,027
N2NI	178	360	45	70	59	62,640
IK2WFN	167	424	44	73	30	62,328
WA4KY	182	375	45	73	46	61,500
WBØYRQ	228	338	41	48	91	60,840
DF3IS	192	448	38	84	13	60,480
LA5YW	172	408	41	92	14	59,976
JR3RIY	170	463	37	76	15	59,264
RV6BO	152	363	46	95	22	59,169
IØKHP	160	388	43	81	28	58,976
DK4IO	153	382	48	87	19	58,828
JH3WKE	154	418	46	73	20	58,102
N9KO	178	321	44	65	72	58,101
HA5LV	138	372	49	78	29	58,032
I2ORX	145	372	42	81	31	57,288
UA9OSV	172	451	39	78	2	53,669
DL1EFD	149	366	38	73	31	51,972
IV3KSE	149	379	34	72	31	51,923
N4PSE	160	286	44	55	73	49,192
JA2UJ	**132**	**380**	**39**	**71**	**19**	**49,020**
DL9SEV	204	441	30	77	4	48,951
SP9CQ	124	320	46	80	19	46,400
N3SOK	141	285	42	66	54	46,170
JM1GHT	132	361	40	66	20	45,486
HA1WD	130	351	40	62	27	45,279
DM5GI	126	332	46	76	13	44,820
DL7VEE	106	275	57	92	8	43,175
SP3GRQ	154	374	31	76	6	42,262
UUØJC	118	301	40	81	17	41,538
VE1AOE	**209**	**451**	**20**	**33**	**39**	**41,492**
GMØJHF	127	313	37	74	20	41,003
W3FQE	131	331	30	68	25	40,713
VE6YR	131	293	37	42	59	40,434
LZ2JE	121	295	42	79	12	39,235
N2LEB	122	255	44	63	40	37,485
DH9SBL	116	311	36	60	22	36,698
LU5MEC	120	342	35	69	1	35,910
JT1CS	**223**	**564**	**–**	**–**	**–**	**35,532**
K9BJM	136	248	38	54	50	35,216
UA3PW	170	369	20	70	3	34,317
WB2FYZ	131	230	37	49	61	33,810
K3OK	120	244	36	59	42	33,428
EA7BDL	127	296	29	69	14	33,152
XE2ML	117	283	31	40	45	32,828
SP6BSL	116	293	37	62	13	32,816
DH6YMC	157	315	22	73	7	32,130
JE3UHV	104	272	43	59	13	31,280
KE6QR	127	211	36	39	70	30,595
VU2LBW	**102**	**274**	**40**	**67**	**2**	**29,866**
DL1ZU	110	274	38	70	0	29,592
DL9YP	112	283	32	59	13	29,432
YO3III	132	299	24	64	8	28,704
PA3FDO	102	254	41	59	12	28,448
N3JIX	100	240	34	60	23	28,080
F5DXN	123	280	34	51	15	28,000
G3URA	119	273	25	61	16	27,846
JA8AGI/1	96	263	33	54	17	27,352
KB9SIZ	120	196	39	42	58	27,244
OH7JJT	102	245	35	68	7	26,950
IK5MEQ	112	272	29	69	1	26,928
NØRKX	135	227	28	40	45	25,651
DF1ZN	97	266	34	43	19	25,536
SP7FBQ	84	235	32	50	26	25,380
SP6RGC	103	244	30	61	11	24,888
WA6BOB	134	199	30	29	64	24,477
WA5JAW	112	214	29	46	38	24,182
G3UFY	85	217	36	59	14	23,653
WT5L	105	211	32	45	34	23,421
AE4Y	106	190	35	43	44	23,180
K6RFM	118	194	27	27	65	23,086
TA1BM	**87**	**218**	**35**	**54**	**12**	**22,018**
GW3YVC	93	212	24	64	8	20,352
USØKW	111	245	24	54	5	20,335
7S3A	126	265	15	58	0	19,345
JA8GTO	72	203	34	45	15	19,285
OK2SWD	107	235	18	60	1	18,565
AE4EC	89	174	28	42	35	18,270
DL2UHD	80	213	32	40	13	18,105
DJ2IA	78	188	35	56	3	17,672
RA4AFZ	98	210	25	58	0	17,430
CT3KY	66	193	26	34	25	16,405
WA2HFI	97	147	28	27	52	15,729
IK4WMH	77	193	24	46	11	15,633
AH8LG	68	202	19	28	28	15,150
VE2FFE	75	174	23	30	33	14,964
WA7NPX	91	149	27	26	47	14,900
I6JSH	82	198	21	35	19	14,850
ES7AAZ	86	192	19	42	5	12,672
WB9BSH	76	136	26	31	34	12,376
W4TTY	68	161	22	43	11	12,236
DF2EY	72	165	23	41	10	12,210
AB1BX	80	143	15	24	41	11,440
DJ4SO	56	142	31	42	5	11,076
ZSØE	55	160	17	25	25	10,720
SM4XIH	60	148	24	47	0	10,508
W1CSM	63	120	22	29	28	9,480
OH2OM	54	120	21	49	3	8,760
SP2IHG	78	155	12	40	0	8,060
WX3M	48	103	24	28	11	6,489
UT3UA	51	113	22	30	0	5,876
SV1XV	36	92	25	29	8	5,704
VE9TTY	38	95	19	25	15	5,605
EA4BNQ	46	108	15	31	5	5,508
WA9AFM/5	52	75	18	16	35	5,175
PA3HGF	35	101	15	17	15	4,747
N2ALE	51	70	16	15	34	4,550
KØXU	47	74	13	13	28	3,996
SL4ZAE	49	99	12	26	0	3,762
N3EYB	39	63	19	18	21	3,654
DF2BQV	26	75	17	23	0	3,000
LY2FN	44	89	8	25	0	2,937
JK2VOC	42	74	14	18	2	2,516
JG3WCZ	11	31	10	11	3	744
W1/WB6BIG	11	16	6	5	8	304
KC7WUE	12	15	5	4	11	300
UT5UGQ	4	9	3	4	0	63

OPS: P40MM (K3MM), **ZX2B** (Y2MNL), **LY6M** (LY1DS), **ER3A** (ER1LW), **OSØTIB** (ON4AME), **RG9O** (RZ9OU), **J49XB** (DJ9XB), **9K2USA** (K4CY), **SN3E** (op), **YL800GC** (op), **7S3A** (SM3CER), **ZSØE** (ZS6AJS), **W8NP** (KF8UN).

SINGLE OPERATOR 10 METERS

L40E	**864**	**2561**	**25**	**78**	**53**	**399,516**
HC1JQ	**876**	**2599**	**22**	**77**	**53**	**395,048**
LU8EKC	**750**	**2213**	**24**	**72**	**53**	**329,737**
LW9EOC	**714**	**2105**	**24**	**68**	**51**	**301,015**
S50C	**613**	**1645**	**32**	**87**	**45**	**269,780**
RN6BN	**677**	**1673**	**32**	**94**	**33**	**266,007**
IT9BLB	**516**	**1382**	**27**	**74**	**43**	**199,008**
K4EA	**524**	**1337**	**31**	**79**	**38**	**197,876**
EO1I	**473**	**1203**	**31**	**76**	**27**	**161,202**
LU4DX	401	1181	17	60	49	148,806
GW4SKA	**368**	**964**	**26**	**61**	**43**	**125,320**
KR6E	**407**	**805**	**30**	**61**	**49**	**112,700**
JA1SJV	**286**	**808**	**26**	**65**	**28**	**96,152**
JA1YNE	295	820	25	63	27	94,300
DL1LH	**261**	**696**	**29**	**70**	**34**	**92,568**
JH1OAI	226	627	27	62	18	67,089
LW5DR	182	528	17	36	43	50,688
W6IWO	237	484	22	37	42	48,884
KB9JD	**217**	**542**	**22**	**49**	**19**	**48,780**
EA1ZH	**158**	**406**	**20**	**47**	**28**	**38,570**
JE2SOY	**128**	**356**	**23**	**53**	**3**	**28,124**
CT2GRF	**109**	**267**	**18**	**43**	**14**	**20,025**
NH6XM	**92**	**272**	**14**	**15**	**37**	**17,952**
RV3APM	92	241	19	39	13	17,111
UU9JQ	98	237	15	32	9	13,272
MØCOP	70	183	15	25	16	10,248
UX5HY	46	124	15	24	4	5,332
EA/OH2GI/P	37	103	14	17	13	4,532
UR5FCM	36	87	12	19	4	3,045
YO6CFB	18	46	9	12	2	1,058
CT3DZ	14	38	8	9	3	760
PR7AB	14	40	4	9	0	520
LU2WD	7	13	4	5	1	130

OPS: L40E (LW7EIC), **EO1I** (UT1IA).

SINGLE OPERATOR 15 METERS

9A5W	**1097**	**2867**	**38**	**107**	**53**	**567,666**
KH6ND	**997**	**2972**	**35**	**83**	**54**	**511,184**
CT3BX	**919**	**2745**	**30**	**87**	**56**	**474,885**
S50U	**858**	**2245**	**37**	**93**	**49**	**401,855**
VA3MM	**849**	**2277**	**34**	**92**	**47**	**393,921**
T94MZ	**884**	**2262**	**32**	**88**	**53**	**391,326**
UX2FXX	**828**	**2066**	**36**	**99**	**49**	**380,144**
LU4DRC	**751**	**2226**	**29**	**80**	**51**	**356,160**
VR2BG	**794**	**2133**	**33**	**82**	**41**	**332,748**
UT7QF	711	1778	38	95	49	323,596
VE6JY	**691**	**1743**	**35**	**85**	**48**	**292,824**
YU7NW	**604**	**1582**	**33**	**83**	**51**	**264,194**
OK2ZC	**615**	**1619**	**33**	**89**	**40**	**262,278**
RDØC	**630**	**1693**	**29**	**78**	**32**	**235,327**
DK2GZ	**530**	**1370**	**36**	**87**	**47**	**232,900**
JK1IQK	**504**	**1406**	**31**	**80**	**36**	**206,682**
EU1DX	**513**	**1342**	**32**	**80**	**42**	**206,668**
EC2ADR	**563**	**1351**	**27**	**72**	**43**	**191,842**
CE8SFG	**471**	**1395**	**22**	**62**	**49**	**185,535**
4U1ITU	**519**	**1310**	**31**	**71**	**33**	**176,850**
AY8A	**393**	**1162**	**28**	**64**	**46**	**160,356**
W6/GØAZT	**468**	**977**	**31**	**73**	**46**	**146,550**
OH2LU	**351**	**895**	**33**	**85**	**35**	**136,935**
CO8LY	**439**	**1063**	**20**	**51**	**54**	**132,875**
W6IHG	361	866	24	70	45	120,374
VK2KM	**303**	**896**	**26**	**77**	**27**	**116,480**
WA1FCN	**365**	**859**	**26**	**69**	**38**	**114,247**
RA3BT	**378**	**903**	**30**	**75**	**18**	**111,069**
JR4GPA	**318**	**874**	**23**	**63**	**23**	**95,266**
PA3BWD	**281**	**734**	**26**	**53**	**44**	**90,282**
OH6N	265	676	28	65	32	84,500
C98DC	**304**	**911**	**21**	**47**	**22**	**81,990**
RWØBG	268	729	22	65	8	69,255
NA4M	**275**	**561**	**26**	**51**	**45**	**68,442**
SP3BGD	**196**	**517**	**29**	**69**	**32**	**67,210**
W8PT	**184**	**435**	**27**	**59**	**31**	**50,895**
UA6ACK	214	487	19	55	9	40,421
UU4J	211	488	19	48	15	40,016
OA4EI	**122**	**361**	**21**	**26**	**42**	**32,129**
W9ILY	**144**	**321**	**24**	**49**	**24**	**31,137**
JA5ATN	**133**	**380**	**19**	**49**	**13**	**30,780**
KC7V	**155**	**333**	**21**	**33**	**31**	**28,305**
HSØGBI	**117**	**313**	**21**	**50**	**8**	**24,727**
UA6ATG	120	287	20	57	9	24,682
JA6BIF	**100**	**275**	**20**	**37**	**15**	**19,800**
OM1AXO	**103**	**273**	**18**	**36**	**18**	**19,656**
DL1EJD	90	236	17	25	24	15,576
OK2VP	89	239	17	36	11	15,296
OM7PY	67	175	22	44	9	13,125
JG3NKP	49	137	23	37	4	8,768
JA7DNO	68	186	14	31	2	8,742
SM3LGO	57	144	16	35	5	8,064
RW3PN	67	158	13	36	0	7,742
OH2LZI	68	160	11	32	1	7,040
EA4ZB	59	139	15	33	0	6,672
TF3VS	53	123	12	32	9	6,519
SM4BTF	49	113	8	29	0	4,181
UA3WCV	40	90	9	23	1	2,970

OPS: 4U1ITU (OM1AM), **AY8A** (LU8ADX), **C98DC** (DL2FAG), **OH6N** (OH8VJ).

SINGLE OPERATOR 20 METERS

AH6OZ	**743**	**2211**	**30**	**79**	**52**	**355,971**
9A2DQ	**849**	**2014**	**32**	**94**	**45**	**344,394**
DL4MCF	**784**	**1913**	**32**	**93**	**46**	**327,123**
IT9STX	**786**	**1886**	**29**	**83**	**45**	**296,102**
DH6LS	602	1510	30	86	50	250,660
OH2BP	**677**	**1578**	**31**	**86**	**34**	**238,278**
SN4G	**557**	**1406**	**24**	**76**	**47**	**206,682**
PJ2EL	**527**	**1574**	**18**	**55**	**48**	**190,454**
EU1MM	**538**	**1251**	**30**	**83**	**37**	**187,650**
CX7BF	**484**	**1441**	**24**	**66**	**36**	**181,566**
UA9CKP	**484**	**1383**	**20**	**64**	**33**	**161,811**
UXØDL	**487**	**1114**	**29**	**80**	**29**	**153,732**
WB8YJF	**412**	**837**	**30**	**73**	**50**	**128,061**
JH1RFM	**293**	**814**	**31**	**74**	**33**	**112,332**
UX6F	477	1064	20	63	22	111,720
N2KI	**455**	**910**	**19**	**58**	**45**	**111,020**
7K4QOK	281	774	28	72	37	106,038
YU7AE	**385**	**866**	**22**	**72**	**20**	**98,724**
UA6ADC	**336**	**752**	**27**	**79**	**17**	**92,496**
IK2FIL	**378**	**835**	**22**	**66**	**20**	**90,180**
UX3MR	252	585	26	65	24	67,275
RZ6AUL	292	632	22	63	14	62,568
RA9XF	256	710	20	60	4	59,640
HA8AR	**342**	**734**	**14**	**55**	**12**	**59,454**
YL3FW	**291**	**629**	**21**	**63**	**10**	**59,126**
RA1ZT	283	602	20	63	14	58,394
DL6EDD	**216**	**479**	**22**	**66**	**4**	**44,068**
IZ8BZX	178	416	18	60	23	42,016
DL9MBZ	224	489	15	50	19	41,076
SP3BLT	188	439	22	55	16	40,827
HG5C	210	496	14	37	28	39,184
RA1AW	216	460	18	48	11	35,420
UT2AU	176	406	18	55	7	32,480
SM2EKN	**221**	**461**	**12**	**51**	**7**	**32,270**
SP3PL	170	346	23	52	15	31,140
CO8TW	**147**	**336**	**17**	**33**	**36**	**28,896**
TA1DX	**170**	**385**	**17**	**48**	**10**	**28,875**
SM7JUR	190	412	16	48	5	28,428
HP1KZ	**137**	**323**	**12**	**28**	**33**	**23,579**
W4XDX	137	235	20	31	44	22,325
UA6JBQ	118	269	17	41	15	19,637
RA4LM	94	198	12	40	2	10,692
JH2OMM	29	60	16	11	6	1,980
RA3DRA	32	70	6	18	0	1,680

OPS: SN4G (SP4MPG), **PJ2EL** (ON4CFD), **HG5C** (HA5WE), **W4XDX** (W1KCD).

SINGLE OPERATOR 40 METERS

IK4MHB	**570**	**1258**	**26**	**77**	**32**	**169,830**
J41YM	**581**	**1312**	**21**	**73**	**32**	**165,312**
DF8QB	**495**	**1085**	**23**	**69**	**32**	**134,540**
RK6BZ	**344**	**759**	**23**	**65**	**23**	**84,249**
KH7U	**218**	**643**	**22**	**25**	**44**	**58,513**
4X/OK1EE/P	**219**	**639**	**13**	**48**	**13**	**47,286**
US9QA	**219**	**501**	**18**	**54**	**15**	**43,587**
T94DO	**248**	**533**	**11**	**53**	**14**	**41,574**
UR5FFC	255	541	14	52	4	37,870
IK3SSJ	237	494	12	51	9	35,568
EA3GIP	**171**	**379**	**14**	**50**	**13**	**29,183**
RZ9IR	**160**	**435**	**11**	**35**	**1**	**20,445**
UR5NX	37	79	7	20	0	2,133
PR7AR	12	35	6	9	2	595
JF2IGP	5	7	2	3	0	35

OPS: J41YM (OK1YM).

SINGLE OPERATOR 80 METERS

IK2QEI	**411**	**878**	**14**	**60**	**20**	**82,532**
S54E	**390**	**826**	**13**	**57**	**16**	**71,036**
UR6F	**385**	**802**	**15**	**59**	**7**	**64,962**
S51DX	365	756	12	53	12	58,212
HA9RU	**356**	**733**	**12**	**53**	**10**	**54,975**
DAØRC	**359**	**666**	**12**	**54**	**5**	**47,286**
LY1FW	**332**	**673**	**7**	**47**	**0**	**36,342**
OK2CLW	**263**	**519**	**9**	**46**	**1**	**29,064**
OK2EQ	224	445	9	48	0	25,365
UT5NM	246	495	7	43	0	24,750
DJ3IW	190	374	10	46	5	22,814
9A7R	**135**	**278**	**8**	**37**	**1**	**12,788**
AH7R	81	241	8	7	31	11,086
T95DVD	**120**	**246**	**7**	**35**	**1**	**10,578**
JE2OTM	24	39	6	6	3	585

OPS: UR6F (UXØFF), **DAØRC** (DL4RCK).

SINGLE OPERATOR ASSISTED

KI1G	**2085**	**5074**	**127**	**335**	**213**	**3,424,950**
JY9NX	**1954**	**5653**	**106**	**308**	**117**	**3,001,743**
DL5AXX	**1578**	**4035**	**127**	**334**	**156**	**2,489,595**
IKØYVV	**1386**	**3532**	**109**	**303**	**151**	**1,988,516**
DK3GI	1277	3185	129	321	142	1,885,520
DL1QW	1244	3111	125	319	129	1,782,603
DKØEE	1199	2992	111	295	125	1,588,752
IK1HSR	1245	3090	97	270	127	1,526,460
RAØOAM	**1384**	**3805**	**88**	**249**	**51**	**1,476,340**
S56A	**967**	**2373**	**111**	**305**	**114**	**1,257,690**
RW9WA	1098	3116	91	274	34	1,243,284
N5JR	**1155**	**2562**	**91**	**216**	**150**	**1,170,834**
K4WW	**1005**	**2216**	**93**	**202**	**164**	**1,017,144**
NO2T	**940**	**2172**	**78**	**217**	**131**	**925,272**
WØGJ	**1101**	**1899**	**98**	**176**	**212**	**922,914**
AD1C	683	1381	92	223	175	676,690
PAØWRS	**622**	**1577**	**100**	**245**	**82**	**673,379**
W7CT	**859**	**1482**	**83**	**117**	**187**	**573,534**
AE9B	**769**	**1416**	**83**	**146**	**167**	**560,736**
SM7BHM	**609**	**1448**	**81**	**204**	**67**	**509,696**
GM4FDM	**685**	**1682**	**66**	**168**	**57**	**489,462**
RX9TX	613	1684	76	179	15	454,680
WØETC	**635**	**1242**	**76**	**149**	**141**	**454,572**
9A8A	**536**	**1397**	**59**	**129**	**83**	**378,587**
NE3H	**511**	**1181**	**63**	**156**	**95**	**370,834**
N3UE	495	1018	63	142	117	327,796
7L4IOU	**436**	**1134**	**84**	**143**	**60**	**325,458**
CX9AU	**410**	**1202**	**57**	**124**	**82**	**316,126**
K1JE	440	1011	70	152	90	315,432
JI1CQA	366	1040	70	143	55	278,720
KØBX	412	952	75	139	72	272,272
IT9JOF	**408**	**1034**	**59**	**126**	**71**	**264,704**
N9CK	406	821	66	110	102	228,238
HA5BSW	**359**	**870**	**63**	**139**	**41**	**211,410**
W2GG	310	657	65	125	85	180,675
OK2ZJ	**292**	**720**	**62**	**133**	**35**	**165,600**
RUØAT	336	906	42	99	13	139,524
OH1MDR	**331**	**731**	**43**	**101**	**13**	**114,767**
WØBR	239	402	53	64	88	82,410
K5AM	192	449	53	83	42	79,922
GØMTN	**208**	**473**	**45**	**98**	**19**	**76,626**
DJ6TK	215	574	29	72	25	72,324
DL9NDV	163	414	45	84	24	63,342
W1NR	140	317	52	86	40	56,426
VA7SW	**163**	**382**	**38**	**41**	**59**	**52,716**
OH4MCV	125	322	49	84	19	48,944
JM1LPN	98	280	35	69	11	32,200
VA7BM	129	281	20	24	48	25,852
KØFJ	119	215	29	40	45	24,510
WØGOM	94	220	32	51	24	23,540

OPS: DKØEE (DL4MDO).

MULTI-OPERATOR TWO-TRANSMITTER

HC8N	**3987**	**11870**	**137**	**376**	**243**	**8,973,720**
W5KFT	**2358**	**4966**	**115**	**274**	**235**	**3,098,784**
JH4UYB	**1457**	**4114**	**111**	**246**	**106**	**1,904,782**
RI4M	**1700**	**3843**	**106**	**308**	**67**	**1,848,483**
KI6DY	**1742**	**3298**	**100**	**234**	**213**	**1,804,006**
NØNI	**1419**	**2765**	**106**	**226**	**212**	**1,504,160**
WA9ALS	**1300**	**2723**	**102**	**226**	**189**	**1,407,791**
J41K	**1341**	**3045**	**73**	**230**	**83**	**1,175,370**
K6KM	**1012**	**1986**	**93**	**154**	**176**	**840,078**

OPS: HC8N (N5KO, K6AW, W6OTC); **W5KFT** (K5DJ, WS7I, VK4UC, K7WM); **JH4UYB** (JH4UYB, JL4NCF); **RI4M** (RA4LBE, RA4LW, RA4LZ, RN4LP, RU4LM); **KI6DY** (KI6DY, VE6RAJ, & Carol); **NØNI** (NØAC, NØNI, NØHR, KØKD, KØWHV); **WA9ALS** (WA9ALS, KB9YTW, WD9GMK); **J41K** (SV1CIB, SV1DPI, SV1DPX); **K6KM** (NA6E, WT6P).

MULTI-OPERATOR SINGLE TRANSMITTER HIGH POWER

HO1A	**3049**	**8101**	**133**	**360**	**242**	**5,954,235**
RW9C	**1925**	**5382**	**131**	**377**	**97**	**3,256,110**
HG1S	**1813**	**4572**	**130**	**369**	**169**	**3,054,096**
RU1A	**1905**	**4599**	**136**	**385**	**142**	**3,049,137**
OM5M	**1713**	**4395**	**129**	**357**	**167**	**2,869,935**
RK2FWA	**1615**	**3993**	**128**	**371**	**138**	**2,543,541**
OL5Q	**1595**	**4011**	**111**	**299**	**155**	**2,266,215**
IK2BUF	**1456**	**3581**	**117**	**334**	**151**	**2,155,762**
MW2I	**1562**	**3653**	**104**	**280**	**144**	**1,928,784**
K4QD	**1560**	**3241**	**98**	**260**	**217**	**1,863,575**
RK9CZO	1303	3691	102	285	69	1,683,096
LY2ZZ	**1193**	**3019**	**110**	**295**	**126**	**1,603,089**
RW9OWD	1503	4154	78	236	50	1,512,056
JJ3YBB	**1280**	**3597**	**90**	**230**	**97**	**1,499,949**
K9YY	**1311**	**2820**	**102**	**243**	**184**	**1,491,780**
WØDC	**1302**	**2766**	**103**	**223**	**179**	**1,396,830**
F8KCF	**1180**	**2890**	**85**	**226**	**113**	**1,225,360**
SP5ZCC	**927**	**2311**	**98**	**273**	**97**	**1,081,548**
SK4TL	**1011**	**2503**	**89**	**232**	**94**	**1,038,745**
UT7L	**904**	**2156**	**90**	**243**	**75**	**879,648**
RK3RWL	1027	2332	79	243	47	860,508
RZ1AWO	**920**	**2080**	**75**	**218**	**63**	**740,480**
DL1YFF	724	1882	68	156	112	632,352
LW8EXF	**718**	**2116**	**57**	**143**	**91**	**615,756**
KJ7TH	**854**	**1371**	**82**	**117**	**186**	**527,835**
RK6AYN	294	673	46	130	22	133,254

OPS: HO1A (DJ7AA, DK1BT, DL7CM, HP1XVH); **RW9C** (UA9CGA, RW9CF, UA9CR, RU9CK, RA9DK); **HG1S** (HA1TJ, HA1DAE, HA1DAC, HA1DAI, HA1AG); **RU1A** (RA1ACJ, RN1AM, UA1AKC, UA1ANX, UA1ARX, & Yuri); **OM5M** (OM3RG, OM2KW, OM2RA); **RK2FWA** (UA2FB, UA2FF, RA2FA, RN2FA); **OL5Q** (OK1HRA, OK1FFU, OK1VSL, OK1INC); **IK2BUF** (IK2BUF, IZ2AVK, IK2ZJJ); **MW2I** (GW5NF, GW4JBQ, G4VXE); **K4QD** (K4QD, AF4Z, K4PX, KE4MMI, WT4I, AB4ET); **RK9CZO** (RX9CAZ, RX9CGR, Igor, Fedjanin, Alex, & Andreev); **LY2ZZ** (LY2PAJ, LY3MM); **RW9OWD** (RW9OW, RA9YDR, UA9UIV, UA9ZBQ); **JJ3YBB** (JA3PJL, JA3FHL, JA3OOK, JH3FQF, JS3VEX, & Toshi Nakamura); **K9YY** (K9YY, KG9OV); **WØDC** (WØLSD, WØBV, WØDC); **F8KCF** (F6FNL, OM3CGN, FØDIA, F6BGC, F1ADG, F1BGO); **SP5ZCC** (SP5HGB, SP5UAF, SQ5BPM, SQ5EBL, SQ5EBJ, SQ5HAB, SQ5VJB); **SK4TL** (SM4RGD, SM4LLP, SM4UOS); **UT7L** (UR4LRG, UR4LTX, US4LGW, UXØLL, UY5LW); **RK3RWL** (RN3RC, RN3RX, RU3RQ, RK3RX); **RZ1AWO** (UA1ACC, UA1ATZ, RA1ARJ, UA1AAF, RV1AQ); **DL1YFF** (DL1YFF, DK1QH); **LW8EXF** (LU1AEE, LU2BA, LU7DW, LW8EXF); **KJ7TH** (KJ7TH, KW7N); **RK6AYN** (RV6ARU, RW6ACM, UA6AH).

MULTI-OPERATOR SINGLE TRANSMITTER LOW POWER

Z37GBC	**1565**	**3740**	**110**	**320**	**128**	**2,086,920**
K1TTT	**1422**	**3162**	**110**	**300**	**209**	**1,957,278**
TI2/AKØA	**1714**	**4343**	**79**	**189**	**173**	**1,915,263**
KP2D	**1477**	**3615**	**81**	**209**	**194**	**1,749,660**
YU7AL	**1153**	**2809**	**107**	**292**	**101**	**1,404,500**
YL7C	**967**	**2324**	**98**	**284**	**80**	**1,073,688**
9A7T	**883**	**2181**	**91**	**247**	**104**	**964,002**
OK1KSL	**794**	**1969**	**86**	**240**	**83**	**805,321**
ES9C	**859**	**1955**	**74**	**241**	**49**	**711,620**
DN1JC	**741**	**1743**	**82**	**221**	**70**	**650,139**
KE7AJ	**850**	**1566**	**85**	**140**	**176**	**627,966**
DF4OR	697	1643	81	216	82	622,697
UZ4E	**731**	**1684**	**81**	**214**	**42**	**567,508**
E21EIC	**739**	**1982**	**73**	**171**	**40**	**562,888**
3Z1V	**541**	**1315**	**87**	**244**	**53**	**504,960**
PY2ZR	**199**	**578**	**32**	**61**	**45**	**79,764**
N7PWZ	**166**	**225**	**31**	**26**	**86**	**32,175**
OK5SWL	29	62	12	25	0	2,294

OPS: Z37GBC (Z31GX, Z32PT, Z33F, Z36W); **K1TTT** (K1TTT, WM1K, WF1B, W1TO, N1XS); **TI2/AKØA** (AKØA, KI7WO); **KP2D** (KP2D, KP2VI, NP2E, NP2W, NP2BT, NP2DJ, NP2DZ, WP2S, W5TTY); **YU7AL** (YU7AL, YT7AW, YZ7EM); **YL7C** (YL2MD, YL2GQT, YL-RS463); **9A7T** (9A2EU, 9A2NO, 9A4KJ, 9A5MR); **OK1KSL** (OK1FAK & ops); **ES9C** (ES1QV, ES1TM, ES2NA); **DN1JC** (DN1JC, DL7VBJ); **KE7AJ** (KE7AJ, K7OX); **DF4OR** (DL1ZBO, DF4OR); **UZ4E** (UR7EU, UR4EN, Igor & Serg); **E21EIC** (Ops); **3Z1V** (SP1MHV, SQ1FTD); **PY2ZR** (PY2ZR, PU2NYV); **N7PWZ** (N7PWZ, W1DRY); **OK5SWL** (OK2SWD, OK2WHG).

MULTI-OPERATOR MULTI-TRANSMITTER

IG9A	**2638**	**7893**	**123**	**353**	**174**	**5,130,450**
K9NS	**2700**	**5824**	**135**	**338**	**242**	**4,164,160**
KA4RRU	**1789**	**4027**	**104**	**268**	**200**	**2,303,444**
OL7R	**1488**	**3827**	**117**	**306**	**155**	**2,212,006**
W4GKM	1249	2596	96	240	185	1,352,516
JA6ZPR	**837**	**2370**	**68**	**159**	**74**	**713,370**

OPS: IG9A (IT9GSF, YL2KL, YL2KA, YL2LY, YL3CW); **K9NS** (K9DX, K9HMB, K9PW, K9RO, KS9W, N9NCX); **KA4RRU** (KA4RRU, N4DXS, W4MGM, W4DC); **OL7R** (OK1XUV, OK1VWK, OK1WMV); **W4GKM** (W4GKM, W4RRE, WA4CGF, KF4YWW); **JA6ZPR** (JH6JSR, JR6CKX).

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

• "*CQ* Reviews: The Alinco DJ-596T Handheld with Digital Voice," by W2VU

• "*CQ* Reviews: The High Sierra HS-1500MkII Antenna," by WB6NOA

• "Build a Portable Radio Direction Finder," by NØGSG

• "An Electrically-Shortened 2-Band Dipole," by VE3ERP

Plus...

• "An Automatic Power Supply/Battery Charger," by K7PF

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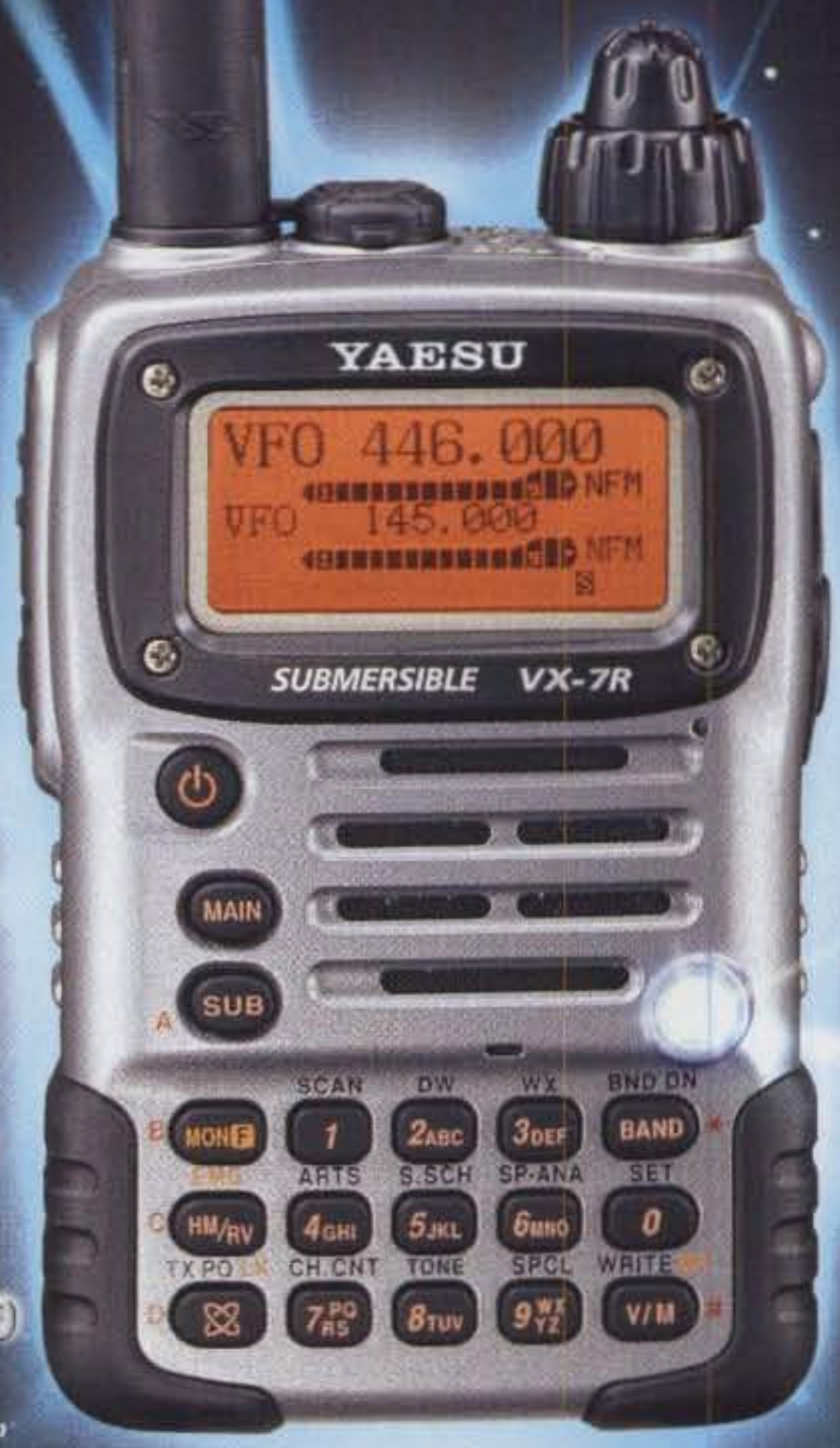

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