Official Journal of
ARRL
The national association for AMATEUR RADIO

QST

devoted entirely to
AMATEUR RADIO

March 2002

QST reviews
- Ranger RCI-5054DX 6-meter transceiver

DXing in Sudan

Taming the trap dipole

The 2001 USA Direction Finding Championships

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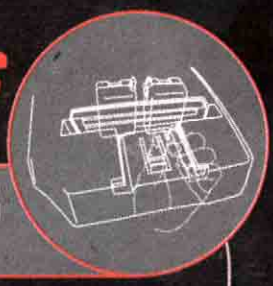

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- Trickle charge current: 70mA
- Discharge current: 300 mA

Sample LCD read out during charging. Shows current voltage, time, and charging capacity

Sample LCD read out during discharging, showing current voltage, time, and discharging capacity.

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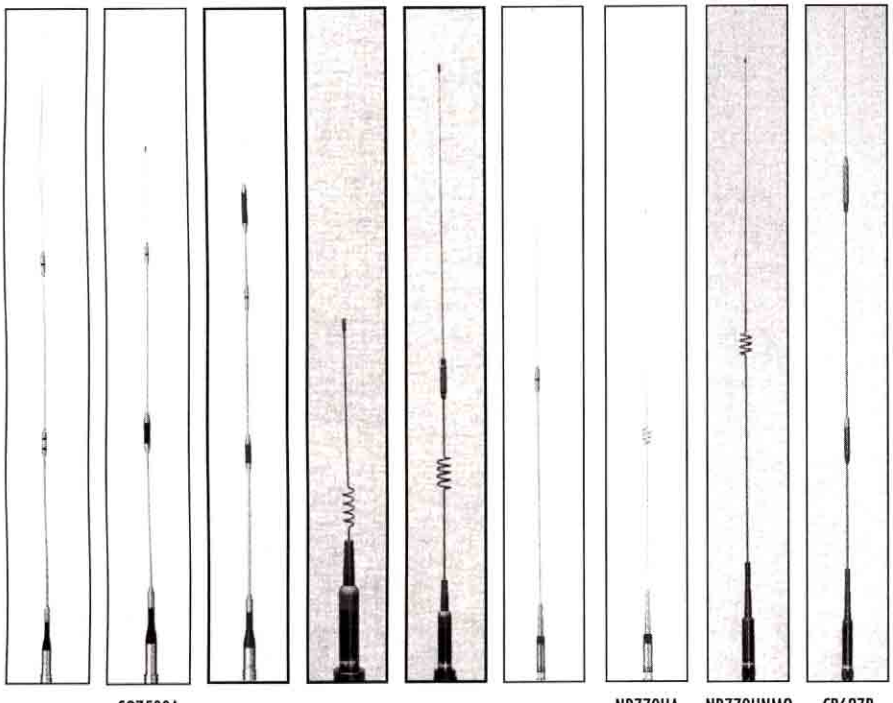


SG2000HD | SG7500A SG7500NMO | SG7900A | NR72BNMO | NR73BNMO | NR2C | NR770HA NR770HB | NR770HNMO NR770HBNMO | CR627B CR627BNMO

HV7A Mobile Antenna System

For New HF/VHF transceivers NEW!
(Such as: IC706 series and FT100)

Optional Loading Coils

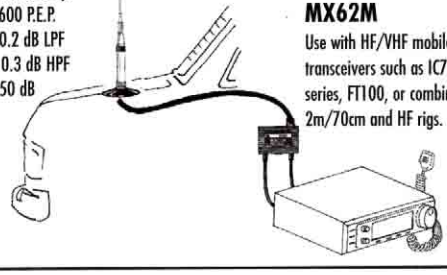
HVC7	40m
HVC14	20m
HVC18	17m
HVC21	15m

Recommended Antenna Mounts: K400C or K600M

MX62M Duplexer
Specifications:
HF/6m & 2m/70cm bands
1.6-56 MHz LPF
76–470 MHz HPF
(76–120 receive only)
Watts: 600 P.E.P.
Loss: 0.2 dB LPF
0.3 dB HPF
Isol.: 50 dB

The NEW HV7A has 5 band capability: 70cm, 2m, 6m, and 2 HF bands through use of loading coils. Foldover feature allows for easy access into low overhead buildings. Ideal for users of IC706 series and FT100 radios.

Bands Supplied:	10m/6m/2m/70cm
Opt. Loading Coils:	40m/20m/17m/15m
Power, P.E.P.:	HF 120w/VHF 200w
Mount Connection:	UHF
Length:	54"
SWR:	1.5:1 nominal



MX62M
Use with HF/VHF mobile transceivers such as IC706 series, FT100, or combine 2m/70cm and HF rigs.

SPECIAL FEATURES:

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- Fold-over feature on most models

FOLD-OVER

Patented One-Touch Fold-over Feature
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MODEL	BAND (MHz)	WATTS	CONN.	HT. IN.	ELEMENT PHASING
NR72BNMO*[6]	2m/70cm	100	NMO	13.8	1/4λ, 1/2λ
NR73BNMO	2m/70cm	100	NMO	33.5	1/2λ, 1-5/8λ
NR770HA[7]	2m/70cm	200	UHF	40.2	1/2λ, 2-5/8λ
NR770HNMO[8]	2m/70cm	200	NMO	38.2	1/2λ, 2-5/8λ
NR770RA	2m/70cm	200	UHF	38.6	1/2λ, 2-5/8λ
SG7000A*[6]	2m/70cm	100	UHF	18.5	1/4λ, 6/8λ
SG7500A	2m/70cm	150	UHF	40.6	1/2λ, 2-5/8λ
SG7500NMO	2m/70cm	150	NMO	41.0	1/2λ, 2-5/8λ
SG7900A*	2m/70cm	150	UHF	62.2	7/8λ, 3-5/8λ

* Not recommended for Magnet Mount
6 Grounding required.
7 NR770HB same specifications but in black finish.
8 NR770HBNMO same specifications but in black finish.
9 52-54MHz only

MODEL	BAND (MHz)	WATTS	CONN.	HT. IN.	ELEMENT PHASING
NR2C	2m	150	UHF	55.5	1/2λ+1/4λ
SG2000HD*	2m	250	UHF	62.6	1/2λ+3/8λ
SG6000NMO*[6,9]	6m	150	NMO	39	1/4λ
CR224A*[6]	2m/1-1/4m	150	UHF	68.5	7/8λ, 2-5/8λ
CR320A*[6]	2m/1-1/4m 70cm	200 100/200	UHF	37.4	1/4λ, 1/2λ 2-5/8λ
CR627B*[6,9]	6m/2m/	120	UHF	60	1/4λ, 1/2+1/4λ/
CR627BNMO*[6,9]	70cm	120	NMO	60	2-5/8λ

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Technical

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News and Features

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QST Workbench

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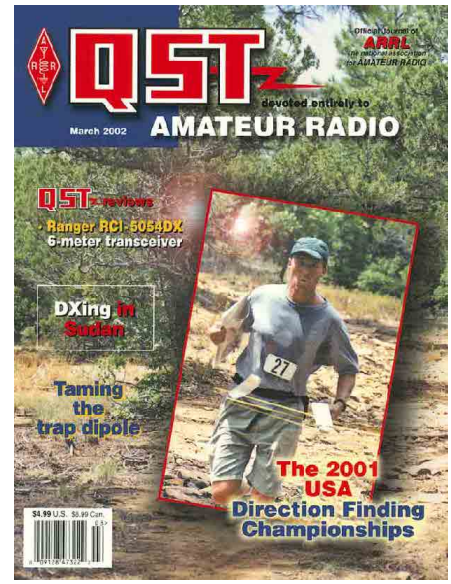
Operating

Departments



Our Cover:
Dave D'Epagnier, K0QE, looks determined as he nears the finish line of the 2-meter direction-finding competition at last summer's USA Championships in Albuquerque. One of three competitors from the Denver area, Dave was taking part in his first formal ARDF competition. Preparations are well underway for the 2002 USA Championships in Georgia. The story begins on page 46.

US & Possessions: Membership in the ARRL, including a one year subscription to *QST*, is available to individuals at $39. Age 65 and over, with proof of age, $34. Licensed radio amateurs age 21 and under and the eldest licensee in the household may qualify for the rate of $20. Life Membership, including a subscription to *QST* is available at $975.* Age 65 and over, $850.* Membership and *QST* cannot be separated. Fifty percent of dues is allocated to *QST*, the balance for membership. Subscription rate for libraries and institutions is $39 per year. Single copies $5.

International
To compensate for additional postage for mailing outside the US, the following rates apply:
Canada: Membership in the ARRL, including a one year subscription to *QST*, $49, payable in US funds. Life Membership, including a subscription to *QST* is available at $1225.* Subscription rate for libraries and institutions is $49 per year.
All Other Countries: Membership in the ARRL, including a one year subscription to *QST*, $62, payable in US funds. Life Membership, including a subscription to *QST* is available at $1550.* Subscription rate for libraries and institutions is $62 per year.
*Payment arrangements available. Please write for details.
Membership without *QST* is available to the immediate family of a member living at the same address, and to anyone who is legally blind, for $8 per year.
Foreign remittances should be by international postal or express money order or bank draft negotiable in the US and for an equivalent amount in US funds.

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02ARD-2159 #011502 *Skycommand II is pending FCC rule change.

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Features: Transmit Range: 144-148 MHz, Receive Range: 130-179 MHz, MARS and CAP capable (permits are required), 5-watts output (with 12 VDC), 40 memory channels store any offset or tone, CTCSS encode and decode included, programmable band and memory scan modes, auto-repeater offset, backlit display and keypad, Size: 4.25" (H) x 2" (W) x 1.3" (D) excluding battery pack

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"IT SEEMS TO US..."

What Belongs in *QST*?

QST is the oldest Amateur Radio periodical in the world. Few magazines of any kind can claim a longer history.

QST is the official journal of the ARRL. Ideally it would chronicle all of the significant activities in furtherance of the purposes of the ARRL. *QST* is our principal means of communicating with members. With a couple of narrow exceptions our Bylaws require that a copy be sent to every member, every month. *QST* is also the principal tangible benefit of ARRL membership. Every so often a member will say they "subscribe to *QST*" even though membership is more than just a magazine subscription.

There are literally dozens of specialties within Amateur Radio that are pursued with great enthusiasm by their devotees. Virtually all of them are worthy of organizational support in the form of visibility and information dissemination, yet we could not begin to do them all justice in every issue of *QST*. Fortunately, there are other ways to provide needed support.

There is *QEX*, a bimonthly forum for communications experimenters. From its introduction in 1981 as a modest newsletter, *QEX* has grown into a slick 64-page technical publication that incorporates *Communications Quarterly* magazine. For the competitively minded there is *National Contest Journal (NCJ)*, a bimonthly magazine with operating and technical content. The ARRL also proudly publishes the annual proceedings of a wide range of educational, amateur satellite, VHF/UHF, microwave, and digital communications conferences and symposia. These publications reach at most a few thousand members, but the information they contain is important to the advancement of Amateur Radio.

The Internet has come into its own as a means of providing information, rapidly and in depth, either to specific groups of members or to almost the entire membership. According to an independent survey that we commissioned in 2000, 89% of ARRL members had Internet access; no doubt the figure is even higher today. There are 95,000 members who are registered to use the members-only portion of the ARRL Web site, and tens of thousands do so on a regular basis. Every week the ARRL Letter is sent electronically to more than 61,000 members and is passed along to countless others. We can say with pride that the ARRL is already in the forefront among national membership associations in making effective use of the Internet, and the best is yet to come.

Recently an exciting new feature debuted in support of the Field Organization: Section News on the Web. Check out **www.arrl.org/sections/** to see how well many Section Managers are already using this medium by including photos, links to other Web sites, and more information than they could possibly fit into their limited *QST* space.

Each month portions of *QST* are made available in advance to members via the Web site. Product Reviews are by far the most popular but the contest results also have an avid following. More than one contester has observed that seeing the results in print a couple of weeks later has become an anticlimax. But we can do more with the Web than just deliver the results earlier; we can also deliver them in more depth and with the line scores in a database so the participants can do their own analyses. For example, we can provide band-by-band contact and multiplier information for each entrant, not just for the high scorers.

Even as Internet capabilities and use have been growing, economic pressures have come to bear on *QST*. Postage increases that far exceed the general rate of inflation and a softening of the advertising market, not just in Amateur Radio but throughout the economy, make it more expensive to deliver each page. At the same time the ARRL is committed to devoting substantial resources to important programs such as spectrum defense, improving the regulatory climate for antennas, and education, while maintaining a wide range of other programs. We incurred a substantial operating deficit during 2001 and expect even larger deficits in 2002 and 2003.

Faced with the obligation to be fiscally responsible, at its January meeting the ARRL Board took two actions affecting *QST*. First, the Board authorized management to set the page count of *QST*. This reversed an instruction given in July 2000 that each issue of *QST* be no less than 176 pages. At least for now, advertising is not sufficient to support 176 pages every month; for the rest of the year you will be seeing 160-page as well as 176-page issues. Second, the Board decided to remove the detailed minutes of the meetings of the Board and Executive Committee from *QST*, saving about 12 pages per year of fine print. The minutes will be available on the Web (they already are) and arrangements will be made for members who want to see them but cannot access the Web. Meeting highlights will be reported in *QST*.

The Board considered, but deferred until July, whether to relocate Section News and contest line scores from *QST* to the Web.

Each month, six pages of *QST* are devoted to Section News. Communication between Section Managers and their volunteers is extremely important, but it is clearly inefficient to print 170,000 copies to reach sections having memberships ranging from a high of 6,664 to a low of 72.

From survey after survey we know that contest rules and results are the least liked content in *QST*. On the other hand, the advancement of operating skills and station performance is an important part of the ARRL's mission. With some of the space freed up by moving line scores to a more appropriate medium we could expand editorial coverage of contest activities in a way that would be of more interest to nonparticipants.

Between now and July we will be doing our best to use the Web to increase the flow of information in these two important program areas. Take a look and let us know what you think.—*David Sumner, K1ZZ*

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If you have a question, try one of these Headquarters departments . . .

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ARRL Directors

Atlantic Division
BERNIE FULLER, N3EFN
17668 Price Rd, Saegertown, PA 16433
(814-763-1529);
n3efn@arrl.org
Vice Director: William C. Edgar, N3LLR, 22 Jackson Ave., Bradford, PA 16701 (814-362-1250); n3llr@arrl.org

Central Division
GEORGE R. ISELY, W9GIG
736 Fellows St, St. Charles, IL 60174
(630-584-3510);
w9gig@arrl.org
Vice Director: Howard S. Huntington, K9KM, 25350 N Marilyn Ln, Hawthorn Woods, IL 60047 (847-438-3452);
k9km@arrl.org

Dakota Division
JAY BELLOWS, K0QB
997 Portland Ave, St Paul, MN 55104
(651-983-2420); k0qb@arrl.org
Vice Director: Twila Greenheck, N0JPH, 3333 Owasso Heights Rd, Shoreview, MN 55126 (651-483-1214);
n0jph@arrl.org

Delta Division
RICK RODERICK, K5UR*
PO Box 1463, Little Rock, AR 72203
(501-988-2527); k5ur@arrl.org
Vice Director: Henry R. Leggette, WD4Q, 7335 Ginger Snap Cove, Memphis, TN 38125-4732
(901-757-0444); wd4q@arrl.org

Great Lakes Division
GEORGE RACE, WB8BGY
3865 Gibbs Rd, Albion, MI 49224
(517-531-4758);
wb8bgy@arrl.org
Vice Director: Gary L. Johnston, KI4LA, 3056 Hergott Dr, Edgewood, KY 41017-3377
(859-341-7477); ki4la@arrl.org

Hudson Division
FRANK FALLON, N2FF*
30 E Williston Ave, East Williston, NY 11596 (516-746-7652);
n2ff@arrl.org
Vice Director: Stephen A. Mendelsohn, W2ML, 318 New Milford Ave, Dumont, NJ 07628 (201-384-0570);
w2ml@arrl.org

Midwest Division
WADE WALSTROM, W0EJ
7431 Macon Dr, Cedar Rapids, IA 52411 (319-393-8982); w0ej@arrl.org
Vice Director: Bruce Frahm, K0BJ, PO Box DX, Colby, KS 67701
(785-462-7388); k0bj@arrl.org

New England Division
TOM FRENAYE, K1KI*
PO Box J, West Suffield, CT 06093
(860-668-5444); k1ki@arrl.org
Vice Director: Mike Raisbeck, K1TWF, 85 High St, Chelmsford, MA 01824
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Northwestern Division
GREG MILNES, W7OZ
740 SE 24th Ave, Hillsboro, OR 97123-7286 (503-648-6990);
w7oz@arrl.org
Vice Director: Jim Fenstermaker, K9JF, 10312 NE 161st Ave, Vancouver, WA 98682 (360-256-1716); k9jf@arrl.org

Pacific Division
JIM MAXWELL, W6CF,
PO Box 473, Redwood Estates, CA 95044 (408-353-3911);
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Roanoke Division
DENNIS BODSON, W4PWF
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Rocky Mountain Division
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Vice Director: Warren G. "Rev" Morton, WS7W, 1341 Trojan Dr, Casper, WY 82609 (307-235-2799);
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Vice Director: Sandy Donahue, W4RU, 15010 Briarhill Ln, Atlanta, GA 30324 (404-315-1443);
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Southwestern Division
ART GODDARD, W6XD,
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Vice Director: Tuck Miller, NZ6T, 3122 E 2nd St, National City, CA 91950 (619-434-4211);
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Eastern Pennsylvania	Eric Olena, WB3FPL, 284 Blimline Rd, Mohnton, PA 19540 (610-775-0526); **wb3fpl@arrl.org**
Maryland-DC	Tom Abernethy, W3TOM, 1133 Apple Valley Rd, Accokeek, MD 20607 (301-292-6263); **w3tom@arrl.org**
Northern New York	Thomas Dick, KF2GC, 4 Jenkins St, Saranac Lake, NY 12983 (518-891-0508); **kf2gc@arrl.org**
Southern New Jersey	Jean Priestley, KA2YKN, 7158 Chandler Ave, Pennsauken, NJ 08110 (856-662-3587); **ka2ykn@arrl.org**
Western New York	Scott Bauer, W2LC, 1964 Connors Rd, Baldwinsville, NY 13027 (315-638-7551); **w2lc@arrl.org**
Western Pennsylvania	John V. Rodgers, N3MSE, 803 S Main St, Butler, PA 16001-6326 (724-287-0424); **n3mse@arrl.org**

Central Division

Illinois	Bruce Boston, KD9UL, 815 E 3rd St, Beardstown, IL 62618 (217-323-2611); **kd9ul@arrl.org**
Indiana	Peggy Coulter, W9JUJ, 12330 SCR 200 E, Muncie, IN 47302 (765-288-0481); **w9juj@arrl.org**
Wisconsin	Donald Michalski, W9IXG, 4214 Mohawk Dr, Madison, WI 53711 (608-274-1886); **w9ixg@arrl.org**

Dakota Division

Minnesota	Randy "Max" Wendel, KM0D, 8539 Bryant Ave S, Bloomington, MN 55420-2147 (952-888-5953); **km0d@arrl.org**
North Dakota	Kent Olson, KA0LDG, 7702 Forest River Rd, Fargo, ND 58104-8004 (701-298-0956); **ka0ldg@arrl.org**
South Dakota	Roland Cory, W0YMB, 815 2nd Ave W, Mobridge, SD 57601 (605-845-2400); **w0ymb@arrl.org**

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Arkansas	Bob Ideker, WB5VUH, 103 Duquesne Ct, Little Rock, AR 72223 (501-868-8847); **wb5vuh@arrl.org**
Louisiana	Mickey Cox, K5MC, 754 Cheniere-Drew Rd, West Monroe, LA 71291 (318-397-1980); **k5mc@arrl.org**
Mississippi	Malcolm Keown, W5XX, 14 Lake Circle Dr, Vicksburg, MS 39180 (601-634-3232); **w5xx@arrl.org**
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Great Lakes Division

Kentucky	John D. Meyers, NB4K, 218 Cory Ln, Butler, KY 41006-9740 (859-472-6690); **nb4k@arrl.org**
Michigan	Richard Mondro, W8FQT, 800 Dover St, Dearborn Heights, MI 48127 (313-730-2111); **w8fqt@arrl.org**
Ohio	Joseph J. Phillips, K8QOE, 2800 Jupiter Dr, Fairfield, OH 45014-5022 (513-874-0006); **k8qoe@arrl.org**

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Eastern New York	Pete Cecere, N2YJZ, 378 Ohayo Mtn Rd, Woodstock, NY 12498 (845-679-9846); **n2yjz@arrl.org**
NYC-Long Island	George Tranos, N2GA, PO Box 296, Bellport, NY 11713, (631-286-7562); **n2ga@arrl.org**
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Midwest Division

Iowa	Jim Lasley, N0JL, PO Box 5, Chillicothe, IA 52548 (641-935-4337); **n0jl@arrl.org**
Kansas	Orlan Q. Cook, W0OYH, 12110 West 71st St, Shawnee, KS 66216 (913-631-0423); **w0oyh@arrl.org**
Missouri	Dale C. Bagley, K0KY, PO Box 13, Macon, MO 63552-1822 (660-385-3629); **k0ky@arrl.org**
Nebraska	Bill McCollum, KE0XQ, 1314 Deer Park Blvd, Omaha, NE 68108 (402-734-3316); **ke0xq@arrl.org**

New England Division

Connecticut	Betsey Doane, K1EIC, 92 Mohegan Rd, Shelton, CT 06484-2448 (203-929-7759); **k1eic@arrl.org**
Eastern Massachusetts	Phil Temples, K9HI, Apt. 803, 125 Coolidge Ave, Watertown, MA 02472-2875 (617-926-5986); **k9hi@arrl.org**
Maine	William Woodhead, N1KAT, 63 1st Ave, Auburn, ME 04210 (207-782-4862); **n1kat@arrl.org**
New Hampshire	Al Shuman, N1FIK, PO Box 119, Goffstown, NH 03045-0119 (603-487-3333); **n1fik@arrl.org**
Rhode Island	Bob Beaudet, W1YRC, 30 Rocky Crest Rd, Cumberland, RI 02864 (401-333-2129); **w1yrc@arrl.org**
Vermont	Bob DeVarney, WE1U, 33 Harborview Rd, Apt 802, S Burlington, VT 05403 (802-238-7007); **we1u@arrl.org**
Western Massachusetts	William Voedisch, W1UD, 240 Main St, Leominster, MA 01453 (978-537-2502); **w1ud@arrl.org**

Northwestern Division

Alaska	David Stevens, KL7EB, PO Box 113242, Anchorage, AK 99511 (907-345-6506); **kl7eb@arrl.org**
Eastern Washington	Kyle Pugh, KA7CSP, 5006 W Houston Ave, Spokane, WA 99208 (509-327-5039); **ka7csp@arrl.org**
Idaho	John J. Cline, K7BDS, 1475 Oriole Way, Boise, ID 83709 (208-376-6045); **k7bds@arrl.org**
Montana	Darrell Thomas, N7KOR, 743 33rd Ave NE, Great Falls, MT 59404 (406-453-8574); **n7kor@arrl.org**
Oregon	William Sawders, K7ZM, 19821 Ponderosa St, Bend, OR 97702 (541-389-6258); **k7zm@arrl.org**
Western Washington	Harry Lewis, W7JWJ, 10352 Sand Point Way NE, Seattle, WA 98125 (206-523-9117); **w7jwj@arrl.org**

Pacific Division

East Bay	Andy Oppel, N6AJO, 1308 Burbank St, Alameda, CA 94501-3946 (510-864-2299); **n6ajo@arrl.org**
Nevada	Jan Welsh, NK7N, 59 Constitution Ave, Henderson, NV 89015-5702 (702-565-0242); **nk7n@arrl.org**
Pacific	Ronald Phillips, AH6HN, HCR 2 Box 6637, Keaau, HI 96749 (808-982-6513); **ah6hn@arrl.org**
Sacramento Valley	Jerry Boyd, K6BZ, PO Box 252, Igo, CA 96047 (530-396-2256); **k6bz@arrl.org**
San Francisco	Leonard Gwinn, WA6KLK, 2960 Blackhawk Dr, Willits, CA 95490-9704 (707-459-1871); **wa6klk@arrl.org**
San Joaquin Valley	Donald Costello, W7WN, 1900 N Ashby Rd, No. 9, Merced, CA 95348 (209-383-5739); **w7wn@arrl.org**
Santa Clara Valley	Glenn Thomas, WB6W, 502 Walnut Dr, Milpitas, CA 95035-4133 (408-263-9450); **wb6w@arrl.org**

Roanoke Division

North Carolina	John Covington, W4CC, PO Box 217122, Charlotte, NC 28221(704-577-9405); **w4cc@arrl.org**
South Carolina	Patricia Hensley, N4ROS, 164 N Main St PO Box 70, Richburg, SC 29729-0070 (803-789-5810); **n4ros@arrl.org**
Virginia	Carl Clements, W4CAC, 4405 Wake Forest Rd, Portsmouth, VA 23703 (757-484-0569); **w4cac@arrl.org**
West Virginia	Hal L. Turley, KC8FS, 657 Forest Circle, S Charleston, WV 25303 (304-744-5949); **kc8fs@arrl.org**

Rocky Mountain Division

Colorado	Jeff Ryan, N0WPA, 6721 Northface Ln, Colorado Springs, CO 80919-1508 (719-260-6826); **n0wpa@arrl.org**
New Mexico	Joe Knight, W5PDY, 10408 Snow Heights Blvd NE, Albuquerque, NM 87112 (505-299-4581); **w5pdy@arrl.org**
Utah	Mel Parkes, AC7CP, 2166 E 2100 North, Layton, UT 84040 (801-547-1753); **ac7cp@arrl.org**
Wyoming	Robert Williams, N7LKH, PO Box 130, Wapiti, WY 82450 (307-527-7758); **n7lkh@arrl.org**

Southeastern Division

Alabama	Bill Cleveland, KR4TZ, 2113 Wildwood Place, Mobile, AL 36609-2583 (334-661-3892); **kr4tz@arrl.org**
Georgia	Susan Swiderski, AF4FO, 772 Camelot Way, Norcross, GA 30071 (770-449-0369); **af4fo@arrl.org**
Northern Florida	Rudy Hubbard, WA4PUP, PO Box 843, Milton, FL 32572-0843 (850-626-0620); **wa4pup@arrl.org**
Puerto Rico	Victor Madera, KP4PQ, PO Box 191917, San Juan, PR 00919-1917 (787-789-4998); **kp4pq@arrl.org**
Southern Florida	Phyllisan West, KA4FZI, 1410 Shelby Parkway, Cape Coral, FL 33904 (941-574-3467); **ka4fzi@arrl.org**
Virgin Islands	John Ellis, NP2B, PO Box 24492, Christiansted, St Croix, VI 00824 (340-773-9643); **np2b@arrl.org**
West Central Florida	Dave Armbrust, AE4MR, 3024 Salem Ave, Sarasota, FL 34232 (941-378-1701); **ae4mr@arrl.org**

Southwestern Division

Arizona	Clifford Hauser, KD6XH, 8741 N Hollybrook Ave, Tucson, AZ 85742 (520-744-9095); **kd6xh@arrl.org**
Los Angeles	Phineas J. Icenbice Jr, W6BF, 19323 Halsted St, Northridge, CA 91324 (818-349-3186); **w6bf@arrl.org**
Orange	Joe H. Brown, W6UBQ, 5444 La Sierra, Riverside, CA 92505 (909-687-8394); **w6ubq@arrl.org**
San Diego	Kent Tiburski, K6FQ, 1405 Greenbay St, San Diego, CA 92154 (619-575-1964); **k6fq@arrl.org**
Santa Barbara	Robert Griffin, K6YR, 1436 Johnson Ave, San Luis Obispo, CA 93401-3734 (805-543-3346); **k6yr@arrl.org**

West Gulf Division

North Texas	Larry Melby, KA5TXL, 8841 Lavalle Ln, Dallas, TX 75243 (214-348-5283); **ka5txl@arrl.org**
Oklahoma	Charlie Calhoun, K5TTT, 16101 E 98th St N, Owasso, OK 74055 (918-272-9872); **k5ttt@arrl.org**
South Texas	E. Ray Taylor, N5NAV, 688 Comal Ave, New Braunfels, TX 78130 (830-625-1683); **n5nav@arrl.org**
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AMERITRON ATR-30

$599

Suggested Retail

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

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

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

All band coverage operates 1.8-30 MHz including all MARS and WARC bands.

Super High Current Roller Inductor

You'll see Ameritron's new *super high current* air core roller inductor. It's *edge wound* from a thick solid copper strip and silver plated. This produces a large surface area and a massive conductor. It can carry huge circulating RF currents and withstand tremendous heat that'll melt or burn ordinary roller inductors.

A gear driven turns counter and crank knob gives you precise inductance control.

Two 500 pf Tuning Capacitors

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

6:1 vernier re-duction drives makes capacitor tuning smooth and easy.

Super Balun, 6 position Antenna Switch

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

A 6 position antenna switch lets you select your desired operating antenna.

Read *true* Peak Power

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

Roomy Cabinet maintains High-Q

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

AMERITRON ATR-20 Antenna Tuner

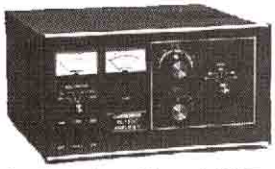
ATR-20, $459. Handles full 1.2 kW SSB/600 Watts CW. Handles full SSB power of Ameritron AL-811/811H/80B/ALS-500M/600, other 1.2 kW SSB amps. Roller inductor, turns counter, verniers on capacitors, balun, cross-needle SWR/Wattmeter.

Ameritron has the best selection of *TrueLegalLimit*™ HF Amplifiers

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

Ameritron's *most powerful* Amp

with Eimac® 8877 ceramic tube



AL-1500

$2945

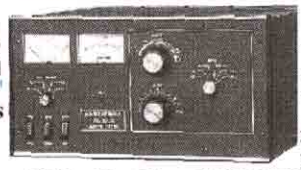
Suggested Retail

TrueLegalLimit™

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

Ameritron's *toughest* Amp

with Eimac® 3CX1200A7 tube



AL-1200

$2495

Suggested Retail

TrueLegalLimit™

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

Ameritron's *classic* Amp

with 2 graphite plate Amperex® 3-500ZG tubes

AL-82

$2395

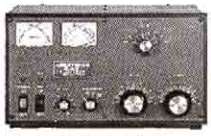
Suggested Retail

TrueLegalLimit™

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

1.5 *plus* kW SSB HF Amp

with 2 Eimac® 3CX800A7 tubes



AL-800H, $2495 suggested retail. Two Eimac® 3CX800A7 tubes produces 1500 *plus* Watts SSB PEP with 55 Watts drive. 52 lbs., 8½Hx16½Dx14¼W in. **AL-800, $1695** suggested retail, single 3CX800A7, 1250 Watts out with 70 Watts drive.

NearLegalLimit™ Amp

with four 572B tubes

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

1 kW Desktop HF Amp

with Amperex® 3-500ZG tube

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

Precision SWR/Wattmeter

AWM-30, $149 suggested retail. Active circuit gives *true* peak/average readings on lighted Cross-Needle meter. 3000/300 Watt ranges. Remote sensor.

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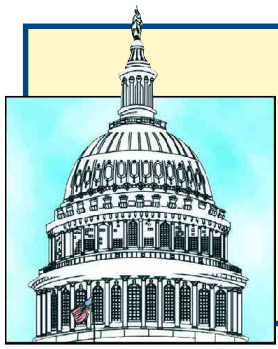


DC Currents

By Steve Mansfield, N1MZA
Manager, Legislative and Public Affairs

Just as radio waves aren't constrained by artificial boundaries, neither is ARRL's government relations effort. "DC Currents" covers behind-the-scenes activity you need to know about in Congress, at the FCC and other regulatory agencies, as well as at worldwide bodies such as the International Telecommunication Union.

FCC in Denial, Puts CC&R Monkey on Congress' Back

The month of March may seem to be an early time to be thinking about phone polls, lawn signs, TV commercials and other accoutrements of elections. But as Congress launches into the year 2002, members of the House of Representatives who want to stay in office are already struggling to amass financial war chests and honing advertising strategies in anticipation of November. A third of the Senate is also up for election. All the while, both bodies are trying to conduct the nation's business and respond to their constituents. As if Congress doesn't have enough to do this year: the FCC has suggested that ARRL take a major and complex issue to Congress for a decision.

The issue is private land use regulations, often better known as "CC&Rs" and the decision, which the FCC rendered in its year-end 2001 ruling that again seemed to dodge the issue and suggested that ARRL take our case to Congress. The FCC decision said, "Should Congress see fit to enact a statutory directive mandating the expansion of our reasonable accommodation policy, the Commission would expeditiously act to fulfill its obligation thereunder." Exactly how the Congress could fit such a "statutory directive" into the end-of-session, pre-election frenzy of activity remains unknown.

What is known, however, is that such legislation, if introduced, would probably be assigned either to the House Telecommunications and the Internet Subcommittee, or the Senate Subcommittee on Communication. Under normal circumstances, for legislation to wend its way to an actual floor vote in either house, the committee to which it has been assigned must approve it.

The FCC's denial of the ARRL's appeal for a review affirmed a November 2000 FCC staff decision declining to include CC&Rs under the limited federal preemption policy requiring municipalities to "reasonably accommodate" amateur communication in antenna-related zoning and regulation. That policy is commonly known in the Amateur Radio community as "PRB-1."

In holding the League at arm's length on this issue, the FCC declared, "There has not been a sufficient showing that CC&Rs prevent Amateur Radio operators from pursuing the basis and purpose of the Amateur Service." The Commission said hams still can get on the air without installing residential antenna systems by operating away from home, while mobile or at club stations.

In its Application for Review in late 2000, the ARRL maintained that the FCC should have the same interest in the effective performance of an Amateur Radio station and in the promotion of amateur communications regardless of whether or not the licensee's property is publicly regulated or privately governed by homeowners' associations and their architectural control committees.

A copy of the FCC's Memorandum Opinion & Order in RM-8763 is available on the FCC Web site at: **hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-01-372A1.doc**.

Many hams (including the ARRL Board of Directors) feel that CC&Rs represent a pressing issue for Amateur Radio. If you are among that group, it may be an appropriate time (politely, calmly and informatively) to let your Representative or Senator know how you feel now, while Congress is still is session, and in advance of the electoral season leading up to November.

Your Senator's contact information may be found at this URL: **www.senate.gov/contacting/index.cfm**. House of Representatives contact information is at: **www.house.gov/writerep/**.

In spite of the unfavorable timing of considering launching a major initiative in an election year, ARRL intends to take the case aggressively to Capitol Hill for some sort of PRB-1 style relief for CC&Rs, this session or next, and we will keep you posted here.

FCC Approves Reorganization Portion of Reform Effort

As part of a reform plan, the FCC formally approved the reorganization of several of the agency's bureaus in January. The changes were subject to Congressional notification. The FCC will create a Media Bureau, a Wireline Competition Bureau, and a Consumer and Governmental Affairs Bureau.

The FCC said the new Media Bureau will be comprised of staff and functions from the current Mass Media Bureau and Cable Services Bureau. It will be responsible for the policy and licensing programs for media services, including cable television, broadcast television and radio. It will handle matters pertaining to multichannel video programming distribution, broadcast radio and television, direct broadcast satellite service policy, and associated matters. It will conduct rulemakings, resolve waiver petitions and adjudications, and process applications for authorization, assignment, transfer and renewal of media services, including AM, FM, TV, the cable TV relay service, and related matters.

The Wireline Competition Bureau will be responsible for the policy programs of communications common carriers and ancillary operations (other than wireless telecommunications services). It will conduct rulemakings, resolve waiver petitions and adjudications, determine the lawfulness of carrier tariffs, act on applications for authorizations, administer accounting requirements for incumbent local exchange carriers, review carrier performance, and administer reporting requirements. It will be comprised of staff and functions from the current Common Carrier Bureau.

The Consumer and Governmental Affairs Bureau will be responsible for the consumer and governmental affairs policies to enhance the public's understanding of the Commission's work and to facilitate the FCC's relationships with other governmental agencies. It will conduct rulemakings, interact with the public, federal, state, local, tribal and other governmental agencies, oversee the Consumer/Disability Telecommunications Advisory Committee and the Local and State Government Advisory Committee, handle informal complaint resolution, handle consumer outreach and education, and maintain FCC filings. The Consumer and Governmental Affairs Bureau will be comprised of staff and functions from the current Consumer Information Bureau, Cable Services Bureau and Common Carrier Bureau. It will handle cable services information functions currently performed in the Cable Services Bureau and some related rulemaking functions currently handled in the Common Carrier Bureau.

The International Bureau will be realigned along functional lines, with consolidation of the international policy and spectrum

rulemaking functions, and intergovernmental and regional leadership and planning functions, which are currently distributed throughout the bureau.

The FCC also said that the Enforcement Bureau now will handle pole attachment complaints and some multichannel video and cable television services complaints currently handled in the Cable Services Bureau. It will also handle common carrier audit functions. The Wireless Telecommunications Bureau will handle instructional television fixed services and multipoint distribution services matters currently handled in the Mass Media Bureau. The Office of Legislative and Intergovernmental Affairs will be renamed the Office of Legislative Affairs.

Edmond J. Thomas Appointed OET Chief

● FCC Chairman Michael Powell announced in January that Edmond J. Thomas will be appointed chief of the FCC's Office of Engineering and Technology (OET). Thomas formerly served as the chief executive officer of a subsidiary of Philips Electronics. He has also served in several senior positions in Bell Atlantic/NYNEX and AT&T.

Thomas holds an MBA from Pace University as well as bachelor's and master's degrees in electrical engineering from Rensselaer Polytechnic University.

Powell said Thomas "brings a wealth of technology development and management expertise to OET at a critical time for communications technology" and that under his leadership, the OET staff would be well-armed to take on sweeping, fast-paced changes that characterize the industries that we regulate."

Acting OET Chief Bruce Franca and Julius Knapp will continue to serve as deputy chiefs of OET. Franca has served as acting chief of OET since December 2000.—*FCC*

DoD says More Control Over Bandwidth Needed to Fight High Tech War

♦ Department of Defense spectrum is in the news again, big time. Defense Secretary Donald Rumsfeld has appointed wireless telecommunications executive Steven Price, formerly president of the software company Live Wire, of White Plains, New York, to fill a newly created position in the Defense Department entitled "Deputy Assistant Secretary of Defense for Spectrum and Command, Control and Communications Policy."

A DoD news release (found at **www.defenselink.mil/**) says that as "DoD's use of the electromagnetic spectrum for communications grows, it increasingly runs into potential competition, interference and coordination requirements for international and commercial frequencies. The Department's long-standing bands of spectrum are critical to meeting the needs of the warfighter, yet also are considered prime by investors in third generation and ultrawideband device markets." The release notes that over the decade the DoD has given up 247 MHz to private industry, even as the military is becoming increasingly high tech and networked in its operations.

Rumsfeld's concerns were echoed by Air Force Maj Gen Charles E. Croom, vice director for command, control, communications and computer systems of the Joint Chiefs of Staff, speaking to a local telecommunications industry trade group meeting.

Croom told the assembly that as the trend toward smarter weapons and decreased ground forces continues, more bandwidth is required. He particularly cites the existing needs of the Demand Assigned Multiple Access satellite system used by brass to give orders and coordinate efforts of units on the ground. The story did not elaborate on what radio frequencies Croom believed to be insufficient, nor what other specific weapons systems he was talking about. However, according to the story, which appeared in the *Washington Post's* **www.washtech.com**, Croom claimed that a shortage of bandwidth might already be hampering the US military effort in Afghanistan.

Media Hits

● The *Seattle Times* gave credit to the important role Amateur Radio plays in emergency situations with a story on the significant volunteer effort in eastern Oregon, as well as what ham volunteers accomplished after the September 11 disasters at the World Trade Center and the Pentagon. The story explained that effort of the hams in eastern Oregon is focused on communications backup for some important military sites. Hams mentioned by name are Whitley Smith, KD7VX, and Gary Cooper, N7ZHG. The story also appeared on KGW television news in Portland, Oregon, and on that station's Web page.

● The *Palos Verdes Peninsula News* in California heralded how Amateur Radio can provide backup communication when commercial telecommunication fails. Featured is the Palos Verdes Estates Neighborhood Amateur Radio Team and its activities with local government and emergency/disaster communication agencies. The article quoted laudatory comments from local officials, and provided a recent example of hams helping out during a power failure. Hams mentioned by name were Bryant Winchell, W2RGG and Susan Nilsen, KF6VRB. Visit the club's Web site, **www.palosverdes.com/pvarc/**.

● *The Northwest Navigator*, which bills itself as "West Sound's Military Newspaper" is a private paper targeted to Navy families and other local government personnel. Published in Kitsap, Washington, it featured a look backward on the 60th anniversary of the infamous Pearl Harbor attack, and forward to the North Kitsap Amateur Radio Club's 32-hour special event tribute. Hams featured in the story included Bob Thomas, N7KTP, Jerry Felten, W7TVA, and Bruce McAffrey, N7OJ. Bob reports the group made 500 contacts during the operation. The story was also picked up by the *Navigator's* sister paper, the *North Kitsap Herald.*

● The Schaumburg Amateur Radio Club earned good coverage in the *Daily Herald* (Arlington Heights, Illinois) when a press release from club member John Nebl, N9MYC, brought a reporter and a photographer to the club's Simulated Emergency Test drill. The resulting article, which featured photos of Nebl and his 14-year-old son, James, KB9VJK, discussed the various types of local emergencies for which the club has provided emergency communications. In addition to the press release, Nebl followed up his writing efforts with a story for the club newsletter.

● The San Antonio (TX) *Express News* highlighted Jack Riegel, N5JAK, in his role as the "volunteer emergency communications officer" for the city of San Antonio. The story chronicles the development of Amateur Radio involvement in the city's emergency services communication, and quotes Riegel saying "ham operators have turned out to be a value to the taxpayer," a message that needs to be promoted whenever and wherever hams volunteer.

Oops

● In Media Hits in the January "DC Currents," we mentioned an article in *The Valley Independent* of Monessen, Pennsylvania. We got the paper right but one thing wrong: Emil "Chip" Chuprinko's (W3WSX) name was misspelled and his call sign was missing. Sorry, Chip. To avoid this sort of thing happening, it would be helpful for members who send in clips for "Media Hits" to highlight the names of each of the hams mentioned in the story, correct spelling errors they know of, and jot the proper call sign of each in the margin.

OUTbacker The Performance Antenna

We Make it Simple ... But GOOD!

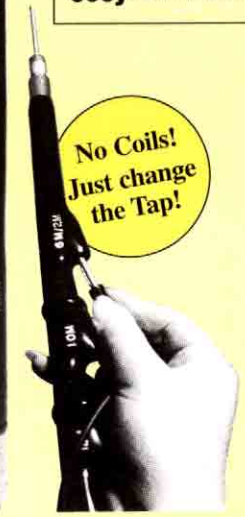
Most mobile antenna installations are notoriously inefficient and complex to install. Some are so big and cumbersome, they need guy ropes and special mounts to handle the wind load when under way. Some are single band only, others need a bag full of resonators for multi-band operation. Whips with automatic tuners or "screwdriver" types are nice, but even more cumbersome to install, usually requiring extra wiring and a controller.

The OUTBACKER eliminates these "big antenna" problems while providing efficient, multi-band performance in a rugged, lightweight, single whip design. Its sleek, low profile design allows use with standard 3/8-24 bases and trunk-lip mounts.

Fiberglass shaft construction, using a pre-tuned copper helical winding with clearly marked brass band taps at points along its length. A final coating of smooth epoxy resin and polyurethane, gives the OUTBACKER a toughness and durability not found in other brands, while making a really good looking mobile installation.

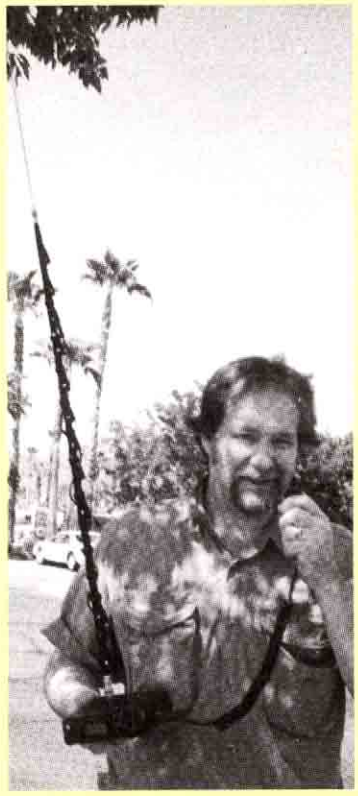
Changing bands is a snap; simply plug into the desired band tap and resume operating without changing whips, resonators, or re-tuning.

MODEL	BANDS	POWER	LENGTH	PRICE
OB 8	75-10M	300W P.E.P.	6 ft.	**$279.00**
OB HP (HIGH POWER)	75-10M	500W P.E.P.	6 ft.	**$299.00**
OB SPLIT*	75-10M	300W P.E.P.	6 ft.	**$299.00**
*Breaks down into two 3 ft. sections, includes a cloth carrying pouch				
TRI-SPLIT Same as OB SPLIT except it breaks down into three 2 ft. sections, pouch included				**$329.00**
PERTH*	75-10M + WARC	150W P.E.P.	7.5 ft.	**$289.00**
*The Most Efficient model for HF Mobile				
PERTH PLUS*	75-10 + 6/2M	150W P.E.P.	6 ft.	**$299.00**
*Perfect for HF Radios with added 6 & 2 meter capability				
STEALTH PLUS*	75-10 + 6/2M	150W P.E.P.	4 ft.	**$269.00**
*Perfect for HF Radios with added 6 & 2 meter capability				
OUTREACH*	160-10M+ WARC	300W P.E.P.	12 ft.	**$399.00**
OUTREACH 500*	80-6M + WARC	500W P.E.P.	12 ft.	**$439.00**
*OUTREACH and OUTREACH 500 perfect for use with the OUTPOST, below				
MARINER*	Marine/HAM*	150W P.E.P.	6 ft.	**$429.00**
*Marine: 2.182, 4.1, 6.2, 8.2, 12.4, 16.5, 22 MHz • HAM: 75, 40, 20, 17, 10M				
Joey New for the FT-817 and other QRP rigs – full description lower right				**$249.00**



Alpha Delta OUTPOST
Tripod Mount / Ground Coupler

- Provides a convenient method of utilizing OUTBACKERS for Base/Portable operation.
- Compact, fold-up design sets up quickly and collapses in seconds; no holes, no concrete!
- 36 x 3 in. blades on each leg unfold and lie flat providing increased ground coupling for a better impedance match and increased radiation efficiency.
- A mobile-type mount on top accepts a 3/8" x 24 antenna stud and PL-259 connector.
- A fold-over top bracket, allows the antenna to be easily removed or folded down for changing bands, or to be out of view.
- Rugged 6061-T6 aircraft aluminum members,18 lbs. Stainless steel hardware and wing nuts, comes all assembled.



the OUTBACKER Joey
Added performance for the FT-817 and other QRP rigs

- Utilizes the famous OUTBACKER band tap system for ultimate convenience
- Covers complete HF/VHF range from 80 thru 2M, including 30, 17 and 12M
- Separate taps for 80 CW and 75 SSB
- Rated at 20W, all modes.
- The antenna has a 30 in. body and a 20 in. stinger when fully extended.
- Complete with a 12 ft. durable copper braid counterpoise, and a custom anti-twist 90 degree SO-239 to PL259 adapter.
- Weighs just over 1 lb. **$249.00**

MicroMount
Lightweight Miniature Desktop Tripod

- Ideal for the Joey!
- 8 in. tall, 12 in. footprint
- 12 ft. counterpoise
- Collapses, portable

$49.95

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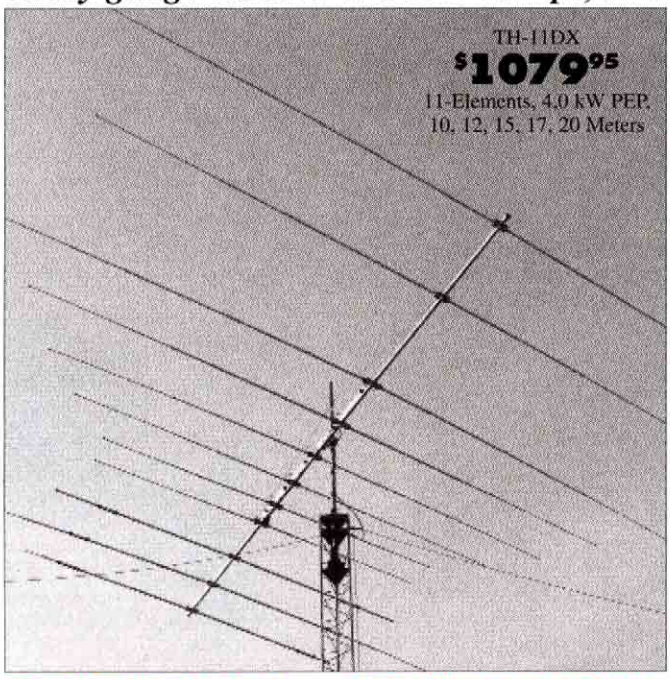
hy-gain HF BEAMS...

. . . are stronger, lighter, have less wind surface and last years longer. Why? Hy-Gain uses durable tooled components -- massive boom-to-mast bracket, heavy gauge element-to-boom clamps, thick-wall swaged tubing -- virtually no failures!



TH-11DX, $1079.95. 11-element, 4.0 kW PEP, 10,12,15,17,20M

The choice of top DXers.

With 11-elements, excellent gain and 5-bands, the super rugged TH-11DX is *the "Big Daddy" of all HF beams!*

Handles 2000 Watts continuous, 4000 Watts PEP.

Every part is selected for durability and ruggedness for years of trouble-free service.

Features a low loss log-periodic driven array on all bands with monoband reflectors, BN-4000 high power balun, corrosion resistant wire boom support, hot dipped galvanized and stainless steel parts.

Stainless steel hardware and clamps are used on all electrical connections.

TH-7DX, $819.95. 7-element, 1.5 kW PEP, 10,15,20 Meters

7-Elements gives you the *highest average gain* of any Hy-Gain tri-bander!

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

Uniquely combining monoband and trapped parasitic elements give you an excellent F/B ratio.

Includes *Hy-Gain's* diecast aluminum, rugged boom-to-mast clamp, heavy gauge element-to-boom brackets, BN-86 balun. For high power, upgrade to BN-4000.

TH-5MK2, $699.95. 5-element, 1.5 kW PEP, 10,15,20 Meters

The broadband *five element* TH5-MK2 gives you outstanding gain.

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

Also standard is *Hy-Gain's* exclusive *BetaMATCH*™, stainless steel hardware and compression clamps and BN-86 balun.

TH-3MK4, $439.95. 3-element, 1.5 kW PEP, 10,15,20 Meters

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

You get an impressive average gain and a whopping average front-to-back ratio. Handles a full 1500 Watts PEP. 95 MPH wind survival.

Fits on average size lot with room to spare -- turning radius is just 15.3 feet. Four piece boom is ideal for DXpeditions. Rotates with CD-45II or HAM-IV rotator.

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

TH-2MK3, $339.95. 2-element, 1.5 kW PEP, 10,15,20 Meters

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

For just $339.95 you can greatly increase your effective radiated power and hear far better!

Ruggedly constructed, top-performing, compact 6 foot boom, tight 14.3 foot turning radius. Installs almost anywhere. Rotate with CD-45II or HAM-IV. BN-86 balun recommened.

EXP-14, $549.95. 4-element, 1.5 kW PEP, 10,15,20 Meters

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

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

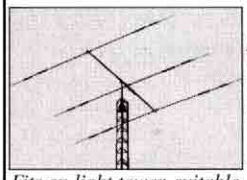
BetaMATCH™ provides DC ground to eliminate static. Includes BN-86 balun. Easily assembled.

***Truly** competitive against giant tri-banders at half the cost!*

QK-710, $169.95. 30/40 Meter option kit for EXP-14.

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

For limited space . . . Installs anywhere . . . 14.75 ft turning radius . . . weighs 21 lbs . . . Rotate with CD-45II, HAM-IV



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

TH-3JRS, $329.95. Hy-Gain's *most popular* 3-element 10, 15, 20 Meter tri-bander fits on most lots! Same top performance as the full power TH3MK4 in a compact 600 watt PEP design.

Excellent gain and F/B ratio let *you* compete with the "big guns".

Tooled manufacturing gives you *Hy-Gain* durability with 80 MPH wind survival.

Model No.	No. of elements	avg Gain dBd	avg F/B dB	MaxPwr watts PEP	Bands Covered	Wind sq.ft. area	Wind (mph) Survival	Boom (feet)	Longest Elem. (ft)	Turning radius(ft)	Weight (lbs.)	Mast dia O.D.(in.)	Recom. Rotator	Retail Price
TH-11DX	11	*For Gain and F/B ratio--See...*		4000	10,12,15,17,20	12.5	100	24	37	22	88	1.9-2.5	T2X	$1079.95
TH-7DX	**7**			**1500**	**10, 15, 20**	**9.4**	**100**	**24**	**31**	**20**	**75**	**1.5-2.5**	**HAM-IV**	**$819.95**
TH-5MK2	5	• www.hy-gain.com		1500	10, 15, 20	7.4	100	19	31.5	18.42	57	1.5-2.5	HAM-IV	$699.95
TH-3MK4	**3**	• Hy-Gain catalog		**1500**	**10, 15, 20**	**4.6**	**95**	**14**	**27.42**	**15.33**	**35**	**1.9-2.5**	**CD-45II**	**$439.95**
TH-3JRS	3	• Call toll-free		600	10, 15, 20	3.35	80	12	27.25	14.75	21	1.25-2.0	CD-45II	$329.95
TH-2MK3	**2**	800-973-6572		**1500**	**10, 15, 20**	**3.25**	**80**	**6**	**27.3**	**14.25**	**20**	**1.9-2.5**	**CD-45II**	**$339.95**
EXP-14	4			1500	10,15,20 (20M optional)	7.5	100	14	31.5	17.25	45	1.9-2.5	HAM IV	$549.95

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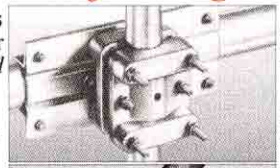
1. Hy-Gain's famous super strong *tooled* die cast *Boom-to-Mast Clamp*



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

3. Thick-wall *swaged* aluminum tubing

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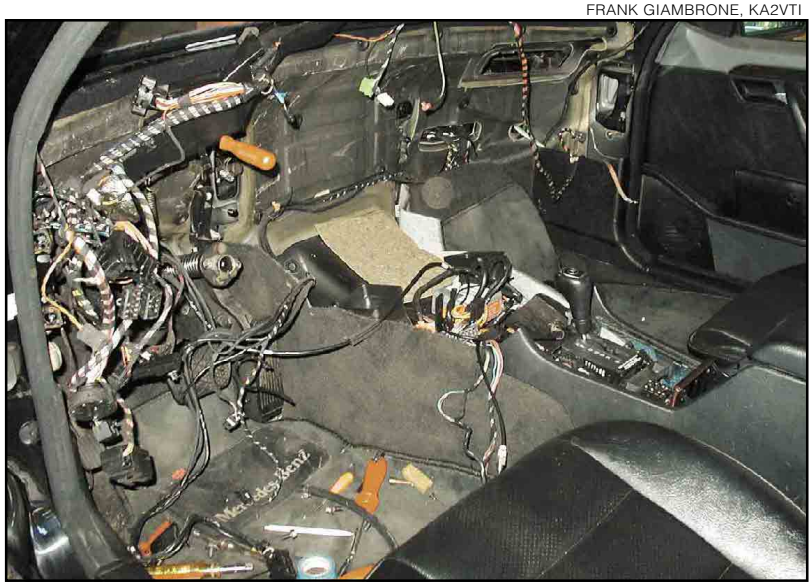
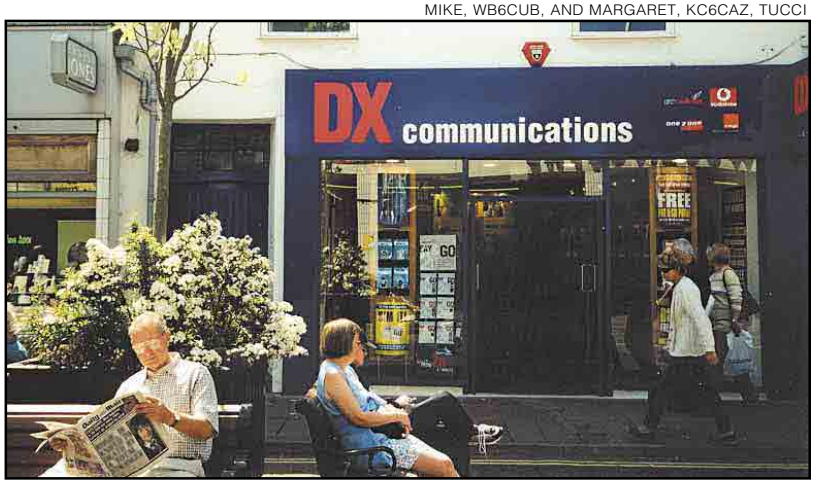
UP FRONT IN QST

FRANK GIAMBRONE, KA2VTI



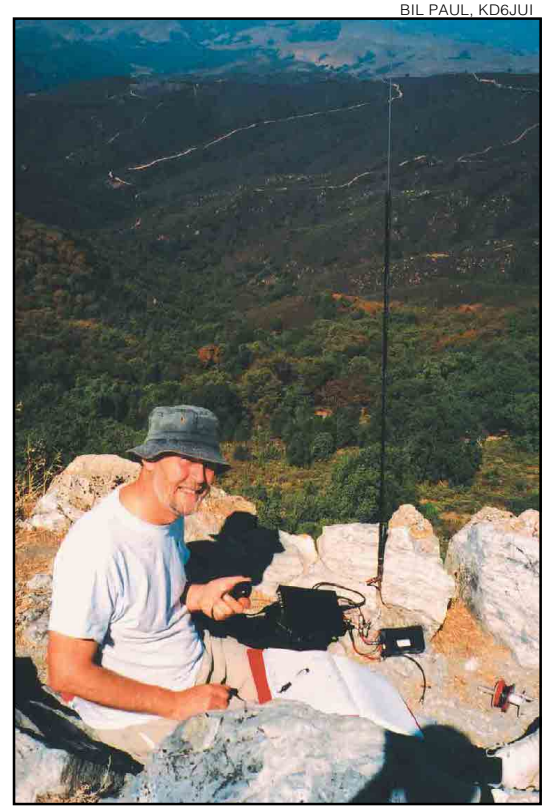
Messiest mobile contest winner! "Don't let this happen to you," warns Frank Giambrone, KA2VTI. In the process of mounting his 2 meter radio bracket, a ham Frank knows accidentally pierced the evaporator core. The *Service Time Book* calls for 30 hours of labor to repair this item. "Suffice it to say they lied," Frank writes. To add insult to injury, the core itself costs $900!

MIKE, WB6CUB, AND MARGARET, KC6CAZ, TUCCI



All that DX, and no one seems to care . . . This shop in Dartmouth, England, evidently specializes in a ham's favorite pursuit.

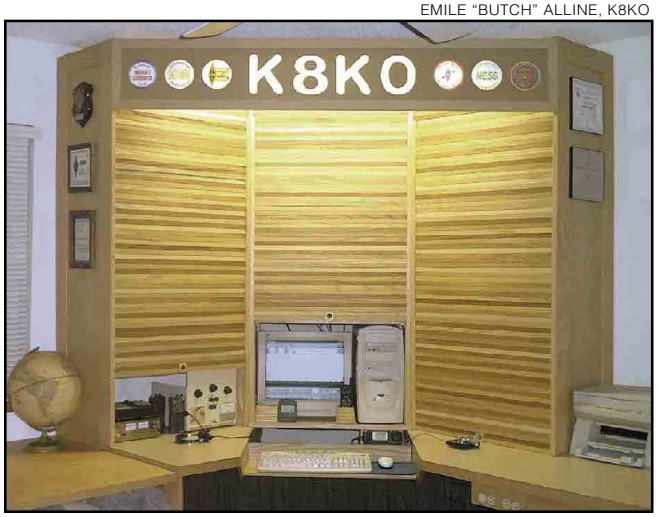
BIL PAUL, KD6JUI



Top this! Bil Paul, KD6JUI, of San Mateo, California, operated 10 meter SSB from the top of 4000-foot-high Fremont Peak near the town of San Juan Bautista during the California QSO Party this past October. From this vantage point, Bil was able to provide San Benito County QSOs to East Coast stations, most of whom were surprised to learn he was running just 5 W into a Hamstick antenna. "Because of favorable solar and atmospheric conditions, much DX was coming in on the higher bands, reachable with low power and modest antennas," he reports. KD6JUI hands out coveted QSOs during each CA QSO Party from a different sparsely populated California county.

Many hams snap photos of Amateur Radio-related items when they happen to come across them. We enjoy publishing a selection of the best ones in Up Front in *QST* each month. Glenn Lambertz, KF2LU, of Prattsburg, New York, suddenly realized that he worked for a radio station whose call letters fit that category—WHAM, an AM broadcast station in Rochester. "One day it dawned on me—I work for ham radio's favorite commercial station! As it turns out," Glenn continued, "only two hams work at WHAM—Randy Gorbman, N2YCB, and me." You can find a Web site that explores the history of WHAM from its start in 1922 at www.aharris1180.com/whamhistory.htm.

EMILE "BUTCH" ALLINE, K8KO



No mess here! "I just could not let those messiest shack photos go unchallenged," writes Butch Alline, K8KO, of Lumberton, Mississippi, "so here is a photo I'd like to have considered for the neatest shack competition." To the upper left of the keyboard is an IC-706. Nearly everything else is hidden by the vertical sliding tambour. Well, how do we *really* know it's neat back there, Butch?

ROLLIN (DUFF) JOHNSON, WA7BFN

Something to celebrate! Reginald Hoskin, Sr, W7ROL, of Four Lakes, Washington, celebrated his 100th birthday last December. He's been a ham for more than 80 of those years—continuously—and has been on the air all that time except for the WW II shutdown.

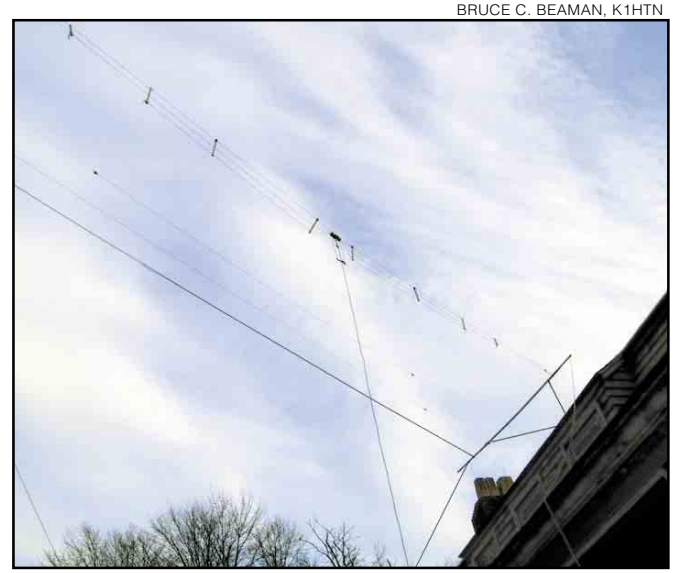
Reg, as he's known, is a fixture of many of the KBARA Nets operating in Eastern Washington. He started his amateur adventures just shy of 1919 with the call 9EML. QSOs back then were conducted via spark gap transmitters and crystal set receivers, catwhiskers and all. On one occasion because of the proximity of his antenna to the gutters on the house, Reg set the roof on fire! Explain that one to your dad. On another he was accused of having secret meetings with the girl next door, when her parents heard his voice in the girl's bedroom—over the radio, of course!

As is apparent from the photo, Reg still has the spark gap transmitter and receiver he built in 1919, and proudly displays them in his well-equipped shack. And yes, they still work. The Ford coil still produces sparks after all these years! The rest of the room is packed with early ham gear, radio magazines and even some of Thomas Edison's first carbon-filament lamps.—*WA7BFN*

JIM PARR, W9OS

Jim Parr, W9OS, of W Dundee, Illinois, sent us this intriguing photo of his "no holes mobile antenna mount." He explains: We used an aluminum plate with U-bolts to attach to the roof rack of the Bravada. We used a marine fold-over mount to get this into the garage without taking off the antenna. A trip to the hardware store provided the brass fittings to adapt to the quick disconnect on the antenna. A simple coax connector and some braid is run under the back hatch to the chassis. The rig is an Alinco DX-70. It works great and my wife is happy that there are no holes in her truck!

BRUCE C. BEAMAN, K1HTN



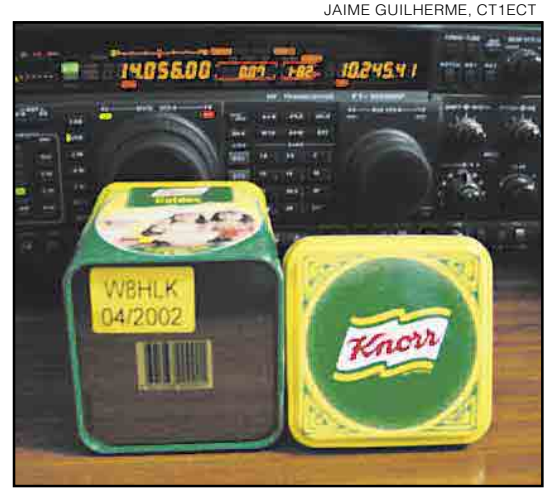
Pilgrimage to Plymouth. In November, the Whitman (Massachusetts) ARC operated WA1NPO from Plimoth Plantation, Plymouth, Massachusetts, with four HF stations and a 2-meter rig. This was our 14th year of operating from the Plantation the weekend after Thanksgiving. This past year we made over 400 contacts, in 40 states, 17 foreign countries and 3 Canadian Provinces.

Three club members had built the antenna featured on page 35 of the November 2001 issue, by Markus Hansen, VE7CA. This antenna performed extremely well for us with everyone saying we were the strongest on the band. On Sunday we had an approximate 5-hour pileup going on 20 SSB. The photo shows the antenna in front of the Hornblower administration building at the Plantation. Approximately 3500 people came through on the two days and saw ham radio in action from the Visitors' Center, where we had 2 and 17 meters SSB/CW on the air.—*Bruce C. Beaman, K1HTN*

MICHELE FICARA, IW2NIQ

APRS, Italian-style. IW2NIQ sent us this photo of his no-nonsense mobile setup.

JAIME GUILHERME, CT1ECT



Jaime Guilherme, CT1ECT, of Lisbon, Portugal, found this strange yet familiar marking on the bottom of a Knorr box. And no, it's not a box of ham.

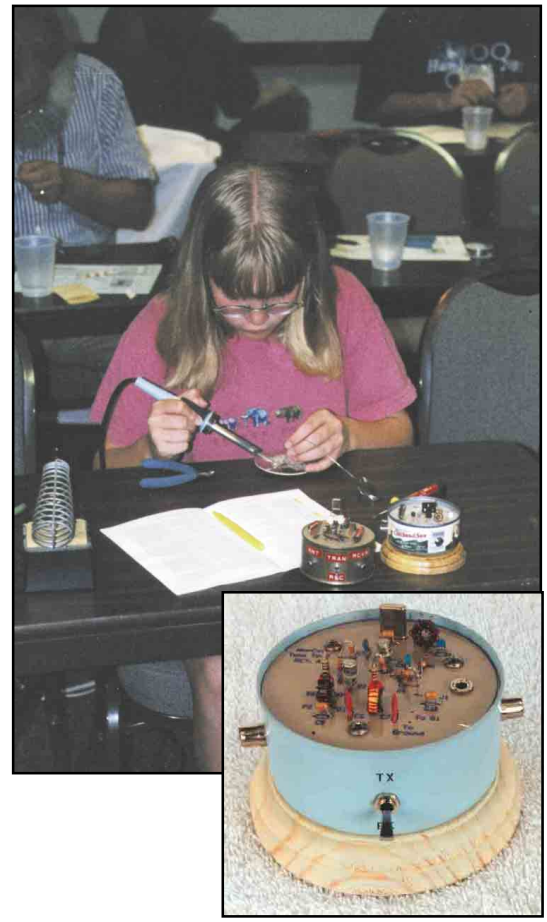
ED BRENEISER, WA3WSJ

Building up the DX. Ed Breneiser, WA3WSJ, of Reading, Pennsylvania, operated QRP in the CQWW CW Contest as VP5ED and a buddy operated 100 W as VP5G. "We had a ball on the Island and I took this picture on a back dirt road," Ed writes. What's the DX? "I believe it's a construction company name," he writes.

KEN CLAERBOUT, JT1/K4ZW

Ham party in JT-land. Ken Claerbout, JT1/K4ZW, of Stafford, Virginia, spotted this sign during a visit to Mongolia in November. He writes: "It's a sign for the democratic party in Mongolia. I later learned that the word 'ham' is Mongolian for party. No, the sign is not for the local JT QSL bureau." But we suspected that…

DARREL SWENSON, KØAWB



Kristin Swenson, age 12, is among those tackling the Tuna Tin II at the QRP construction contest held at last year's Iowa QRP Club State Convention in Sioux City, Nebraska. Proud dad Darrel, KØAWB, reports: "Kristin did all the work except painting the can and drilling the holes. When I asked her what color she wanted it, she said "light blue." So it became "Kristin's Baby Blue Tuna Tin II." For her efforts, Kristin came home with a TiCk-4 keyer kit—her next project.

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*Simultaneous reception on two different Frequencies, in-band or Cross-Band. Cross-band Repeater Function not available.

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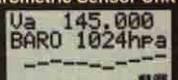

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  TX : 50-54 MHz 144-148 MHz
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ARES NEEDS HELP

♦ The article by Murray Green, K3BEQ, in the Public Service column in the December issue ("Responding to an Emergency—You Have to Know What to Do," p 78) was well put. Today's ARES needs help and I think he understated just how thin our ranks are today. With so many experienced hams out there, it's unfair to recruit new blood to the Amateur Radio ranks and expect them to carry the load. But, unfortunately, that's where the enthusiasm lies.

I don't understand the "been there-done that-can do it again" attitude of many old salts as their reason for not needing to actively participate in the seasonal "little" emergencies. The problem is, without practice, skills atrophy big time. (If one doesn't believe this, try going back to driving a stick shift after many years of driving an automatic!)

One local old timer—who has contributed substantially *in the past*—said that he would turn out in a real emergency because he had "been there-done that-can do it again." When asked what constituted a "real emergency," the response was "a major earthquake." I guess localized emergencies like major flooding from swollen rivers and breached levees don't count.

The BT-DT-CDIA attitude can be a major obstacle when one does volunteer for the "big one" because the face of ARES has changed dramatically over the past several years. And if one didn't believe it before, 9-11 should have been the convincer. Little if any HF skills sets were required during that event. Brought to play were "tactical" communications skills carried over repeaters. Brought to play were "tactical" communications skills working hand-in-hand with emergency service agencies. Witness the San Francisco ARES operator who was in Manhattan on business on 9-11. Shortly after volunteering, he quickly became communications center supervisor at the FEMA incident command center—all from polished skills garnered from earthquake practice in SF. [The ham volunteer is Bart Lee, KV6LEE.—*Ed.*] He ought to receive an ARES Special commendation for that one. And, if we don't have such a medal, strike one for him!)

Locally we work frequently with public safety agencies, providing Incident Commanders with operators to handle their local nets during major public events. Fifteen-year-old skills are nearly useless for these types of communications.

To the old timers, why don't you take a fresh look at ARES today and ask how you can help? In today's world, merely having an FCC Amateur Radio Service license won't be enough if you step up to the plate to help in an emergency—unless you will be content helping by running the photocopier and emptying wastebaskets.—*Jim Piper, KD6YKL, Aptos, California*

FURTHERING THE RADIO ART

♦In reply to K4LRX's letter in January 2002 *QST*: Why do a minority of hams put up such a fight to keep code as a barrier to entering the world of HF? On any day, just check out the CW portions of the HF bands with many kHz of dead silence, except for one or two stations. Then compare that to the phone portions of the bands where interference is common and an open frequency a rarity. Common sense should dictate which has the greatest following and popularity. I sense there are some, with little vision, who would rather "protect their frequency space from outsiders" than accept change, new people, new ways and ideas that would attract more people to the hobby.

It is doubtful, as some have alleged, that elimination of code would lead to the dumbing-down of Amateur Radio. I would think of it more as wising up. I have known many technically qualified people with an interest in Amateur Radio to lose interest quickly just by the idea of having to learn "that old code that no one uses anymore." This is an unfortunate loss to Amateur Radio. Mr. Hilyerd sees the change in code exams where only 1 in 10 pass as a qualified Amateur, yet failed to mention that this qualified CW operator may have only marginal technical skills and excluded 9 who possibly had excellent technical skills.

Knowledge of CW was important when it was the primary mode of operation. However, those days have long since passed. It is now 2002, not 1942. Furthering the advancement of electronics technology and the radio art is why many of us came to Amateur Radio. This artificial barrier has been used all too often to exclude otherwise skilled and knowledgeable people, and that is the dumbing-down and the stagnation of Amateur Radio. Technical skills in electronics, skill in operating digital modes and new innovative ideas are the keywords of the 21st century and what will support the growth and success of Amateur Radio, not being a skilled CW operator. Morse code have a place in the legacy of Amateur Radio. But we must learn to accept change. Morse code and CW operator skill should no longer be in the forefront as a primary qualification for Amateur Radio. The removal of this barrier would generate new interest in Amateur Radio with young people and serve to eliminate the perception of Amateur Radio as something that is just for older people and "retirees." There has been a paradigm shift and if we don't lose these "sacred cows" and accept the new paradigm, there may not be an Amateur Radio left to enjoy after commercial interests are done slicing up our underutilized CW and other spectrum.—*Eric Funderburk, K5III, San Antonio, Texas*

SHAME!

♦ Shame on all the CW contesters during the weekend of November 24 who called CQ on occupied frequencies, such as 14070 and 14080. Didn't your mother tell you never to do that?

And I am still wondering how all signals suddenly become 599 during a contest. Every one of them.—*Bo Thunman, W8ISG, Augusta, Michigan*

TR-22 MEMORIES

♦ I read with interest the article on the Drake TR-22 (Ford, "The Drake TR-22: An FM Classic," Jan 2002, p 48). I had an interesting experience with the TR-22. In the early 1970s, I was working in the mine countermeasures group for the Naval Ship Engineering Center. This was during the time that we were leaving Vietnam and cleaning the mines out of Haiphong harbor. We received an urgent request for small, battery operated multichannel transceivers for the divers to use on their rubber boats. Since there was very little available at that time, I made arrangements for the Virginia Section Communications Manager at the time, Bob Slagel, to demonstrate his TR-22 to the people at Headquarters in Crystal City. They thought it was a good idea and so we ordered 10 (I think) of them with oddball simplex frequencies and shipped them over to the Navy divers. We did

advise them that while they were water-resistant, they were not waterproof and recommended keeping them in a plastic bag as much as possible.

We only got indirect feedback but they seemed to do the job just fine. The divers were probably violating some radio regulations but I don't think there was anyone in North Vietnam who would have complained. Another case of ham radio to the rescue. The Drake people were most cooperative and helpful, but sadly I can't remember the name of the person I dealt with. I couldn't tell the story at the time because some of the details were classified but it's now ancient history. I personally had a TR-22C that had 12 channels instead of 6 and used it a lot until I got my Tempo S1. In some ways, I wish I had kept it. But at the time, I justified the new radio by getting rid of the old one.—*Cliff Bedore, W3CB, College Park, Maryland*

TEMPORAL MECHANICS?

♦ As you reported in December *QST* (Ford, "Across Oceans of Time, p 45), Dec 12, 2001 was the centenary of a pivotal point in human technological development: Marconi's transatlantic transmission. But until I read that he received that transmission on Dec 12, 1901 at Signal Hill, in St John's, Newfoundland, Canada, I had little idea how utterly groundbreaking a development it was. This, my friends, went way beyond some scratchy spark-gap radio signal. Clearly, it was man's first, possibly only to date, experiment in temporal mechanics.

How do I know this? I know this because Newfoundland did not join Confederation until 1949.

Merry Christmas, eh?—*Kelly Taylor, VE4XT, Winnipeg, Manitoba, Canada*

SPECIAL EVENTS WOES

♦ I am wondering if anyone else has been having problems getting special event stations to return their QSL and SASE. I am waiting for one to be returned since August of 1999—I have sent two requests but nothing yet. Also, some from July and August of this year. I am hopeful that some of these people are not becoming stamp collectors. Most are fairly responsive, but with the postage costs increasing, I wonder if it is worth the time to keep working them.—*Keith (Red) Anderson, W7LQU, Rigby, Idaho*

RADIO ROW RENAISSANCE

♦ All is not lost on New York's fabled Radio Row (December 2001 Up Front In *QST*). In late November, several of us defied the terrorists and flew to NYC to shop, sightsee and eat Dim Sum. On a Sunday around noon I ducked into an electronics shop at 269 Canal Street near Chinatown and purchased a 5 band shortwave radio for $19. In the back of the same store was 269 Electronics, who sells NTE semiconductors and components. There I was able to purchase a 2N5179 RF transistor needed for my W1FB Universal VFO. There are at least three shops near Times Square that have odds and ends of amateur equipment in stock, mostly older VHF handhelds. Only in New York, I'd say!—*Erik Westgard, NY9D, Shoreview, Minnesota*

FCC SITE WORKS!

♦ Some recent letters (Correspondence, Jan 2002 *QST*) have severely criticized the FCC Web site for license renewal. I must offer the FCC kudos as a result of my experience.

I explicitly followed instructions from the FCC and ARRL for registration on the site and found that it all worked very well. I renewed my license on-line on December 12, 2001. I received my renewed license on December 19, 2001.

That's darn good service!—*Don Novy, N4VZD, Arden, North Carolina*

♦ I read Rick Tavan's comments regarding FCC forms with some interest since I've been an amateur continuously since 1968 and ARRL member since 1971 (pardon me while I wheeze), am 51 years old, and I am abidingly impatient with those who use technology as an excuse for poor customer service. I recently renewed my license using the FCC Web site. In less than, I think, fifteen minutes, I had filled out the form at the FCC web page and I was done. In about ten days I had my renewal in the mail. Simple, fast, efficient, without postage, a request for a printed form, or other complications...a rather pleasant experience, actually. I may be an exception to the rule, perhaps, but I'd like to thank the FCC for an efficient process!—*Gerry Geisel, WA8ZPP, Cincinnati, Ohio*

KUDOS

♦ I just want to give you unsolicited thanks for a really great issue of *QST*—January 2002. The technical articles such as "Digital Voice," "Build Your Next Computer," etc, articles on Old Time Radio, news, equipment reviews, the Cycle 23 report in "The World Above 50 MHz" and many other features all fitted together perfectly to make the sort of *QST* that I need and enjoy. Congratulations to editor Steve Ford WB8IMY and all concerned.—*Alan Masson, K6PSP/G3PSP, Newbury Park, California* QST

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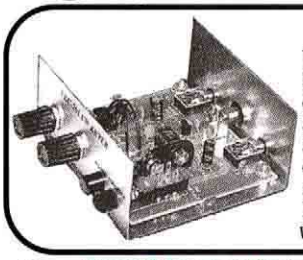

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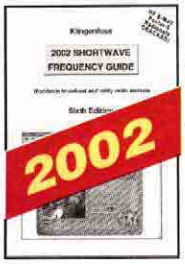

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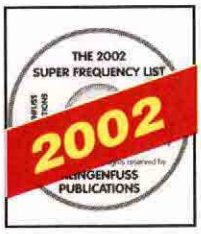

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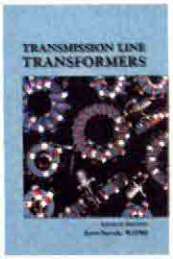

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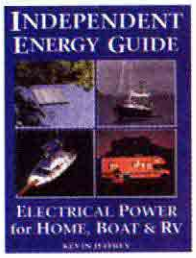

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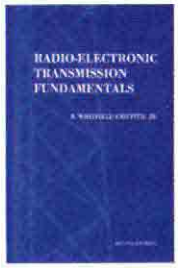

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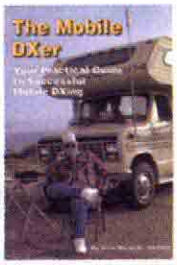

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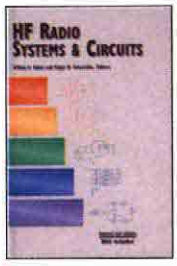

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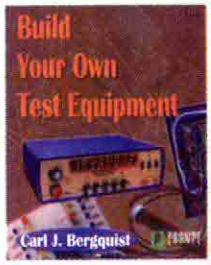

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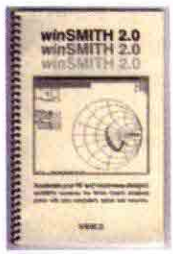

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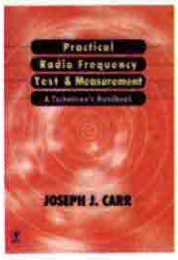

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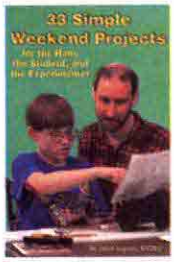

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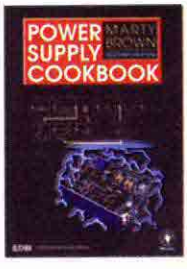

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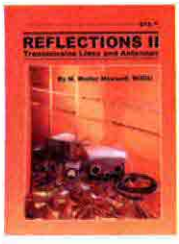

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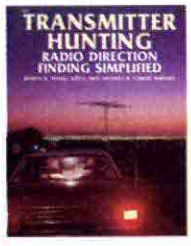

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By Dave Benson, K1SWL

Taming the Trap Dipole

A self-supported dipole for 10/15/17 meters can be a fine thing—if it's designed right.

After our recent move from a city location to several acres of wooded bliss, it was only natural that a young man's fancy would turn to thoughts of . . . antennas! I've experimented with any number of antenna configurations over the years, but multiband operation always seemed to involve tuners used to press non-resonant wires into service. With the "clean slate" afforded me with the new location, I decided I wanted to pursue the "hook up the coax and forget it" approach. I'm also reluctant to spend my limited discretionary funds on commercial antennas when the homebrew approach works well.

One approach to a multiband dipole design is the so-called "fan dipole" wherein a separate electrical half-wavelength of wire is added in parallel at the feedpoint for each band of interest. This can become mechanically cumbersome after the first several bands and interaction between bands becomes noticeable, at least with close wire spacings. I elected instead to pursue the trap approach. This article describes the development of a self-supported 10/15/17 meter trap dipole.

This project moved from the back burner to the "gotta try it" category when I found that the local home-improvement emporium carried 8-foot lengths of 3/8-inch aluminum C-channel stock. This material has one important advantage: all surfaces are flat, which eases a number of construction details. The joints between the element sections need to be an insulating material and of sufficient strength to carry the weight of the outboard sections. The ideal material for this application turned out to be 3/8-inch square black Delrin (plastic) stock, which has good tensile strength properties.[1] This material is also available in sizes up to 4 inches square (at daunting prices) for applications where higher strength is required.

Figure 1 shows the dimensions of the trap antenna. The innermost dipole section (10 meters) is decoupled from the rest of the antenna by a pair of traps tuned to 28.1 MHz. The next pair of sections is decoupled from the outer wires by a pair of traps adjusted to 21.1 MHz. Although the dimensions shown are for the 10/15/17-meter bands, there's nothing to prevent you from developing other combinations.

The traps themselves are quite simple—a parallel-resonant tuned circuit adjusted to the center of each amateur band of interest. I constructed each of these from iron-powder toroidal cores and a pair of silver mica capacitors. Each trap uses two 1 kV-rated capacitors in series and T94 cores, the largest that would fit in the "low-profile" trap enclosures I chose. I used Serpac C-series enclosures available from mail-order distributors, and a number of choices are also available through RadioShack. Figure 2 shows the construction details—a pair of machine screws exits through the rear wall of the trap enclosure and passes through holes drilled through the insulator stock and the aluminum C-channel.

The traditional tool for adjusting traps has been a grid-dip meter, and this has been supplanted more recently by antenna

[1]Notes appear on page 30.

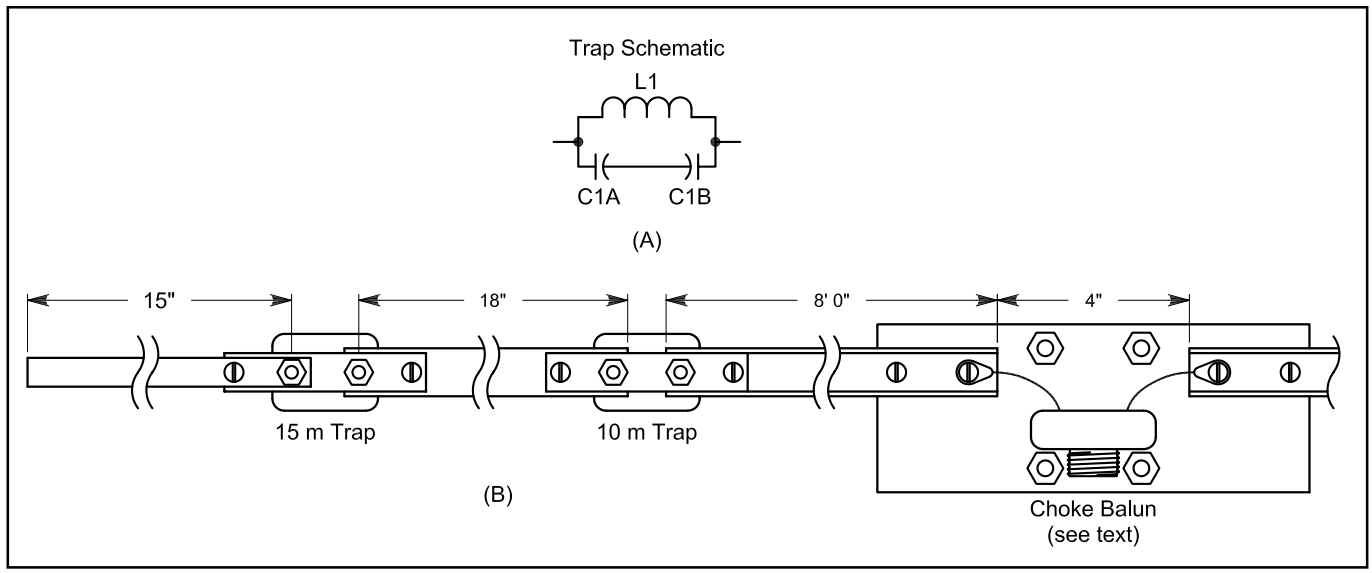


Figure 1—The dimensions of the trap antenna. Other dimensions can be devised for bands other than 10, 15 and 17 meters. At A, the schematic of the trap. At B, dimensions for one side of the dipole antenna.

C1A, C1B—100 pF, 1 kV silver mica capacitor.

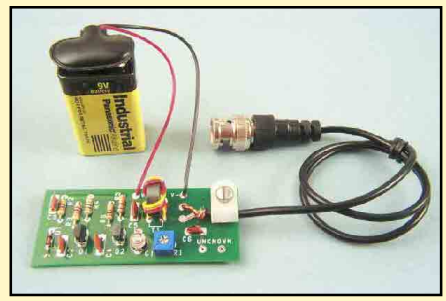
L1—*10 meters*: 9 turns on a T94-10 toroidal core; *15 meters*: 11 turns on a T94-6 toroidal core. The coils must be tuned to resonance.

The Noise Bridge

Diode D1 is a source of broadband noise. This noise is amplified to useful levels by the two-stage circuit comprising Q1, Q2 and associated components. Although there's no attempt made to frequency-compensate this noise source, there's plenty of signal for our purposes—its output level ranges from S9+20 dB at 1.8 MHz to S7 at 30 MHz. In practice, when the impedances connected to points B and U are equal, this "bridge" circuit is in a balanced condition and output to the receiver is at a null. The only "tricky bit" in this circuit consists of the trifilar winding T1. [The circuit board project offering uses color-coded wire for this toroid, so hookup is pretty much foolproof.]

So Now What?

Let's put this to practical use: Connect a 100-Ω ¼ W resistor across the "unknown" terminals and connect to your receiver with a length of coax. Apply dc power (8-15 V) to the noise bridge circuit and you should hear a loud rushing noise in the receiver. Adjust control R1 for minimum S-meter indication and then C1. Once these are both adjusted carefully, the noise level in the receiver should drop



to its internal noise level alone. The noise bridge is now adjusted for a null—the impedance presented by the 100-ohm resistance and stray capacitance is now balanced by the bridge's R1 and C1 settings.

Putting it all Together

If you add the trap—a parallel L-C circuit—at its resonance frequency across that 100-ohm resistor, there'd be no disturbance to the null since its impedance at the intended operating frequency is theoretically infinite. Away from the resonance frequency, the noise level will rise as the receiver is tuned off to either side. Finding the trap's resonant frequency amounts to tuning your receiver until you've located the noise null. This null will be fairly broad; however, it should be easy to locate using 1-MHz and then 100 kHz tuning steps.

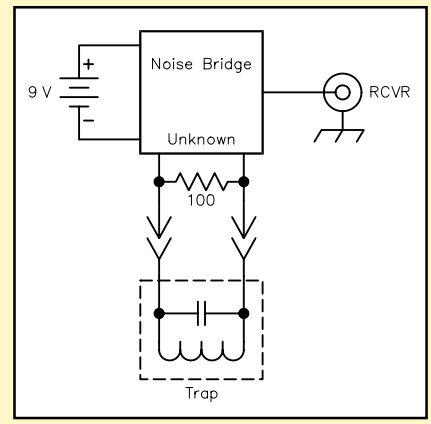


Figure B—How to hook up the noise bridge.

Once you've found the null, bunch the toroid turns together to lower the trap resonance frequency or spread the turns apart to raise the resonance frequency. There's a fair amount of adjustment possible without resorting to changing the toroid turns count—the 21 MHz traps, for instance, could be tuned in this manner to cover a range of 19-22 MHz.

Caution

My initial attempts at repeatable resonance measurements were inconsistent—the "casual" approach using clip leads yielded well over a MHz of variation in resonance frequency at 25 MHz! It's critical to make the leads from the "unknown" terminals on the bridge to the traps as rigid as is practical. I used 2-inch lengths of no. 20 magnet wire to the 100-Ω parallel load and installed solder lugs outboard of that resistor. This allowed the traps to be added and removed with a minimum of change in stray capacitance, which affects the resonance measurement significantly. Once these precautions were taken, the measurements became reassuringly repeatable. *Note: Once these trap hookup connections are ready to go and prior to adding the traps, be sure to readjust C1 for a noise null—this effectively tunes out the test setup stray capacitance.*

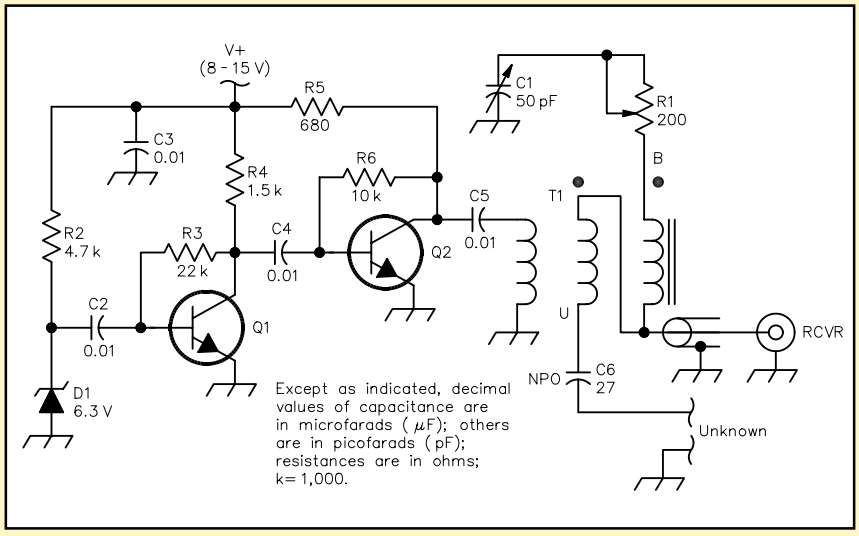


Figure A—The schematic diagram of the noise bridge, based on a design that appears in *The ARRL Antenna Book*. All resistors are 5%, ¼-W carbon composition.
D1—6.3-V, 0.5-W Zener diode, 1N753A or equiv.
Q1, Q2—High-speed NPN switch, PN2222A, 2N4401 or equiv.
T1—4 turns trifilar-wound on FT37-43 toroid; observe phasing.

analyzers. If you don't have access to either of these tools, though, despair not! If you have an HF transceiver with general coverage capability, you've already got most of what you need.

The remaining piece of equipment required is a noise bridge. Despite the arcane-sounding name, this is a simple circuit that is easily duplicated. The sidebar shows the schematic diagram for this circuit, and this is taken largely intact from *The ARRL Antenna Book*.[2] A printed circuit-board kit was developed as a club project and is available to interested builders.[3]

Antenna Adjustment

This antenna was developed by starting with the innermost (10-meter) section and working outward one band at a time. With a 4-inch spacing between the ends of the 8-foot channel sections, the 10-meter antenna simply worked on the first try. Resonance for this dipole was at 28.1 MHz and SWR characteristics were fairly broad due to the element thickness.

Upon adjustment of a pair of 10-meter traps, these were added to the element

Figure 2—Construction details of the trap. See text.

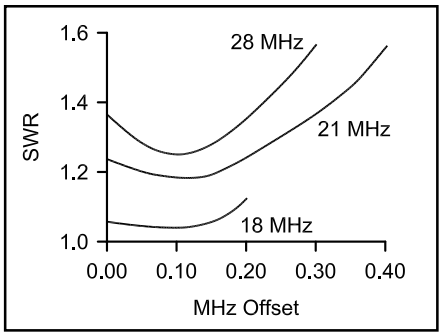


Figure 3—The SWR characteristics for the trap dipole. Since the author operates primarily CW and data modes, the lengths are optimized for the lower end of each band.

ends and outboard sections for 15 meters were added. Rather than use the C-channel material on the initial adjustments, I found it much more convenient to install outboard sections of ¼ inch aluminum rod stock. This material proved to be quite easy to trim to length with a pair of boltcutters! Tune-up was done at an initial height of 20 feet. Element lengths are adjusted using an SWR bridge and transmitter to determine the frequency at which SWR is minimum and adjusting accordingly. *A gentle suggestion: It's much easier to start "long" and subtract material rather the reverse!*

You'll find that the outboard lengths for each additional lower-frequency band do not meet the familiar formula for computing dipole lengths. The traps themselves present a very high impedance at their design frequency but below this frequency are inductive. This has the effect of shortening the resonant length of the antenna. [It has a modest effect in lowering feedpoint resistance as well, but is not significant within the context of this application.] With the trap components I chose, each outboard section length was shortened by 30-35% over the expected values for a dipole. For the adventurous, this length may be estimated by calculating the effective impedance of the trap at the lower band and applying it to any of several tools. This information is found in graphical form in *The ARRL Antenna Book*[4] or by use of *EZNEC*.[5]

With the length of the 15-meter section under control, I replaced the temporary rod sections with C-channel and added a pair of 15-meter traps. With the addition and adjustment of the outer 17-meter sections, this completed the design for my applications, so I elected to leave the outer antenna ends in the form of ¼-inch rod stock to reduce weight and lower the antenna's visible "profile."

The center insulator/mounting block is constructed from a $^3/_8 \times 3 \times 12$-inch block of Delrin plastic. This provides sufficient rigidity for this antenna, although if the concept is extended to lower bands you'd probably want thicker plastic material. A small plastic box at the feedpoint contains a choke balun. I constructed this using a short length of RG-174 coax looped three times through a group of six FT37-43 ferrite toroids. There's nothing magical about this approach—any of a number of other methods can be used to achieve the same goal.

Construction

All fastening hardware for the trap dipole should be of stainless steel, and toothed lock washers are needed to maintain integrity of the tightened joints. Once the traps are adjusted to the desired resonance frequencies, the trap enclosures are sealed shut with an edge-bead of model airplane cement and resonance was re-checked. This final check ensures that adding the enclosure covers has not disturbed the trap frequencies—a possibility given the tight quarters afforded by the enclosures I chose.

Results

The SWR characteristics for this antenna are shown in Figure 3. I operate primarily CW and data modes, so my interest is in the lower end of each band; the lengths in this article reflect that preference. Whatever frequency you choose, you know you've done a careful job tuning the traps if the addition of these traps and outboard sections has no effect on resonance frequency of the inner antenna portion. Their presence, though, will narrow the effective SWR bandwidth as you move away from resonance—the trap-antenna bandwidths are lower than for that of a "plain-vanilla" dipole.

Trap Losses

Although I normally operate at 5 W output or less, that's not everyone's "cup of tea." I've tested this antenna at 100 W without incident. *EZNEC* analysis using the published "Q" values for the toroid trap material shows antenna gain at 28 MHz to be 0.8 dB down from the expected free-space values, and 0.9 dB down at 21 MHz. At 18.1 MHz, the loss is approximately 0.25 dB. These values would be somewhat improved with the use of higher-Q inductors. This design has traded "compact" and "low-profile" for modest gain penalties—proof indeed of the old adage about "no free lunch."

A point of interest—I calculate the peak voltage across the traps at that power level to be over 1 kV. This is no place for junkbox capacitors of questionable pedigree! A high-quality NP0 capacitor type is a "must"—the types typically available from your local electronics emporium may be quite lossy at high frequencies, and this will translate into considerable component heating and disappointing performance. The 500-V silver mica capacitors available from the large distributors are sufficient for lower-power (QRP) operation.[6]

I installed this antenna at the 35-foot level above my roof and have been very pleased with its performance. After years of "low-profile" QRP operation, my success rate snagging contacts on the first call has improved markedly. To a large extent, the old maxim of "Put it up high and in the clear" applies here! As a final "food-for-thought" consideration, the trap-construction scheme I've described would lend itself nicely to multiband vertical and ground-plane antennas.

Acknowledgments

Special thanks to Seabury Lyon, AA1MY, for his assistance with the noise bridge project.

Notes

[1]Delrin plastic may be purchased in small quantities from McMaster-Carr, **www.mcmaster.com**; see "raw materials."

[2]*The ARRL Antenna Book*, 19th Ed., p 27-24.

[3]A noise bridge kit consisting of double-sided/silkscreened printed-circuit board, on-board parts and RG-174/U cable with BNC connector and instructions is available from the New England QRP Club for $17 ($20 overseas) postpaid. Checks or money orders payable to S. Lyon, AA1MY, 99 Sparrowhawk Mtn Rd, Bethel, ME 04217.

[4]Dean Straw, N6BV, Ed., *The ARRL Antenna Book*, 19th Ed., p 6-28.

[5]*EZNEC* is available from Roy Lewallen, W7EL, **www.eznec.com**.

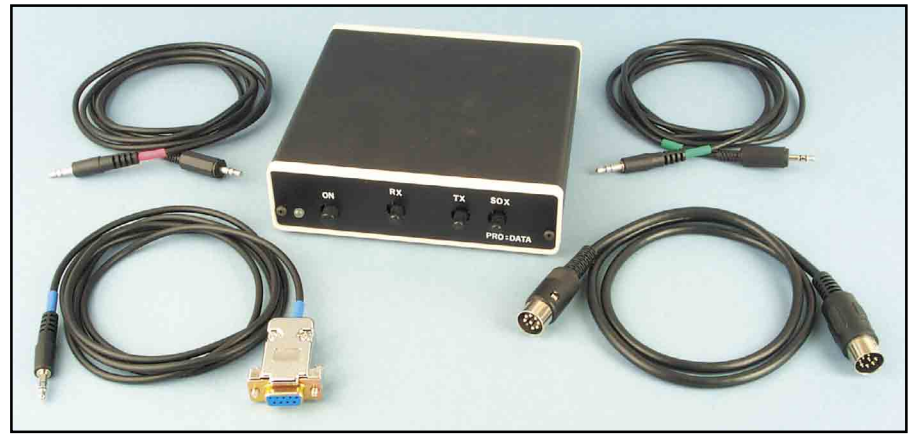
[6]Toroids are available from Amidon Associates (tel 714-850-4660) or Palomar Engineers, **www.palomar-engineeers.com**. 1-kV silver mica capacitors are available from RF Parts Co (**www.rfparts.com**; tel 800-737-2787).

Dave Benson, K1SWL, is a frequent contributor to QST. *He can be reached at* **dave@smallwonderlabs.com**.

By Bob Lewis, AA4PB

A Quality Sound Card Interface for ICOM Rigs

Incorporating advanced shielding and RFI protection, intelligent PTT switching and complete connector/signal pass-through for maximum flexibility, this interface makes full use of ICOM's ACC(1) connector. If you have a suitably equipped ICOM transceiver, this is the Cadillac of sound card interfaces!



Having recently purchased a shiny new ICOM IC-756PRO HF/6-meter transceiver, I decided to design a soundcard interface that would take full advantage of the features that ICOM has made available through its ACC(1) accessory connector. This eight-pin DIN connector is located on the rear panel of the IC-756PRO and many earlier ICOM rigs. Among other things, it provides a low-level (100-300 mV RMS) receiver audio output that is unaffected by the front-panel volume (AF) control.

Thanks to this feature, users can adjust the volume control to a comfortable level in their headphones or station speaker without affecting the level of the signal connected to the sound card. Likewise, the ACC(1) connector has a low-level (300 mV) modulation input that bypasses the front-panel MIKE GAIN control. This input means that the audio levels for digital modes can be adjusted without upsetting the microphone gain typically set for SSB operation.

In addition, the transceiver mutes its front-panel microphone connector whenever a digital mode is selected so room noises are not accidentally transmitted, even if the microphone is connected. ICOM also fitted the ACC(1) connector with PTT control and 13.8-V dc with which to operate the interface circuitry—handy!

The final result is what I call the ProData Interface. Here are the major design features:

- Op-amps in the receive and transmit audio chains to ensure ample signal strength from low-level ACC(1) signals.
- Logic controls guarantee that receive and transmit audio paths can never be open at the same time. This lets users listen to the transmit audio through the radio's transmit monitor without incurring feedback, even if the sound card loops its input through its output.
- Analog gain controls on the front panel of the interface provide smooth, easy adjustment of levels while viewing the radio's panel meter and the digital mode software display. It's quite inconvenient to adjust software sliders with a mouse, especially given the coarse resolution of most on-screen controls. It's also inconvenient to switch back and forth between the operating program and the sound card mixer program while making adjustments. With analog gain controls in the interface, the sound card mixer controls can all be set center scale and forgotten. All adjustments are made with "real" controls on the front panel of the interface.
- Power for the interface is provided by the transceiver's 13.8-V dc supply via the ACC(1) connector.
- A front-panel switch turns the interface on or off and an LED indicator displays the status of power and PTT.
- Two identical eight-pin DIN connectors on the rear panel of the interface provide a pass-through of all leads to the second connector when the interface is not in use. This provides a place to connect other accessory devices such as TNCs, hardware controllers, etc. I connect the SCS PTC-II multimode data controller to this port, and when the ProData interface is turned off, the SCS hardware controller can be used *without* swapping cables.
- The transceiver signal lines not needed by the interface (RTTY, SQLS and ALC) are *always* passed through to the second DIN connector where they are available for use even if the interface is enabled.
- A reliable Sound Operated Xmission (SOX) circuit controls the transceiver's PTT circuit without the need to tie up another computer serial port.
- An optically isolated PTT circuit and a switch to disable the SOX are available for those who are still convinced that the

serial port is the best way to handle T/R switching. This circuit is fully compliant with the RS-232 specification for voltage and impedance.

• Plenty of excess PTT keying capacity is available. The PTT keying transistor will handle a maximum open-circuit voltage of +60 V and a closed-circuit current of up to 450 mA. The maximum closed-circuit voltage drop is 0.4 V.

• Balanced, ground-isolated inputs and outputs for all computer connections guard against hum and noise sometimes caused by equipment grounding differences.

• Telescoping shields on all computer connections provide excellent RFI protection while eliminating the possibility of ground currents flowing in the shields. Telescoping shields are grounded at the interface end and not connected at the computer end.

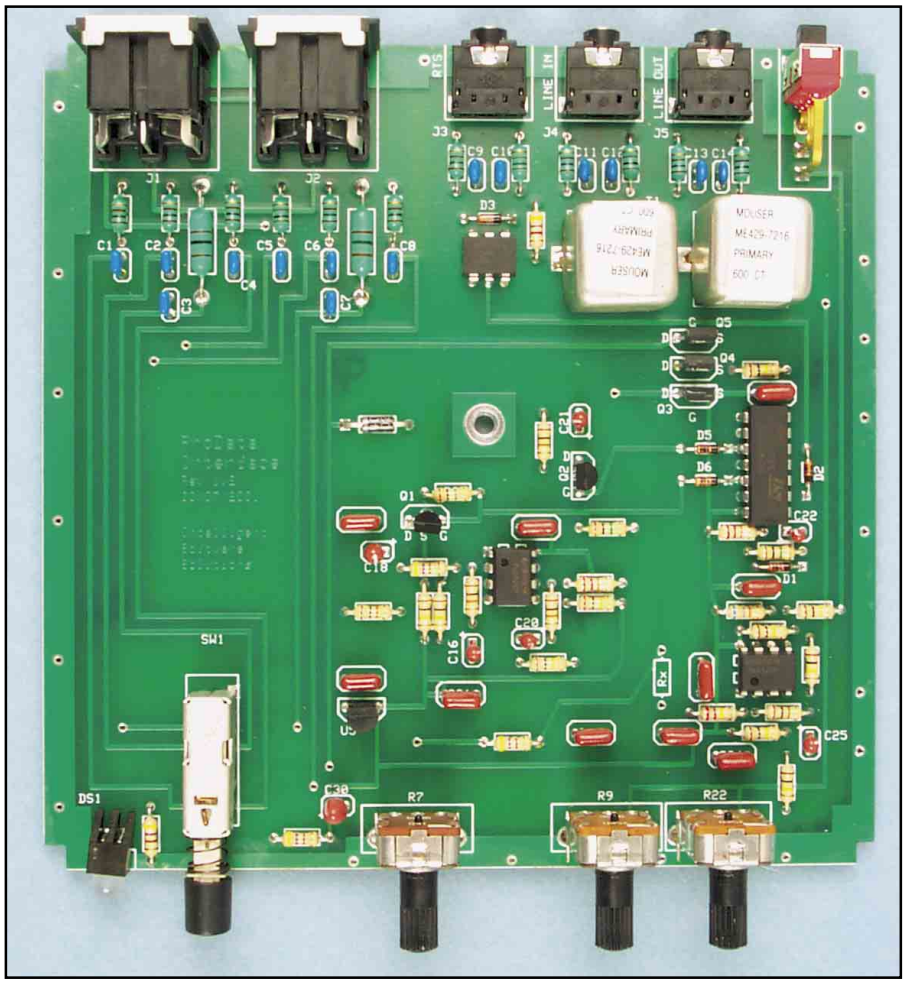
• RFI filters on each lead entering or exiting the interface guard against RF getting into the circuitry.

• A single cable connection is used between the interface and the transceiver's ACC(1) connector. There's no "rats nest" of leads to connect to the transceiver.

Circuit Description

L1 through L14 and C1 through C14 form RFI filters for each lead entering or exiting the interface to help ensure that the internal circuits are not affected by RF.

The ICOM transceiver is connected to the ProData Interface via connector J2, an eight-pin DIN identical to ICOM's

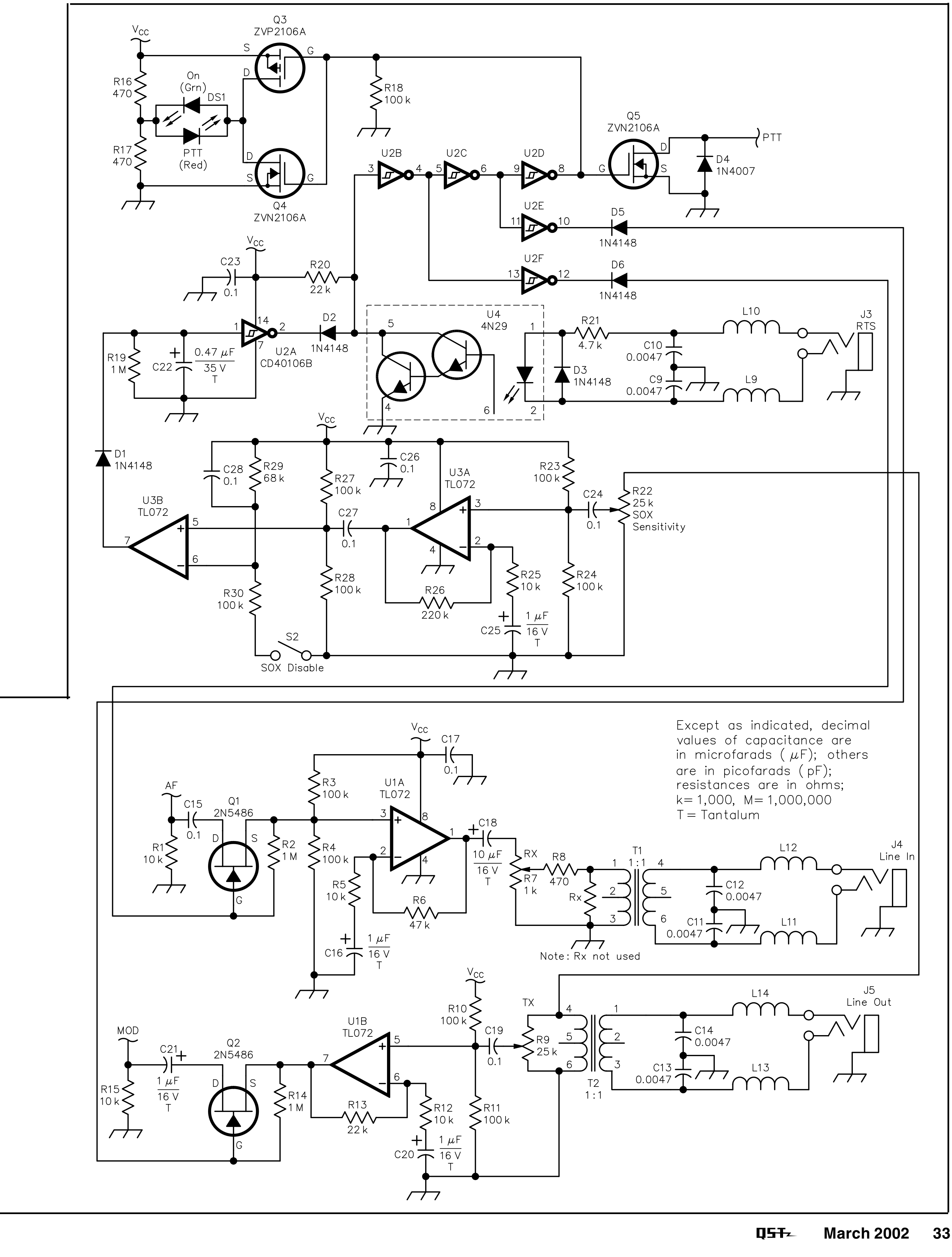


The ProData Interface printed-circuit board. Note the shielded transformers and the RFI filtering applied to every input lead.

Figure 1 (right) —The schematic diagram for the sound card interface. Parts numbers in parenthesese are Digi-key (701 Brooks Ave S, Thief River Falls, MN 56701, tel 800-344-4539, fax 218-681-3380; e-mail webmaster@digikey.com, www.digikey.com). Other parts are available from Mouser Electronics, 800-346-6873; www.mouser.com.

C1-C14—0.0047 µF, 50 V ceramic capacitor (P4950-ND).
C15, C17, C19, C23, C24, C26, C27, C28, C29, C31—0.1 µF, 50 V metal film capacitor (P4525-ND).
C22—0.47 µF, 35 V tantalum capacitor (P2057-ND).
C16, C20, C21, C25—1 µF, 16 V tantalum capacitor (P2105-ND).
C18—10 µF, 16 V tantalum capacitor (P2038-ND).
C30—22 µF, 16 V dc tantalum capacitor (P2040-ND).
DS1—Bi-color LED (L20048-ND).
D1, D2, D3, D5, D6—1N4148 diode (1N4148DICT-ND).
D4—1N4007 diode (1N4007GICT-ND).
J1, J2—8-pin DIN receptacle (275-1027-ND).
J3, J4, J5—3.5 mm stereo jack (CP-3523NG-ND).
J6—9-pin female "D" connector (Mouser 156-1309).
L1, L2, L4, L5, L6, L8-L14—100 µH inductor, 125 mA (M7837-ND).
L3, L7—100 µH inductor, 760 mA (Mouser 542-5300-25).
P2, P4—3.5 mm stereo phone plug (Mouser 17PP004).
P7—8-inch DIN plug (Mouser 171-0278).
Q1, Q2—2N5486 FET (Mouser 610-2N5486).
Q3—ZVP2106A FET (ZVP2106A-ND).
Q4, Q5—ZVN2106A FET (ZVN2106A-ND).
R8, R16, R17—470 Ω, 1/4 W, 5% resistor (470QBK-ND).
R21—4.7 kΩ, 1/4 W, 5% resistor (4.7KQBK-ND).
R1, R5, R12, R15, R25—10 kΩ, 1/4 W, 5% resistor (10KQBK-ND).
R13, R20—22 kΩ, 1/4 W, 5% resistor (22KQBK-ND).
R6—47 kΩ, 1/4 W, 5% resistor (47KQBK-ND).
R29—68 kΩ, 1/4 W, 5% resistor (68KQBK-ND).
R3, R4, R10, R11, R18, R23, R24, R27, R28, R30—100 kΩ, 1/4 W, 5% resistor (100KQBK-ND).
R26—220 kΩ, 1/4 W, 5% resistor (220KQBK-ND).
R2, R14, R19—1-MΩ, 1/4 W, 5% resistor (1MQBK-ND).
R7—1 kΩ potentiometer (CT2251-ND).
R9, R22—25 kΩ potentiometer (CT2255-ND).
Rx—Optional; used to reduce sensitivity. See text.
S1—4PDT push-button switch (CKN1195-ND).
S2—SPDT Mini Slide Switch (CKN5007-ND).
T1, T2—1:1 transformer (Mouser ME429-7216).
U1, U3—TL072CP op-amp (296-1775-5-ND).
U2—CD40106B hex Schmitt trigger (CD40106BCN-ND).
U4—4N29A Darlington optoisolator (4N29ASHORT-ND).
U5—78L09 voltage regulator (NJM78L09A-ND).

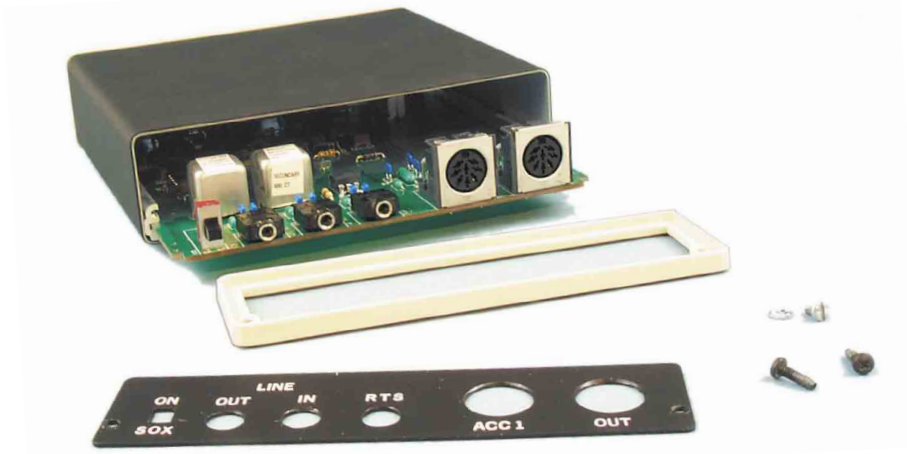
Misc
1—"D" connector hood (Mouser 156-3009).
3—Shielded cable with 3.5 mm stereo plug (Mouser 172-2206).
1—Shielded Cable with 8-pin DIN plug (Mouser 172-0008).
1—Black switch cap (CKN1199-ND).
One—4-40 × 1/4-inch male/female threaded standoff (Mouser 534-8712).
One—4-40 × 1/4-inch machine screw (Mouser 561-P440.25).
One—4-40 nut (Mouser 5721-440).
Two—#4 lock washer (Mouser 5721-LWS-4).
Two—#4 flat washer (Mouser 524-11-142C).
4—Polyurethane feet (Mouser 517-SJ-5007BK).
1—Printed circuit board.


Q3
ZVP2106A
Q4
ZVN2106A
Q5
ZVN2106A
R16
470
R17
470
On
(Grn)
DS1
PTT
(Red)
R18
100 k
PTT
D4
1N4007
U2B
U2C
U2D
U2E
U2F
D5
1N4148
D6
1N4148
C23
0.1
R20
22 k
D2
1N4148
U2A
CD40106B
U4
4N29
R21
4.7 k
L10
J3
RTS
C10
0.0047
C9
0.0047
L9
D3
1N4148
R19
1 M
C22
0.47 μF
35 V
T
D1
1N4148
C28
0.1
R29
68 k
R27
100 k
C26
0.1
U3A
TL072
R23
100 k
C24
0.1
R22
25 k
SOX
Sensitivity
U3B
TL072
C27
0.1
R28
100 k
R26
220 k
R25
10 k
R24
100 k
C25
1 μF
16 V
T
R30
100 k
S2
SOX Disable
C17
0.1
AF
C15
0.1
Q1
2N5486
R1
10 k
R2
1 M
R3
100 k
R4
100 k
U1A
TL072
C18
10 μF
16 V
T
RX
R7
1 k
R8
470
Rx
T1
1 : 1
L12
J4
Line In
C12
0.0047
C11
0.0047
L11
R5
10 k
R6
47 k
C16
1 μF
16 V
T
Note: Rx not used
MOD
C21
1 μF
16 V
T
Q2
2N5486
R15
10 k
R14
1 M
U1B
TL072
R13
22 k
R12
10 k
C20
1 μF
16 V
T
R10
100 k
C19
0.1
R11
100 k
TX
R9
25 k
T2
1 : 1
L14
J5
Line Out
C14
0.0047
C13
0.0047
L13
Except as indicated, decimal values of capacitance are in microfarads (μF); others are in picofarads (pF); resistances are in ohms; k= 1,000, M= 1,000,000 T= Tantalum

ACC(1) connector. S1 is a 4PDT pushbutton switch that routes signals to the output connector, J1, or to the interface. Signals that aren't needed by the interface are always routed directly to the output connector.

The fixed, low-level (100-300 mV RMS) audio output of the ICOM receiver is first applied to Q1, an N-channel JFET that acts as an audio switch. When the gate of Q1 is pulled to ground by U2F and D6 during transmit, the source-to-drain impedance of Q1 becomes very high, interrupting the receive audio path. When the gate is not grounded, resistor R2 pulls it to the source voltage and the source-to-drain impedance becomes low, passing the receive audio signal on to the input of U1A, a low-noise TL072 op-amp set for a gain of 4.7 by R5 and R6. The output of U1A is sent to R7, the front panel receive audio level control and isolation transformer T1. The secondary of T1 passes the audio to the sound card's line input connection.

In a similar manner, the sound card's line output is applied to isolation transformer T2. The secondary of T2 is applied to the receive amplifier and the Sound Operated Xmission (SOX) circuit. Audio from T2 is applied via the transmit level pot, R9, to the input of U1B and is set for a gain of 2.2 by R12 and R13. The output of U1B is applied to Q2, another N-channel JFET, which acts as a transmit audio switch. When the gate of Q2 is pulled to ground by U2E and D5 during receive, the source-to-drain impedance of Q2 becomes very high, interrupting the transmit audio path. When the gate is not grounded, resistor R14 pulls it to the source voltage and the source-to-drain



The various inputs are visible in this view of the interface with its rear cover removed.

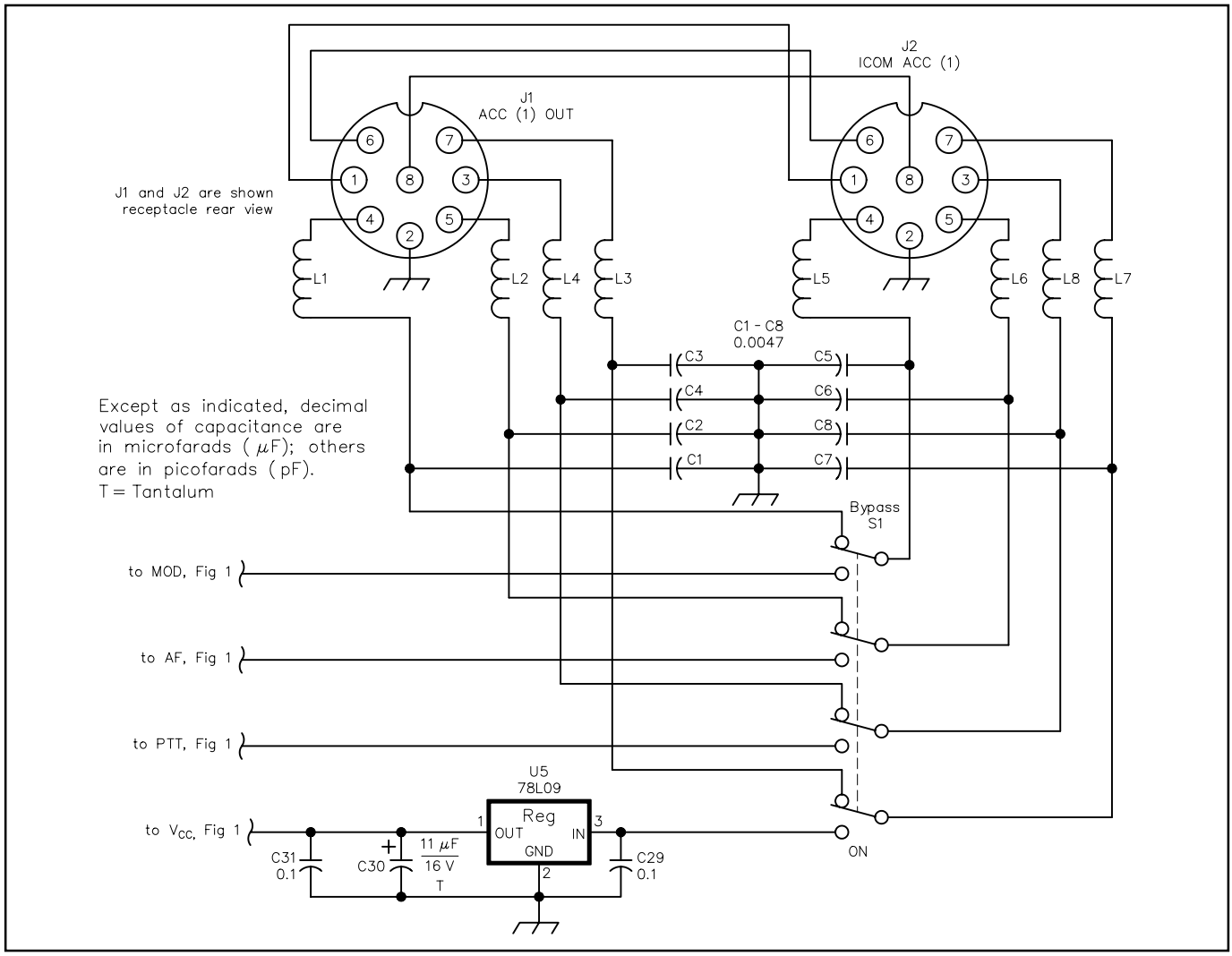


Figure 2—The schematic diagram of the two DIN receptacles and the 4PDT push-button switch. The parts list appears under the Figure 1 caption.

Telescoping Shields—How do they Work?

Telescoping shields is a technique often used by the professional audio industry to prevent ground currents from flowing in the shields of balanced cables interconnecting various pieces of audio equipment. Any time that conductors, including shields, are grounded to more than one piece of equipment there is a potential for ground currents to flow in the grounded conductor. Connecting the shield at only one end will break the path for current flow while still providing the required shielding for the inner conductors. Current in shields grounded at more than one point can be caused either by an actual difference in potential between the two equipment grounds or by magnetic induction from nearby current carrying power leads (called a ground loop).

If the computer and transceiver are both plugged into an ac outlet with a safety ground (the third pin on the power plug) how can they possibly be at different ground references? One possible scenario revolves around the use of an external power supply with the transceiver. The power supply is tied to the same ground reference as the computer, but the transceiver is connected to the power supply ground only via the ground wire in the dc power cable. With a 100-W transceiver, this ground wire can have peak currents of 20 A or more flowing in it. If you connect an audio ground between the computer, which is at the power supply's ground reference, and the transceiver ground, it ends up being in parallel with the supply's dc power cable. A small portion of that 20 A will flow through the audio ground, developing a signal that is essentially in series with the audio signal path.

Another potential problem is that transceivers often end up with multiple ground connections: One to the building's power system ground, one to the ground rod outside the window, one via the antenna coax to the tower, etc. These grounds can often have slightly different ground references that cause currents to flow in the various ground connections. It doesn't take much voltage difference to cause a good deal of current to flow in a low-resistance ground wire.

It has also become a rather common technique to use an isolation transformer to couple the audio signals between the transceiver and the computer sound card. This is an effective and inexpensive way to break the ground connection between the computer and the transceiver, thereby eliminating any currents caused by differing ground references. There is no completed path for ground currents to flow because neither signal line is grounded at both ends. By itself however, a transformer is not effective against currents induced into the shield by magnetic coupling to nearby power conductors because the shield serves as the return for the signal and is still in the signal path. It is also not totally effective against RFI because RF currents picked up by the shield can be capacitively coupled across the windings of the transformer and into the audio circuitry. A Faraday shield between the windings can prevent this if it's returned to an effective RF ground, but such transformers are exotic and generally expensive.

Telescoping shields take inexpensive transformer coupling one step further to minimize induced coupling and RFI. A telescoping shield makes use of a pair of conductors covered by a shield that is not connected to anything at the computer end. The pair is connected across the isolation transformer winding located at the transceiver end of the cable in a balanced fashion (neither lead is grounded). At the computer end one lead is connected to the sound card ground and the other to the audio input or output. Any magnetic flux will hopefully cut both wires equally, thereby inducing equal currents flowing in the same direction. The net result is that no current flows between the two conductors. The shield, because it's connected only at the transceiver end, acts as an extension of the shielded housing on the transceiver. Any RF coupled into the shield will be returned to the transceiver ground. Induced or ground reference currents cannot flow in the shield because it is connected only at one end and does not provide a complete circuit path.

Done correctly, adding telescoping shields to an isolation transformer is an inexpensive and effective way to keep RF and ground currents out of your sound card and transceiver audio circuits.

impedance becomes low, passing the transmit audio signal to the modulation input of the transmitter.

Note that the JFET switches are placed on the input side of U1A and the output side of U1B. This was done because the JFET switches will only work correctly with low-level signals. Placing the switch at the output of the op-amp results in better noise performance, but the output signal from U1A is much too large for the switch to function without causing distortion and leakage. No, one of the JFETs hasn't accidentally been installed backwards. Signals in a JFET will pass between the source and drain in either direction, similar to a variable resistor. The important thing for this application is that the source be tied to a positive voltage so the gate will be reverse biased when it's grounded. With about 2 V of reverse bias applied to the gate, little current will flow between the source and drain.

The sound card audio output from T2 is also applied to the SOX sensitivity control, R22. From here the signal is applied to another low-noise op-amp, U3A, which is set for a gain of 22 by R25 and R26. The output of U3A is applied to the input of U3B, which acts as a comparator. With the SOX-disable switch S2 closed, resistors R29 and R30 form a voltage divider to set the negative input for U3B to 5.3 V. Resistors R27 and R28 set the positive input of U3B to 4.5 V. With the positive input voltage lower than the negative input voltage, the output of U3B remains near 0 V. When sufficient audio signal is applied from the sound card, the signal at the positive input of U3B goes higher than the negative input during audio peaks. When this happens, the output of U3B jumps to 9 V, quickly charging C22 via diode D1 and applying a positive input to the Schmitt trigger, U2A.

During the time interval between audio peaks, capacitor C22 discharges through resistor R19. Diode D1 also prevents C22 from discharging back through the output circuit of U3B. The RC time constant of C22 and R19 is selected so U2A remains keyed for approximately 0.5 seconds. That's more than enough time to ensure that the SOX circuit remains keyed during the nulls in the digital-mode waveforms or the CW ID.

The use of a comparator and a Schmitt trigger in the SOX circuit provides a very narrow detection threshold and ensures that the decay time remains constant by fully charging capacitor C22 each time the input signal crosses the threshold. The SOX sensitivity control reacts almost as though it were a switch. Below some level there will be no activity. Setting the control anywhere above this level will cause the SOX circuit to key reliably. The decay time is not dependent upon the sensitivity setting or the size of the input signal.

Opening switch S2 will disable the SOX by permitting R29 to pull the negative input of U3B to 9 V. It's impossible for the audio signal to cross this threshold and key the transmitter, regardless of the sensitivity setting. Disable the SOX to take advantage of serial port (RTS or DTR) signal keying as required by some software.

Capacitor C28 momentarily pulls the negative input of U3B to 9 V, temporarily disabling the SOX circuit when power is first applied. This prevents a momentary keying of the transmitter when the ProData Interface is first turned on.

The remaining sections of U2 provide the proper logic levels and buffering for the various controls. The input to U2B is normally pulled to 9 V by resistor R20. When the SOX is keyed, the output of U2A pulls this line low via diode D2. D2 prevents the optical isolator, U4, from shorting the output of U2A in the event that keying is accomplished via the serial port. If a serial port is connected it will supply a negative voltage to the RTS pin with respect to the signal ground during receive. This will cause current to flow through R21 and D3 rather than through the LED in the optical isolator, U4.

D3 limits the reverse voltage across the optical isolator, protecting its internal LED from potential failure. When the software is placed in transmit, the serial port will supply a positive voltage to the RTS pin and current will flow through the optical isolator's LED and resistor R21. With current flowing through the optical isolator LED, the Darlington transistor pair in the isolator will pull the input to U2B low and key the logic circuitry. A Darlington type of optical isolator was selected because of its high transfer ratio, which provides the ability to reliably key the logic circuitry with a minimum amount of current required from the serial port.

The RS-232 specification provides for serial port voltages between ±5 V and ±15 V under load with a maximum of ±25 V with no load. The load impedance is specified to be in the range of 3 kΩ to 7 kΩ. The optical isolator circuit in the ProData Interface is fully compliant with the RS-232 specification and will work with any computer that is also in compliance. With the optical isolators evaluated during testing, the circuit functioned reliably all the way down to 3 V.

When the circuit is keyed, either by the SOX or by the serial port, U2F mutes the receive audio channel, U2E un-mutes the transmit audio channel, and U2D applies a positive voltage to the gate of the keying MOSFET, Q5, and the LED control MOSFETs, Q3 and Q4. When the circuit is un-keyed the opposite happens. U2F un-mutes the receive audio channel, U2E mutes the transmit audio channel and U2D removes the positive voltage from the gates of the MOSFETs. When the gate of N-channel MOSFET Q5 is positive, its source-to-drain impedance is very low, pulling the transceiver's PTT line to ground, thereby placing it in transmit. Diode D4 provides reverse-voltage protection for Q5. Diodes D5 and D6 isolate the mute lines from the positive output voltage of U2. A MOSFET was selected for the PTT circuit because its high gate impedance does not load the output of the CMOS driver, its on-state source-to-drain resistance is very low and its high-voltage and current ratings provide plenty of capacity for driving other equipment, if required.

The output from U2D is also applied to the gates of a complimentary pair of MOSFETs, Q3 and Q4, to control the bi-color LED, DS1. One lead of the bi-color LED is connected to the junction of R16 and R17, giving it a reference voltage of 4.5 V. The other lead of the LED is switched to 9 V by P-channel MOSFET Q3 during receive (or to ground by N-channel MOSFET Q4 during transmit). This causes the current flow to the LED to reverse so the LED lights green during receive and red during transmit. When the interface or the transceiver is turned off there is no voltage available and the LED does not light.

U5, a 78L09 voltage regulator, receives +13.8 V from the transceiver and supplies a regulated 9 V to the interface circuitry.

Compatible ICOM Transceivers

The following ICOM transceivers should be compatible with the ProData Interface: IC-275, IC-375, IC-575, IC-707, IC-721, IC-723, IC-725, IC-726, IC-728, IC-729, IC-732, IC-735, IC-736,IC-737, IC-737A, IC-738, IC-746, IC-751, IC-756, IC-756PRO, IC-760, IC-761, IC-765, IC-777DSP, IC-781, IC-820 and IC-970.

Sound Card Line vs Mike Input Levels

The sound card should be driven via its line input connection whenever possible. The microphone input pre-amplifiers in many sound cards typically add noise and distortion, so it's better to provide the required gain in the interface and send a larger signal to the sound card's line input. If the sound card has only a mike input then you'll have to use it. This may require that the level of the received signal be reduced more than can be reliably done via the front-panel level control, R7. Resistor location Rx can be used in conjunction with R8 to form a voltage divider to reduce the level as needed. Normally there will be no component installed at the Rx location.

Construction

The ProData Interface is constructed on a 5.28 × 5.2-inch double-sided PCB with plated-through holes.[1] Perfboard construction is also possible. The layout isn't critical, although consideration should be given to the location of the RFI filters to minimize RF coupling between pre-filter leads and the rest of the circuitry. Good ground-plane techniques should be observed in the filter sections.

The locations of the case grounding tabs on some of the Mouser ME429-7216 audio transformers have been found to be slightly off center. One option is to trim the width of an off-center mounting tab so it fits through the PCB mounting holes. If the offending tab is bad enough, it can be cut off and the other tab used for grounding the shielded case. The transformers should be mounted slightly above the circuit board rather than attempting to force them down flush against the board. It's important to avoid bending the connection pins, which may cause an internal winding to become disconnected, making the transformer unusable. Similarly, never twist the transformer in an attempt to force an off-center grounding tab through the PC board hole.

Two case options are available from Lansing Enclosures (**www.lansing-enclosures.com**). The C-Style MicroPak, an extruded base with a formed, slide-on cover, is stocked in a five-inch length, ready to accept this PC board. The D-Style MicroPak is a one-piece, seamless, extruded tube that offers better RFI shielding. This enclosure, unfortunately, is not available as a stock item in the five-inch length. It's necessary to purchase the six-inch length and cut it off at five inches with a band saw. Both case options provide rails into which the circuit board will slide. A large grounding pad in the center of the PC board permits a #4-40 threaded aluminum spacer to serve as a ground connection between the board and the case.

Both case options come with blank front and rear panels in a variety of colors. I selected a black case with black panels and cream colored trim bezels. I drilled the panels to match the location of the various controls and connectors. White Datak dry transfer labels were applied to the panels before coating them with clear acrylic spray.

Building the Interconnecting Cables

The cables must be wired in accordance with the schematic shown in Figure 3. *Particular attention should be paid to the fact that the computer ends of the cables have no connection to the shield.* An easy means of building the cables is to purchase the cables available from Mouser Electronics (which are already terminated on one end with a molded connector). Use the terminated ends of the audio cables for the ProData Interface connection and prepare the other end for connection to the computer sound card. Use heat shrink tubing over the end

[1]The author has a limited number of PC boards (double sided, plated through holes, solder masked and silk screened) available for this project. Please contact him via e-mail to reserve a PC board prior to sending money. The cost is $15 plus $1.50 shipping in the US and Canada.

of the cable to guard against the shield shorting to the connector shell or other contacts. I recommend using a different color heat shrink for each cable and sliding a short piece over the cable and down to the molded connector before assembling the other end. Make the heat shrink for the assembled end long enough so it will be exposed when the connector is assembled. This will provide a matching, color-coded identifier at each end of the various cables.

The ACC(1) cable is wired straight through, pin to pin, so either end may be connected to the ProData Interface. Once again, Mouser comes to the rescue with an eight-conductor shielded cable that has a DIN connector already molded onto one end (see the parts list for Mouser numbers). This cable has an overall shield rather than individually shielded lines, but I have not experienced any ill affects from its use.

Be certain to verify the color coding used on the Mouser cables *before* assembling them. You wouldn't want to find out after building all the cables that the manufacturer has changed the color assignments since this article was written!

Connecting the Interface

Connecting the interface is a simple matter of connecting the cables. Connect J2 to the transceiver's ACC(1) jack using the transceiver cable with DIN connectors. Connect the Line In to the sound card line in jack. Connect the Line Out to the sound card line out jack. Connect the RTS to the serial port connector on the computer (only if you need to use the computer PTT interface). Be sure that the end of the cables with the shield connection goes to the ProData Interface card. If you are using the serial port, turn off the SOX slide switch on the back of the interface. If you want to use the SOX, turn the switch on and omit the RTS connection.

Adjusting and Operating the Interface

Turn the three audio level controls on the front of the interface to their full counter-clockwise positions. With the ICOM transceiver turned on, press the button on the front of the interface to activate it. The LED should glow green. Using the control applet on your personal computer, set all of the relevant sound card controls to 50% (half way on the sliders). Tune in a signal and advance the receive-level control on the front of the interface to provide the proper audio level to the sound card as described by your data programs documentation or on-line help function. Note that the receive level is not affected by the radio's front-panel volume control.

If you are using SOX, put the program in transmit and advance the SOX level adjustment slowly until the transmitter keys. Advance the control a bit farther. Put the program in receive and the transmitter should un-key. Key the transmitter again and adjust the transmit-level control for the proper amount of audio drive to the transmitter (generally just below the point where there is any ALC reading). Note that the transmit level is not affected by the radio's front-panel mike gain control.

Be sure to carefully read and understand the documentation for the data program that will be used so you'll know exactly where the transmit level should be set to avoid distortion and broad signals that can cause QRM to others. In general, you'll have better results if you keep the transmitter power output fairly low, rather than attempting to squeeze out every last watt. Although most ICOM transceivers are capable of running a full 100 W PEP output on PSK31, running at 50 W will result in a cleaner signal with less stress on the finals and the power supply. The difference in copy at the other end of a QSO will be insignificant.

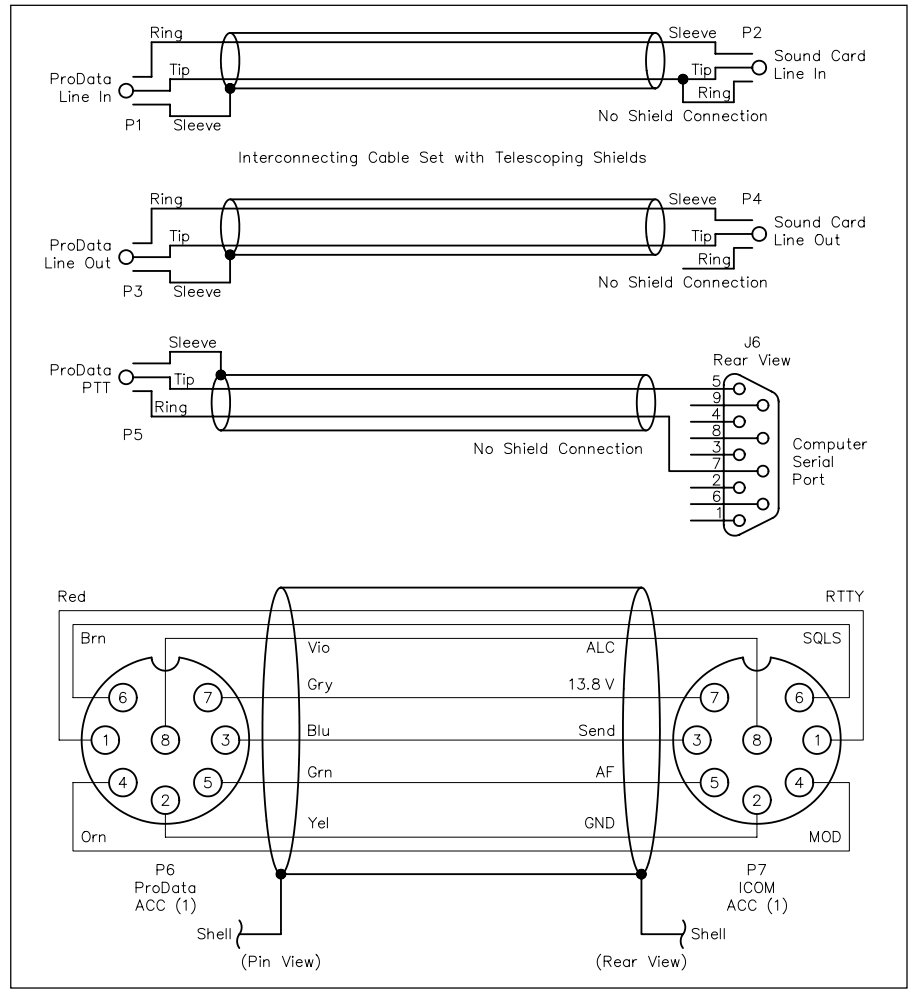


Figure 3—The schematic diagram of the interconnecting cable set with telescoping shields.

Summary

With the ProData you'll have a high-quality interface worthy of your favorite ICOM transceiver. With this interface and the appropriate PC software you can run almost any "sound card mode," including PSK31, MFSK16, RTTY and SSTV. With the ProData's bypass feature you can continue to use your multi-mode hardware controller for Pactor-II or other specialized modes without the need to constantly swap cables. Who said you can't have your cake and eat it too?

Bob Lewis, AA4PB, became interested in Amateur Radio during junior high school in the late 1950s. With the encouragement of his cousin, Al Krugler, K8DDX, Bob obtained his Technician license, K8KNI, and spent most of his time on 6-meter AM in the Detroit area. His early interest in Amateur Radio resulted in a career in electronics, first as a radio mechanic in the air-transport industry, followed by 10 years in the Navy as an aviation electronics technician. While in the Navy, Bob found 6-meter activity to be a bit sparse in the middle of the Atlantic, so he upgraded to General, then Advanced and finally Extra class. He enjoys QRP, PSK31 and home-brewing. Bob is retired from Civil Service, and is currently working part time for an electronics consulting firm. You can contact him at Box 522, Garrisonville, VA 22463; **rlewis@staffnet.com**.

By Jim Millner, WB2REM

I-Link, the .*WAV* of the Future

A 222 or 440-MHz H-T can become your link to the world.

Once upon a time an Amateur Radio operator was on his 440-MHz H-T calling for anyone. To his surprise and amazement Terry, VK2JTP, in Sydney, Australia answered. He was loud and clear, as if he were a few blocks away. How could this be?

Worldwide communications via VHF/UHF was once considered a dream. Now it's a reality! There has been an emergence of different approaches to VHF/UHF linking. In December 1996, this author published an article in *QST* titled, "A New Band for Your Radio." It discussed an Internet linking system that utilized a program called *Repeater Link*. Since then, experimenters in the area of Internet remote linking such as Graeme, M0CSH, have taken this topic to a higher plateau.

M0CSH has designed a software Internet linking program specifically for Amateur Radio operators. *I-Link*, as it is called, is a free and versatile program that can be downloaded from **www.aacnet.net**. The program is less than 300 kbytes in size and will work on most *Windows*-based 486 or above computers with sound cards and microphones. An Internet connection is also necessary. There are three types of the software available for I-Link operators. They include the user, SysOp and conference server software.

The user software is for hams who want to contact repeaters, link stations or other Amateur Radio operators around the world. The SysOp software allows individuals to connect I-Link remotely to their repeater or to transmit I-Link out of a simplex repeater. The conference server resembles a repeater with multiple amateurs participating in roundtable conversation.

Setup

In order to run the I-Link programs you'll need to make sure the speaker and microphone are working properly on your computer. If you can hear music from the CD player or other audio source, it is likely your speaker is working. However, during the setup of I-Link, you may need to adjust the volume control. To check your computer's microphone, go to the volume control and open "properties." Check the recording control area. Once in the recording control panel check the box below the microphone ("line-in" if this is a setup for the SysOp program). This will activate the microphone for use in the program. You may need to return here later once the I-Link program is running to adjust your microphone level. To help guide you through the process, Terry, VK2JTP, has set up additional audio-microphone help files on his Web site.[1]

User Software

The user software—*Link.EXE*—can be downloaded from **www.aacnet.net**. It will only work on a *Windows*-based platform. The higher the Internet connection speed that you have, the less likely that speech coming through the connection will be broken up. The disruption of speech is called "packet loss."

Once the software is downloaded, run the program. The first time you open the program you'll be asked to type in call letters, a location and a password. This information is placed in an ILINK.INI file in the *Windows* directory. If in the future, you would like to change location (QTH) information, you can do so. Changing the call will cause the program to malfunction. If the call needs to be changed, go to the *Windows* directory and carefully delete the ILINK.INI file. Restart the I-Link program and it will ask for new information.

After information is entered into the program, you'll be assigned a unique four- or five- digit number, which will be your personal identifier. To activate the program, click on the I-Link icon and the following screen appears (see Figure 1).

Press BEGIN to open the main screen of the program (Figure 2). A listing of all stations that can be reached through I-Link will be shown. Stations are listed in three sections. Stations at the top of the screen with a gray background are link or repeater stations. If the link or repeater is in use, the print turns from

[1]Notes appear on page 42.

Figure 1—This screen appears when you first click on the I-Link icon.

Figure 2—The main screen of the User program.

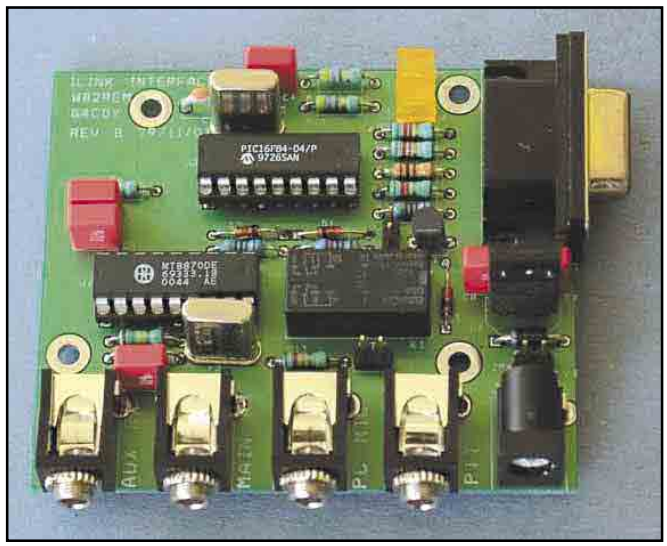


Figure 3—The assembled link board.

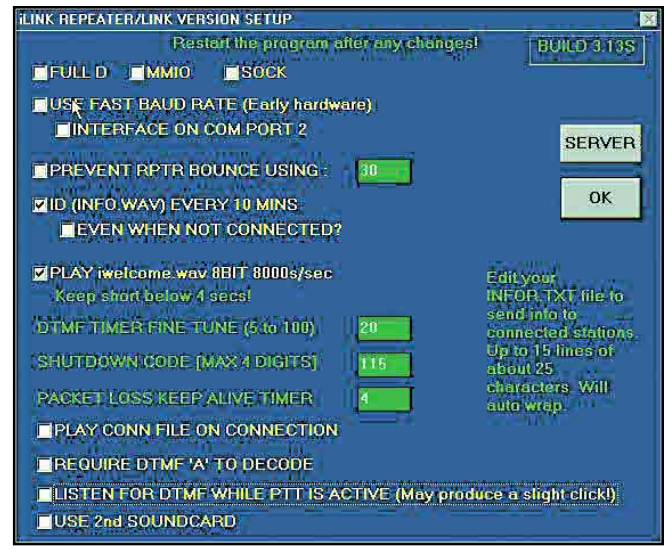


Figure 5—The Help section of the I-Link SysOp software.

white to yellow. Users looking for conversations can be found in the middle section and appear on a blue background. Conference servers are at the bottom with aqua print on a burgundy background.

To talk to any station listed, simply highlight the call sign and push OK. Once you've connected, the amateur's call sign will appear in the middle of the screen (Figure 1). Use the space bar on the computer to toggle between transmit and receive. Do not hold down the spacebar but lightly tap the spacebar once to transmit and once to go back to receive. The screen will change from receive to transmit after the spacebar is pushed.

Like radio, there is a protocol to operating I-Link. When connecting to a repeater or another on the air linking station, listen first for ongoing activity. Once it has been determined that no one is using the repeater, identify yourself and the link that you are transmitting through, call a station or give a general CQ. A slight delay should be left between transmissions to allow other repeater users to break in. To end a conversation, simply push END at the top of the screen.

When using I-Link, be careful—third-party rules still apply! A US amateur may not use Amateur Radio to send a message to or on behalf of an unlicensed third party in another country, unless that country has an agreement with the United States allowing such traffic (you'll find a list of these countries on *ARRLWeb* at **www.arrl.org/FandES/field/regulations/io/3rdparty.html**). This prohibition applies to *all* uses of Amateur Radio, including radio systems connected via the Internet.

Utilities

The Utilities area is the first section

Figure 4—The opening screen of the I-Link SysOp software.

listed on the I-Link screen. Opening the utilities displays five areas:

Log-in—This area shows all stations connected with call signs shown in order of time called.

Server edit—The I-Link program relies on servers around the world. In this section there are up to four server addresses that can be listed. Multiple servers are used so that if one server goes down it will automatically switch over to another one. The servers will default sequentially according to the listing. The server listing can be edited manually in this area.

Edit info.txt file—In this area, a user can enter pertinent information about the operation. This could include name, location and interests. When a station connects, they will be shown the info.txt file that was created.

Help/options—In this section there are boxes which can be checked off if you experience assorted problems or specialized needs related to the program. In general, the default settings are used. They include:

- **Full D** (Full Duplex)—This is used for full duplex operation
- **MMIO**—This can be applied if a sound card exists.
- **Sock**—This fixes network socket problems.
- **S. Dev1**—This is used when you have two sound cards and want to use one or the other.
- **Net—**This should be used only when you plan to use the system off line only.

Note: To make a change, check off the appropriate box and push OK. In order to make a change you must re-boot the program. However, in most cases, none of these areas will need to be checked.

Exit- Pressing exit terminates the program.

End: End terminates a conversation.

MIN: This is used to minimize the Screen.

INF: Accesses the information screen. This is where you view information about the other person. This area also shows transmit and receive packet information.

SysOp Software

The SysOp software is similar to the User software but requires an interface for it to be activated (see Figure 3). If the hardware is not present or recognized, the software will respond with the message

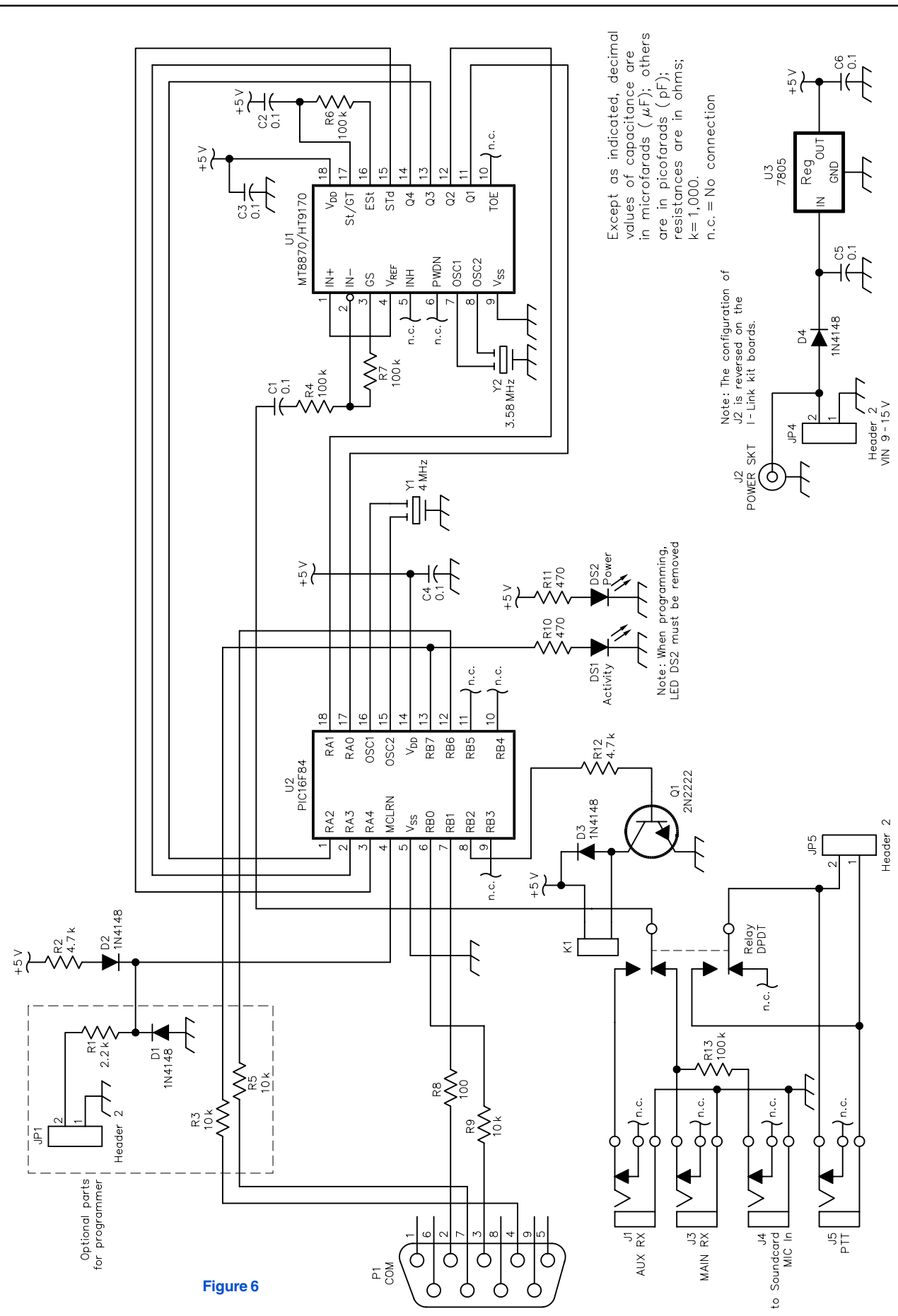

Except as indicated, decimal values of capacitance are in microfarads (μF); others are in picofarads (pF); resistances are in ohms; k=1,000.
n.c. = No connection
Note: The configuration of J2 is reversed on the I-Link kit boards.
Note: When programming, LED DS2 must be removed
U1 MT8870/HT9170
U2 PIC16F84
U3 7805 Reg
Y1 4 MHz
Y2 3.58 MHz
Q1 2N2222
K1 Relay DPDT
JP1 Header 2
JP4 Header 2 VIN 9 - 15 V
JP5 Header 2
P1 COM
J1 AUX RX
J2 POWER SKT
J3 MAIN RX
J4 to Soundcard MIC In
J5 PTT
Optional parts for programmer

Figure 6

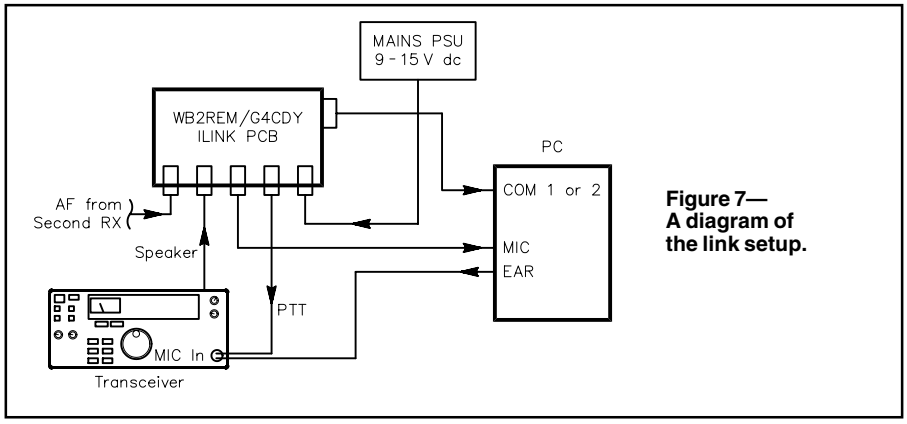


Figure 7—A diagram of the link setup.

As per the requirements of the FCC, control of a remote link needs to be done at 222.15 MHz or above (excluding 431-433 and 435-438 MHz), or through other control devices such as a telephone line.

"No Interface Board Found-Most Functions Disabled." The I-Link hardware can be built or purchased as a kit or fully assembled.[2] We'll discuss the hardware in more detail later.

The SysOp software allows I-Link to be interconnected to repeaters by transmitting the link to the repeater site or can be its own simplex link. Pictured in Figure 4 is the opening screen of the I-Link SysOp software. The SysOp software can be downloaded from **www.aacnet.net/**.

The main screen of the SysOp program shows five items along the top. They perform the following functions:

Figure 6—Schematic diagram of the link board. The key components of the board are U2, the PIC16F84-04-P PIC and U1, the HT9170B or MT8870 DTMF decoder chip. The PIC chip can be programmed by downloading the HEX file from the author's site at www.ilinkboards.com and by using a PIC programmer or the onboard programming capabilities of the board itself. Terry, G4CDY, has set up a Web site at www.g4cdy.co.uk with full instructions on how to use the onboard programmer.

C1, C2, C3, C4, C5, C6—0.1µF polyester.
D1, D2, D3, D4—1N4148 diodes.
DS1, DS2—LEDs.
JP1, JP4, JP5—2-pin header connectors.
J1, J3, J4, J5—Phone jacks.
J2—Power jack.
K1—Relay, DPDT (DigiKey Z105-ND; www.digikey.com), 5 V, 72-Ω PCB mount.
P1—DB9 connector, PCB mount, female, right angle.
Q1—2N2222 transistor.
R1—2.2 kΩ.
R12, R2—4.7 kΩ.
R3, R5, R9—10 kΩ.
R4, R6, R7, R13—100 kΩ.
R8—100 Ω.
R10, R11—470 Ω.
U1—MT8870/HT9170B, Holtek part number HT9170B, www.holmate.com; tel 510-252-9880.
U2—PIC16F84, Futulec part number PIC16F84-04/P; www.futulec.com. Must be programmed before use.
U3—7805, 1-A, 5-V voltage regulator
Y1—4-MHz ceramic resonator with caps, DigiKey X902-ND.
Y2—3.58-MHz ceramic resonator, DigiKey X901-ND.

UTL (UTILITIES)

Display Stats Window—This area is similar to the INF section of the user software. This area allows for typed conversations with other stations connected as well as the monitoring of packets.

System Log—The log is comparable to the log-in area of the user software. It keeps record of all stations and the time they connected to the link from the Internet.

Vox—The Vox setting controls the sensitivity of the audio in the software and determines the level of volume necessary to trigger the link into transmit.

Exit—Exit closes the program entirely.

BEG (Begin)

Push BEG to start a search for contacts. The same screen shown in Figure 2 appears.

END

To end a conversation, push this button.

MIN (minmize)

This minimizes the screen.

HELP

See Figure 5. Boxes in the help area are checked to fine tune the link.

Full D, MMIO, Sock—These boxes are used in the same manner as the User software. (Use no check as the default.)

Use Fast Baud Rate—Applies to older versions of the hardware and will not affect most users. (Use no check as the default.)

Interface on com port 2—Check this box if the hardware is placed on COM port 2.

Prevent repeater bounce using—This control stops repeaters from keying each other up. It prevents beeps from being re-transmitted back and forth.

ID (Info.Wav) every ten minutes—This plays *info.wav* ID file every 10 minutes while the link is connected.

Even when not connected—When checked, this plays *info.wav* at 10-minute intervals, connected or not connected. This should be used for simplex operation.

Play IWelcome and Connect Wav files—You can create .wav files for many of the actions of the link. They are stored in the I-Link folder. Sample .wav files are provided and should be modified for the use of your system. These boxes are used to turn off the .wav files.

DTMF timer fine tune—This is adjusted to match the speed and sensitivity in which touchtones are decoded.

Shutdown code—Choose a code that can be used to shutdown the system if a problem occurs. Once touchtone entered codes are transmitted the system shuts down and cannot brought back on line unless the computer is re-booted.

Packet keep alive timer—Despite packet loss, when this box is checked, the timer will be kept alive.

Require DTMF A to Decode—This prevents other stations from fishing for TouchTones and requires an "A" to be sent before the 4-digit access code will connected to other stations.

Listen for DTMF when PTT is active—The hardware has the capability of accepting a second audio signal (on another frequency or band). This can be used to control the link even when the PTT has been engaged.

Use second sound card—As in the User software, this allows for a second sound card.

SysOp Hardware

The SysOp hardware used in conjunc-

tion with the software produces an excellent I-Link station that will work as a stand-alone simplex link or a repeater link. Figure 6 shows the complete I-Link hardware schematic.

As per the requirements of the FCC, control of a remote link needs to be done at 222.15 MHz or above (excluding 431-433 and 435-438 MHz), or through other control devices such as a telephone line.

The link board is connected to the serial port of the computer through a 9-pin DB9 female connector. This connector accepts a standard DB9 cable (male-female), which is attached to COM port 1 of the computer. Pin 2 of the serial port connector (TX) goes to pin 7 of the PIC chip, pin 3 of the connector (RX) to pin 6 of the PIC chip and pin 5 of the DB9 to ground of the board. A diagram of the link setup is shown in Figure 7.

Audio comes to the link board from the speaker jack of the radio. The same audio also goes into the LINE IN or MIC IN jack of the computer. The board has an audio in and audio out connector to accomplish this task. In order to reduce hum, place a 1:1 transformer (RadioShack 273-1374) between the audio out of the board and LINE or MIC IN.

Assemble a microphone connector for the link radio. Attach shielded wires to the PTT (push-to-talk) and ground, and the radio microphone audio and microphone ground leads. Like the other attachments to the computer, the RADIO MIC input should have a 1:1 transformer in line between it and the SPEAKER OUT of the computer. The PTT Line can either be connected to the relay on the board that places the PTT to ground when activated, or to other PTT systems that do not use a ground-going signal. The PTT can also be attached to the collector of the transistor (pin 2 of JP3), which produces a ground-going signal.

The link takes the audio from the radio and through a 0.1 µF capacitor and 100-kΩ resistor and sends it to the DTMF decoder through pin 2. The DTMF decoder takes the audio and transfers it into a digital code. After a TouchTone is recognized, digital signals are sent to the PIC chip from pins 11, 12, 13, 14 and 15. The PIC chip is programmed to communicate with the software, taking the decoded numbers and triggering the link to transmit or receive and to send voice messages in response to commands. The PIC Chip produces a high-going signal at pin 8, which switches transistor Q1 to ground and activates the DPDT relay (K1), which in turn activates the PTT. It also switches the radio's audio to a secondary radio audio line. The secondary audio line can only be used when the PTT is active and the station on the Internet is in transmit. In essence, if you have a secondary control frequency, it is then possible to disconnect the user if needed.

You'll notice that the board shown in Figure 3 uses two crystals rather than the ceramic resonators (Y1 and Y2) shown in the schematic. Most builders will discover that ceramic resonators are less expensive and easier to find. The choice is up to you. If you have the crystals at hand, you can use these as well. Note, however, that a crystal substituted for Y1 will also require 22 pF capacitors in parallel. See the revised schematic illustrating the crystal option on the Web at **www.ilinkboards.com**.

Other Options

Sample .wav files are produced when the SysOp software is downloaded and unzipped. Listen to them and use the sound recorder or other audio recorder software in the computer to create your own. It is not necessary to use all of them, but the *INFO.WAV* is more important than others. This IDs your station every 10 minutes. The ID, when played, doesn't interfere with the person talking. It inserts itself at the same time the audio of the person talking is buffered so that when the ID stops, the conversation is played in its entirety. The IWELCOME file, which has to be recorded in an 8-bit message format, should be no longer than 4 seconds. It identifies your station to the Internet station connecting to you. Other audio files that can be played are, disconnect, connect and no response.

The SysOp software also has the availability through TouchTone command to connect to random station by pressing 00 or to random repeaters by pressing 01. This is useful when you are mobile and do not know a repeater's access code. VK2JTP is maintaining a list of active I-Link repeaters that can be downloaded from his site at **www.qsl.net/vk2jtp**.

Conclusion

I-Link has been met with extreme excitement and pleasure as well as disdain and hatred. As with anything new and different, it is hard for people to accept change. Being a ham for almost 40 years, I have witnessed many technological transitions, all of which have been accompanied with a certain amount of angst. We are Amateur Radio operators who are also a part of the computer-Internet age. In order for us to survive we need to accept the technology, embrace and incorporate it in an effort to improve our hobby and the pleasure we obtain from it. We are communicators and whether we use the Internet as a backbone for RF communications or pure radio transmission, it is the pleasure of communicating with others, experimenting and performing public service that can be accomplished through this new mode of operation.

Have an open mind and try it. Worldwide crystal-clear communications through I-Link is on the horizon.

I would like to thank Graeme, M0CSH, for the effort he has put forth to develop and support the I-Link program. I would also like to thank Terry, G4CDY, for his tremendous assistance in helping to produce the printed circuit board and schematic diagram. Lastly, I would like to thank JoAnn Lupo for editing assistance.

Notes

[1]**www.qsl.net/vk2jtp**

[2]PC boards and kits can be purchased on line at **www.ilinkboards.com**.

Jim Millner, WB2REM, is a Child Psychologist who has been a licensed amateur for nearly 40 years. His Amateur Radio interest began at age 11 and he currently holds an Amateur Extra Class license. Jim is a published QST *author. His articles have included "A New Band for your Radio" (December 1996) and "The WB2REMote Link" (January 1995). Jim has also been published in* 73 Magazine *(September 1986) with an article titled "The Missing Link." He is active on CW, SSB, satellites and contesting.*

You can contact Jim at 7 Winnipeg Ln, Lawrenceville, NJ 08648; **wb2rem@amsat.org**.

FEEDBACK

◊ The existing APCO25 and Iridium systems mentioned in my recent Digital Voice articles ("Digital Voice: The Next New Mode?" Jan 2002 *QST*, pp 28-32, and "Digital Voice: An Update and Forecast," Feb 2002 *QST*, pp 38-41, respectively) actually use improved multi-band excitation (IMBE) coding, not advanced multi-band excitation (AMBE). The two coding systems are similar but not identical. Both are from Digital Voice Systems, Inc (**www.dvsinc.com**). Thanks Mike Somers, KT4QF.—*Doug Smith, KF6DX*

◊ There is an error in the parts list for "Updating the W1FB 80-Meter Sardine Sender" (Nov 2001 *QST*, p 55). The value of capacitors C6, C8, C9 and C12 should be 0.1 µF. —*Erik Westgard, NY9D*

◊ In Figure 1 of "A CW Generator and Audio Distribution System for Students" (Feb 2002 *QST*, p 63), the top input terminals of the eight op-amps (U3A through U6B) should be marked with a plus sign (non-inverting input terminal), and the bottom terminals should be marked with a negative sign (inverting input terminals). In addition, pins 5 and 6 are reversed in the op-amps shown in Figure 1.—*Bill Rynone*

By Jeff Hambleton, G4KIB/5B4YY/KF9BI

The Digital Escapades of ST0P in the Sudan

Sudan is one of the most sought-after DXCC entities—particularly on the digital modes. Pull out the atlas and enjoy the story of how PSK31 came to Sudan in June and July 2000, courtesy of G4KIB.

In Khartoum, where the White Nile runs into the Blue Nile, you feel a real sense of history. Little seems to have changed since 1885, when General Gordon was standing on his palace roof looking through his binoculars down the Nile for the reinforcements that finally came—two days after he had been killed in battle.

Waiting (and Waiting) for a License

On my first trips to Khartoum, like those reinforcements, I was unsuccessful. The bureaucratic obstacles proved to be too much and I had to return home without operating. I felt very disappointed but not discouraged. Like any serious ham, when I knew I was going to the Sudan to work, my order of priority was "Where can I get a license" followed by "Where can I get yellow fever jabs."

Finally my luck changed on a subsequent visit when I met Hassab, now ST2AA, at the Ministry of Road and Telecommunication. Hassab was the frequency manager, not the minister or other top official, but just mention Hassab's name in Khartoum and it was like saying "Open Sesame!" Hassab knew that there were Amateur Radio operators in Khartoum, especially Dr Sid, ST2SA, who had been operating since who knows when but Hassab said there were no procedures in place in the Sudan for issuing Amateur Radio licenses.

Hassab asked me if I would be willing to give a talk to some of his young associates at the ministry about Amateur Radio. Of course I agreed, although I am far from the teacher type, setting up a sked for two days hence.

I had *The ARRL Handbook* and *Antenna Book* CDs with me, so I was able to print up a few handouts. I set up my IC-746 and connected it to the HF antenna on top of the ministry building. I also had some very slow and intermittent Internet access to show a few pictures on the HZ1AB Web site.

The talk was supposed to last for half an hour but lasted a lot longer. All participants gave the impression they were interested as I talked about the international goodwill and self-training that come from Amateur Radio. I also addressed old-fashioned security concerns, stressing that nowadays the Internet was a much more likely medium for clandestine activities. Whether my talk was good

The ST0P antenna with the Khartoum sunset in the background.

The Largest Nation in Africa

The largest country in Africa in terms of geographic area, the Republic of the Sudan gained independence from the United Kingdom and Egypt in 1956. Only 5% of the land area is arable. Its population of about 36 million is made up of blacks (52%), Arabs (39%) and others (9%). Religions include Sunni Muslim (70%, mainly in the north), indigenous beliefs (25%) and Christian (5%, mostly in the south and in Khartoum). Agriculture accounts for 80% of the workforce. Because of a 20-year civil war, US officials at the US Embassy in Khartoum were relocated to the US embassies of nearby countries for security reasons in 1996.—*From the* World Factbook

or not, everyone was friendly and made me very welcome.

Back at the ministry, I was informed that my license application was being taken seriously, but no one had ever officially asked for an amateur license before and there were no procedures in place for issuing one. Again, I had to leave the country but on my next visit I was told that I still had a good chance of getting a license. However, it was still being considered by the council of ministers.

All in all, this process had taken nearly two years when my luck suddenly changed for the better. Hassab had just returned from the ITU conference in Istanbul. While there he had met some officials from the ARRL and had talked about Amateur Radio in the Sudan. The powers that be had agreed in principle to issuing Amateur Radio licenses and now Hassab only had to get the approval of the higher security echelons.

The License At Last

Finally the day arrived when I was called to Hassab's office to get my Sudan license. I had the same feeling inside as when I got my first G4 license in the UK back in 1979. I sat talking to Hassab while his secretary was busily typing a draft Amateur Radio license on a computer in the other office. The license had to have a serial number and I received 002 out of respect for Dr Sid who should rightfully have 001. Everyone at the ministry had heard of Dr Sid, who was a bit of a celebrity in Sudan as well as being famous as ST2SA throughout the global DX fraternity, having operated for over 20 years. "Dr Sid doesn't need a license," they said. On advice of the security authorities, my license was issued for only three months as a kind of trial period to be renewed after that.

The next thing was to agree on a call sign. At the time, being totally ignorant of the history of Sudanese Amateur Radio, I told Hassab that as Khartoum was the capital of Sudan, it would be appropriate if zero were used for the capital, then 1 to 9 could be used for other areas. I had no idea that zero had already been allocated for the old Southern Sudan, which used to be a separate state. This was no longer the case, but the world's DX databases still associate zero with Southern Sudan. Anyway, we agreed on ST0 and for a call sign, I chose ST0P. I soon found out after the e-mails started coming in that people thought I was in Southern Sudan. This may have upset the apple cart a little, but the DXCC Desk didn't seem to mind and accredited the operation.

Operating from Khartoum

I immediately rushed home to my house to erect my antennas. I installed a G5RV as a sloper on the roof of my two-story house with the apex about 5 meters above the flat roof. Additionally, I had a quad loop made by Walter Spieth, DK9SQ (see Figure 1). This consisted of a vertical 10-meter telescopic fiberglass mast with a horizontal member at the bottom. The whole thing magically collapses into a canvas bag the size of a small fishing rod and weighs only 1.5 kg (about 3½ pounds)—very easy to carry around and quick to erect.

The loop was much less susceptible to noise than the G5RV. I could often hear signals on the loop that were nonexistent on the G5RV, so the G5RV was used as a general-purpose antenna. Even though the loop could go down to 80 meters the mast had to be collapsed in order to open and connect a jumper, so the loop was kept on the higher bands.

At one point, the base of the mast was positioned on the grass lawn in between the house and a very large tree and guyed with tent pegs. The tree was home to 2 million birds, which used to twitter very loudly during dawn and dusk. At the same time every evening they would all stop twittering in an instant and then go to sleep for the night. We knew what they were twittering about—in the morning they would all be saying "Good morning, good morning, good morning…" until they had gone through the whole tree. In the evening it was almost the same "Good night, good night, good night…" —1,999,999 times each.

Figure 1—ST0P antennas in Khartoum. The DK9SQ loop is supported on a fiberglass pole—you can read more about this antenna at www.qsl.net/dk9sq/fibregle.htm.

Figure 2—The author sorts through some of the QSLs that resulted from his expedition.

PSK31 from Africa

The modes I used were SSB, PSK31 and a little CW. For PSK31, I used the SHARC Ezkit board by Analog Devices and the *MPSKWIQ* software from Mike, DL6IAK. (*MPSKWIQ* is available from **www.qsl.net/dl6iak/projects/mpskwiq.htm**.) When in QSO with Mike, we would start on BPSK but would soon switch to QPSK9 for much better performance.

The *MPSKWIQ* software was developed around the same time as Peter Martinez, G3PLX, was developing his sound card version. Although the sound card version is easier to get going and doesn't need a separate board, I personally like Mike's version better, especially the spectral display that enables you to see all the signals across a 4 kHz or 400 Hz frequency band. Take a look at the sample picture on the *MPSKWIQ* Web site. The spectral display shows both how narrow and frequency efficient the PSK31 signal really is—even compared to a CW signal.

Operating was a lot of fun, but as I hadn't operated for a long time, I was quite rusty at operating pileups at the start. With a little practice and advice from helpful hams, I was able to quickly improve my operating speeds. Usually after making a call or two, ST0P would flash up on the Internet DX clusters and an immediate pileup would ensue. Even though my techniques were far from perfect, I managed to scrape through.

Working pileups in PSK31 was a real education. I could clearly see the signals on the spectral display, choose a vacant spot and jump in. The first one or two

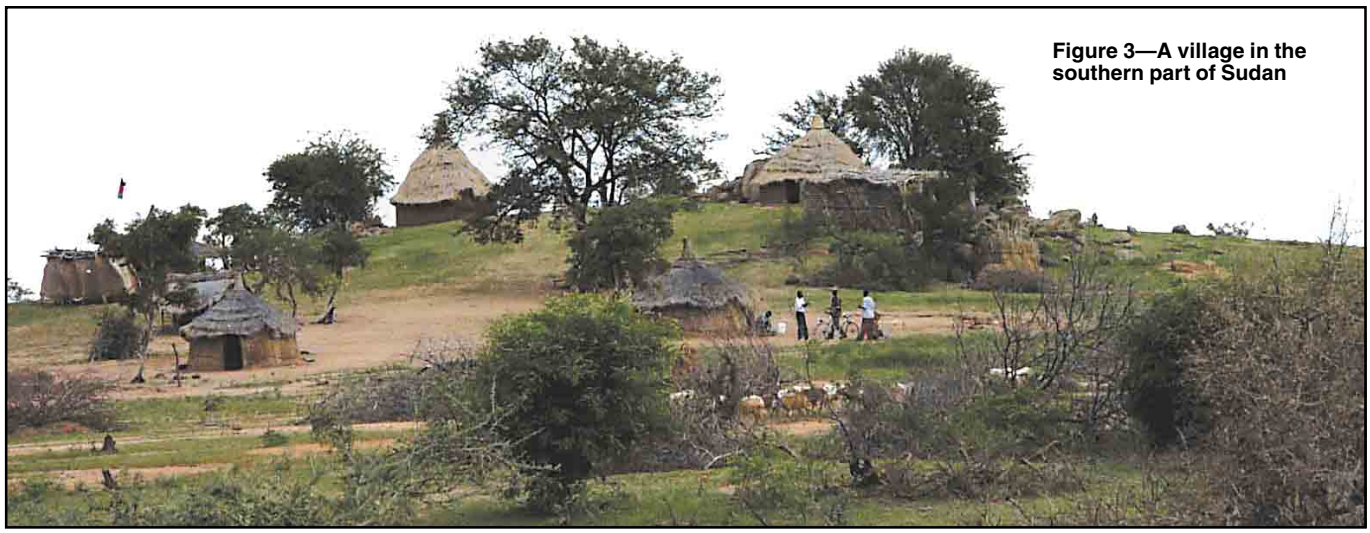


Figure 3—A village in the southern part of Sudan

Figure 4—Young guards the author encountered while traveling through Sudan.

QSOs would consist of the usual politenesses but after the cluster watchers saw ST0P, I would switch over to PUM (pileup mode).

In a pileup, PSK31 requires completely different operating practices from conventional digital modes. Too often, callers who were new to PSK31 or who had moved over from AMTOR and PACTOR would send their call too many times. I would usually get their call the first time and have to watch it be repeated again and again. By the time it was finished, I had already worked another two or three stations over the top of them.

I programmed the function keys with short phases, such as:

"UR RST…"

"QTH Khartoum—Sudan"

"QSL to 5B4YY" and

"http://www.qsl.net/st0p"

Unfortunately, not every caller had the idea that small is beautiful. Some people would endeavor to send the full contents of their 20-GB hard drive for my knowledge and true delight. Due to propagation peculiarities, I found I could send QRZ over the top of an incoming data stream and work other stations while the data was coming in.

I feel sure that G3PLX never intended PSK31 to be used to send data streams as there are other modes much better suited. Rather, PSK31 should be used for general chitchat with the possibility of breakins by other hams.

A copy of my log can be seen on **www.qsl.net/st0p** consisting of 1225 QSOs—about 1000 SSB, 160 PSK31 and 10 CW. The SSB QSO rate was much greater than the PSK31 rate and in my case a lot faster than CW, especially in pileup conditions. As many people joined the pileup in order to get a new entity for DXCC, I wanted to work as many stations as possible. At the same time I wanted to work some PSK31 QSOs—some of the first ever from Sudan. As you can see from Figure 2, the desire for a Sudanese QSL is high. All QSOs have been sent QSL cards either direct or via the bureau.

Amateur Radio in Sudan

Since my license was issued, I see that Hassab is now issuing more licenses. Interested hams can view the new Sudan Amateur Radio Association (SARA) Web page at **www.sudanham.bizland.com.**

This is very encouraging because Sudan is an emerging country. Where Amateur Radio may be competing in many countries with the Internet, Sudan has a lot of room to expand. It should be remembered, however, that Amateur Radio equipment is not available and is out of reach of most, even salaried workers, and especially young people such as Boy Scouts. For this reason, I wish to personally appeal to make a donation of radio equipment to Dr Sid of SARA.

A closing thought: If only General Gordon, standing surrounded on his palace roof, could have sent London a message via PSK31, how history would have changed!

The author was first licensed in 1979 as G4KIB. He was a member of HZ1AB from 1987 to 1995 where under the influence of his many American friends, became KF9BI. Since 1995 he has been based in Thailand, although for the last three years has been on assignment in Germany where he met his good friend and mentor DL6IAK. He is a life member of the Radio Society of Thailand (RAST), although SK there due to licensing restrictions. His main QTH is in the southwestern part of the island of Cyprus as 5B4YY, where he has operated several contests with friends from all over the world. Jeff is honored to be a member of SARA, the Sudanese Amateur Radio Association.The author can be reached at Hauptstr 80, D76889 Karlsdorf-Neuthard, Germany; **jeff@hambleton.com**.

All photos by the author.

By Jerry Boyd, WB8WFK, and Brian Mileshosky, N5ZGT

2001 USA Direction Finding Championships

A flavor of transmitter hunting, ARDF tests not only your DFing skills, but also your mental and physical abilities. Last year's Championships near Albuquerque, the first to be held in the US, drew competitors from this country and around the world.

Left at a holding area with their equipment impounded, the competitors are permitted to head to the start line two at a time. They are given their direction finding gear and an orienteering map of the undisclosed lay of land they have been driven to. Their challenge: locate up to five transmitters hidden before them. After a quick rundown of rules to follow, a "good luck!" and a chance to ask questions, they nervously and anxiously hear, "five, four, three, two, one!" and the blow of a horn. The competitors of the first-ever ARDF Championship hosted in the United States are off to locate the transmitters, hopefully faster than anyone else in their respective age categories!

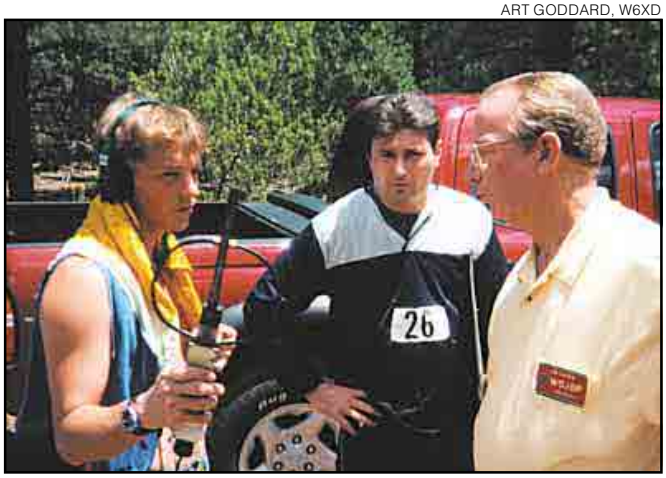
The Event Convenes

Last July 31-August 4 the members of the Albuquerque Amateur Radio Club (AARC) and Albuquerque Transmitter Hunters proudly hosted the 2001 USA ARDF Championships[1] at Manzano State Park, 60 miles southeast of Albuquerque, New Mexico. Thirty-two radio direction finding enthusiasts, both new and experienced, from around the United States and from Ukraine, Australia and China enthusiastically participated to meet new friends, sharpen their direction finding skills, and place competitively in this truly international event. ARRL President Jim Haynie, W5JBP, was present as the event's special guest, as were Art Goddard, W6XD (Southwestern Division Vice Director), Joe Knight, W5PDY (New Mexico Section Manager) and Joe Moell, K0OV (ARRL ARDF Coordinator). Officials from the Chinese Radio Sports Association (CRSA) were also present.[2]

ARDF is a particular flavor of transmitter hunting, in which five transmitters are hidden in an area, each transmitting sequentially for a minute on the same frequency. Rather than looking for these transmitters by driving around, as is done in traditional T-hunting, this event takes place only on foot, and on both 2 meters and 80 meters (separately). Competitors are placed in age categories that stipulate how many of the five transmitters they are required to find. Only a few at a time, they are started at a common start point with only their DF equipment, a compass, a furnished orienteering map, an official control card and other personal items like water and a snack. Once the clock begins, they are to find the transmitters through map and compass as well

[1]Notes appear on page 49.

ART GODDARD, W6XD



Serhiy Zarubin (left), Csaba Tiszttarto and ARRL President Jim Haynie, W5JBP, discuss 80-meter hunting techniques before the start of the 80-meter event.

JOE RIGGS, AB5YC

Dave D'Epagnier, K0QE, shows it isn't easy to run through the mountains looking for five transmitters, but it sure is a bunch of fun!

as their direction finding skills. Their goal is to cross a common finish line as soon as they possibly can.

Attached to each transmitter is an orienteering punch that marks the competitor's control card, each with a unique hole pattern, as proof that they did indeed find each transmitter. Not finding the required number of transmitters or spending too much time on the field than is allowed (three hours in the case of the 2001 Championships) will penalize or even disqualify the competitor. No transmitting equipment, instant photography equipment or additional navigation aids other than a compass are allowed to be on the field with the competitor to prevent anyone from gaining an unfair advantage. ARDF is truly a fun and competitive event that tests not only your DFing skills but also your physical and mental abilities!

The Games Begin

The event began July 31 with check-in at the University of New Mexico, where the competitors were being housed and fed. Following check-in, the participants were able to meet one another, socialize, show off their equipment and relax to help acclimate themselves to being more than a mile above sea level. The actual site of the event was approximately 7000 feet ASL, and many of the competitors were coming from almost sea level. This acclimatization was a must, especially since the hidden transmitters could be anywhere in a 4-square-mile area designated as inbounds.

On August 1, the competitors received a warm welcome from Mike Eaton, K5MJE (AARC President) and Jerry Boyd, WB8WFK (Championships chairman) at the opening ceremony. They also learned the event rules and procedures, and attended safety briefings addressing possible hazards in the forested event site, such as dehydration, bears (a mom and two cubs were spotted by competitors on the field) and possible adverse weather. Following the ceremony, the order in which each competitor was to start for both the 2-meter event and the 80-meter event was determined via lottery. Training sessions and a practice hunt on the UNM campus awaited everyone to round off the day before the competitions were actually to begin!

The following morning, the competitors took a shuttle bus that delivered them to the still-undisclosed site, Manzano State Park, for the 2-meter competition. First stop was a holding area, where competitors were given energy snacks and drinks. Their direction finding equipment was impounded by the event officials un-

JOE RIGGS, AB5YC

Hou Huimin, a member of CRSA, carefully scouts the mountainside for one of the 2-meter transmitters.

JOE RIGGS, AB5YC

Robert Frey, WA6EZV, runs through the woods searching for the 2-meter transmitters.

2001 USA ARDF Championships
Control Card

BIB Number:_____ Category:_____

NOTE: Transmitter that is not required is marked out with an X.

MOE	MOI	MOS	MOH	MO5
1	2	3	4	5

Each competitor was given a control card that was used to prove they did indeed find all of the required transmitters. Each transmitter had an orienteering punch that made a unique hole pattern on the control card.

ART GODDARD, W6XD

2001 USA ARDF Championships medalists.

Gold Medalists by Event and Age Category

2-Meter Overall
M60: Harley Leach, KI7XF (USA)
M50: Dick Arnett, WB4SUV (USA)
M40: Dale Hunt, WB6BYU (USA)
M21: Volodymyr Griedov (Ukraine)
M19: Jay Thompson, W6JAY (USA)

2-Meter USA Only
M60: Harley Leach, KI7XF
M50: Dick Arnett, WB4SUV
M40: Dale Hunt, WB6BYU
M21: Gyuri Nagy, KF6YKN
M19: Jay Thompson, W6JAY

80-Meter Overall
M60: Harley Leach, KI7XF (USA)
M50: Hou Huimin (China)
M40: Dale Hunt, WB6BYU (USA)
M21: Serhiy Zarubin (Ukraine)
M19: Jay Thompson, W6JAY (USA)

80-Meter USA Only
M60: Harley Leach, KI7XF
M50: Dick Arnett, WB4SUV
M40: Dale Hunt, WB6BYU
M21: Gyuri Nagy, KF6YKN
M19: Jay Thompson, W6JAY

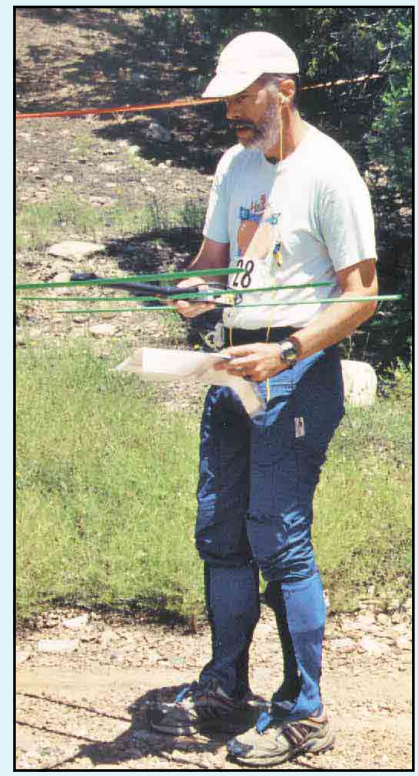
More ARDF Action in 2002—USA and World Championships

If you missed the foxhunting fun in Albuquerque last summer, your second chance is coming soon. Georgia Orienteering club is hosting the Second ARDF/Radio-Orienteering Championships, April 19-21, 2002. The action will take place at F.D. Roosevelt State Park near Pine Mountain, about 90 minutes southwest of Atlanta.

The competition gets under way on Friday afternoon with a practice event, followed on Saturday by the main two-meter hunt and on Sunday by the 80-meter hunt. In addition to the hunts, there will be a cookout on Friday evening, a spaghetti dinner on Saturday night, and an award ceremony following the 80-meter hunt, all included in the registration fee.

As in Albuquerque, the Championships in Georgia are open to anyone, from beginner to expert. Competitors will be placed in age/gender categories, with awards for first/second/third place in each category. Foreign visitors are welcome. Awards will be presented in two divisions, Overall and USA-Only.

Laurie Searle, KG4FDM, of GAOC is the Meet Director. Sam Smith, N4MAP, will set the ARDF courses. Lodging options include cabins in the park and campgrounds with RV hookups. There are also many local motels and bed-and-breakfast inns.



JOE MOELL, K0OV

Sam Smith, N4MAP, who will be setting the courses for the 2002 USA Championships in Georgia.

Go to GAOC's Championships Web site, **www.mindspring.com~sam.smith/gaoc/Radio-O/Radio.htm** for the official event flyer, rules and registration forms.

ARDF is a worldwide radio-sport, organized by committees of the International Amateur Radio Union (IARU). There are regular competitions in over 30 countries around the globe. Every two years, one country hosts the ARDF World Championships (WCs). In 2000 they were in Nanjing, China[3] with a dozen US participants on hand. This year's WCs are being hosted by the Slovak Amateur Radio Association September 2-7. The site is Tatranske Matliare, in the High Tatras of the Slovak Republic.

ARDF Team USA 2002 is now forming and training for the WCs. Team selection is based primarily on performances at the USA Championships in New Mexico and Georgia. If you wish to compete in Slovakia this year, register now for the Georgia Championships and visit my "Homing In" Web site, **www.homingin.com** for the latest information on ARDF Team USA membership and travel arrangements.—*Joe Moell, K0OV, ARRL ARDF Coordinator,* **homingin@aol.com**.

til it was their turn to begin. Two competitors were set up, given their maps and launched into the field every five minutes to find the transmitters. This served to spread out the 32 competitors and keep the job of time-keeping manageable. The event officials and volunteers held three separate 2-meter nets for coordination, time-keeping and any needed emergency traffic. The 2-meter event ended successfully and the competitors were shuttled back to Albuquerque just before monsoon-like rains settled in.

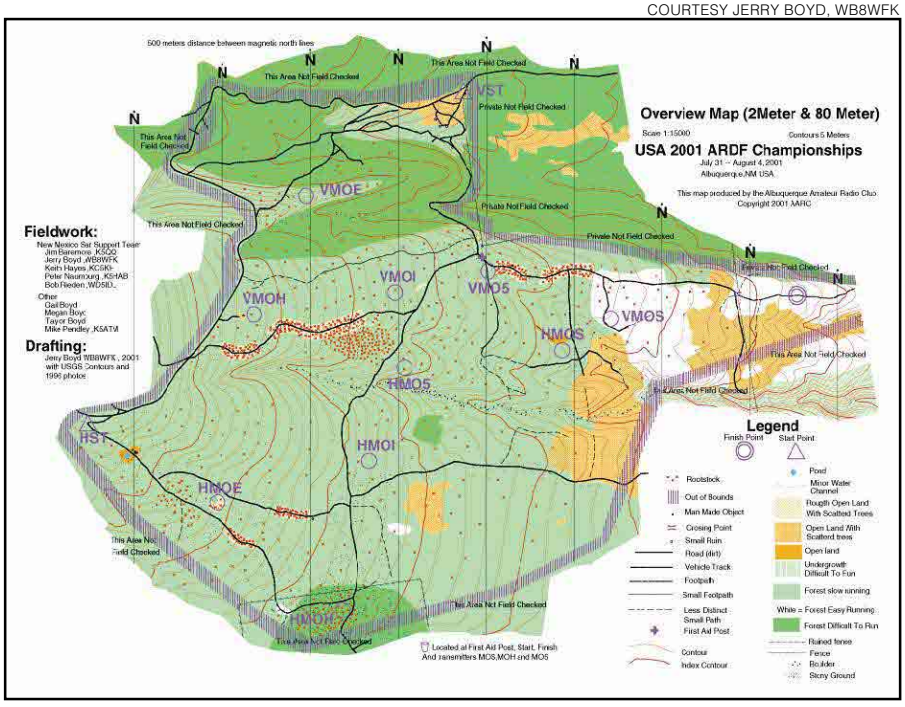
On the morning of August 3, the competitors followed the same routine as before, and were again shuttled to Manzano State Park, this time for the 80-meter event. Each participant followed the same procedure as before, but were given maps for a completely different lay of land than the 2-meter event. Direction finding on 80 meters is quite interesting, as there is no multi-path during the course of the hunt, though it is just as difficult.

Field Support Proves Useful

Field marshals were scattered throughout the event site to keep an eye on rule compliance as well as any safety issues. Members of New Mexico Search and Rescue Support and Albuquerque Mountain Rescue were also on hand to provide medical assistance if needed. This support proved to be useful on a few occasions, including the incident where one of the competitors became disoriented and lost. He was found two miles outside of the in-bounds area a few hours after the timekeepers noticed he had not returned after three hours. After being given a clean bill of health, he later rejoined his team members.

The closing ceremonies and awards banquet was held the evening of the 80-meter event back at the university. Following the New Mexican buffet dinner, all of the competitors who placed first, second and third in each of the age categories for the 2-meter and 80-meter events were given gold, silver and bronze metals, respectively. Congratulations to all of those who placed! To end the memorable evening, the event chairman, Jerry Boyd, WB8WFK, was presented with a framed orienteering map of the combined 2-meter and 80-meter event sites showing the location of each transmitter. It was signed by all of the participants, volunteers, guests and planning committee members. The 2001 USA ARDF Championships was then declared closed, and each of the participants was bid farewell.

COURTESY JERRY BOYD, WB8WFK



This is the complete orienteering map showing both the 2-meter and 80-meter fields with all transmitters denoted. Each participant was given a copy as a souvenir at the banquet.

Next: Atlanta in April

Many people are responsible for the overwhelming success of this event. First and foremost, the participants. Thank you for coming to Albuquerque! We were honored to host the event for you. Next, we wish to thank each of our sponsors: the Albuquerque Amateur Radio Club, the members of the Albuquerque Transmitter Hunters, the ARRL for supporting us through the Colvin Memorial Fund, the Upper Rio FM Society, RadComm Radio, Bird Electronic Company, and Electronic Parts of Albuquerque. Without their generous donation of funds, equipment and time, this event would not have been possible. Equally as important are all of the volunteers (too many to mention), New Mexico SAR Support and Albuquerque Mountain Rescue. The event planning committee was made up of Mike Eaton, K5MJE, John Eldridge, KB5ENN, Brian Mileshosky, N5ZGT, Mike Pendley, K5ATM and Scott Stevenson, KC5VVB. It was led by Jerry Boyd, WB8WFK, who was responsible for approaching the team over a year ago with, "Hey, I've got a neat idea I'd like your help with."

We encourage T-hunting groups across the United States to continue promoting the art of direction finding to their communities. Unknown to many, youngsters absolutely love transmitter hunting, so use it as a tool to get more youth into our hobby. The good thing about this aspect of Amateur Radio is that no license is required to find hidden transmitters, as the participant is only receiving, and not transmitting. The Albuquerque Transmitter Hunters are more than happy to pass along advice and ideas to help your ARDF or T-Hunting group grow and promote itself to others, young and old. Do not hesitate to contact us if you have any questions.[4]

See everyone in Atlanta!

Jerry Boyd, WB8WFK, who was first licensed in 1976 and holds an Amateur Extra license, served as chairman of the 2001 USA ARDF championships. Active in the New Mexico search and rescue support team (his specialization is locating aircraft ELT transmitters), Jerry also enjoys designing his own radio direction-finding equipment and is an active T-hunter. He is currently a senior member of the engineering staff at Sandia Natonal Laboratories. He can be reached at **wb8wfk@worldnet.att.net**.

Brian Mileshosky, N5ZGT, is a senior in electrical engineering at the University of New Mexico, and writes the Youth@Ham Radio column for ARRLWeb Extra. Brian welcomes visitors to his Web site at **www.swcp.com/~n5zgt**. *He may be reached at* **n5zgt@arrl.net**.

Notes

[1]For more information, and many pictures from the event, visit the official 2001 USA ARDF Championships Web site at **www.yahoogroups.com/files/abqardf/web/index.html**.

[2]See Note 1.

[3]Joe Moell, "Amateur Radio Direction Finding: USA Holds Its First National Championships," *QST*, May 2001, p 57.

[4]For more information about the Albuquerque Transmitter Hunters, visit their official Web site at **home.att.net/~wb8wfk/**. QST

NEW PRODUCTS

CUSTOM RADIO COVERS

◊ Preserve the appearance of your equipment with custom-made dust covers. The covers are constructed of your

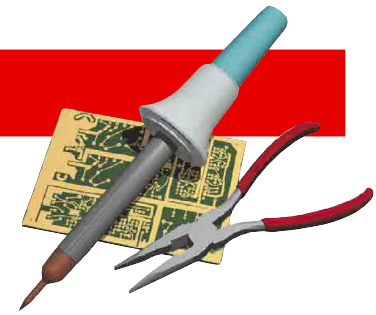
choice of materials and borders. Call signs can also be embroidered on the front of each cover ($2 additional per character). All seams are sewn for strength and durability. Costs range from $6 for small radio covers, to $30 for larger amplifier covers. For more information send a self-addressed, stamped envelope to Judy Vermeer, K0IDS, PO Box 74, Leighton, IA 50143. You can contact her by e-mail at **nn0c@iowatelecom.net**, or see the Web site at **mtmfriends.homestead.com/Custom.html**.

NEW AM-COM AUTOMATIC SCREWDRIVER ANTENNA CONTROLLER

◊ Am-Com has introduced an automatic controller for screwdriver antennas. With most modern mobile transceivers, it is just a matter of pressing the TUNE button and the screwdriver antenna goes to resonance and stops. Change frequency and the controller will retune the antenna

automatically. The Am-Com controller works with the High Sierra antenna, other full size screwdrivers and even the Yaesu ATAS-100. Cabling and control head are provided. No antenna or radio modification is required. Price: $209.95. Contact Am-Com, 100 Bierney Creek Rd, Lakeside, MT 59922; tel 888-803-5823; **www.amcominc.com**.

Next New Products QST



The Doctor is IN

Q Scott McNutt, N3ADP (smcnutt@monmouth.com), of Perrineville, New Jersey, writes: I have two different antennas for AO-27 and OSCAR 14: one for the 2-meter uplink and one for the 70-cm downlink. I'd like to use these with my new transceiver that has only a single antenna jack. What's the best way to accomplish this?

A What you need is a 2-meter/440 MHz diplexer—a little box with one connector on one side and two on the other, and some filters inside. They are made by Diamond and several other antenna manufacturers, are sold at most ham radio stores such as AES and sell for $35-$50 depending on the brand and retailer.

Q Scott H. Schau, N0NAB (scotschau@worldnet.att.net), of Prairie Village, Kansas, writes: Is there a way to listen to shortwave broadcasts/live HF ham radio on the Internet? If so, what are the sites?

A Yes, radio can be "broadcast" over the Internet. If you are using a PC with Windows, you already have a "window" onto the world. Open Windows Media Player (this is located at Start/Programs/Accessories/Entertainment). Click on Radio Tuner on the left hand side. Now, depending on the Version of Windows/Media Player, use the Station Finder to locate the type of commercial listening you want—these stations are from all around the world.

For ham radio "broadcast" on the Internet, check out the TIS Internet Ham Radio page: **www.arrl.org/tis/info/internet.html**

In addition, using your Web browser and a search engine such as Google (**www.google.com/**) you can find more. Some examples:

windowsmedia.com/radiotuner/default.asp
www.virtualtuner.com/
www.rac.ca/swl.htm

Q Dick Keller, KF4NS, of St Petersburg, Florida, writes: I have one wish for the new year. After extensive searching I cannot come up with a decent electronic component identifier. I just returned a book that was nothing but a manufacturers' phone directory. It did nothing but tell you who made an item based on the stamped labeling on it.

I wish someone would write a book that explains all the different components and what they look like as well as their recommended application. Take for example the capacitor; there are so many I can't remember them all. You have the electrolytic, the vacuum variable, the ceramic, the mica, feedthrough, etc, etc, etc. Resistors that I remember were all carbon or wirewound. If you look at a catalog like Newark, it blows your mind trying to differentiate the many types. Diodes are also a problem. There are so many, I can't determine which one is for what.

I am restoring some old (of course age is relative) tube rigs and would like to substitute state of the art components for resistors, capacitors and diodes. If you know of a book that will help me identify the components to use, please let me know.

A At first, we were at a loss and unaware of any one-stop book that goes into any detail on what specific component variety is good for a specific type of radio. You can usually glean this information from publications or articles on "How to"... build, design, restore, refurbish, etc, a variety of radio gear or test apparatus...

On component specifics, Chapter 10 in the current *ARRL Handbook* discusses the behavior of various components across wide ranges of frequency and temperature, and could give you a general idea of how to approach a given circuit. The rest of the *Handbook* has projects galore that list specific component types fitted to the application addressed by the specific project.

Other than that, the selection of, say, a metal film resistor for high stability and tolerance versus the older and more familiar carbon film, composition, or wire wound variety is a decision that one could make based on studying and comparing the manufacturer's technical data sheets on the particular series of resistor, capacitor, inductor, etc, of interest.

There are, however, so many unexpected performance possibilities (and "exceptions to the rule") for such components in the actual applications in which they might be used. You almost always need to consider the specific circuit or project at hand, and the environment in which it must perform...

I've personally found that reading specific articles on, for example, amplifier construction, to be most insightful from others more knowledgeable and experienced than I on the subject. Often, they've done the grunt work of trial and error and can save you a lot of headaches!

If reading others' experiences or preferences does not fully answer your questions as a designer or restorer for a given area of interest, you can always experiment after viewing specific data sheets, performance curves, etc, provided by the component manufacturer. If you have access to the world wide web via your computer, you can also find a lot of useful information by doing component or subject-specific searches. The results—you must often review them considerably to find the exact area of relevance—are still mighty fast as compared to visiting a research library, for example.

A caveat (caution) to you according to one colleague regarding older radio component and wiring "layout": Typically, in older gear, the component size and wiring layout is such that there can be considerable interaction between stages/sections that is considered normal for proceeding with alignment at the factory when the gear was new. Altering the physical makeup or general interconnection/wiring layout as can occur with newer, smaller (or larger), different shaped components, etc., even with the best of restorative intentions, can change the operating characteristics of the circuit to varying degrees.

Nonetheless, regarding sourcing some guidance in the subject area you mentioned, try this: Go to **www.google.com** (an excellent search engine). Once there, in the search box, type in "Selection and Application of Electronic Components." Many of the first 10 (of approximately 418,000!) results appear quite relevant in the way of publications (Wiley, etc) that address the specific area of your interest.

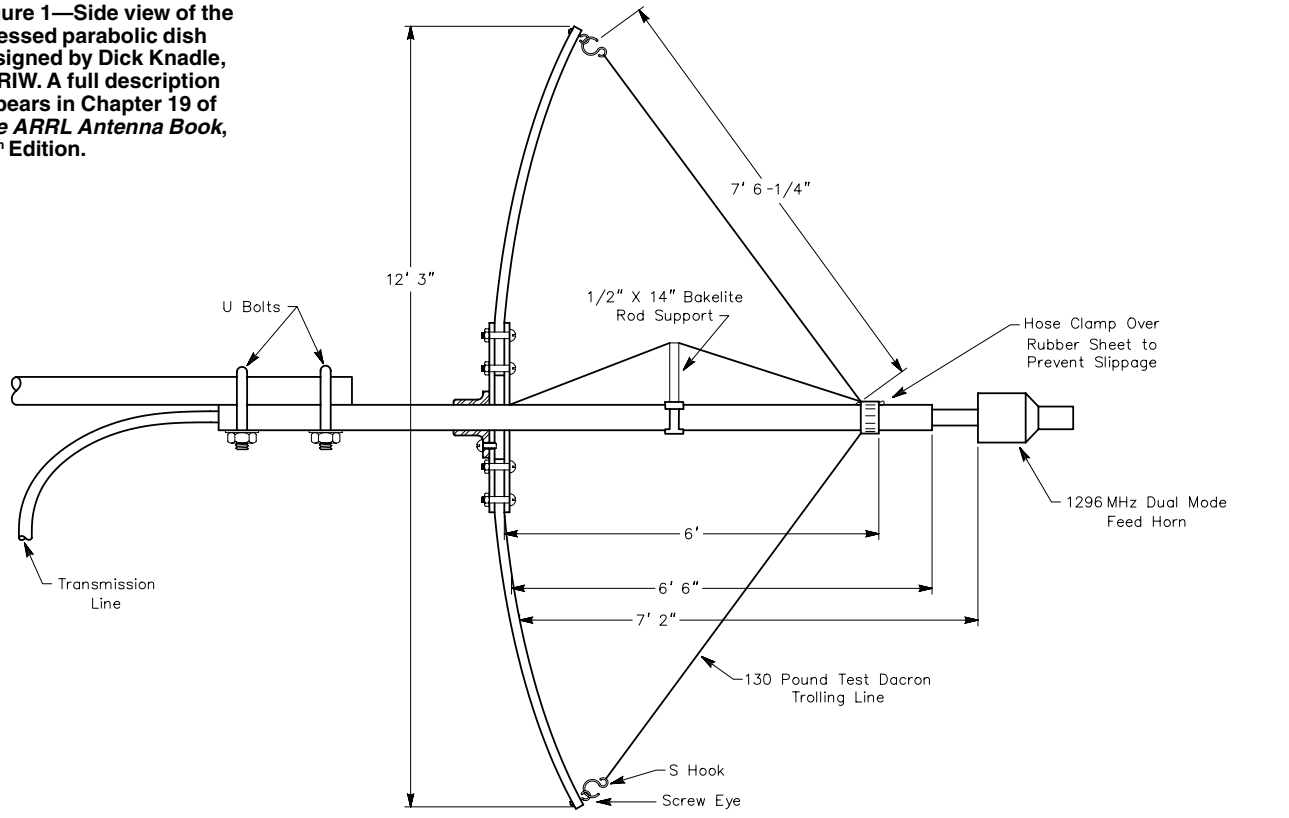


Figure 1—Side view of the stressed parabolic dish designed by Dick Knadle, K2RIW. A full description appears in Chapter 19 of *The ARRL Antenna Book*, 19th Edition.

I hope this helps you out, Dick. As a fellow homebrewer/restorer, it always helps to know a fair amount about the planned replacement component, as "trial and error" can be a tedious and frustrating experience.

Q Jim, K4UHL (k4uhl@aol.com), of N Augusta, South Carolina, writes: I am just getting together a station for AO-40 and have been interested in what I could find about building a dish antenna to receive the 1.2 GHz downlink. In my part of the country, there are many 10-foot satellite dish systems that can be had simply by taking it off the owner's hands. Can they be used for 1.2 GHz and do you recommend them? What modification would be necessary and where could I find info about converting them to ham use?

A Sorry, but there is no 1.2 GHz downlink, as there is no allocation for the satellite to transmit on 1.2 GHz. There is a 1.2 GHz uplink—you can transmit to the satellite on 1.2 GHz.

We don't recommend a 10 foot dish for AO-40—the beamwidth is just 5 degrees. However, if you can figure a cheap and easy way of tracking the satellite with such a big antenna, I'm sure many *QST* readers would like to see an article.

One possibility is to just use the central portion of the dish. This has the advantage of increasing the focal point distance to dish diameter so that simpler feed systems work reasonably well. However, you can run into problems with the dish not being accurate—some dishes are only accurate at the outer surfaces, which provide most of the gain. *The ARRL Antenna Book* is a very good reference on antennas—particularly the information written by Dick Knadle, K2RIW. See Figure 1.

Q George Trujillo, K0EZX (k0ezx@juno.com), of Jefferson, Colorado, writes: I have purchased a G5RV antenna, and I am trying to figure out an optimum installation. I have been told by fellow hams that best performance is an install of an inverted V, but I am not aware of how many degrees to form the inverted V. Also, does a flattop install better than a "V," and how about height above ground level?

A The original G5RV designed by Lou Varney is the flat-top dipole configuration. The optimum (flat-top or inverted V) would depend on the effect you are trying to achieve. There's a discussion of this subject on pages 7-3 to 7-5 of *The ARRL Antenna Book*, 19th Edition.

Height above ground also depends. If you intend to use it as a 20 meter antenna (its original purpose), then 33 feet would be good. If you intend to use it as a multiband antenna (as most people do), then 60+ feet to accommodate 40 meters would be nice.

Q Rod Vlach, NN0TT, writes: When operating split on the same band, is there any advantage to "split mode" versus "XIT" (Transmit Incremental Tuning)? My rig has XIT of ±10 kHz, and I use it almost exclusively in pileups. It is quicker and easier than initiating split mode. The only advantage I can see in split mode is if I would need more range (more than 10 kHz).

A Well, on many radios, XIT/RIT and split operation can be used to accomplish the same thing, so it really depends on your radio's features and your operating preferences. I often use XIT if the pileup is small and the DX station is listening up a few kilohertz. If he's listening over a wide range, and I want to find the stations he is working, I often find split operation more convenient. In either case, be sure you understand exactly where you are transmitting so you don't interfere with the DX station or other users of the band.

Do you have a question or a problem? Ask the Doctor! Send your questions (no telephone calls, please) to: "The Doctor," ARRL, 225 Main St, Newington, CT 06111; doctor@arrl.org; www.arrl.org/tis/. Add your comments: "The Doctor is On-line" at www.arrl.org/members-only/qst/doctor/. QST

By Ron Skelton, W6WO and George Heron, N2APB

Enhance Your PSK31 Warbling Experience

Here's a super accessory for the ubiquitous 80-meter "Warbler" rigs, Small Wonder Labs PSK31 transceivers, or any other low-power radio.

One of the banes of PSK31 operating is the overdriven transceiver. Many PSK31 users adjust the audio output from their computer sound cards until they see ALC limiting on their transceiver displays, then they decrease the output just until limiting ceases. While this approach produces a reasonably clean signal much of the time, it isn't foolproof. And what do you do if you're using a QRP PSK31 transceiver that doesn't provide RF or ALC metering? (This is true of the popular rigs such as the 80-meter QRP Warbler.[1])

Without some sort of indicator it is difficult to know if your radio is transmitting at all ("did I click the RX button in *DigiPan*?"), or if you left your sound card's volume control at the blasting level from the last time you were playing Linda Ronstadt's "Blue Bayou" through the computer's multimedia speakers.

[1]Notes appear on page 54.

Don't Splatter that Signal!

It is critically important to have the correct drive level on the audio tones going to your transceiver to ensure that you do not overmodulate and inadvertently present a much wider signal on the band than necessary. Conversely, if you are using a transceiver like a Warbler that lacks indicators, it's important

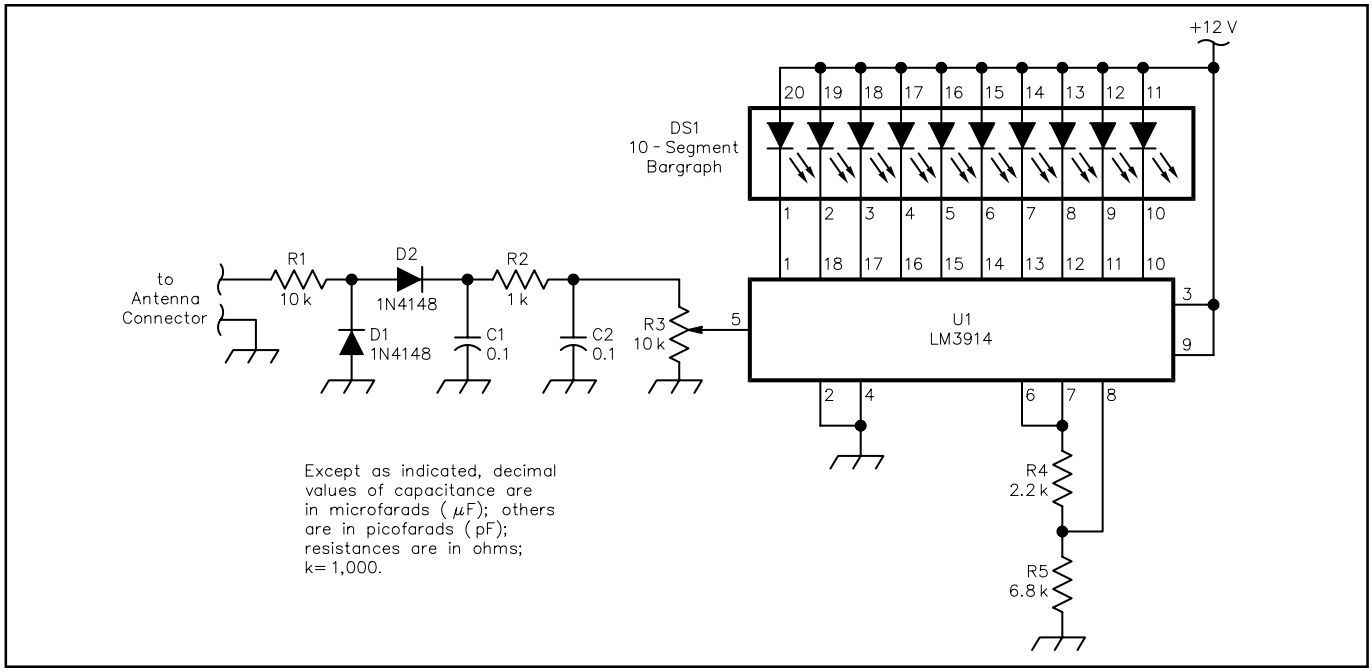
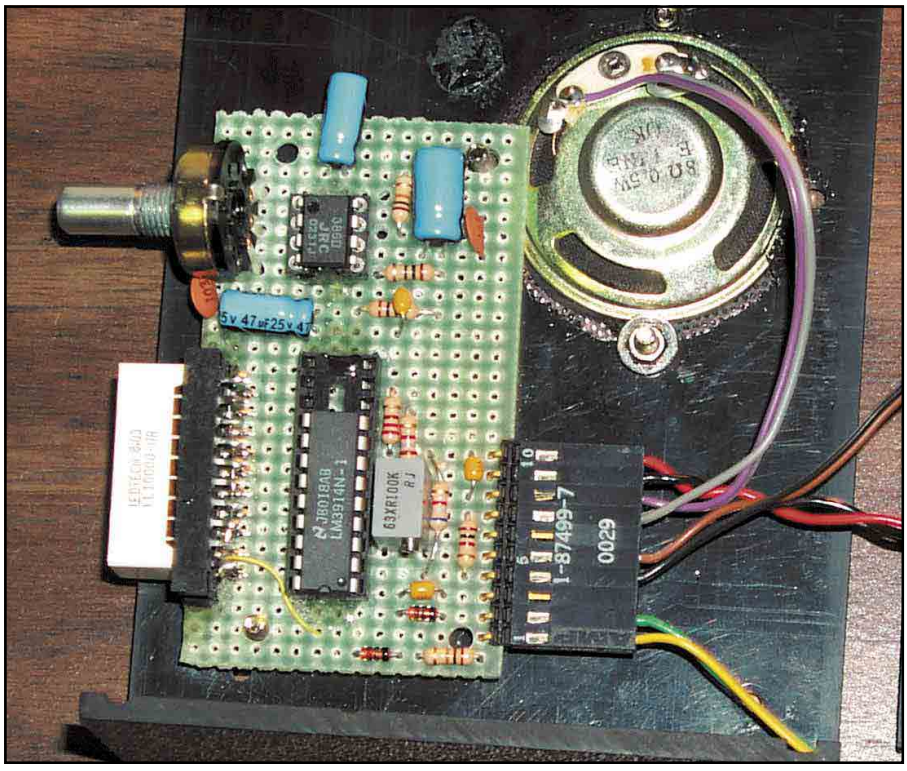


Figure 1—Schematic of the RF Power Indicator. All resistors are 1/4-W, 5% tolerance carbon-composition units. Part numbers in parentheses are from Mouser Electronics (www.mouser.com). Equivalent parts can be substituted.

C1, C2—0.1 μF ceramic disk capacitor (21RX310).
D1, D2—1N4148 silicon diode (512-4148).
DS1—Bargraph array (512-MV59164).
R1—10 kΩ (291-10).
R2—1 kΩ (291-1K).
R3—10 kΩ potentiometer (31CQ401).
R4—2.2 kΩ (291-2.2K).
R5—6.8 kΩ (291-6.8K).
U1—LM3914 dot/bargraph driver (526-NTE1508).



This is a close-up view of the power indicator and audio amp circuits. Note the bargraph array and the volume control extending past the edge of the unit. When the front panel is in place, these components protrude from the holes in the panel to form an attractive front presentation of the unit.

to make sure you're getting as much of the available power output as possible.

This project will help you do just that in a flashy way. Although it is designed for use specifically with the Warbler, you can adapt it for other radios.

The LM3914 used in the circuit in Figure 1 is a dot/bar display driver chip that senses analog voltage levels and drives up to 10 LEDs to provide a linear analog display. The chip contains its own adjustable reference and accurate 10-step voltage divider. When a voltage is presented at the input pin, the corresponding "level" is indicated in its output pins to cause an LED bar graph array to operate like a level meter. This display technique is similar to the way an LED VU meter operates on your stereo amplifier system. For example, when full-scale voltage is applied on the input pin, all LEDs are illuminated; when a half-scale voltage is sensed, the leftmost five LEDs are illuminated; and when only a small voltage level is sensed, the single LED on the left is illuminated.

This IC has been used in other QRP projects as a battery voltage indicator. This time, however, we begin by sampling the RF signal being produced by the radio. In the case of the Warbler, a short two-wire cable tacked onto either side of capacitor C12 does the job; for other rigs a single wire wrapped around the coax at the antenna output should work. The sampled RF is rectified and filtered to produce a dc voltage, and this voltage in turn is applied to the input of the LM3914. The internal analog comparators of the LM3914 sense this voltage and illuminate a corresponding number of LEDs connected to its output pins.

In order to calibrate this RF power indicator circuit, adjust your computer sound card output until it drives the radio to the highest output *while still maintaining a clean signal*. Check your signal by obtaining on-air reports, or by monitoring with a second receiver.

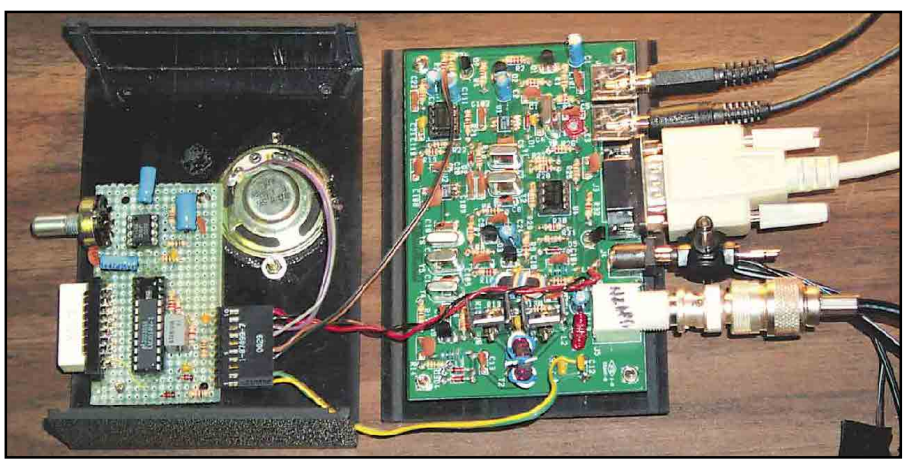
Set the trim pot (R3) to indicate about "6 LEDs" of output. Setting it up in this way allows you to see at a glance that you have the proper sound card setting. If you want to back off the power, you can easily do so by adjusting the computer's volume control and watching the bargraph array while transmitting. And if you jump on the radio right after playing some tunes and see 7 or even 10 glowing LEDs, it's a powerful reminder to reduce your audio output!

If you don't want to use a bargraph array, individual LEDs would also work fine. Alternatively, you could get even fancier and use a multicolored 10-element bargraph array. One LED segment could indicate when PTT is activated, while the remaining LEDs indicate the power output. There are lots of display possibilities. For more information about the LM3914, see the data sheet referenced in Note 2 at the end of this article.

Listening to PSK31

The Warbler doesn't need a speaker output. After all, it's only important for your computer to hear the audio, not you. However, it is still pleasant to be able to hear the PSK31 signals present in the transceiver's 1.5 kHz passband.

You can add a little audio amplifier to your Warbler by using the LM386 audio amplifier circuit shown in Figure 2,



The ABS plastic enclosure comes apart easily by bending the sides outward, yielding an overall view of the internal layout. The power indicator and audio amp circuits are mounted on the inside of the top cover along with the speaker. The Warbler is the board on the right, showing the cabling for power, antenna (the yellow and green cable) and connection to the computer.

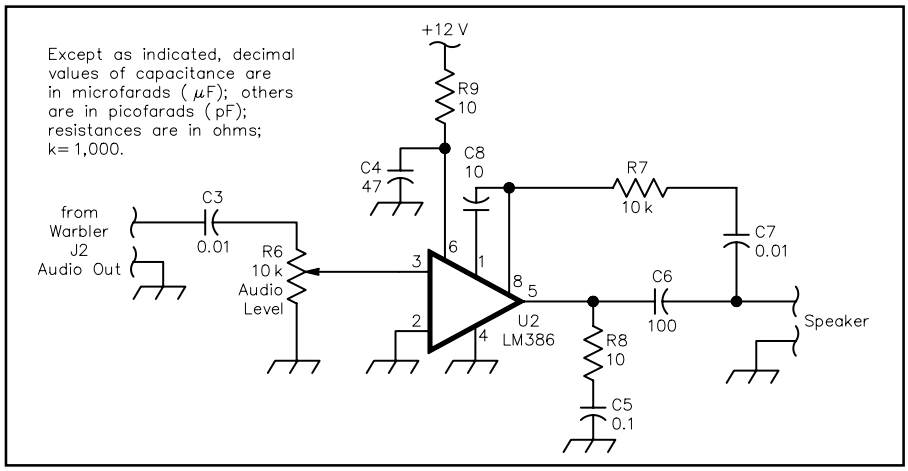


Figure 2—Schematic of the Warbler Audio Amplifier. Part numbers in parentheses are from Mouser Electronics (www.mouser.com). Equivalent parts can be substituted.

C3, C7—0.01 µF ceramic disk capacitor (21RX410).
C4—47 µF, 16 V electrolytic (140-XRL16V47).
C5—0.1 µF ceramic disk capacitor (21RX310).
C6—100 µF, 16 V electrolytic (140-XRL16V100).
C8—10 µF, 16 V electrolytic (140-XRL16V10).
R6—10 kΩ potentiometer (31CQ401).
R7—10 kΩ (291-10K).
R8, R9—10 Ω (291-10).
U2—LM386N audio amplifier (513-NJM386BD).

as first described in this way by Dave Ottenberg, WA2DJN, in a recent issue of *QRP Homebrewer*.[3] The amp can be added to the same perf board that contains the RF power indicator. Be careful to use shielded input wires so as to reduce the possibility of feedback or crosstalk.

Warbler owners can mount the board alongside the speaker in the top half of the Warbler enclosure. The bargraph array and the amplifier's volume control slip neatly through the front panel when it's all buttoned up.

Bringing it all Together in the Warbler Deluxe Enclosure

If you really want to kick it up a notch, you can incorporate everything—including your Warbler—in a custom enclosure. We followed the guidelines of Bill Jones, KD7S, to produce one of his ABS plastic enclosures.[4] By following his clear instructions we were able to fabricate some 1/8-inch sheets of black ABS plastic into a small, sharp-looking, no-screws clamshell enclosure for the Warbler.

Operating the Warbler Deluxe

Operating the newly modified "Warbler Deluxe" is a dream. There is a very positive and proper-level indication whenever the rig is placed in transmit, and you have the luxury of being able to listen to the receive audio yourself. By the way, an added benefit of the audio circuit is that it picks up the faint audio transmit signal as well, thus serving as a "PSK31 sidetone." Give these simple circuits a try and enhance your own warbling experience!

Notes

[1]The Warbler is a simple, single-board PSK31 transceiver designed by Dave Benson, K1SWL, the proprietor of Small Wonder Labs (www.smallwonderlabs.com).

[2]You can obtain many application details for the LM3914 from the Jameco Web site (www.jameco.com). Do a search from that home page for "LM3914" and select the "data sheet" link when it appears.

[3]*QRP Homebrewer* is a 64-page quarterly journal dedicated to the combined topics of QRP and homebrewing. For details, see www.njqrp.org/data/qrp_homebrewer.html.

[4]The ABS plastic Warbler Deluxe enclosure is a custom design created from the detailed plans of Bill Jones, KD7S, a notable craftsman in the QRP community. An excellent tutorial on making ABS enclosures "Be Your Own Cabinet Maker" can be found at the KD7S Web site at www.psnw.com/~kd7s/hbcabs.html. While you're there you should also check out his version of a Warbler Deluxe at www.psnw.com/~kd7s/warbler.html.

You can contact Ron Skelton, W6WO, at 4221 Gull Cove Way, Capitola, CA 95010; **rskelton01@home.com**. *George Heron, N2APB, can be reached at 2419 Feather Mae Court, Forest Hill, MD 21050;* **n2apb@amsat.org**.

NEW PRODUCTS

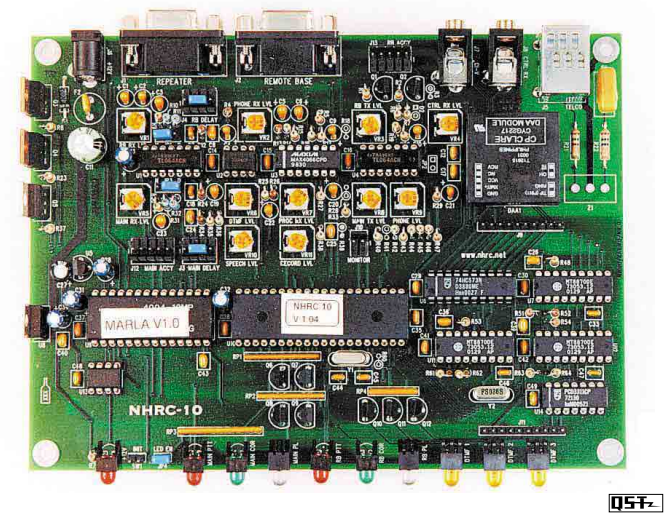
THE NHRC-10 ADVANCED REPEATER CONTROLLER

◊ Designed for maximum functionality and a minimal parts count, NHRC's new repeater controller includes features such as true speech, multiple ID messages, 90 recorded words (can be customized), a six-slot voice mailbox and an audio test mode that can record and play back a user's transmission.

The NHRC-10 also has a full-duplex autopatch, 100 autodial numbers, advanced DTMF decoders, a second radio port for remote base operation, a computer-control port that supports most ICOM HF radios, the ability to answer and process incoming calls (reverse autopatch), and much more.

Prices: $449 (controller and comprehensive user manual); $89 (cabinet); $59 (digital output board). For more information, contact NHRC LLC at 444 Micol Rd, Pembroke, NH 03275; tel 603-485-2248; **info@nhrc.net**; **www.nhrc.net**.

Previous • Next New Products



KAM XL Multimode Communications Processor

With so many digital modes available as computer sound card applications these days, is there still a place in the Amateur Radio world for a multimode communications processor like the new Kantronics KAM XL?

The answer is a qualified "yes," depending on the need…

- A stand-alone processor allows hams with older computer technology to enjoy digital operating. With just a simple terminal program, even a vintage Commodore computer can "talk" to a stand-alone processor.
- A stand-alone processor offers flexibility to amateurs who own fast sound-card-equipped computers. An external processor allows them to operate digital modes while using their computer sound cards simultaneously in other applications.
- Despite the sound-card "revolution," there are still several operating modes that are not commonly available as full-transceive software applications. These include PACTOR and PACTOR II, G-TOR, Clover and NAVTEX. With few exceptions, if you want to use these modes you still need a stand-alone controller.

So What About the KAM XL?

The KAM XL is the latest product to build on the respected KAM processor series. Its operating modes include packet (up to 9600 baud), PACTOR I, RTTY (AFSK and FSK), NAVTEX, CW, ASCII and WEFAX. The XL also includes goodies such as GPS compatibility (connect a GPS receiver to the KAM and you're ready for mobile APRS enjoyment), remote control with telemetry functions and a hefty mailbox that you can access on packet or the TOR modes.

The KAM will also do PSK31, after a fashion. The methodology is cumbersome, especially compared to the ease of panoramic sound card software such as *DigiPan* and others. Even so, it does work.

And, of course, the KAM XL continues the tradition of offering dual ports. With dual radio ports, the KAM XL can "gateway" between ports 1 and 2, allowing local packet to be received, then transmitted over HF. All port connectors are DB9s, except for the telemetry port that uses a DB15.

Hits and Misses

I put the KAM XL to work during the OK DX RTTY contest last December and it performed reasonably well. The traditional KAM "bouncing LED" tuning meter was a pleasure to use. When it came to weak or fluttery signals, however, my *RITTY* and *MMTTY* sound card software consistently copied text when the KAM could not.

On PACTOR the KAM was a winner. I could tune and copy PACTOR signals within seconds. I also tried the KAM XL with *AirMail* software, which is popular among WinLink 2000 users. *AirMail* recognized the KAM XL and worked perfectly.

The KAM XL copied CW remarkably well—even when the sending was a little sloppy. I don't know if Kantronics actually changed the CW decoding algorithm in the KAM XL, or if I was just lucky, but the processor seemed to read CW better than almost any other I have tried in recent memory.

The KAM XL still carries the G-TOR mode, but I couldn't find anyone on the air to test it with, even after persistent searches and CQs. There are a lot of G-TOR-capable KAMs out there, but few hams are using the mode.

The KAM XL's NAVTEX mode was terrific for monitoring maritime stations. I tuned to 518 kHz and quickly picked up the following:

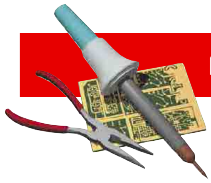
> UNEXPLODED ORDNANCE HAS BEEN REPORTED IN THE VICINITY OF CASHES LEDGE IN THE FOLLOWING POSITIONS: 42-40N 069-00W AND 42-29N 069-00W. MARINERS ARE URGED TO USE CAUTION WHEN FISHING OR CONDUCTING UNDERWATER OPERATIONS IN THIS AREA.

The nits to pick with the KAM XL include the absence of a printed manual. The XL manual exists on a CD-ROM as an Adobe *Acrobat* file, so you have to read it on your computer screen, or print it yourself. The CD also includes *PacTerm '98* for *Windows* by Creative Services Software (**www.cssincorp.com/**), which runs beautifully with the KAM XL and makes operating a breeze. (It beats the heck out of using *HyperTerminal* in *Windows*!) The *PacTerm '98* provided on the KAM XL CD is only a demo copy. The full version is available for $79.95 from Creative Services Software. *Pacterm for Windows* owners can upgrade for $29.95. Finally, the ports on the back panel of the XL are unlabeled, which is annoying when you're trying to set up the unit.

Is the KAM XL worth the cost? If you want multimode capability in a stand-alone processor, the KAM XL is an excellent choice—as long as you don't need Clover or PACTOR II, which are proprietary modes unavailable on the XL. On the other hand, if you're content using sound card software for all of your digital operating, *any* outboard processor would be a difficult purchase to justify.

Kantronics, 1202 East 23rd St, Lawrence, KS 66046; tel 785-842-7745; **www.kantronics.com**. *$399.95* QST

Steve Ford, WB8IMY ♦ *QST* Editor

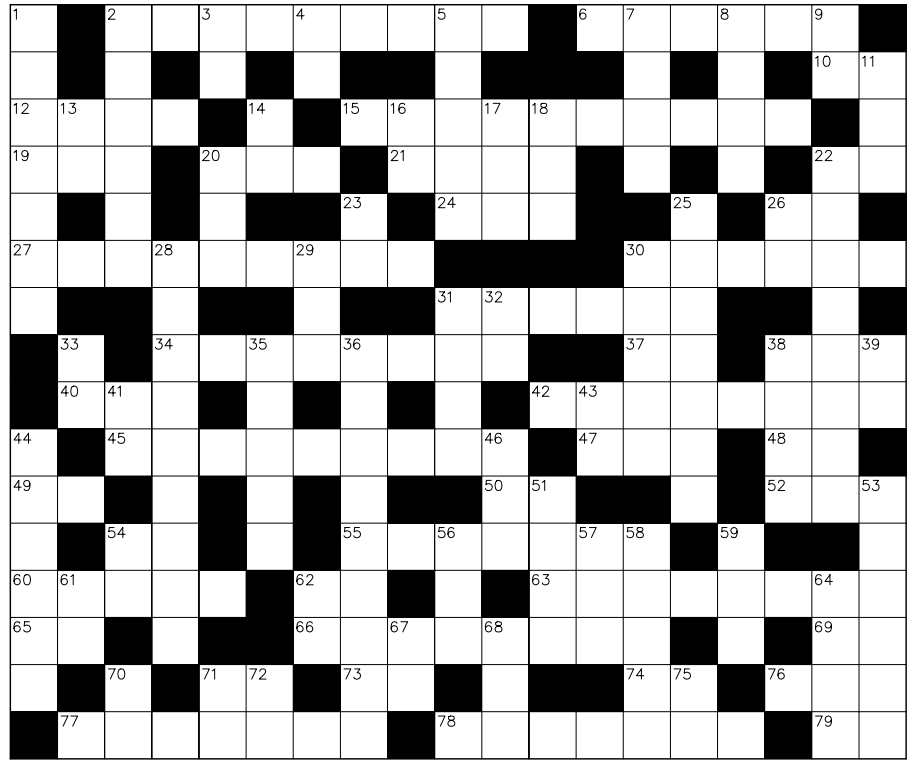


By H. Ward Silver, N0AX

Test Your Knowledge!

Traffic/Emergency Communications

Some of us find emergency communications and traffic handling puzzling. Your chance to unravel the puzzle is at hand.

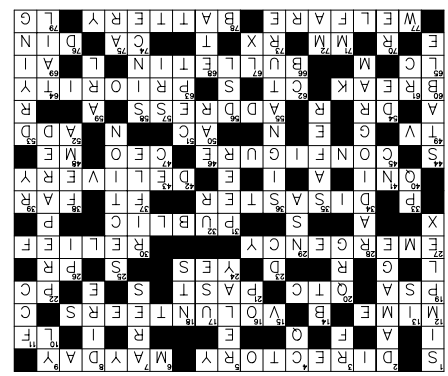


Across

2. Listing of nets by frequency
6. Phone distress signal
10. Low Frequency (abbr)
12. Message encoding or silent actor
15. Unpaid workers
19. Public Service Announcement (abbr)
20. Q-signal for number of messages
21. Opposite of future
22. Computer (abbr)
24. Affirmative
26. Public Relations (abbr)
27. Urgent situation
30. Replacement operator
31. Citizens
34. Natural calamity
37. Feet (abbr)
38. Opposite of near
40. Q-signal for check-in
42. Present message to destination
45. Set up operating parameters
47. Company leader (abbr)
48. Not you
49. Broadcast media
50. Commercial power
52. Increment
54. Doctor (abbr)
55. Destination of a message
60. Interrupt
62. Count (abbr)
63. Urgent messages have top ___
65. Tuned circuit
66. Broadcast message
69. Artificial Intelligence (abbr)
71. Maritime Mobile (abbr)
73. Receiver (abbr)
74. Canada (abbr)
76. Loud noise
77. Health and ___
78. Portable current source
79. Large (abbr)

Down

1. Talk and listen on a single channel
2. Destruction or injury
3. Radio Frequency (abbr)
4. Calling anyone
5. Pass from station to station
7. Amateur emergency organization
8. Trouble puts you in ___ straits
9. Send 88 to these
11. The agency that governs ham radio
13. Ham Radio ___ fun
14. Prosign for dash
16. Operator (abbr)
17. Work with a tool
18. National Traffic System (abbr)
20. Q-signal for frequency
22. Trained and ready
23. Constant current
25. Smallest ARRL organizational division
26. Ratio of circumference to diameter
28. Formal message transmitted by radio
29. National Security Agency (abbr)
30. Type of gun
31. Person of equivalent status
32. You Are (CW abbr)
33. Canadian province (abbr)
35. Less dangerous
36. Identification of message sender
38. Federal agency in charge of emergency response (abbr)
39. RTTY test pattern
41. Numerical control (abbr)
43. Emergency Coordinator (abbr)
44. Steady
46. Listen with this
51. International licensing agreement
53. Removing water
54. From (CW abbr)
56. High-speed data line
57. Sorry (CW abbr)
58. After a specific event
59. Numeric abbreviations that represent common message text fragments
61. Radio control (abbr)
62. 11-meter service
64. Opposite of head
67. Prefix for Luxembourg
68. Estimated time of arrival (abbr)
70. Regarding (abbr)
71. Bands below HF
72. Milliamp
75. End of message prosign



22916 107th Ave SW
Vashon, WA 98070

HINTS & KINKS

REDUCING HISS IN THE LM-386

◊ I know everyone is into direct-conversion receivers and digital VFOs, but there are still many AN602-LM386 low-budget receivers out here.

LM-386s have a bad reputation for hiss. I believe most of the hiss is not produced by the 386, but rather its wide gain bandwidth amplifies any noise from an IF section or 602 mixer stage.

My solution is to make the 386 into an active filter by adding series LC circuit[1] as shown in Figure 1. I figure the response of this filter peaks at about 800 Hz. My radio is an NW8020,[2] and the parts mount neatly on and beside the 386.—*James Graves, ex WA9RDT, 312 NW 12th St #317, Oklahoma City, OK 73103*

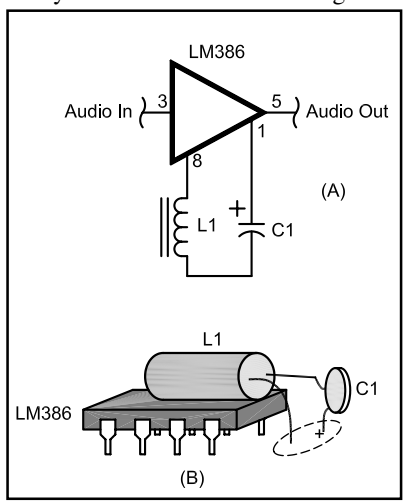


Figure 1—A shows the schematic. B shows how he mounted the parts in his NW8020 transceiver. Part numbers in parentheses are for Mouser (see Note 4).
C1—0.47 µF, 35 V electrolytic capacitor (#581-0.47K35V)
L1—82 mH inductor (R = 71 Ω, Q=100, #434-02-823J)

CURE IC-707/FL-53A AUDIO HUM

◊ If you are a CW addict like me, a perfect audio tone with no background "hum" is essential. So for me, the following hum-reduction modification for the IC-707 turns a great CW rig to a super CW rig! I purchased an IC-707 new in July 1997 and performed the following modification shortly thereafter.

Since CW is my main mode of operation, I purchased and installed ICOM's 250 Hz FL-53A filter. The FL-53A operates at a center frequency of 455 kHz. It is electrically connected by plugging it into a PC board and soldering the four terminals. Once this was accomplished, a test on several CW bands indicated that this filter did indeed provide the kind of filtering needed for day-to-day DXing.

However, I soon noticed that upon "cranking up" the audio gain about halfway on weak but noise-free DX signals, there is a background hum. The frequency of the hum was about 125 Hz. At the wider bandwidth settings, no hum was discernible. This was somewhat disappointing since everything else about the 707 seemed to work perfectly.

After all the usual internal checks for possibly leaky capacitors and such, I discovered that the hum disappeared completely when the cooling fan rotation was manually stopped. I decided that the mechanical fan rotation modulated the dc fan voltage, which in turn made its way back to the 455-kHz amplifier containing the 250-Hz filter.

I found that 9400 µF across the fan dc line eliminated the hum. Fortunately, it's easy to come up with a couple of 4700 µF (35 V) capacitors from RadioShack at only modest cost. So I wired two such capacitors in parallel and installed them within the cabinet. (There is more than enough room in the 707 for these capacitors across the fan-motor dc power line.)

The IC-707 has run with this minor modification for several years now and I've noticed no side effects other than hum elimination. I sent the ICOM Service Department a summary of my experience at the time of the original modification.—*Paul E. Schmid, W4HET, PO Box 939, Vienna, VA 22183-0939;* **w4het@aol.com**

A SOLDER-SPOOL HOLDER

◊ I have been using this solder-spool holder for a while now. The holder keeps solder readily available and neatly packaged to keep your shack clean and orderly. The parts consist of a pegboard parts tray, a length of $^3/_8$-inch dowel, a $^3/_8$-inch washer-cap push nut, a $^3/_8$-inch shaft collar, a rubber grommet and four stick-on rubber feet

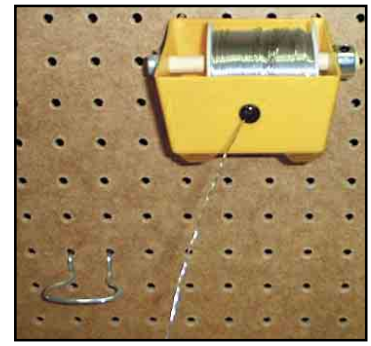


Figure 2—A front view of the solder-spool holder hanging on pegboard. Most construction details are visible.

Construction of the project is easy! Figures 2 and 3 show the finished project. Drill a hole in the parts box for the dowel rod, approximately $^1/_2$-inch down from the top edge of the box sides. Drill a hole for a rubber grommet in the front of the box, $^3/_4$ inch down from top edge. Install rubber grommet in hole. Place the end-cap on one end of the dowel rod. Insert the dowel rod through one box side, the solder spool and the other box side. Place the shaft collar on the free end of the dowel and tighten it in place with an Allen wrench. Install the self-stick rubber feet on the bottom of the parts tray.

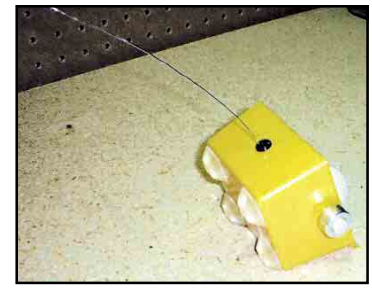


Figure 3—A bottom view shows the stick-on feet in place.

Once it's finished, you can either set the box on your desk or hang it on pegboard at your workbench. Pull out the solder as you need it and then roll the spool back up when you're finished.—*Dave Malara, KB2UBO/9, 40 E Field Stone Cir #5, Oak Creek, WI 53154;* **dmalarajr@wi.rr.com**

Hints and Kinks items have not been tested by *QST* or the ARRL unless otherwise stated. Although we can't guarantee that a given hint will work for your situation, we make every effort to screen out harmful information. Send technical questions directly to the hint's author.

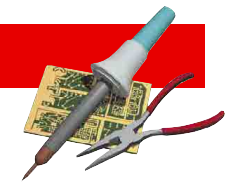
QST invites you to share your hints with fellow hams. Send them to "Attn: Hints and Kinks" at ARRL Headquarters (see page 10), or via e-mail to **h&k@arrl.org**. Please include your name, call sign, complete mailing address, daytime telephone number and e-mail address on all correspondence. Whether praising or criticizing an item, please send the author(s) a copy of your comments. QST

[1]Parts are from Mouser Electronics, 1000 N Main St, Mansfield, TX 76063; tel 800-346-6873, 817-804-3888, fax 817-804-3899; e-mail **sales@mouser.com**; **www.mouser.com**.

[2]EMTECH, 1127 Poindexter Ave W., Bremerton, WA 98312; tel 360-405-6805; **emtech.steadynet.com/qrpdesc.htm**.

Bob Schetgen, KU7G ♦ Senior Assistant Technical Editor

The ARRL Incoming QSL Bureau System



Within the US and Canada, the ARRL DX QSL Bureau System is made up of numerous call area bureaus that act as central clearing houses for QSLs arriving from foreign countries. These "incoming" bureaus are staffed by volunteers. The service is currently free and ARRL membership is not required, although operating costs are funded from ARRL membership dues. That's why we welcome your support as an ARRL Member.

How it Works

Most countries have "outgoing" QSL bureaus that operate in much the same manner as the ARRL Outgoing QSL Service. The member sends his cards to his outgoing bureau where they are packaged and shipped to the appropriate countries.

A majority of the DX QSLs are shipped directly to the individual incoming bureaus where volunteers sort the incoming QSLs by the first letter of the call sign suffix. One individual may be assigned the responsibility of handling from one or more letters of the alphabet. All Incoming QSL Bureaus have e-mail addresses. Some bureaus have active Web pages. Please send an e-mail to **buro@arrl.org** for the e-mail address or URL of your bureau.

Claiming your QSLs

Send a 5 × 7½ or 6 × 9-inch self-addressed, stamped envelope (SASE) or money credit where applicable to the bureau serving your call sign district. Neatly print your call-sign in the upper left corner of the envelope. Place your mailing address on the front of the envelope. A suggested way to send envelopes is to affix a first class stamp and clip extra postage to the envelope. Then, if you receive more than 1 oz of cards, they can be sent in a single package.

Some incoming bureaus sell envelopes or postage credits in addition to the normal SASE handling. They provide the proper envelope and postage upon the prepayment of a certain fee. The exact arrangements can be obtained by sending your inquiry with a SASE to your area bureau. A list of these bureaus appears below.

Helpful Hints

Good cooperation between the DXer and the bureau is important to ensure a smooth flow of cards. Remember that the people who work in the area bureaus are volunteers. They are providing you with a valuable service. With that thought in mind, please pay close attention to the following DOs and DON'Ts:

DOs

- DO keep self-addressed 5 × 7½ or 6 × 9-inch envelopes or money credits on file at your bureau, with your call in the upper left corner, and affix at least one unit of first-class postage.
- DO send the bureau enough postage to cover SASEs on file and enough to take care of possible postage rate increases.
- DO respond quickly to any bureau request for SASEs, stamps or money. Unclaimed card backlogs are the bureaus' biggest problem.
- DO notify the bureau of your new call as you upgrade. Please send SASEs with your new call, in addition to SASEs with your old call.
- DO include a SASE with any information request to the bureau.
- DO notify the bureau in writing if you don't want your cards.
- DO notify your bureau of a change in address.

DON'Ts

- DON'T send domestic US-to-US cards to the various call-area bureaus.
- DON'T expect DX cards to arrive for several months after the QSO. Overseas delivery is very slow. Many cards coming from overseas bureaus are over a year old.
- DON'T send your outgoing DX cards to your call-area bureau.
- DON'T send SASEs to your "portable" bureau. For example, WB8IMY/1 sends SASEs to the W8 bureau, not the W1 bureau.
- DON'T send SASEs or money credits to the ARRL Outgoing QSL Service.
- Don't send SASEs larger than 6 × 9 inches. SASEs larger than this require additional postage surcharges.

ARRL INCOMING DX QSL BUREAU ADDRESSES

First Call Area: All calls[1,3]
W1 QSL Bureau
PO Box 7388
Milford, MA 01757-7388

Second Call Area: All calls[1,3]
ARRL 2nd Dist QSL Bureau
NJDXA
PO Box 599
Morris Plains, NJ 07950

Third Call Area: All calls
Pennsylvania DX Association
PO Box 100
York Haven, PA 17370-0100

Fourth Call Area: All single-letter prefixes (K4, N4, W4)
Mecklenburg ARC
PO Box DX
Charlotte, NC 28220

Fourth Call Area: All two-letter prefixes (AA4, KB4, NC4, WD4, etc)
Sterling Park ARC
Call Box 599
Sterling, VA 20167

Fifth Call Area: All calls[1]
W5 Incoming QSL Bureau
Magnolia DX Assn
PO Box 999
Wiggins, MS 39577-0999

Sixth Call Area: All calls[1,2]
ARRL Sixth (6th) District DX QSL Bureau
PO Box 530
Weed, CA, 96094-0530

Seventh Call Area: All calls[1]
Willamette Valley DXC Inc
PO Box 555
Portland, OR 97207

Eighth Call Area: All calls
8th Area QSL Bureau
PO Box 182165
Columbus, OH 43218-2165

Ninth Call Area: All calls[1]
Northern Illinois DX Assn
W9 Incoming QSL Bureau
PO Box 273
Glenview, IL, 60025-0273

Tenth Call Area: All calls[1]
0 QSL Bureau
PO Box 4798
Overland Park, KS 66204

Puerto Rico: All calls[1]
Puerto Rico QSL Bureau
PO Box 9021061
San Juan, PR 00902-1061

US Virgin Islands: All calls
Virgin Islands ARC
GPO Box 11360
Charlotte, Amalie
Virgin Islands 00801

Hawaiian Islands: All calls[1]
Wayne Jones, NH6K
PO Box 860778
Wahiawa, HI 96786

Alaska: All calls[1]
Alaska QSL Bureau
PO Box 520343
Big Lake, AK 99652

Guam:
Guam QSL Bureau
PO Box 445
Agana, Guam 96932

SWL:
Mike Witkowski, WDX9JFT
4206 Nebel St
Stevens Point, WI 54481

QSL Cards for Canada may be sent to:
RAC Incoming QSL Bureau
Box 51
St John, NB E2L 3X1

QSL cards for Canada may also be sent to the individual bureaus:

VE1, VE0,[1]
Brit Fader Memorial QSL Bureau
Box 8895
Halifax, NS B3K 5M5

VE2
Jacques Dube, VE2QK
875 St Severe St
Trois-Rivieres, QC G9A 4G4

VE3
The Ontario Trilliums
Box 157
Downsview, ON M3M 3A3

VE4
Adam Romanchuk, VE4SN
26 Morrison St
Winnipeg, MB R2V 3B4

VE5[1]
Bjarne Madsen, VE5FX
Box 2860
Tisdale, SK S0E 1T0

VE6[1]
VE6 Incoming QSL Bureau
Box 1515
Gibbons, AB T0A 1N0

VE7[1]
Dennis Livesey, VE7DK
8309 112th St
Delta, BC V4C 4W7

VE8[1]
Rolf Ziemann, VE8RZ
2 Taylor Rd
Yellowknife, NWT X1A 2K9

VE9, VY2
VE9, VY2 QSL Bureau
Box 73
Moncton, NB E1C 8R9

VO1, VO2
Rick Burke, VO1SA
Box 23099
St John's, NF A1B 4J9

VY1
Hugh Henderson, VY1HH
PO 33062
Whitehorse, YT Y1A 5Y5

Notes

[1]These bureaus sell envelopes or postage credits. Send an SASE to the bureau for further information.

[2]These bureaus can only accept specific sized envelopes. Send an SASE to the bureau for further information.

[3]These bureaus will not accept SASEs. Send money credits only.

By Dave Patton, NT1N

The 2002 Annual Meeting of the Board of Directors

Organizational policies and Novice spectrum refarming headline a busy meeting.

It was an election year for the ARRL. In the even numbered years the Board elects Officers as part of its duties. It is hard to believe that two years has passed since Jim Haynie, W5JBP, was elected as the 13th President of the ARRL (see March 2000 *QST*, p. 62). Perhaps the intervening two years were such a blur because everyone was incredibly busy! In between back surgeries and real life job and family responsibilities, President Haynie was a road warrior visiting every Division and attending dozens of meetings, hamfests, and conventions, and gathering with federal government officials at all levels. One might think our intrepid President would need a break, but that won't be the case as the Board of Directors, meeting in Ft. Worth Texas over the weekend of January 18 and 19, re-elected him for another two years. Mr Haynie knows there is a tough road ahead, and he is chomping at the bit to keep going. Of the agenda items for the next two years that will receive his attention, he said, "We have a great role we could play in homeland security—the problem we have is getting Amateur Radio introduced to the proper agencies." He added that federal agencies "need a big education on what Amateur Radio does."

The events of September 11, 2001, are forever etched into everyone's minds. And it was with a somber resolution read aloud by President Haynie that the Board remembered the tragedy:

WHEREAS, the United States suffered unparalleled acts of war during the attacks occurring on September 11, 2001; and

WHEREAS, Radio Amateurs were among those whose lives were lost on that day; and

WHEREAS, numerous Radio Amateurs were among those who participated in the rescue and recovery efforts on September 11, 2001, and thereafter;

NOW, THEREFORE, BE IT RESOLVED, that the American Radio Relay League Board of Directors extends the organization's most sincere condolences to the families and friends of the Radio Amateurs who lost their lives on September 11, 2001.

AND BE IT FURTHER RESOLVED, that the American Radio Relay League Board of Directors commends and honors all the Amateur Radio operators who generously volunteered their time and expertise during the rescue and recovery efforts on September 11 and thereafter.

Homeland Security

While Hams have always been recognized for their public service capacity, the September 11 attacks really drove home the importance of a well-trained, and very large group of communicators who can mobilize rapidly. The Board, recognizing just how important emergency communications and preparedness are to the nation and the world in general, has tasked the Volunteer Resources Committee (VRC) to perform an in-depth study of the ARRL's programs in these fields. Several Board members expressed how important it would be for ARRL to be actively involved at all levels of government as Homeland Security planning takes place (see Minute 35).

In other VRC actions, the Board voted to accept several changes to the field organization Rules and Regulations, as the Volunteer Resources Committee recommended. In addition to updating and re-

(L-R) ARRL Chief Operating Officer Mark Wilson, K1RO; Chief Development Officer Mary Hobart, and Chief Financial Officer Barry Shelley, N1VXY, were among those attending the ARRL Board meeting. Hobart informed the Board that the 2002 drive for the Fund for the Defense of Amateur Radio Frequencies now totaled more than $400,000.

vising the Rules and Regulations, the Public Service Honor Roll criteria were updated. According to the new rules, "The Section Manager is accountable for carrying out the duties of the office in accordance with ARRL policies established by the Board of Directors and shall act in the best interests of Amateur Radio." Section managers will be proscribed from "committing, obligating, or binding the League" without review by the Field and Educational Services Manager and approval of the ARRL president. Among other changes, the revised rules will prohibit a section manager removed from office by recall from running in the next SM election following removal. Anyone removed by action of the Executive Committee would have to get that committee's consent to be eligible to run again. The Executive Committee also will have the power to cancel any field organization appointment "whenever it appears to be in the best interest of the ARRL to do so." The Board also modified the ARRL bylaws to say that anyone removed from office by recall "shall not be eligible to be a candidate for director or vice director for three years following removal from office" (see Minutes 32, 33, 54).

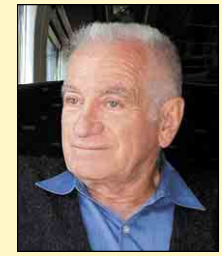
FCC and Part 15 Devices

The Board resolved to petition the FCC for reconsideration in ET Docket 98-156, by comments in ET Docket 01-278, and "by other necessary means" in order to elicit "a clear statement from FCC acknowledging the limit of its statutory jurisdiction to authorize the manufacture and sale of unlicensed Part 15 devices." The ARRL wants the FCC to acknowledge that its jurisdiction to allow the manufacture and sale of Part 15 devices "must be premised on a finding that the devices will not cause interference to licensed services" and that the rules do not entitle FCC to permit unlicensed devices with substantial interference potential to licensed services (see Minutes 44, 63).

Committees

The makeup of some standing committees was altered. Dakota Division Director Jay Bellows, K0QB, will succeed Rocky Mountain Division Director Walt Stinson, W0CP, as chairman of the Administration and Finance Committee. Stinson will remain a committee member. Southwestern Division Director Art Goddard, W6XD, will take over the reins of the Membership Services Committee that had been headed by Hudson Division Director Frank Fallon, N2FF, who remains a committee member. Pacific Division Director Jim Maxwell, W6CF, was tapped to continue as Volunteer

ARRL Humanitarian Award



The 2001 ARRL Humanitarian Award winner is Dr Jim C. Hirschman, K4TCV, of Miami, Florida, "in recognition of a lifetime of medicine and public service communications that has touched so many lives and put our Service in such a positive light," the Board said in making the award.

Hirschman, who's been involved in public service communications for several decades, is the titular "fleet surgeon" of the Waterway Net on 40 meters and known by many simply as "Doctor Jim." The Board's resolution naming Hirschman said he "combines his Amateur Radio and medical skills to give on-air advice on a moment's notice."

Hirschman's skills were put to the test on two occasions when individuals were injured as a result of pirate attacks on sailing vessels in the Caribbean Sea. In March 2000, marauders fired upon Jacco van Tuijl, KH2TD, and his son, Willem, and attempted to commandeer the family's sailboat while it was moored off the coast of Honduras. Willem was severely injured. Among those who responded following van Tuijl's radio calls for help, Hirschman provided live on-the-air medical assistance for approximately nine hours until the youngster could be evacuated to medical facilities. Willem later was transported to the US for additional treatment. Hirschman and his wife visited the boy in the Netherlands last year to check on his progress.

Hirschman also provided critical medical advice in the wake of a subsequent and similar incident a year later, when Bo Altheden, SM7XBH, of Sweden, was shot by pirates who boarded his vessel. Altheden's wife, ViVi-Maj Miren, put out a call for help on 20 meters that attracted the attention of the Maritime Mobile Service Net. The Board said the incidents were "but two examples of a lifetime of dedication to public service that has made him well-known internationally."

Hirschman is a member of the Miami-Dade Amateur Radio Public Service Corps and a volunteer operator at the National Hurricane Center's W4EHW. The Coordinator of Amateur Radio at the National Hurricane Center, John McHugh, KU4GY, urged the Board to approve Hirschman's nomination.

Hirschman will get an engraved plaque, and his accomplishments will be the subject of an article in a future edition of *QST*.

Nominations and supporting materials for the 2002 International Humanitarian Award are invited. Send submittals in writing and in English to ARRL International Humanitarian Award, 225 Main St, Newington, CT 06111 USA. Nominations must be received by December 31, 2002. For more information, contact Jean Wolfgang, WB3IOS, **jwolfgang@arrl.org**; 860-594-0219.

Summary of Major Board Actions

Minute	*Purpose*	*Action*
Elections		
8-18	Officers	Elected
19	Honorary Vice President Gauzens	Elected
20	Executive Committee	Elected
21	Foundation Directors	Elected
Organizational		
33	PSHR Revisions	Approved
35	Emergency and non-emergency communications programs	VRC Study
38	Guidelines for Honorary Vice Presidents	Amended
40	Management to determine *QST* page count	Approved
41	2002 Budget, as amended	Approved
43	Amateur Radio Interference Assessment	Approved
44	Electromagnetic Compatibility Committee	Approved
52	Historical Artifacts Funding	Approved
54	Bylaw 24	Amended
55	Rules and Regulations of Field Organization	Amended
56	Committee Appointments	Announced
61	Novice Spectrum refarming	Approved
64	ARES clothing	VRC Study
65	VHF, UHF, Microwaves contests and programs	MSC Study
67	Moved and Seconded to *ARRLWeb*	Approved
68	40 meter digital band plan	MSC study
Awards and Recognition		
2	September 11, 2001	Recognized
34	International Humanitarian Award, Dr. Jim Hirschman, K4TCV	Conveyed
50	2001 Bill Leonard, W2SKE, Professional Media Award, Michaelangelo Conte, *The Jersey Journal*	Conveyed
Regulatory		
63	Petition for Reconsideration, Part 15 Devices	Approved

Resources Committee chairman. A new committee, the Electromagnetic Compatibility Committee, was formed by renaming the RFI Task Force, and will encompass the remaining objectives and recommendations from the Spectrum Strategy Committee—which was discharged (see Minutes 44, 56).

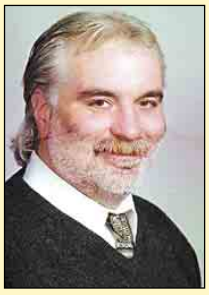
Novice Band Refarming Plan

The ARRL Board of Directors has adopted a modified proposal to refarm the Novice bands, now that the FCC no longer issues Novice licenses. In December, acting on the basis of nearly 5000 survey responses, the ARRL Novice Spectrum Study Committee recommended that the CW Novice/Technician Plus subbands be eliminated as such. The panel proposed allowing Novice and Tech Plus (or Technician with Element 1 credit) licensees to operate CW on General-class 80, 40, 15 and 10-meter CW segments at up to 200 W output. It also recommended refarming the current Novice/Tech Plus subbands, in part to allow expansion of phone allocations on 80, 40 and 15 meters.

Following discussion, the Board ap-

The 2001 Bill Leonard, W2SKE, Professional Media Award

The winner of the 2001 Bill Leonard, W2SKE, Professional Media Award is Michaelangelo Conte, a staff writer for *The Jersey Journal* in Jersey City, New Jersey. This award is given annually to a professional journalist (or group) for outstanding coverage of Amateur Radio in TV, radio, print or multimedia. The winner receives an engraved plaque and a check for $500.



Conte's winning submission, "Radio operators took to air—Aided rescue at Ground Zero," covered the communications activities of the Jersey City Amateur Radio Club following the World Trade Center attack last September. The club, which is affiliated with the Hudson County chapter of the American Red Cross, focuses on emergency communications, was just being formed and had not even held its first meeting prior to September 11. Several club members were interviewed about their roles in providing a needed communications link between Jersey City and emergency units in lower Manhattan.

Conte was nominated by the club's president Rich Krajewski, WB2CRD, who subsequently renamed the new organization the Cirri Memorial Radio Club in honor of Robert D. "Bob" Cirri Sr, KA2OTD, who died in the World Trade Center attack. Cirri, 39, served as ARRL Hudson County District Emergency Coordinator and had helped form the Jersey City club. A lieutenant with the Port Authority Police, Cirri was helping to evacuate workers from the World Trade Center when it collapsed.

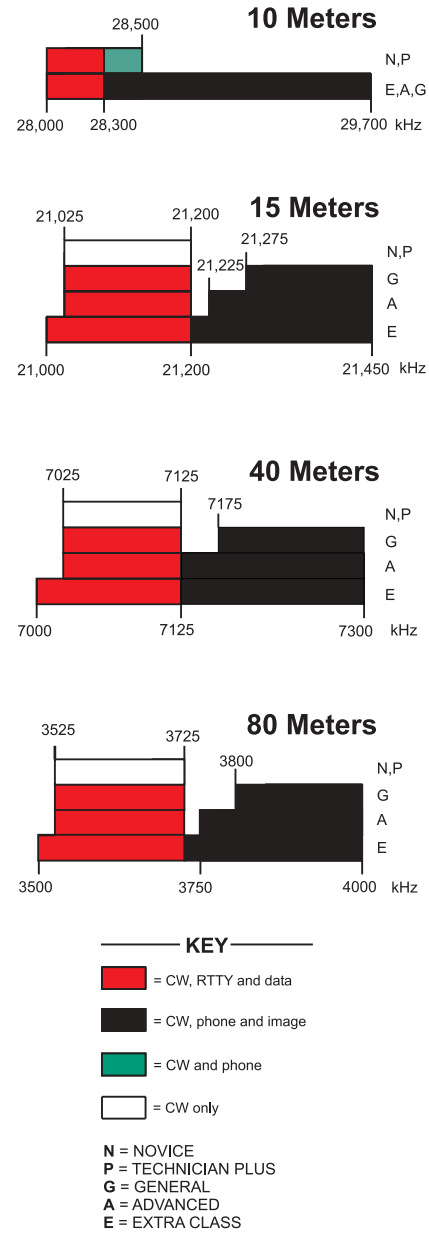
Members of the ARRL's Public Relations Committee judged the nominations, and the Board of Directors ratified the group's decision at its January meeting. Five other nominations were received for the 2001 award program.

In Amateur Radio circles, Bill Leonard, a former president of CBS News, is remembered for his 1958 contribution to *Sports Illustrated*, "The Battle of the Hams," which describes the "sport of DXing." In November of 1996, Leonard was inducted into the *Broadcasting and Cable* Hall of Fame. Leonard became a Silent Key in 1994.

Nominations are now being accepted for the 2002 Bill Leonard, W2SKE, Professional Media Award. The deadline for entries is December 13, 2002. For more information, including rules for entry and nomination forms, contact ARRL Manager of Media Relations Jennifer Hagy, N1TDY, jhagy@arrl.org; 860-594-0328.

The new Southwestern Division leadership team mug for the photographer: Director Art Goddard, W6XD, and Vice Director Tuck Miller, NZ6T.

Board-Approved Novice Spectrum Proposal



The "4Rs" club gathered for a photo at the meeting: (l-r) Southeastern Division Director Frank Butler, W4RH; Technical Relations Manager Paul Rinaldo, W4RI, and new Southeastern Division Vice Director Sandy Donahue, W4RU. Frank and Sandy are both beginning three year terms. Frank has served on the Board of Directors for over 22 years. Paul has worked for ARRL for over 18 years.

A year ago President Haynie initiated the informal "Armadillo Award," which is awarded at each Annual meeting to the Director whose Division had the largest membership increase. Northwestern Division Director Greg Milnes, W7OZ, receives this year's award from last year's winner, West Gulf Division Director Coy Day, N5OK.

proved a modified plan that would leave in place or slightly trim the amount of additional phone spectrum the committee had recommended for 75 and 15 meters. The amended plan would drop the bottom edge of the US phone band on 75 to 3725 kHz but leave it at 21,200 kHz on 15 meters instead of dropping both by another 25 kHz as called for in the original plan. The 75-meter proposal would expand the phone band by 50 kHz for Generals over the present allocation, and by 25 kHz for Advanced and Extra licensees. On 15 meters, Generals would get another 25 kHz of phone spectrum, but phone privileges for Advanced and Extra class operators would stay the same. On 40 Meters the Board approved lowering the phone band to 7125 kHz from 7150, while moving the bottom of the General Class band down to 7175 kHz (see Minute 61). The ARRL plans to propose the modified plan to the FCC later this year along with other regulatory requests.

QST

Trying to improve *QST* in an economic downturn and amongst planned deficits, the Board discussed several issues, including page count and content. A downward trend in advertising has led to a need to cut pages from the magazine. Options considered include removing detailed contest line scores and Section News from *QST*. But after much discussion, the Board deferred until its July meeting a decision on whether to cut these items from *QST* and rely on their availability in enhanced form on the ARRL Web site. Both topics can be covered in much greater detail and interest on the Web. Before deciding to relocate the *QST* content, the Board said, it wants members to be "aware of the reasons for the proposed relocation and the enhanced capabilities available on the Web site." The Board said it also wants to evaluate "variations and alternatives" to the proposal (see Minute 41). But, the Board did decide to eliminate the minutes of its own meetings—published as "Moved and Seconded"—from *QST*, although the journal will continue to carry news of important Board and Executive Committee actions. Minutes already are posted on the ARRL Web site (**www.arrl.org/announce/board.html**) and will be made available via alternative means to members lacking Internet access. Their last appearance in *QST* will be in this issue (see Minute 67).

Amateur Radio History

The ARRL is lucky to have collectors and historians as Board members, and the ARRL Historical Committee has been working hard (having fun!) digging through the archives and long-lost file cabinets at Headquarters. In addition to the large amount of vintage equipment on hand, there are thousands of old documents that need attention. The Historical Committee has been investigating how to best catalog, display, and store such items. Pacific Division Director Jim Maxwell, W6CF, and his wife Trudy, KC6NAX, spent a week at HQ searching, cataloguing, and no doubt enjoying the history. The Board approved spending up to $25,000 from the Fund for the Preservation of Historic Artifacts for the construction and furnishing of an area to be used for inventory work and storage of historic artifacts, including moving items from the current storage area and the purchase of additional or replacement file cabinets as necessary (see Minutes 51, 52).

Awards

Two important awards were conferred at the Board meeting. The International Humanitarian Award was awarded to Dr. Jim Hirschman, K4TCV, in recognition of his lifetime of medicine and public service communications work. Known as the "Fleet Surgeon" on the Waterway Net on 40 Meters, he helped save the Swedish skipper of a sailboat, Bo Altheden, SM7XBH, of Bjärred, Sweden, who was shot after pirates boarded his vessel last March 20 off the coast of Venezuela (see Minute 34).

The winner of the 2001 Bill Leonard, W2SKE, Professional Media Award is Michaelangelo Conte, a staff writer for *The Jersey Journal*. This award is given annually to a professional journalist (or group) for outstanding coverage of Amateur Radio in TV, radio, print or multimedia. The winner receives an engraved plaque and a check for $500 (see Minute 50).

There's More

For further information on what happened at the meeting read through the Minutes on the pages that follow this story. The table "Summary of Major Board Actions" will help you navigate through them. Copies of the reports of the Board Standing Committees, Ad-Hoc Committees and Advisory Committees will be available soon on *ARRLWeb*.

MOVED & SECONDED

2002 ANNUAL MEETING OF THE ARRL BOARD OF DIRECTORS
January 18-19, 2002

Summary Agenda
1. Roll Call
2. Moment of Silence
3. Consideration of the Agenda for the meeting
4. Approval of the Minutes of the 2001 Second Meeting
5. Election of Officers and Executive Committee members
6. Reports by the Officers
7. Receive Reports and consider recommendations of the committees
8. Directors' motions

1. Pursuant to due notice, the Board of Directors of the American Radio Relay League, Inc., met in annual session at the DFW Airport Marriott South, in Ft. Worth, Texas, on Friday, January 18, and Saturday, January 19, 2002. The meeting was called to order at 8:36 AM CST, January 18, with President Jim Haynie, W5JBP, in the Chair and the following Directors present:

Bernie Fuller, N3EFN, Atlantic Division; George R. Isely, W9GIG, Central Division; Jay Bellows, K0QB, Dakota Division; Rick Roderick, K5UR, Delta Division; George Race, WB8BGY, Great Lakes Division; Frank Fallon, N2FF, Hudson Division; Wade Walstrom, W0EJ, Midwest Division; Tom Frenaye, K1KI, New England Division; Greg Milnes, W7OZ, Northwestern Division; James Maxwell, W6CF, Pacific Division; Dennis Bodson, W4PWF, Roanoke Division; Walt Stinson, W0CP, Rocky Mountain Division; Frank M. Butler, W4RH, Southeastern Division; Art Goddard, W6XD, Southwestern Division; Coy Day, N5OK, West Gulf Division. Also present without vote were Joel M. Harrison, W5ZN, First Vice President; Kay C. Craigie, WT3P, Vice President; John Kanode, N4MM, Vice President; Rodney J. Stafford, W6ROD, International Affairs Vice President; James McCobb, W1LLU, Treasurer; David Sumner, K1ZZ, Executive Vice President/Chief Executive Officer and Secretary; Chief Operating Officer Mark Wilson, K1RO; Chief Financial Officer Barry J. Shelley, N1VXY, and Chief Development Officer Mary M. Hobart.

Also in attendance at the invitation of the Board as observers were the following Vice Directors: William Edgar, N3LLR, Atlantic Division; Howard Huntington, K9KM, Central Division; Twila Greenheck, N0JPH, Dakota Division; Henry Leggette, WD4Q, Delta Division; Gary Johnston, KI4LA, Great Lakes Division; Stephen Mendelsohn, W2ML, Hudson Division; Bruce Frahm, K0BJ, Midwest Division; Mike Raisbeck, K1TWF, New England Division; James Fenstermaker, K9JF, Northwestern Division; Robert Vallio, W6RGG, Pacific Division; Les Shattuck, K4NK, Roanoke Division; Nelson E. "Sandy" Donahue, W4RU, Southeastern Division; Tuck Miller, NZ6T, Southwestern Division; and Dr. David Woolweaver, K5RAV, West Gulf Division. Also present were General Counsel Christopher D. Imlay, W3KD; Membership Services Manager Wayne Mills, N7NG; Field and Educational Services Manager Rosalie White, K1STO; Technical Relations Manager Paul Rinaldo, W4RI; Legislative and Public Affairs Manager Steve Mansfield, N1MZA; and Special Assistant to the Executive Vice President David Patton, NT1N. Unable to attend was Vice Director "Rev" Morton, WS7W, of the Rocky Mountain Division.

2. On motion of Mr. Maxwell, seconded by the entire Board, the following resolution was ADOPTED and read aloud by President Haynie:

WHEREAS, the United States suffered unparalleled acts of war during the attacks occurring on September 11, 2001; and

WHEREAS, Radio Amateurs were among those whose lives were lost on that day; and

WHEREAS, numerous Radio Amateurs were among those who participated in the rescue and recovery efforts on September 11, 2001, and thereafter;

NOW, THEREFORE, BE IT RESOLVED, that the American Radio Relay League Board of Directors extends the organization's most sincere condolences to the families and friends of the Radio Amateurs who lost their lives on September 11, 2001.

AND BE IT FURTHER RESOLVED, that the American Radio Relay League Board of Directors commends and honors all the Amateur Radio operators who generously volunteered their time and expertise during the rescue and recovery efforts on September 11 and thereafter.

3. The assembly observed a moment of silence in recollection of Radio Amateurs who have passed away since the previous Board meeting, especially John Abbott, K6YB; Hartley Alley, NA0A; Les Belyea, N7AIK; Dale Blair, KA7IWP; Joe Braund, K8JCV; Jean Butler; Roger Causse, W3EVW; Robert D. Cirri Sr., KA2OTD; Edward T. Clegg, W8LOY; Floyd Colyar, W7ME; Gerard J. "Rod" Coppola, KA2KET; Paul Craig, N3YSI; Steve Grant, N8AJD; Winston A. Grant, KA2DRF; Claude H. Haring Jr., W3IIM; Mel Hixson, WK7P; Michael G. Jacobs, AA1GO; Steven A. Jacobson, N2SJ; Bill James, WA2QHL; Ernest W. "Bill" Jennings, K1WJ; Robert A. Jerome, N8PTI; Bahri Kacan, TA2BK; Walt Kowalchik, W8KK; Armand Lambert, K1FLD; Steve Linn, N4CAK; Jerome Maslowski, KS8B; John McKinney, W0AP; Craig Mellinger, N2MNA; Lyndell C. "Chuck" Miller, WA0KUH; Dave Nicholson, KD4NYC; J. Dawson Ransome, W2SAI; Jim Romelfanger, K9ZZ; William R. Ruth, W3HRD; Bob Smart, W5TBV; Arnold L. Smith, W0KQO; Dean Spare, N3TAL; William V. Steckman, WA2ACW; William F. Stewart, K6HV; Richard "Rick" Vahan, N4PBF; George Veraldo, WB2BAU; Edgar Younginger, W8EY.

4. On motion of Mr. Race, seconded by Mr. Bodson, the agenda of the meeting was ADOPTED as presented.

5. On motion of Mr. Maxwell, seconded by Mr. Isely, the Minutes of the 2001 Second Meeting were ADOPTED as printed in *QST*.

6. The President of the Radio Amateurs of Canada, Mr. Bill Gillis, VE1WG, sent his written greetings and regrets that RAC was unable to be represented at the meeting, and affirmed the desire of RAC to maintain a close relationship with ARRL.

7. Mr. Frenaye reported on the activities of the ARRL Foundation, and reported that the Foundation has assets totaling $2.15 million. He thanked the ARRL for the excellent support of the staff, particularly ARRL Foundation Secretary Mary Lau, N1VH.

8. At this point, Mr. Harrison assumed the Chair and opened nominations for the office of President. Mr. Goddard nominated Mr. Haynie. On motion of Mr. Bellows, seconded by Mr. Day, it was VOTED to close nominations. The Chair declared Mr. Haynie elected as President. (Applause).

9. Mr. Haynie returned to the Chair and opened nominations for the office of First Vice President. Mr. Bellows nominated Mr. Harrison. On motion of Mr. Goddard, seconded by Mr. Day, it was VOTED to close nominations. The Chair declared Mr. Harrison elected as First Vice President. (Applause).

10. The Chair opened nominations for the office of an additional Vice President. Mr. Fuller nominated Mrs. Craigie. Upon motion of Mr. Race, seconded by Mr. Milnes, it was VOTED to close nominations. The Chair declared Mrs. Craigie elected as an additional Vice President. (Applause).

11. The Chair opened nominations for the office of an additional Vice President. Mr. Bodson nominated Mr. Kanode. Mr. Goddard nominated Mr. Fried Heyn, WA6WZO. On motion of Mr. Butler, seconded by Mr. Fallon, it was VOTED to close nominations. At this point, the Chair appointed Mr. Stafford, Mr. Frahm, and Mr. Huntington as Tellers. The Tellers found 8 votes for Mr. Heyn, and 7 votes for Mr. Kanode, whereupon the Chair declared Mr. Heyn elected as an additional Vice President. (Applause).

12. The Chair opened nominations for the office of International Affairs Vice President. Mr. Maxwell nominated Mr. Stafford. On motion of Mr. Goddard, seconded by Mr. Bodson, it was VOTED to close nominations. Mr. Stafford was declared elected as International Affairs Vice President. (Applause).

13. The Chair opened nominations for the office of Treasurer. Mr. Frenaye nominated Mr. McCobb. On motion of Mr. Isely, seconded by Mr. Butler, it was VOTED to close nominations, whereupon the Chair declared Mr. McCobb elected as Treasurer. (Applause).

14. The Chair opened nominations for the office of Secretary. Mr. Frenaye nominated Mr. Sumner. On motion of Mr. Day, seconded by Mr. Isely, it was VOTED to close nominations, whereupon the Chair declared Mr. Sumner elected as Secretary. (Applause).

15. The Chair opened nominations for the office of Executive Vice President. Mr. Stinson nominated Mr. Sumner. On motion of Mr. Bellows, seconded by Mr. Butler, it was VOTED to close nominations, whereupon the Chair declared Mr. Sumner elected as Executive Vice President. (Applause).

16. The Chair opened nominations for the office of Chief Financial Officer. Mr. Sumner nominated Mr. Shelley. On motion of Mr. Day, seconded by Mr. Fallon, it was VOTED to close nominations, whereupon the Chair declared Mr. Shelley elected as Chief Financial Officer. (Applause).

17. The Chair opened nominations for the office of Chief Operating Officer. Mr. Sumner nominated Mr. Wilson. On motion of Mr. Race, seconded by Mr. Bodson, it was VOTED to close nominations, whereupon the Chair declared Mr. Wilson elected as Chief Operating Officer. (Applause).

18. The Chair opened nominations for the office of Chief Development Officer. Mr. Sumner nominated Ms. Hobart. On motion of Mr. Day, seconded by Mr. Stinson, it was VOTED to close nominations, whereupon the Chair declared Ms. Hobart elected as Chief Development Officer. (Applause).

19. The Chair opened nominations for Honorary Vice Presidents. Mr. Butler nominated Mrs. Evelyn Gauzens, W4WYR. There being no other nominations, it was unanimously VOTED to elect Mrs. Gauzens Honorary Vice President. (Applause).

20. The Chair opened nominations for Director members of the Executive Committee for one-year terms. Mr. Bodson nominated Mr. Butler. Mr. Day nominated Mr. Roderick. Mr. Frenaye nominated Mr. Fallon. Mr. Bellows

nominated Mr. Frenaye. On motion of Mr. Race, seconded by Mr. Goddard, it was VOTED to close nominations, whereupon the Chair declared Mr. Butler, Mr. Roderick, Mr. Fallon, and Mr. Frenaye elected as Executive Committee members. (Applause).

21. At this time the Chair yielded the floor to Mr. Frenaye. On motion of Mr. Frenaye, seconded by Mr. Butler, it was VOTED that Jay Bellows, K0QB, Greg Milnes, W7OZ, and Eugene Hastings, W1VRK, be re-elected for three-year terms on the ARRL Foundation. (Applause)

22. At this point, the officers reported on their activities during the second half of 2001. President Haynie reported on the many successful forums and meetings in which he participated over the last year. He plans to continue working to build a stronger relationship between the Board and the membership. He also reported that he felt the League's relationship with the FCC had improved and he was very pleased with the Amateur Radio Day at the FCC. Mr. Haynie thanked the various committee members for their hard work and understanding as the organization works its way through a few years of deficit spending. First Vice President Harrison's report echoed the President's words about Amateur Radio Day at the FCC and the good rapport with some of the FCC personnel. He covered his concerns over the need for strong resolve required to battle the tough CC&R issue. Vice President Craigie reviewed her work with the ARRL Education Project—the "Big Project"—and its successful fruition. She also detailed her work with the Volunteer Resources Committee and some ideas for promoting public interest in Amateur Radio. Vice President Kanode reported on his work with the Membership Services Committee and his pleasure with the growing success of the DXCC program. He outlined the importance of ARRL involvement in the new Homeland Security initiatives at the federal level. International Affairs Vice President Stafford described his extensive work on the Volunteer Resources and Novice Spectrum Study committees, and the outcomes of the IARU Region 2 Conference in Guatemala where he was elected Secretary of Region 2.

23. Mr. McCobb, as Treasurer, reviewed draft revisions to ARRL's Investment Policy Statement. At this time, on motion of Mr. McCobb, seconded by Mr. Stinson, it was unanimously VOTED that the revised Investment Policy Statement be approved. He then continued his report with an update on stock market activity and the allocation and performance of the investment portfolio over the last year. The Board was in recess from 9:52 AM until 10:11 AM.

24. Executive Vice President Sumner referred to his extensive written report and expressed his pleasure with the results of the Headquarters reorganization and the addition to staff of Ms. Hobart as CDO. He noted that 2002 will be a critical time for work on WRC2003 issues and he expects to be heavily involved with various projects in support thereof.

25. Chief Operating Officer Wilson outlined the activities of the Field and Educational Services, Membership Services, Laboratory, Volunteer Examiner, Editorial & Production, Advertising, Circulation, and Web/Software Development Departments. All departments are functioning well with special mention made of the success of the Certification—Continuing Education Program. Mr. Wilson expects that significant time will be spent in the coming months testing and learning new software systems in several departments.

26. Chief Financial Officer Shelley referred to his extensive written report, and characterized the League's financial position as being "as predicted" with an operating loss for the previous year. Significant improvements have been made to the Headquarters building's interior and to the computer system.

27. Chief Development Officer Hobart presented a detailed look at the principles of fund development and described her objectives and plans as she builds the League's new Development Program. The Defense of Frequencies campaign has been successful and will continue to draw attention. She also outlined plans for developing a Major Gifts Program and Planned Giving Program to go along with expanding efforts to fund existing campaigns such as the Education Project. The Board was in recess for luncheon from 12:01 PM until 1:10 PM when the group gathered for a photograph session. At 1:33 PM the Board reconvened with all persons hereinbefore mentioned.

28. Mr. Mansfield, Manager of Legislative and Public Affairs, supplemented his written report with a presentation explaining how ARRL can present its arguments to congresspersons regarding the need for FCC preemption of CC&Rs to reasonably accommodate Amateur Radio antennas.

29. Mr. Rinaldo, Technical Relations Manager, reported on the wide range of activities in which he and his staff at the ARRL's Washington D.C. area office are participating. Significant progress has been made on WRC2003 preparation including the 7 MHz band. Mr. Rinaldo reported on his work on ARRL committees including the Technology Task Force and the Ad hoc Spectrum Strategy Committee. The Board was in recess from 2:57 PM until 3:18 PM.

30. General Counsel Imlay supplemented his written report with further explanation on two areas of particular interest—the Petition for Rule Making of SAVI Technology, and an FCC Report and Order implementing the certification of Part 15 equipment in the 24.05 – 24.25 GHz band. Both proceedings deal with Part 15 devices with an interference potential that the ARRL believes exceeds the FCC's statutory authority.

31. Mr. Fallon, as Chairman, presented the report of the Membership Services Committee. One new entity, Ducie Island, was added to the DXCC Program as was a 30 Meter DXCC award and a QRP DXCC award. The DX and Contest Advisory Committees were commended for their work on the approval of Ducie Island for DXCC, and for a very detailed report on Club contesting issues respectively.

32. Mr. Maxwell, as Chairman, began his presentation on the activities of the Volunteer Resources Committee. The primary result of the Committee's work was an extensive draft revision of the Rules and Regulations of the ARRL Field Organization. Discussion ensued until the Board recessed at 5:18 PM. The Board was in recess until 8:35 AM on January 19, reconvening with all persons hereinbefore mentioned.

33. Mr. Maxwell continued with his report on the VRC's activities. On motion of Mr. Roderick, seconded by Mr. Maxwell, it was unanimously VOTED that the Public Service Honor Roll (PSHR) criteria, as amended by the Volunteer Resources Committee, are adopted.

34. On motion of Mr. Butler, seconded by Mr. Race, it was unanimously VOTED that the following resolution is adopted.

WHEREAS, Dr. Jim Hirschman, K4TCV, has been performing public service communications for over 50 years; and

WHEREAS, as a medical doctor, he is the "Fleet Surgeon" of the Waterway Net on 40 meters, who combines his amateur radio and medical skills to give on-air advice on a moment's notice; and

WHEREAS, his skills were put to the test when pirates attacked Jacco van Tuijl's boat in the Caribbean Sea off the coast of Honduras severely injuring his son Willem. Jim provided live on-air medical assistance for over 9 hours until the U.S. Coast Guard could evacuate the boy to proper medical facilities; and

WHEREAS, in a similar incident he provided critical medical advice to the crew of the Swedish sailboat "Lorna" when she was boarded by pirates and the skipper was severely injured; and

WHEREAS, these are but two examples of a lifetime of dedication to public service, that has made him well known internationally;

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors, assembled in formal session in Fort Worth, Texas, on this date, January 19, 2002, hereby conveys the International Humanitarian Award to Dr. Jim Hirschman, K4TCV, in recognition of a lifetime of medicine and public service communications that has touched so many lives and put our Service in such a positive light. (Applause).

35. On motion of Mrs. Craigie, seconded by Mr. Walstrom, it was unanimously VOTED that the following resolution is adopted.

WHEREAS, Amateur Radio's emergency communications capability ranks first among the bases and purposes of the service set forth in the FCC's Rules; and

WHEREAS, non-emergency public service communications events are training experiences which prepare Amateurs for service in both natural and man-made disasters; and

WHEREAS, since the founding of our League, the ARRL has sponsored programs which train, organize, and enable Amateur Radio volunteers to provide emergency communications support to charitable agencies and government authorities; and

WHEREAS, in these challenging times not only for our country but also for the entire civilized world, it is essential for Amateur Radio to offer the most efficient and effective emergency communications systems, including support for Homeland Security;

NOW, THEREFORE, BE IT RESOLVED, that the ARRL's Volunteer Resources Committee is directed to perform an in-depth study of the League's programs related to emergency communications and non-emergency public service communications, and to report recommendations for modernizing, streamlining, and increasing the effectiveness of these programs to the Board at the Annual Meeting in January, 2003.

36. Mr. Bellows, as Chairman, presented the report of the Election Committee. He expressed appreciation to the members of the ARRL staff who assisted with the opening and counting of thousands of Vice Director ballots. In addition to supervising the Director and Vice Director election process, the Committee considered questions regarding two elections for Section Manager. The Board was in recess from 9:09 AM until 9:30 AM.

37. President Haynie reported on the activities of the Executive Committee. He described the Committee's work on the CC&R issue and possible strategies to put forward in the near term. The Committee also studied the procedures and qualifications for ARRL Honorary Vice President.

38. On motion of Mr. Haynie, seconded by Mr. Fallon, it was MOVED that Standing Order 69 is amended to read as follows:

(69) Distinguished members of the League may be elected as Honorary Vice Presidents of the League in order to recognize their outstanding contributions to ARRL and Amateur Radio. Candidates may be nominated in accordance with the following criteria.

Service Eligibility: (a) Volunteers: Not less than 15 years of service as an official of the League, elected by the Board or the membership. (b) Staff: Not less than 25 years of service to the League, which could include prior or subsequent service as an elected official, similar to (a) above.

Achievement Eligibility: (a) Volunteers: Must have made an exceptionally notable contribution to the health and strength of ARRL

which is clearly and demonstrably above and beyond the call of duty. Must have demonstrated leadership among leaders, including service as either a committee chairman or officer. (b) Staff: Must have contributed significantly, above and beyond the call of duty, to the efficiency and unity of League affairs.

General Consideration: (a) There shall be an upper limit of ten Honorary Vice Presidents. (b) Not less than 60 days before the election of Honorary Vice Presidents, which shall take place only at Annual meetings of the Board, the Officer or Director making a nomination must supply a written biographical sketch to the Directors. This sketch shall fully substantiate the candidate's term of qualifying service and shall spell out in detail the candidate's extraordinary accomplishments that justify election as an Honorary Vice President. (c) No nomination may be made unless there is a current vacancy. (d) No elected official of the League or member of the staff may serve simultaneously as an Honorary Vice President. (e) The election of an Honorary Vice President requires eight affirmative votes cast by secret ballot. Only the fact of election or non-election shall be announced by the tellers. The vote count shall not be announced.

On motion of Mr. Walstrom, seconded by Mr. Isely, it was MOVED to amend the number of years of service for a volunteer to read "20 years" instead of "15 years," but the motion was LOST. On motion of Mr. Bodson, seconded by Mr. Milnes, it was MOVED to amend the original motion to change the upper limit of Honorary Vice Presidents to be "twenty" instead of "ten," but the motion was LOST. The question then being on the original motion, the same was ADOPTED. The Board was in recess from 10:10 AM until 10:28 AM.

39. Mr. Stinson, as Chairman, presented his detailed written and visual report on the activities and recommendations of the Administration and Finance Committee. He observed that while traditional revenues and expenses are roughly flat over the last few years, the Board has directed the ARRL into an expanded agenda that will require re-evaluation of priorities.

40. On motion of Mr. Stinson, seconded by Mr. Bodson, it was unanimously VOTED that League management is authorized to establish the page count of *QST*. The Board was in recess for luncheon from 12:02 PM until 12:52 PM, reconvening with all persons hereinbefore mentioned.

41. On motion of Mr. Stinson, seconded by Mr. Isely, it was MOVED that the 2002 budget submission is approved. On motion of Mr. Bellows, seconded by Mr. Maxwell, it was VOTED to amend the motion by adding the following resolution:

WHEREAS, the ARRL management and ARRL Board of Directors are committed to effectively and efficiently providing information of interest to all ARRL members; and

WHEREAS, the two primary means of providing information to members are *QST* magazine and the ARRL Web site; and

WHEREAS, ARRL management and the ARRL Administration & Finance Committee have proposed moving Section News and Contest Result line scores to the enhanced ARRL Web site in an effort to reduce ARRL operating losses while still affording a means of providing that information to ARRL members; and

WHEREAS, prior to deciding to relocate *QST* content from *QST* to the Web site it is desirable that members are aware of the reasons for the proposed relocation and the enhanced capabilities available on the Web site; and

WHEREAS, deferring the decision to relocate *QST* content will afford an opportunity to better understand the effect of such an action and investigate how best to provide this information and expanded content to members while being mindful of our fiscal responsibilities; and

WHEREAS, deferring the decision to relocate Section News and Contest Result line scores will afford an opportunity to evaluate variations and alternatives to the proposal.

NOW, THEREFORE, BE IT RESOLVED, that the determination of whether to relocate Section News and Contest Line scores from *QST* to the ARRL Web shall be deferred until the July, 2002 Board meeting.

The question then being on the motion as amended, the same was ADOPTED.

Roanoke Division Director Dennis Bodson, W4PWF, Past Vice President John Kanode, N4MM, and Roanoke Division Vice Director Les Shattuck, K4NK, gather for a photo at the Board meeting. Mr. Kanode served on the ARRL Board for 21 years.

42. Mr. Harrison, as Chairman, presented the report of the Spectrum Strategy Committee. He noted the creation of the Committee's Amateur Radio Interference Assessment (ARIA), which consists of a group of five well qualified members who will perform a noise study under approved test plan methodologies. The main goal of ARIA is to produce documented evidence of the interference being received by FCC-licensed services from unlicensed Part 15 devices.

43. On motion of Mr. Harrison, seconded by Mr. Butler, it was unanimously VOTED that the following resolution is adopted.

WHEREAS, electromagnetic compatibility is important to the Amateur Radio Service; and

WHEREAS, the work of the Ad Hoc Spectrum Strategy Committee has initiated the Amateur Radio Interference Assessment (ARIA) regarding Part 15 and other devices operating on frequencies allocated to the Amateur Radio Service; and

WHEREAS, a joint study and excellent working relationship exists with the FCC's Technological Advisory Council.

THEREFORE, IT IS RESOLVED that the ARIA Steering Group is created with the purpose of overseeing the work outlined in the ARIA Test Plan. The group shall consist of Officers, Directors, and staff as determined by the President.

44. On motion of Mr. Harrison, seconded by Mr. Fallon, it was unanimously VOTED that the following resolution is adopted.

WHEREAS, the Spectrum Strategy Committee (Stratcom) has initiated an important process in evaluating the impact of Part 15 and other devices operating in the Amateur Radio Service; and

WHEREAS, the remaining objectives of Stratcom are shared with the RFI Task Force.

NOW, THEREFORE, IT IS RESOLVED, that the remaining objectives and recommendations of Stratcom be transferred to the RFI Task Force. The RFI Task Force shall be renamed the Electromagnetic Compatibility Committee (EMC Committee). The current members of the RFI Task Force shall be appointed to the EMC Committee and additional members appointed by the President as necessary.

IT IS FURTHER RESOLVED, that the Spectrum Strategy Committee is discharged with thanks.

45. Mr. Harrison, as Board Liaison, presented the report of the SAREX/ARISS Working Group. The Space Station school contacts continue to be extremely popular with 32 such contacts thus far.

46. Mr. Harrison, as Chairman, presented the report of the Technology Task Force. The TTF continues its oversight of three subgroups: The Digital Voice Working Group, the High Speed Digital and Multimedia Working Group, and the Software Defined Radio Working Group.

47. Mr. Bodson, as Chairman, presented the written report of the RFI Task Group. He updated the Board on the status of some ongoing problems with good news about the TCI Cable modem noise issue which has largely been ameliorated. The biggest problem at present is that of power transmission line interference, and he cited the ARRL Lab staff for their excellent work on this subject for both the Committee and the membership.

48. Mr. Huntington, as Board Liaison, presented the report of the RF Safety Committee. He listed several examples of cases that have come directly or indirectly to the committee and which have received responses. Many inquiries are based upon misinformation which also tends to attract more publicity in popular media. The Committee would like to see the ARRL lab obtain updated software modeling tools to enable more accurate testing and evaluation.

49. Mr. Johnston, as Board Liaison, presented the report of the ARRL Public Relations Committee. The events of September 11, 2001, presented a real public relations challenge—how to make the most of the Amateur Radio participation and yet be sensitive to the main story. The Public Relations Handbook is nearly finished.

50. On motion of Mr. Fallon, seconded by Mr. Bodson, it was unanimously VOTED that, as recommended by the Public Relations Committee, Mr. Michaelangelo Conte is selected to receive the "2001 Bill Leonard W2SKE Professional Media Award." (Applause).

51. Mr. Frenaye, as Chairman, presented the report of the Historical Committee. The Committee thanked Mr. Maxwell and Trudy Maxwell, KC6NAX, for the week they spent at Headquarters searching and cataloguing the collection of artifacts—some of which date back to the beginnings of the ARRL. He also described efforts to find a suitable place to store and/or display items.

52. On motion of Mr. Frenaye, seconded by Mr. Maxwell, it was unanimously VOTED that up to $25,000 from the Fund for the Preservation of Historic Artifacts be made available for the construction and furnishing of an area to be used for inventory work and storage of historic artifacts, including moving items from the current storage area and the purchase of additional or replacement file cabinets as necessary.

53. Mr. Bellows, as Chairman, presented the report of the Ad Hoc Committee on ARRL Support of Antenna Cases. The Committee is pleased with the results in Florida of the Gorodetzer case. There also is a need for the Committee to develop a brief funding request form for future interested parties to mitigate the confusion felt presently in the membership over what criteria are used to determine eligibility. The Board was in recess from 2:37 PM until 2:44 PM.

54. Mr. Maxwell, as Chairman, reviewed revisions made to the proposed Rules and Regulations of the ARRL Field Organization by the Volunteer Resources Committee. On motion of

Mr. Frenaye, seconded by Mr. Roderick, it was MOVED that By-Law 24 be modified by adding, "A person removed from office by recall, shall not be eligible to be a candidate for Director or Vice Director for three years following removal from office." A roll call vote being required, the question was decided in the affirmative with all Directors voting aye.

55. On motion of Mr. Race, seconded by Mr. Maxwell, it was unanimously VOTED that the Rules and Regulations of the ARRL Field Organization, as amended by the Volunteer Resources Committee, are adopted.

56. At this point, the President announced the committee appointments as follows: *Administration and Finance*: Directors Bellows, Chairman; Stinson, Fuller, Day, Isely, Vice Director Fenstermaker, Vice President Harrison, and Treasurer McCobb. *Membership Services*: Directors Goddard, Chairman; Bodson, Fallon, Milnes, Frenaye, Vice Director Frahm, and Vice President Stafford. *Volunteer Resources*: Directors Maxwell, Chairman; Race, Walstrom, Butler, Vice Director Edgar, and Vice Presidents Craigie and Heyn. *Election*: Directors Stinson, Chairman; Goddard, and Fallon. *Industry Advisory Council:* Director Goddard, Chairman. *Electromagnetic Compatibility*: Director Bodson, Chairman. *Public Relations*: Diane Ortiz, K2DO, Chairman; Vice Director Johnston, Rich Moseson, W2VU; Jeff Reinhardt, AA6JR; Jim McDonald, KB9LEI; Phyllisan West, KA4FZI; Gary Pearce, KN4AQ; Tom Webb, WA9AFM; and Bob Josuweit, WA3PZO. *RF Safety*: Vice Director Huntington, Liaison. *SAREX/ARISS*: Roy Neal, K6DUE, Frank Bauer, KA3HDO, and Vice President Harrison. *Technology Task Force*: Vice Directors Huntington, Chairman, Raisbeck, and Director Frenaye. *Historical*: Directors Frenaye, Chairman, Maxwell, Treasurer McCobb, and Al Cohen, W1FXQ. *Antenna Defense*: Directors Bellows, Chairman; Fallon, Counsel Imlay, and Jim O'Connell, W9WU.

57. Mr. Goddard, as Chairman, presented the report of the Industry Advisory Council. The Japan Amateur Radio Industry Association said it was unable to implement the Council's *Recommended Interface Standards for Amateur Radio Equipment* at this time, but pledged to look for opportunities to implement standards in the future. He also reported on a teleconference with FCC's Dr. Mike Marcus, N3JMM, who recommends promoting software-defined radios as a way to increase experimentation within Amateur Radio.

58. Mr. Frenaye, as Liaison, reported on the activities of the Contest Advisory Committee. Ned Stearns, AA7A, Chairman of the CAC, led the Committee in a detailed review of the ARRL Club Competition program. The Committee considered possible rule changes to increase participation in Club Competition, and in the end recommended some changes while leaving the overall program structure the same.

59. Mr. Roderick, as Liaison, delivered the report of the DX Advisory Committee. The main task of the Committee was the study and adoption of Ducie Island as a new entity.

60. The Board noted the written report of ARDF Coordinator Joe Moell, K0OV, which covered recent events including a recap of the first USA ARDF Championships held in Albuquerque July 31 through August 4, 2001. Preparations are underway for Team USA's participation at the 2002 World Championships in Slovakia in September 2002.

61. Mr. Stafford, as Chairman, presented the report of the Novice Spectrum Study Committee. The Committee's report included its recommendations and a sampling of comments from some of the 4744 respondents to a survey placed on the ARRL Web site and in *QST*. On motion of Mr. Stafford, seconded by Mr. Race, it was MOVED that the following resolution be adopted.

WHEREAS, the FCC in a 1999 Report and Order stated it would no longer issue Novice Class Amateur Radio Licenses after April 15, 2000; and

WHEREAS, at Minute 66 of the January, 2001 Annual Meeting the President was authorized to appoint a committee to study the issue of "re-farming" the Novice bands through solicitation of input from the Amateur Radio community; and

WHEREAS, the Committee, using *QST* and the ARRL Website, sought input from the entire Amateur Radio community; and

WHEREAS, the committee received input from approximately 5000 amateurs on this issue; and

WHEREAS, a large majority of responses indicated a preference for expansion of the phone bands.

NOW, THEREFORE, IT IS RESOLVED that the ARRL Executive Vice President and Counsel are instructed to file a petition containing the following request for changes in the phone, CW, and digital and image mode portions of the following bands:

80 Meters phone, image, CW:

General Class	3800 to 4000 kHz
Advanced Class	3725 to 4000 kHz
Extra Class	3700 to 4000 kHz

40 Meters phone, image, CW:

General Class	7175 to 7300 kHz
Advanced Class	7125 to 7300 kHz
Extra Class	7125 to 7300 kHz

15 Meters phone, image, CW:

General Class	21250 to 21450 kHz
Advanced Class	21200 to 21450 kHz
Extra Class	21175 to 21450 kHz

IT IS FURTHER MOVED that the CW only portion of the following bands, available to Novice Class and Technician Plus Class licensees, be amended as set out below:

80 Meters	3525 to 3700 kHz
40 Meters	7025 to 7125 kHz
15 Meters	21025 to 21175 kHz

AND FURTHER MOVED that the CW, RTTY and data band available to Novice and Technician Plus licensees of 28100 to 28300 kHz be expanded to 28000 to 28300 kHz;

AND FURTHER MOVED that Novice and Technician Plus licensees shall be limited to 200 watts output power when operating CW or digital modes within these expanded band segments. Section 97.313 (C) (1) shall be amended so as to apply only to the 10100 – 10150 kHz band.

On motion of Mr. Roderick, seconded by Mr. Walstrom, it was VOTED to amend the parts of the resolution regarding 80 Meters and 15 Meters to read:

80 Meters phone, image, CW:

General Class	3800 to 4000 kHz
Advanced Class	3750 to 4000 kHz
Extra Class	3725 to 4000 kHz

15 Meters phone, image, CW:

General Class	21275 to 21450 kHz
Advanced Class	21225 to 21450 kHz
Extra Class	21200 to 21450 kHz

And, correspondingly, CW for Novice and Technician Plus licensees on 80 meters from 3525 to 3725 kHz, and on 15 meters from 21025 to 21200 kHz.

The question then being on the amended motion, it was unanimously VOTED to adopt same.

62. At this point the Board considered Directors' motions.

63. On motion of Mr. Roderick, seconded by Mr. Isely, it was unanimously VOTED to ADOPT the following resolution:

WHEREAS, Section 301 of the Communications Act requires that all interstate or intrastate communications, and operation of devices which may interfere with other communications must be done pursuant to an FCC license; and

WHEREAS, there is no exception to this statutory requirement relative to Part 15 devices, and therefore FCC's jurisdiction to allow the manufacture and sale of Part 15 devices must be premised on a finding that the devices will not cause interference to licensed services; and

WHEREAS, Section 302(a) of the Communications Act does <u>not</u> entitle FCC to permit unlicensed devices which have substantial interference potential to licensed services;

NOW, THEREFORE, BE IT RESOLVED, that the ARRL's Washington Advocacy team is directed to pursue, by means of a petition for reconsideration in ET Docket 98-156; by comments in ET Docket 01-278, and by other necessary means, a clear statement from FCC acknowledging the limit of its statutory jurisdiction to authorize the manufacture and sale of unlicensed Part 15 devices, imposed by 47 U.S.C. section 301.

64. On motion of Mr. Fallon, seconded by Mr. Bodson, it was MOVED that the following resolution be adopted:

WHEREAS, it is important to advertise Amateur Radio when responding to disasters and while communicating at special events;

NOW, THEREFORE, IT IS MOVED that staff be tasked with designing and developing a distinctive garment similar to that used by Red Cross volunteers, which can be sold by ARRL to our ARES volunteers and worn by them when responding.

Mr. Butler moved, seconded by Mr. Day, that the matter be referred to staff for study, but the motion failed. On motion of Mr. Day, seconded by Mr. Stinson, it was unanimously VOTED to refer the matter to the Volunteer Resources Committee for study.

65. On motion of Mr. Frenaye, seconded by Mr. Roderick, it was unanimously VOTED that the Membership Services Committee review existing VHF, UHF, and Microwave contest and awards programs and make recommendations on ways to increase interest and participation.

66. Mr. Bodson moved, seconded by Mr. Milnes, that the ARRL omnibus filing shall petition the FCC to revise Part 97 of its rules to permit data emissions in the MF/HF bands where phone emissions are authorized. This can be achieved by adding the word "data" to each line that says, "phone, image" in 97.305. In addition, modify 97.307(f)(2) by deletion of the words "image and phone." Following discussion, the motion was LOST.

67. On motion of Mr. Isely, seconded by Mr. Harrison, it was VOTED that "Moved and Seconded" be moved from *QST* but be published on the ARRL Web and other media.

68. On motion of Mr. Maxwell, seconded by Mr. Milnes, it was VOTED that the MSC study a digital bandplan for the 40 Meter band, anticipating favorable FCC response to the ARRL Spectrum Refarming proposal.

69. On motion of Mr. Goddard, seconded by entire assembly, it was unanimously VOTED to thank staff, especially Lisa Kustosik, KA1UFZ, and Stacy Rogers, for their hard work to ensure the success of this function. (Applause).

70. There being no further business, those present were invited to make informal closing comments and the meeting was adjourned at 5:23 PM. (Time in session as a Board: 13 hours, 51 minutes).

Respectfully submitted,

David Sumner, K1ZZ
Secretary

League Eyes Congressional Action on CC&Rs

The ARRL got the proverbial lump of coal in its stocking in late December, but it wasn't from Santa. The FCC affirmed a November 2000 staff-level decision that declined to include privately imposed deed covenants, conditions and restrictions—CC&Rs—under the limited federal preemption known as PRB-1. That policy requires municipalities to "reasonably accommodate" amateur communication in antenna-related zoning and regulation.

In its *Application for Review* in late 2000, the ARRL maintained that the FCC should have the same interest in the effective performance of an Amateur Radio station and in the promotion of amateur communications regardless of whether the licensee's property is publicly regulated or privately governed by homeowners' associations and their architectural control committees. The ARRL had appealed to have the full FCC review the earlier denial.

The Commission turned down the League's *Application for Review* in a *Memorandum Opinion and Order* released December 26.

"There has not been a sufficient showing that CC&Rs prevent Amateur Radio operators from pursuing the basis and purpose of the Amateur Service."—FCC

"There has not been a sufficient showing that CC&Rs prevent Amateur Radio operators from pursuing the basis and purpose of the Amateur Service," the FCC said. The Commission said hams still can get on the air without installing residential antenna systems by operating away from home, while mobile or at club stations.

The FCC said it recognizes the importance of preserving the integrity of contractual relations that CC&Rs represent. It asserted that the ARRL had submitted no specific evidence that would persuade it to abandon its long-standing policy of excluding CC&Rs from PRB-1.

ARRL President Jim Haynie, W5JBP, expressed disappointment in the Commission's ruling. "The biggest problem Amateur Radio operators face today is being able to put up an antenna," Haynie said. "Our only approach now is to get a bill into Congress."

The FCC itself even hinted that Congressional action ought to be a next logical step. "However, should Congress see fit to enact a statutory directive mandating the expansion of our reasonable accommodation policy," the FCC declared in its *MO&O*, "the Commission would expeditiously act to fulfill its obligation thereunder."

Haynie conceded that extending PRB-1 protection to CC&Rs would be "a tough sell" to members of Congress. He noted, however, that it's getting more difficult all the time for amateurs to find desirable housing that does not come with deed covenants and restrictions.

The topic was the focus of additional discussion at the January meeting of the ARRL Board of Directors. See the related article elsewhere in this issue. Also see "FCC in Denial, Puts CC&R Monkey on Congress' Back" on page 15 of this issue.

New Hampshire Supreme Court Antenna Decision Boosts PRB-1

A New Hampshire ham appears to have won a battle to erect an antenna support structure on his property. It remains to be seen, however, whether Jerry Muller, K0TV, of Hudson will be allowed to erect the extensive system of towers that he'd originally planned. In a 4-0 vote, with one justice abstaining, the Supreme Court of New Hampshire reversed a lower court ruling that ordered Muller, an ARRL Life Member, to dismantle the three towers he had erected on part of his six-acre residential tract.

Writing for the court in *Marchand v. Town of Hudson*, New Hampshire Chief Justice David A. Brock concluded that the lower court's order violated the limited federal preemption known as PRB-1 as well as New Hampshire's statutory codification of PRB-1. "In light of the FCC's clear directive, we agree that the superior court erred when it ordered the towers removed," Brock stated in a ruling issued December 31, 2001. The Supreme Court ruling vacates the dismantling order and sends the matter back to the town's zoning board of adjustment.

ARRL New England Division Vice Director and Volunteer Counsel Mike Raisbeck, K1TWF, represented Muller in written and oral arguments before the New Hampshire Supreme Court. ARRL General Counsel Chris Imlay, W3KD, also filed an *amicus* brief on ARRL's behalf.

Unlike many amateur antenna battles, this case did not pit Muller against the town. In December 1998, Muller applied for a permit to erect three 100-foot antenna structures on his property, and the Town of Hudson granted the permit. Three of Muller's neighbors appealed the grant, but the Hudson ZBA affirmed it. The neighbors then sued the town and won, resulting in the order for Muller to dismantle that's now been vacated.

While Muller has won the right to get on the air in some capacity, he will still have to make a case for his proposed three-tower installation. Brock agreed with the lower court that Muller's three-tower installation did not qualify as a "customary, incidental and subordinate" accessory use under Hudson's ordinance.

Nevertheless, Brock said that Muller's installation may be permitted within the framework of PRB-1, if Muller can demonstrate that his three towers are necessary to "reasonably accommodate" his communications needs.

Thirteen states have incorporated PRB-1 into their statutes.

FCC GATHERS COMMENTS ON AMATEUR RADIO-RELATED PETITIONS

The FCC has collected comments on several rule making petitions put on public notice in December and January.

- A proposal from Bill Tippett, W4ZV, and Jeff Briggs, K1ZM, seeks to have the FCC subdivide 160 meters into mode-specific subbands. The petition was designated

Rick Lindquist, N1RL ♦ Senior News Editor

REALLOCATION SPARES 219-220 MHz AMATEUR SLOT

Amateur Radio's secondary allocation at 219-220 MHz remains intact in the wake of an FCC spectrum reallocation of 216 to 220 MHz and other bands. The FCC declined, however, to go along with ARRL's request to expand amateur access to 216 to 220 MHz. On a brighter note, the Commission potentially relieved spectrum competition for Amateur Radio at 2.3 GHz by making space available elsewhere.

The FCC acted December 21, 2001, in ET Docket 00-221 and in several other proceedings that it lumped into a single *Report and Order and Memorandum Opinion and Order* released January 2, 2002. The FCC Order reallocated 27 MHz of spectrum in seven bands from government to non-government use. Some of the spectrum will be put up for bid in public auctions. The Commission allocated 216 to 220 MHz to the fixed and mobile services (co-primary), although some government systems in the band will remain.

"We are pleased that the FCC has found suitable spectrum for MicroTrax and AeroAstro other than at 2300-2305 MHz," said ARRL Executive Vice President David Sumner, K1ZZ, referring to two commercial competitors. "We hope this will clear the way for an upgrade to primary status at 2300-2305 MHz for the Amateur Service."

MicroTrax has sought access to 2300 to 2305 MHz and other bands for a proposed Personal Location and Monitoring System to enable tracking of people and objects. AeroAstro has proposed sharing the band with amateurs on a co-primary basis for its Satellite Enabled Notification System global messaging service. Both indicated interest in the 1670-1675-MHz band; MicroTrax also has said that 2385-2390 MHz might be a good fit. The FCC also noted comments from ArrayCom that the 1670-1675-MHz band would be suitable for its i-BURST high-speed data system, now operating experimentally at 2.3 GHz.

Sumner was less enthusiastic about the FCC's action at 216 to 220 MHz as it impacts the Amateur Service. "While the limited secondary allocation to the Amateur Service at 219 to 220 MHz is being maintained, the more intensive use of 216 to 220 MHz by commercial services is likely to preclude amateur use of the band in many parts of the country," he commented.

The amateur 219-220-MHz allocation is secondary to the Automated Maritime Telecommunications System (AMTS). Amateurs may install and operate point-to-point digital message-forwarding systems there, but only under strict limitations.

FCC TO ALLOW HIGHER-POWER PART 15 DEVICES AT 24 GHz

Despite objections from the ARRL, the FCC has announced plans to amend its Part 15 rules to allow fixed point-to-point transmitters in the 24.05 to 24.25 GHz band to operate at field strengths of up to 2500 mV per meter. That's 10 times the level currently permitted. Among other interference safeguards, the FCC will require devices operating at these higher field strengths to use highly directional antennas. Amateur Radio is primary at 24.0 to 24.05 GHz and secondary on the rest of the band. The AO-40 satellite includes beacon, digital and analog transmitters in the vicinity of 24.048 GHz.

"This band has accommodated unlicensed transmissions, government radar and amateur facilities with no major conflicts," the FCC said.

The FCC first proposed permitting the Part 15 devices at the elevated field strengths in 1998, in response to a *Petition for Rule Making* from Sierra Digital Communications Inc. Sierra had requested that its proposal be authorized to include a portion of the 24.0 to 24.05 MHz segment, but ARRL had argued that such a move would adversely affect amateur operations there, and the FCC agreed. The FCC finally acted in the three-year-old proceeding, ET Docket 98-156, on December 11 in a *Report and Order* that closely mimics its earlier *Notice of Proposed Rule Making*.

The FCC took issue with ARRL's assertion that the FCC should acknowledge that Part 15 devices are only allowed under the Communications Act when they pose no interference potential to licensed services. The FCC called ARRL's interpretation "overly conservative."

BROADCASTER, UTILITY ASKED TO HELP CURE WEIRD INTERFERENCE

The FCC has written a Cincinnati AM radio station and the electric utility serving

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as RM-10352. Tippett and Briggs contend that the ARRL band plan for 160 meters—modified last year after lengthy consideration by the *ad hoc* ARRL 160-Meter Band Plan Committee on which both men sat—does not go far enough and is unenforceable. They want the FCC to prohibit SSB, AM and other wideband modes below 1.843 MHz—something the revised ARRL band plan already recommends.

Tippett and Briggs made it clear that while the topic of their petition did arise during the ARRL committee's deliberations, their petition is an independent effort with no connection to the committee or the ARRL. A copy of Briggs' book, *DXing on the Edge—The Thrill of 160 Meters*, accompanied the 18-page petition. The book is published by ARRL.

• The Quarter Century Wireless Association (QCWA) has asked the FCC to change its amateur vanity call sign system rules to permit individual amateurs to, in effect, bequeath a call sign to a designated club as an "in memoriam" call sign. The FCC designated the petition as RM-10353. The QCWA notes that the current vanity rule "excludes current licensees from speaking for themselves" while they're still alive and "requires their relatives to speak for them *post mortem*."

• Novice licensee John S. Rippey, W3ULS, has petitioned the FCC to grant Novice and Technician (with Element 1 credit) licensees new or expanded operating privileges on 80, 40, 30, 17, 15, 12 and 10 meters. His suggestions include SSB privileges for Novices and Tech Plus licensees on 17 and 12 meters. The FCC designated the petition as RM-10354.

• The NASA John H. Glenn Research Center Amateur Radio Club is seeking a modification in wording to the Part 97 rule that already permits amateur retransmission of NASA manned shuttle communications. The petition was designated as RM-10355. The club wants the Amateur Service rule, Sec 97.113(e), to include International Space Station communications as well as any manned spacecraft in the future.

• Don Schellhardt and Nick Leggett, N3NL, want the FCC to require that all electronic equipment subject to the Commission's jurisdiction be shielded against electromagnetic pulse (EMP) damage. The proposal, as drafted, would apply to both new and existing equipment that falls within its scope. If the petitioners have their way, that would include Amateur Radio equipment. The FCC designated the petition as RM-10330.

EMP—a high-voltage wave of electromagnetic energy—already is known to be a side effect of a thermonuclear explosion. But Schellhardt and Leggett

that region to help resolve an unusual and longstanding interference situation affecting local amateurs. Sharon Bowers of the FCC's Consumer Information Bureau in December wrote Clear Channel-owned WLW (700 kHz; 50,000 W nondirectional) and power company Cinergy Corp citing numerous reports of apparently spurious signals associated with WLW transmissions that have been monitored over a wide area and frequency range.

"Many of these reports indicate that, although the noise is associated with WLW transmissions, the strongest signals appear to be originating some distance from the WLW transmitter site, possibly on a high-voltage tower owned by Cinergy Corp," Bowers wrote. The FCC said the circumstances suggest that multiple sources of interference are involved.

One of the amateurs affected—Bob Reiff, WA8ULW, of Mason, where WLW's tower is sited—said that while the noise is most noticeable on 160 meters, it's showing up elsewhere.

Bowers expressed the FCC's appreciation to WLW and Cinergy for their "considerable efforts" to locate the noise source and cause. The FCC, she added, "recognizes that this is an unusual case, and the source could turn out to be something unexpected."

Amateur Enforcement

♦ **Schoenbohm, Mitnick applications designated for hearings:** The FCC has designated for hearing Amateur Radio applications from former licensee Herb Schoenbohm, ex-KV4FZ, who wants to return to his favorite pastime, and from convicted computer hacker Kevin Mitnick, N6NHG, who wants to renew his General ticket. Assuming that both cases go forward, their outcomes could hinge on character issues.

In April 2001, only a few months after losing his battle to renew his ham ticket and his operating authority had expired, Schoenbohm applied for a new Amateur Radio license and passed the General exam. The FCC designated the pending application for hearing, to determine, in part, if Schoenbohm, who lives in Kingshill, Virgin Islands, now is "rehabilitated" following a 1992 fraud conviction and allegations that he lied to the FCC during his renewal hearing, and that he again deserves to be an FCC licensee.

The FCC didn't mince words in its *Hearing Designation Order*, released January 6 in WT Docket No 01-352. Schoenbohm's "previous criminal behavior, misrepresentation and lack of candor warranted denial of his renewal application," the *Order* said. "Mr. Schoenbohm is a convicted felon and was found to have misrepresented facts and lacked candor in his testimony in that hearing."

The FCC said, however, that what's past is past, and it does not intend to rehash Schoenbohm's earlier case in the current proceeding. Now, the Commission says, it needs to know if Schoenbohm "could be relied upon to observe our rules and policies and deal with the Commission in an honest and forthright manner."

"Absent a demonstration by Mr. Schoenbohm that he now possesses the requisite character qualifications to be a Commission licensee, his pending applications may not be granted," the FCC added. Schoenbohm vowed last year to return to Amateur Radio.

The FCC cited the Schoenbohm case in Mitnick's hearing *Order*. Mitnick's history of illegal computer-related activity—which includes several convictions and prison sentences—dates back more than a decade. Not long after his latest US District Court conviction in August 1999, Mitnick filed with the FCC to renew his General ticket.

"Mr. Mitnick's criminal background raises a substantial and material question of whether he possesses the requisite character qualifications to be and remain a Commission licensee," the FCC said in its *Hearing Designation Order* released December 21. "Given his propensity to engage in criminal activities, particularly those involving fraud, we have serious reservations about Mr. Mitnick's ability to comply with our rules and regulations in the future."

In 1999, Mitnick was sentenced to 46 months in federal prison, the FCC said, after pleading guilty to wire fraud, computer fraud and illegally intercepting a wire communication—all felonies. Prior to that, the FCC *Order* stated, he'd received a 22-month term for possessing cloned cell phones and for violating his supervised release after a 1989 conviction for computer fraud. He's currently on probation following his January 2001 release from federal prison. Mitnick's license expired December 12, 1999, but he may continue to operate while his application is pending.

Mitnick and Schoenbohm would bear the burden of proof in their proceedings before an administrative law judge.

claim that terrorists could initiate an EMP using other technology—so-called "E bombs"—developed by the US military but, as yet, untested on a major scale.

Leggett said the primary intention of the petition was to promote serious discussion on the EMP issue—especially in the wake of the September 11.

Interested parties may view the petitions and comments filed via the FCC's Electronic Comment Filing System (ECFS), **www.fcc.gov/e-file/ecfs.html**.

ARISS CONTACT MARKS MARCONI ANNIVERSARY

One hundred years ago this past December in Newfoundland, Guglielmo Marconi used a kite to hoist his receiving antenna aloft to hear the first radio signal to ever span the Atlantic—the simple Morse letter "S." Marconi likely would have been blown away with astonishment if he could have seen youngsters—on the centennial of his epochal accomplishment—sitting where he once sat and carrying on a radio conversation with someone in a spacecraft.

The successful December 12 Amateur Radio on the International Space Station (ARISS) contact between special event station VO1S on Signal Hill, Newfoundland, and astronaut Frank Culbertson, KD5OPQ, operating NA1SS in space was just one of the events to celebrate Marconi's transatlantic reception in 1901. During the contact, 10 students got to quiz Culbertson about life in space. The ninth-graders were winners of a crystal-set building competition associated with the centennial observance.

ARISS mentor Charlie Sufana, AJ9N, said the question that got the most response from the audience was from Chris Mong, 13. Mong wanted to know if the force of a

SONRA

Sudents at Signal Hill in Newfoundland queue up to ask their questions during the Marconi transatlantic commemorative ARISS QSO December 12, 2001. VO1S operators were Graham Dillabough, VO1DZA/VE6KJ (holding mike) and Bob Bruninga, WB4APR, lower right. SONRA President Brad Sheppard, VO1XA, is standing behind Dillabough.

SONRA

The VO1S ISS/satellite antenna system.

sneeze on the space station would propel you backward. Culbertson said it could.

Fourteen-year-old Ashley Evans wanted to know how the crew members brush their teeth in space. "The only difference between brushing your teeth in space and on the ground is that most people end up swallowing the toothpaste, since we don't have a sink with running water to get rid of it in," Culbertson explained.

The ARISS contact—only the third to involve Canadian students—was arranged with the assistance of Memorial University of Newfoundland, the Institute of Electrical and Electronics Engineers, and the Society of Newfoundland Radio Amateurs. The commemorative event marked the first time an ARISS school contact was scheduled while a shuttle was docked with the ISS.

RHODE ISLAND SM ARMAND LAMBERT, K1FLD, SK

Rhode Island ARRL Section Manager Armand E. Lambert, K1FLD, died December 31, 2001, at his home in Woonsocket following a lengthy illness. He was 58.

"Armand was one of the nicest people I've ever met, and he was a steady hand as Rhode Island Section Manager," said New England Division Director Tom Frenaye, K1KI. "He was someone who really left the world better as a result of his efforts."

In 1999, Lambert outpolled two other candidates to succeed Rick Fairweather, K1KYI, who did not seek another term, and he ran unopposed for re-election two years later. Lambert was a regular participant in the New England Division cabinet meetings and, on Field Day, he made it a practice to visit as many sites in Rhode Island as possible. He also was president of the Blackstone Valley Amateur Radio Club.

Field and Educational Services Manager Rosalie White, K1STO, has named Assistant Rhode Island SM Robert G. "Bob" Beaudet, W1YRC, to succeed Lambert. Beaudet, 63, will serve out the remainder of Lambert's term of office, which expires in June 2003.

Lambert's wife, Simone, KA1YVF, reported that Armand had suffered a recurrence of kidney cancer last fall. A memorial service was held January 12.

Beaudet had been serving as an Assistant SM under Lambert and worked closely with him during his illness. An ARRL Life Member from Cumberland, Beaudet has held several League appointments in the past.

Spark Gap Signal Heard for Hundreds of Miles

David Wilson, VE3BBN, reports his commemorative spark gap transmissions December 12 to celebrate the 100th anniversary of Marconi's 1901 transatlantic experiments were heard hundreds of miles away. Wilson, who lives near Niagara Falls, Ontario, built a low-power rotary spark transmitter and secured permission from Industry Canada (that country's FCC equivalent) to use it briefly on 80 meters. He transmitted "MARCONI S" twice a minute and said he got more than 450 reports but estimated that only about 60 of them were valid. "The best distance was Kansas City," he said—some 850 miles away. He noted that the majority of the reports were in the 200 to 400-mile range. Additional information, photos and audio of what his transmitter sounds like are available on the "Spark Gap Transmitter Signals for Marconi Centennial" Web site, **www.qsl.net/g4rfr/marconi.htm**.

DAVID LAWRENCE, VA3ORP

David Wilson, VE3BBN, demonstrates his rotary spark gap transmitter.

In Brief

• **Vote on *QST* Cover Plaque Award:** The winner of the *QST* Cover Plaque Award for December 2001 was Joe Taylor, K1JT, for his article "WSJT: New Software for VHF Meteor-Scatter Communication." Congratulations, Joe! The winner of the *QST* Cover Plaque award—given to the author of the best article in each issue—is determined by a vote of ARRL members. Voting takes place each month on the Cover Plaque Poll Web page, **www.arrl.org/members-only/qstvote.html**. As soon as your copy arrives, cast a ballot for your favorite article!

• **DARA announces 2002 scholarships:** The Dayton Amateur Radio Association has announced the availability of scholarships for the 2002-2003 academic year. Applicants must be graduating high school seniors in 2002 and hold an FCC Amateur Radio license of any class. DARA grants scholarship awards of up to $2000, toward tuition at an institution of higher education. To obtain an application, send a self-addressed, stamped envelope to DARA Scholarships, ATTN: DARA Scholarship Committee Chairman Gary Des Combes, N8EMO, 9873 Lower Valley Pike, Medway, OH 45341, or via e-mail to Gary Des Combes, **n8emo1@msn.com**. Completed applications must be postmarked by June 1, 2002.

• **ARRL reminds FCC of "legacy" amateur microwave allocation:** The ARRL has reminded the FCC that the Amateur and Amateur-Satellite Services have primary access to the 75.5 to 76.0 GHz band—a so-called "legacy" allocation—until 2006. Loea Communications Corporation filed a *Petition for Rule Making* in September seeking to establish Part 101 licensing and service rules for fixed, point-to-point operation in that part of the spectrum using narrow beamwidth antennas. In reply comments the ARRL noted that neither the petitioner nor any commenters had mentioned the amateur allocation, due to phase out as a result of a shift in amateur allocations at WRC-2000. The ARRL said it had no objection to Loea's petition but wanted the FCC to note in any rules it adopts that the Amateur Service is entitled to operate at 75.5 to 76 GHz on a primary basis until 2006. QST

Ranger Communications RCI-5054DX 6-Meter Transceiver

Reviewed by Joe Bottiglieri, AA1GW
Assistant Technical Editor

It's already clear that Cycle 23 will be going down in ham history as the best yet for 50-MHz fans. For years, we younger folks could only stand by and listen quietly as Old Timers reminisced about the incredible worldwide 6-meter openings they witnessed during the peaks of the legendary cycles of the hollow-state age. Now, however, a few of us—bona fide members of "generation solid-state"—have impressive 6-meter cycle-peak DX tales of our own to tell.

Impeccable Timing

Ranger Communications recently added several new transceivers to its Amateur Radio lineup. These include three tabletop/rack-mount transceivers—two for 10 and 12 meters and a single-bander for 10—and a mobile rig for the 6-meter band. The RCI-5054DX 6-meter all-mode, the focus of this review, first hit dealers' shelves last July. Considering the tremendous 6-meter propagation that we've been experiencing over the last several months, it's hard to imagine Ranger's release of this radio could have been timed any better.

The Big Picture

The RCI-5054DX covers 50 to 54 MHz in the SSB, CW, FM and AM modes. Maximum power output is 25 W for SSB, and 10 W for the other modes. Features include 10 memory channels, a relative SWR indicator, an all-mode squelch, a noise blanker/antenna noise limiter, memory and VOX scanning, programmable scan and band limits and transmit/receive frequency offset capabilities (for repeater and split operation).

The '5054 shares faceplate, enclosure and chassis components with Ranger's classic—and somewhat hefty—'2900-series mobile transceivers. A peek under the covers of this new rig, however, reveals a big double-sided glass/epoxy printed circuit board that's rather sparsely populated with surface mount components.

Frankly, there's an awful lot of underutilized space inside this cabinet. It's likely that the conversion to surface mount technology in its most recent products (the changeover occurred within the last couple of years) provided Ranger with a tempting opportunity to decrease overall radio dimensions—and this should certainly be a consideration for companies marketing contemporary mobile equipment. By retaining all of the existing—albeit oversized—exterior components used in the manufacture of some of its earlier radios, though, the company could avoid considerable re-engineering and retooling costs. While most of the other ham radio manufacturers are focusing on ever smaller and sexier packaging, Ranger chose an alternative route. They evidently believe they can lure traditionally frugal ham customers with *functional* styling, but attractive *pricing*. Hmmm…maybe bigger *is* better?

The transceiver's large LCD display is easy to read from most angles. The exception: viewing angles below perpendicular to the screen. From these vantage points the segments essentially vanish. A mounting location on a high shelf or in an overhead console probably won't cut it. Glare and washout can also be a problem—especially in a mobile installation. Keep these factors in mind when choosing a permanent mounting position.

Big frequency digits, a signal strength/RF power/SWR bargraph-style meter and an extensive collection of feature icons appear as black segments on a teal background. The display and key illumination can be set to one of three different levels or shut off entirely.

Front panel controls include the main tuning knob, a small army of pushbuttons and seven rotary controls. The tuning knob—located in the upper left-hand corner—has a detented action (40 clicks per revolution—4 kHz per revolution at the 100 Hz tuning step size). There are also CHANNEL up and down buttons on the top of the included hand mike, and Δ and ∇ buttons on the front panel. Any of these can be used to tune around in the VFO mode.

The available tuning step sizes are 1 MHz; 100, 10 and 1 kHz; and 100 Hz. The step increment is selected via a "shift" key. Each press of the SHF button repositions an arrow cursor under one of the digits in the display. The mike buttons, the tuning knob or the Δ/∇ buttons are then used to increase or decrease the selected digit's value. This arrangement works very well for rapidly hopping around on the band.

The minimum step size for transmit tuning is 100 Hz. A CLR (clarifier) control knob…*all right*, RIT for you purists… allows the receive frequency to be varied anywhere within ±2.5 kHz of the transmit frequency. For the receive and transmit frequencies to match, the indicator on the knob must be set to the 12 o'clock position. It would be handy if the control had a detent at this "zero-offset" setting.

I found the main tuning knob a bit too

Bottom Line

The Ranger RCI-5054DX all-mode transceiver has made gearing up for 6 meters considerably more affordable.

Joe Bottiglieri, AA1GW ♦ Assistant Technical Editor

Table 1
Ranger RCI-5054DX, serial number TIY00796

Manufacturer's Claimed Specifications	*Measured in the ARRL Lab*
Frequency coverage: receive and transmit, 50-54 MHz.	Receive and transmit, as specified.
Power requirements: 13.8 V dc; current consumption not specified.	Receive, 0.30 A; transmit, 4.6 A, tested at 13.8 V.
Modes of operation: CW, USB, LSB, FM, AM.	As specified.
Receiver	***Receiver Dynamic Testing***
CW/AM Sensitivity, 10 dB (S+N)/N: 0.5 μV.	Noise floor (MDS)[1]: 50 MHz –135 dBm AM, 10 dB (S+N)/N, 1-kHz tone, 30% modulation: 53 MHz 0.44 μV
FM Sensitivity, 12 dB (S+N)/N: 0.25 μV.	For 12-dB SINAD: 52 MHz 0.16 μV
Blocking dynamic range: Not specified.	Blocking dynamic range, 20-kHz spacing: 50 MHz 80 dB
Two-tone, third-order IMD dynamic range: Not specified.	Two-tone, third-order IMD dynamic range: 50 MHz 65 dB
Third-order intercept: Not specified.	Intercept: 50 MHz, –37 dBm.
FM adjacent channel rejection: Not specified.	20-kHz offset from 52 MHz, 60 dB.
FM two-tone, third-order IMD dynamic range: Not specified.	20-kHz channel spacing, 52 MHz: 59 dB.
S-meter sensitivity: Not specified.	Maximum indication: 52 μV.
Spurious response: IF rejection, 65 dB; image rejection: Not specified.	IF rejection: 112 dB; image rejection, 93 dB.
Squelch sensitivity: Not specified.	0.34 μV at threshold.
Audio power output: 2.5 W, THD and load unspecified.	2.3 W at 10% THD into 8 Ω.
IF/audio response: Not specified.	Range at –6 dB points, (bandwidth): CW: 340-2426 Hz (2086 Hz); USB: 346-2472 Hz (2126 Hz); LSB: 340-2425 Hz (2085 Hz); AM: 389-2252 Hz (1863 Hz).
Transmitter	***Transmitter Dynamic Testing***
Power output: CW, FM, AM, 10 W; SSB, 25 W.	AM, FM, CW, typically 10 W; SSB, typically 26 W.
Spurious signal and harmonic suppression: 60 dB.	Meets FCC requirements for spectral purity.
SSB carrier suppression: 50 dB.	50 dB.
Undesired sideband suppression: Not specified.	37 dB.
Third-order intermodulation distortion (IMD) products:	See Figure 1.
CW keying characteristics: Not specified.	See Figure 2.
Transmit-receive turn-around time (PTT release to 50% of full audio output): Not specified.	Squelch on, S9 signal, 200 ms. Unit is not suitable for use on AMTOR.
Receive-transmit turn-around time ("tx delay"): Not specified.	SSB, 40 ms; FM, 30 ms.
Composite transmitted noise: Not specified	See Figure 3.
Size (HWD): 2.4×7.8×10.8 inches; weight, 3.2 lb.	

All dynamic range measurements are taken at the ARRL Lab standard spacing of 20 kHz.

[1]500-Hz bandwidth filter not available. Bandwidth on CW is approximately 2100 Hz.
[2]Intercept points calculated using noise floor method.

small for my tastes. For weak signal work, I like to manually tune for activity at the smallest available step size. I'd consider a larger tuning knob a welcome enhancement.

The RF power output level and microphone gain; RIT and RF gain; and volume and squelch are set up as concentric pairs of rotary controls. A six-position mode selector switch stands alone. The inner and outer knobs of the concentric sets and the mode selector knob are nice and big—and that does make them easy to grip, but there's insufficient space between them. It's difficult to make adjustments without accidentally changing the settings of nearby controls. In this instance, I'd gladly trade off some overall knob size for the increase in room between that would result. Perhaps Ranger could look into marketing an optional set of replacement knobs? I'll bet it would be an extremely popular accessory package—and not just with owners of this rig, but for those who have one of the dead-ringer '2900-series radios as well.

Fourteen pushbuttons are arranged in

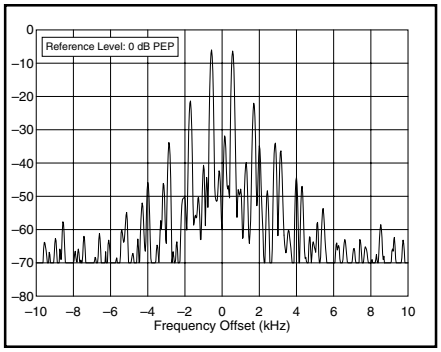


Figure 1—Spectral display of the RCI-5054DX transmitter during two-tone intermodulation distortion (IMD) testing. The third-order product is approximately 22 dB below PEP output, and the fifth-order is approximately 35 dB down. The transmitter was being operated at 25 W output at 50.2 MHz.

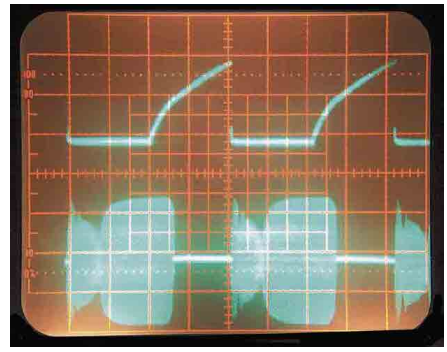


Figure 2—CW keying waveform for the RCI-5054DX showing the first two dits. The equivalent keying speed is 60 WPM. The upper trace is the actual key closure; the lower trace is the RF envelope. Horizontal divisions are 10 ms. The transceiver was being operated at 10 W output at 50.02 MHz. See text.

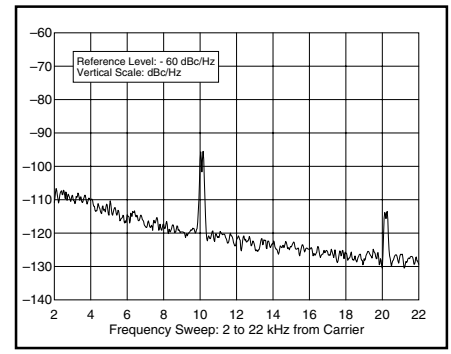


Figure 3—Spectral display of the RCI-5054DX transmitter output during composite-noise testing at 50.02 MHz. Power output is 10 W. The carrier, off the left edge of the plot, is not shown. This plot shows composite transmitted noise 2 to 22 kHz from the carrier.

two rows just below the display window. These white buttons are backlit and translucent, and function legends are printed in black on the surface of each—a particularly nice design feature for nighttime mobile operation. The majority of these keys control just a single operation—another mobiling plus.

Rear-panel jacks include an SO-239 antenna connector, three $^1/_8$-inch mono phone jacks and a flat three-pin dc power socket. The mating dc power cord is about 5½ feet long and fused, in the positive lead only, at 7 A. The phone jacks serve as connection points for a CW key, external speaker and public address speaker. A dedicated headphone jack is not provided. A multi-finned heat sink is attached to the rear apron. An internal speaker is mounted in the bottom cover.

A mike hanger, an adjustable mobile mounting bracket with four large knob-style screws and a handful of associated fastening hardware are supplied.

The 20-page *Owner's Manual*, though brief, is more than adequate. The radio is simple and intuitive to operate, and the programming and operating instructions in the manual text are clearly worded and easy to follow. A pin-out diagram for the 6-pin microphone connector is included, but—unfortunately—a schematic diagram of the radio is not.

Basic Feature Basics

Memories

The '5054 comes up in the VFO mode when the power is switched on. Pressing the MEM key activates memory mode operation. Memory channel one is always initially selected when entering the memory mode. Each subsequent stroke of the key then selects the next higher channel. A press of the MAN (manual) key will return the radio to the VFO mode. The tuning knob, microphone control buttons and the front panel Δ and ∇ buttons cannot be used to step through the memory channels, and the memories are not tunable.

Splits

Split transmit/receive frequency capabilities—for repeater, phone or CW operation—are supported. Split offsets of up to 4 MHz are possible. The memories do not retain the mode, offset value or direction of the split, though. If you decide to use memory channels to store repeater information, you'll have to select the FM mode and activate split operation separately. While the radio is in the split mode, the transmit frequency appears in the display when the transmitter is keyed.

Scanning

The transceiver includes a scan feature that will troll for activity on the programmed memory channels or within a range of frequencies. The scan direction can be set to ascending or descending. The scan will stop on any signal that breaks the squelch, and will remain there until activity ceases for more than two seconds. Facilities for locking specific memory channels out of a memory scan operation are not provided.

The upper and lower scan limits are programmable. These two frequencies also serve as the upper and lower limits of the manually tunable range of the VFO. Once you've changed these setting from their default values, to restore the full 4-MHz VFO tuning range, the upper and lower 6-meter band edges (50 and 54 MHz) must be manually reentered. This is a simple operation, though. This feature is handy when you wish to concentrate your attention on a particular band sub-segment—the bottom 80 kHz or so to listen for CW beacons, from about 50.103-50.250 for SSB activity or within one of any of several different ranges for searching for FM simplex operations, for example. (See *The ARRL Repeater Directory* or visit *ARRLWeb* for the suggested ARRL 6-meter Band Plan).

Noise Blanker/Antenna Noise Limiter

The '5054DX features both a noise blanker and a combination noise blanker/antenna noise limiter. The noise blanker is designed to work on repetitive impulse noise (classic ignition interference). It wasn't effective on the computer hash that's generated by my late-model vehicle. The noise blanker/antenna noise limiter setting worked reasonably well on my particular flavor of automotive electrical interference, but—unfortunately—only in the AM mode.

Public Address

The RCI-5054DX's mode switch includes a PA position. Connect an external speaker to the rear-panel PA jack, and you can use the rig to make door prize announcements at your club's next hamfest, or to get the whole gang's attention at the Field Day site ("Hey, everybody! I worked Western Samoa!"). An undocumented alternative application is to use it for evaluating the change in sound quality when testing substitute microphones—a feature that's typically referred to as a "monitor" function.

SSB Operation

The transceiver can operate in either the upper *or lower* SSB modes (6-meter RTTY, anyone?). Separate RF power output and mike gain controls are provided. The bargraph meter doesn't include a marker for the ALC set point. I received good audio reports with the mike gain control adjusted so that voice peaks hovered at about two-thirds scale when the RF power output setting was set to maxi-

mum. The mike gain control also varies the transmit audio level when operating in the AM or FM modes. The same mike gain setting that I settled on for the SSB mode worked just fine for the other phone modes as well.

The comparatively large (100-Hz) transmit tuning steps are pretty coarse for weak signal work, at least by today's standards. Most contemporary transceivers tune in 10-Hz (or smaller) increments. Although this is usually not a problem when chasing DX and general one-on-one ragchewing, net operation is occasionally an *I'm-as-close-as-I-can-get* proposition. The manual mentions—but doesn't detail—a modification that involves rewiring the clarifier (RIT) control so that it varies both the transmit and receive frequencies simultaneously. This change would come at the expense of independent receive incremental tuning, however. Contact Ranger for additional information.

FM and Repeater Operation

The radio works fine in the FM mode; reports on the quality of the transmit audio were invariably favorable. The '5054DX has one particularly disappointing shortcoming for those who are hoping to use it for communicating through repeaters. Nearly every 6-meter repeater system uses CTCSS tone access to reduce the interference that can result from distant repeaters that share the same frequency pair. (When this band opens up, the whole concept of what constitutes a "distant repeater" goes right out the window!)

The RCI-5054DX does not come equipped with a CTCSS tone encoder. Text in the *Owner's Manual* and Ranger's advertisements for this rig state that an "optional" tone unit can be installed, but it turns out that this is a little more involved than simply popping off a cover and plugging in an accessory board.

Ranger's Web site has a section that provides complete instructions for hardwiring in one of three models of CTCSS units sold by Communications Specialists.[1] One of these is an encode board that generates a single tone. (The specific tone frequency is set prior to installation by bridging a combination of solder-pad jumpers.) The second is an encode/decode board that employs six DIP switches for programming the desired tone. The third—and most flexible alternative—is a tone encoder unit that comes in its own separate enclosure, the TE-32. This model has front-panel toggle and rotary switches that allow quick and easy selection of one of 32 commonly used tones. It sells for around $50. (You should first verify that your favorite 6-meter repeaters are using CTCSS tones that the TE-32 is capable of generating.)

Installation of either of the two encode-only models is fairly easy. DC power, ground and a connection (through a 100 kΩ resistor) to the main circuit board at the base of a surface mount transistor are all that's required. Wiring in the encode/decode board is a bit more complicated. This procedure involves cutting a circuit board trace and making a couple of additional connections. Hooking up any of these boards should be well within the capabilities of hams with moderate soldering skills. It would have been great if Ranger had included CTCSS circuitry in this radio's design, or at least provided a dedicated multi-pin socket on the board or a rear-panel accessory jack for this purpose. Local 6-meter FM repeater operation can be lots of fun, and can sure help you wile away the time between those long-haul band openings.

CW Operation

The mode selector switch on the RCI-5054DX includes a CW position, but—as has been the case with the last couple of Ranger products we've looked at—CW seems as if it's more of an afterthought than a feature. A single CW signal can be heard on both sides of zero beat. As we pointed out in our evaluation of the RCI-2970DX (see "Product Review," Oct 2001), you can verify that you are properly tuned to a CW signal by taking a quick listen for it in the LSB mode. The CW sidetone volume and frequency are fixed.

As can be seen in Figure 2, the CW keying waveform shows considerable distortion during the "make" of each element. While, quite surprisingly, this didn't result in any on-air reports of unusual-sounding keying (it also sounded acceptable to me on a second receiver) it certainly warrants some further investigation on Ranger's part. A second unit we looked at exhibited identical waveform distortion.

Take a Number

Looking over Table 1, you'll notice that sensitivity in the FM mode, which came in at a hot 0.16 µV, is right in line with the best we've measured on recently reviewed transceivers that include 6-meter FM capabilities. The FM adjacent channel rejection (20-kHz offset) fell slightly below par, as did the FM two-tone, third-order IMD dynamic range.

SSB/CW sensitivity—at −135 dBm—came in somewhat short of the running average for this parameter as well, but still manages to equal the 6-meter number posted by a very popular multi-band/multi-mode mobile that we evaluated a couple of years ago. The SSB/CW blocking and IMD dynamic numbers that we measured on this rig were pretty mediocre. All in all, though, I guess this is about what should be expected from an economy-class transceiver.

On the Road with the RCI-5054DX

It was time to give the RCI-5054DX a try on the open road. I temporarily lashed it to the center console of my truck. (Finding a permanent mounting spot for a rig this size in most modern vehicles will likely present some challenges.)

The comparatively low maximum current requirement—under 5 A—makes it tempting to try to power it from a fuse block, vehicle cigarette lighter or dc accessory jack. If you choose to go with any of these connection schemes and end up running into problems with interference to or from your vehicle's electronics, begin your troubleshooting process with a direct power connection to the vehicle's battery terminals.

One of the great things about 6—particularly when you compare it to setting up for mobile operation on the HF bands—is the relative ease of installation and potential efficiency of 6-meter mobile antennas. A full-size $^1/_4$-λ vertical (a very adequate mobile antenna on this, and most other bands) is only around 4$^1/_2$ feet tall. I mounted a whip on an adapter that threads onto my existing through-the-roof NMO connector. A 2-meter $^5/_8$-λ mobile antenna—even mag-mount versions—will also work very well on 6.

Just five minutes after hooking the rig up in the car, I already had three west-coast SSB contacts in the log. Readability and signal reports were good—59 in all three cases—and specific requests for honest critiques on my audio quality were met with universally good comments.

Summing It Up

Admittedly, the RCI-5054DX is unlikely to become the radio of choice among serious VHF contesters—particularly those who have any interest in CW. This radio will get you on the band for casual DXing, net operations, ragchewing and even informal contesting pretty inexpensively, though. With just a few more dollars and a little workbench time, it can even be further accessorized for FM repeater use.

Manufacturer: Ranger Communications Inc, 401 W 35th St—Suite B, National City, CA 91950; 877-536-0772, fax 702-262-0780; **rci@rangerusa.com**; **www.rangerusa.com**. Manufacturer's suggested list price: $329. Typical current street price: $300.

[1]Communications Specialists Inc, 426 W Taft Ave, Orange, CA 92865; 800-854-0547, fax 800-850-0547; **www.comm-spec.com**.

Maha MH-C777 and MH-C777*PLUS* Battery Chargers

Reviewed by Kenneth Stuart, W3VVN
ARRL Technical Advisor

It's probably safe to say that most of us own a transceiver—or at the very least a portable consumer electronics device—that relies on a rechargable battery pack for its power source. Perhaps that's why rechargable battery choices and their proper care and feeding always seems to be a popular topic.[1]

Maha Energy Corp provides a wide selection of battery-related products to both the communications and consumer electronics markets. Among these are replacement and higher-performance battery packs—of a variety of compositions—and charging devices that can be used to replenish them. Let's take a look at a couple of the charging systems that Maha is currently marketing to both consumers, and amateur and land-mobile transceiver users.

Maha's product offerings include a few different tabletop charging devices, but the two that would seem to be of most interest to radio operators are the MH-C777 universal charger/conditioner and the more recently developed—and somewhat more expensive—MH-C777*PLUS* universal charger/conditioner/analyzer. Both are designed to rapidly recharge and condition nickel-cadmium (NiCd) and nickel-metal-hydride (NiMH) batteries. The MH-C777*PLUS* can also handle lithium-ion (Li-ion) recharging duties.

The units employ microprocessor control. The devices begin the charging process with a determination of the voltage of the connected battery pack. The charging stage is then initiated. The systems use any one of four parameters to sense when to terminate the charging process:

1) The battery voltage begins to drop
2) The voltage of the pack rises above its rated value
3) The pack reaches a certain temperature
4) The maximum time for the charging cycle elapses

Once the main charging cycle is completed, the units automatically switch to a lower charging current stage in order to balance the charge in the individual cells, thereby "topping off" any that might not have reached a fully-charged state during the main cycle.

Consider the Choices

The MH-C777 is the more basic of the two and will charge packs that are 4.8 to 12 V. The MH-C777*PLUS* offers some advanced features and is intended for packs of 1.2 to 14.4 V (3.6 to 14.4 V for Li-ion packs). The most obvious difference between the two chargers is the display arrangement. The basic unit employs LED indicators to show the charge state, while the deluxe unit contains a much more sophisticated LCD readout. The display on the MH-C777*PLUS* provides a wide range of information, and this allows the user to more fully monitor the charging or reconditioning process. The mAh rate of charge, or discharge, is continuously shown. Elapsed time—in minutes—is also displayed, as is the battery pack terminal voltage.

The *PLUS* has a two-position switch that must be set to correspond with the type of battery pack. One of the positions is for nickel cadmium and nickel metal hydride, and the other is for lithium-ion packs. When charging Li-ion packs, the charger employs a "taper charging" procedure. As the battery approaches the fully charged state, the charging current is greatly reduced. Li-ion packs can take as long as 12 hours to charge.

Those who frequently travel abroad will be happy to hear that the inline transformer-type power supply that's provided with the *PLUS* will operate on any voltage between 80 and 240 V ac. The included ac line cord fits standard US convenience outlets, but the transformer end of the cord is terminated in the conventional three-pin plug that's commonly used on computer equipment. Locating a suitable substitute cord to use in other countries should be easy. The MH-C777 comes with a wall transformer supply designed for 120 V ac use only.

Bottom Line

The Maha 'C777-series microprocessor-controlled chargers can help you get maximum performance out of a wide variety of rechargeable battery pack types.

Pack and Power Particulars

The physical design of the two units is significantly different. The end of the case of the 'C777 can be swung open and the battery contact pin blocks reversed, allowing it to work on physically larger packs—such as those that fit the RadioShack HTX-202/404 and some of the older ICOM handheld units. (These radios use the hefty BP-7 and BP-8 type packs). The *PLUS* doesn't offer this feature. These larger battery packs cannot be directly accommodated without the use of some type of external drop-in charger cup, and this accessory is not available from Maha.[2] A set of alligator clip terminated jumpers is supplied with the *PLUS*, but in order to use them on the BP-series batteries you'll have to slightly back out the contact screws on the bottom of the packs. Though you won't need it for these packs, the jumper set is also available as an optional accessory for the 'C777.

The two units employ entirely different ac power supplies. The charging current that's supplied by the one that comes with the *PLUS* is somewhat greater—on the order of 800 mA—so battery packs that contain cells rated at less than 400 mAh can quickly overheat during the charging process. Maha recommends that you don't

[1]For additional information regarding rechargable battery types and their associated characteristics, please refer to my Dec 2001 *QST* article, "Honey, They've Shrunk the Batteries!"

[2]A cup that can be adapted for this application is available from W&W Maufacturing Co. (See "Index of Advertisers," p 174.)

recharge these packs with the *PLUS*.

Although the MH-C777*PLUS* can be directly powered from 12 V dc (a cigarette lighter cord is provided with both models), the packs that can be charged are then limited to those that contain at most four NiCd or NiMH cells, or two Li-ion cells. One workaround for this would be to set up a system that powers the unit's included ac supply through a 12 V dc to 115 V ac inverter.

Operating the MH-C777

When a battery pack is initially connected to this model, the charger's microprocessor quickly measures the pack voltage and flashes a red front panel LED. The number of flashes corresponds to the number of cells that it has detected inside the pack. Note that if one or more of the cells are fully discharged, the microprocessor may be fooled into thinking that the number of cells in the pack is fewer than the actual number. If this occurs the pack will not be properly recharged.

The more deluxe model avoids this by immediately starting the charging process, and then stopping and determining the cell count a few minutes later. You can manually duplicate this action on the more basic model by briefly disconnecting the pack from the charger after the first minute or so and then reconnecting it. This will to force the microprocessor in the MH-C777 to make a second assessment of the number of cells in the pack.

On this basic model, the charge state of the attached pack is indicated by a set of three LEDs. These light up to show when the pack is in the low, medium or full charge states. When a full charge is attained, the charger automatically switches to a low current trickle charge mode.

Conditioning of a battery pack can be done at any time by simply pressing the DISCHARGE button. The MH-C777 will then slowly discharge the battery to what it considers a low state-of-charge and then automatically perform the charging procedure.

Operating the MH-C777*PLUS*

When a battery pack is initially connected to this model, the charger applies a "surface charge" to the battery for a period of three minutes. This allows any depleted or reverse-charged cells to come up within their normal voltage range. At the end of this stage, the microprocessor determines the voltage of the pack. Charging then begins at a constant current of 800 mA (400 mA for lithium batteries).

During the charging process, the display shows the mAh of charge accepted, the battery voltage, the elapsed charging time and the operating status ("Quick Charge" or "Full").

Quick charging will cease when the microprocessor detects either a slight reduction in the battery voltage, that a specific period of time has elapsed without an increase in battery voltage or that the pack has reached a temperature of 123° F. When the Quick charge cycle is completed, the unit automatically enters a low-rate trickle charge mode.

Lithium-ion batteries are charged under a different routine. The initial charge current is tapered rapidly with increasing battery voltage. Maha states that it can take as long as 10 hours for a Li-ion battery to reach full charge. They illustrate this by saying that when charging a fully depleted 1200 mAh Li-ion battery pack, the accumulated charging capacity will likely be 300 mAh at the end of the first hour, 550 mAh at the end of the second hour and 1150 mAh at the end of the fourth hour. However, the remaining 50 mAh of charge can take up as much as 3 to 5 additional hours. This is because the Li-ion cell is highly intolerant of overcharging. Of course, the final 50 mAh adds little to the overall capacity of the battery, and for all practical purposes charging can be manually terminated after the first four or five hours, even though the charger will not be indicating that the battery has reached full charge.

The user must be reminded, however, that the charger cannot automatically identify which type of battery has been connected to its terminals. The NiCd NiMH/Li-ion selector switch must be set in the correct position before the battery is connected. Failure to do this will likely result in damage to lithium batteries.

Conditioning of a battery pack is performed by depressing the DISCHARGE button within 30 seconds of attaching the battery to the charger. The MH-C777*PLUS* will first surface charge the battery to determine its nominal voltage and then discharge the pack at a rate of about 300 mAh to what it considers a low state-of-charge. A series of beeps will then be emitted. At this point the charger will pause for about 15 minutes before it begins the main charging cycle.

Summary

Either the MH-C777*PLUS* or the MH-C777 chargers are capable of doing a fine job of keeping your collection of rechargeable battery packs in tiptop condition. Charging them with either of these units is fast and safe, and the connection alternatives offered on the units are flexible enough to work with almost any battery pack. With the MH-C777*PLUS*, though, you'll enjoy the added benefits of having a continuous readout of voltage, battery capacity and elapsed charging time, as well as an excellent indication of remaining battery life.

Manufacturer: Maha Energy Corp, 545-C W Lambert Rd, Brea, CA 92821; 714-990-4557, fax 714-990-1325; **sales@mahaenergy.com**; **www.mahaenergy.com**. Manufacturer's suggested list price, MH-C777*PLUS*, $89.95; MH-C777, $49.95; MHS-CW4 clip-lead accessory for the MH-C777, $4. QST

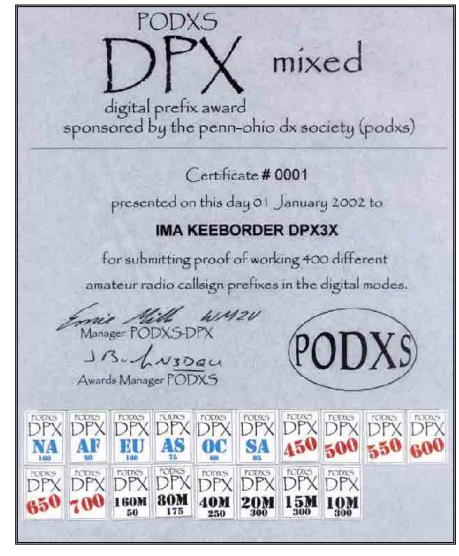
STRAYS

THE PENN-OHIO DX SOCIETY DIGITAL PREFIX AWARDS PROGRAM

◊ The Penn-Ohio DX Society (PODXS) recognizes the achievements of Amateur Radio operators worldwide by offering its new Digital Prefix Awards Program.

To qualify for the *mixed basic award* the applicant must have a minimum of 400 different prefixes confirmed by either hard copy QSL or eQSL. There are many more specific digital awards being offered—PSK DPX, RTTY DPX—with a minimum confirmed requirement of 300 each. Endorsements to the basic awards are in increments of 50. Continent and Band endorsements are also available.

All applicants must use the PODXS DPX application—PODXS form 3-36, and the endorsement list, PODXS form 3-37—or a computer printout. If you use the latter option for the endorsement list, please maintain a similarity to the PODXS form 3-37.



Go to **www.qsl.net/wm2u/podxs_dpx.html** or **hometown.aol.com/n3dqu/podxs_dpx.htm** for detailed information and instructions. You can download the required forms in either PDF or zipped Microsoft *Word* format.—*Ernie Mills, WM2U*, **wm2u@arrl.net**. QST

Next Strays

A Thanksgiving to Remember

By Robert Hathaway, KA2NCC

It had been over two hours since my 12 year-old-son Bobby and I had become stuck in a deep rut on a snow-covered forest road. It was early Thanksgiving afternoon (2001), and we had gone on what we expected to be a short drive in the mountains of Oregon while the turkey cooked in the oven.

"Okay, this is bad," I remarked to my son as the jack broke after the third time we had slid back into the rut. We had been using the jack to raise the car to put rocks and wood under the tires to get out of the rut. The snow had hidden the depth of the crevasse until we slid in and heard the undercarriage of the car slam against the snow and dirt. The left front tire spun freely in all directions.

I guess it didn't help that we'd been driving a Hyundai Accent in a snowstorm on unimproved roads in the Oregon Cascades. The precipitation was forecast to diminish in the afternoon. Before we left home in Beaverton, we changed to studded snow tires just in case we ran into slick roads. At lower elevations it had been raining heavily. As we climbed, the rain became mixed with snow and then eventually turned to a heavy, wet snow. It was fun to drive in the slush as it splashed outward to the sides of the car and even in front of us as the watery snow became deeper. We were enjoying ourselves and talking about how—if it kept coming down—we could get snowed in. But, we had never been stuck—not in 40-some years since I can remember my father taking me out into remote areas. I wasn't really concerned.

When the snow had become deep and a steep incline slowed us down, we decided it was time to go back. That was when we found the rut. At that point, there were about three inches of snow. "Let's get in the car and get dry and warm," I said. Although calm at that point, only five minutes earlier I was a bit panicked. I had been working as fast as I could by moving snow, cranking that fragile, little scissors jack, digging up rocks and logs to jam under the tires. During that extreme exertion, I had noticed my heart pumping a bit too hard. It felt as if it might explode if I continued. I'm sure the altitude, temperature, and wet conditions weren't helping any. I slowed down a little, realizing panic may hinder my ability to think clearly. Having served on a search and rescue team for several years, I had seen the results of people not thinking before they acted. I didn't want to become one of those statistics.

Bob Hathaway, KA2NCC, and his son, Bobby, were stuck in this car during a Thanksgiving snowstorm.

In the KA2NCC shack in Beaverton, Oregon.

Call for Help

I looked at the cell phone perched in its hands-free holder. "No Service" wasn't what I wanted to see. I moved the phone but I couldn't get a signal no matter where I held it. I had Bobby run through the Family Radio Service channels, trying to get an answer from anyone, but he had no response on all channels. Luckily, I had a two-meter transceiver under my seat. It wasn't permanently mounted, and I had moved it for some reason. Since I wasn't using it very often, I never hooked it back up. The window-mount antenna, however, was still installed. I was somewhat discouraged that I still had Anderson connectors on the transceiver without the matching set hooked to a power source. I yanked the wires from the connector and plugged the hot wire into the power side of a spare fuse plug. Then, I wedged the ground wire between two pieces of body metal inside the fuse access panel.

The snow continued to fall extremely heavily, and it was adding about an inch every fifteen minutes. I pushed the power button on the radio, but nothing happened. I'm sure it was only a fraction of a second before I thought to turn on the car's ignition, but it seemed like a long time. When I saw the display light up, I was excited. I tuned to 146.520 MHz and called, "This is KA2NCC, I have an emergency, can anybody copy?" I waited 30 seconds and then repeated the call, but no answer. I started dialing through repeater frequencies stored in memory, announcing my call sign and hoping for a squelch tail. After several attempts, I heard a noisy return. I called again, "This is KA2NCC. I have an emergency. Can anybody copy?"

I don't remember the first station to respond, but I do remember what a relief it was to hear a voice. I told him I was north of Detroit Lake on forest road 2207. The responding station was unsure of where I was. Then another operator replied, "This is KD7CSY." He knew where we were and we weren't far from where he was located. He also let us know there was a closer repeater that I might try. "145.130, standard 600 offset, with no tone." I switched over and had a full quieting return. I was able to move to low power and still have a great signal into the repeater.

Eric Larson, KD7CSY, was the perfect person to come across. Luckily, he had just happened to be scanning the repeater when he heard my plea for help. I gave him all the details that I could, including the road number and data from GPS including my latitude and longitude. Eric activated the phone patch and connected me to Marion County dispatch.

Over the next 12 hours, yes, 12 hours, starting at 5:30 PM on Thanksgiving evening, Eric kept in contact with us. Since we did have some camping equipment in the car, sleeping bags, water and other gear (everything except food), it was never considered a life-threatening emergency. We attempted two commercial vehicle retrievals, but both a two-wheel drive and four-wheel drive tow were unable to reach us. The snow had

Steve Ewald, WV1X ♦ Public Service Specialist

continued to fall heavily, and by 9 PM when the first vehicle had tried to reach us, we had received over eight inches of snow. By 1 AM when the second vehicle gave up, there was over a foot of snow. It was such a wet snow, that it was difficult to open the doors to get out and clear the air intake and exhaust to allow the car to run. The entire time, Eric had kept us apprised of the tow truck's progress. Even though most of the news was bad news, Eric kept a positive attitude and constantly asked how we were doing.

Search and Rescue

Once the commercial services had failed, Marion County dispatch decided to contact Search and Rescue. Eric continued to relay information and asked us to listen for the siren and watch for the lights as the search and rescue deputy had gone as far as he dared and wanted to know if we were close enough to see or hear his vehicle. I'm sure the deputy's GPS was showing only about ¼ mile position difference, but there was a high ridge between us. He was over a mile away by road. With the howling storm, the wind, running streams of water, and fog, we could neither hear nor see any sign of his vehicle. The deputy retreated and attempted an alternate route.

At about 5:30 AM, I saw lights in my rear view mirror. A set of headlights with a spotlight off to one side was pretty firm evidence that the deputy had found us. I actually had to do a double take since the lack of sleep had allowed me to imagine lights and engine noises several times since about 2 AM. It became apparent he couldn't drive all the way into where we were because the snow was just too deep even for the oversized tires and the new Dodge V-10 he was driving. We walked jubilantly back several hundred yards to meet Officer Don Galbraith.

After a short ride off the mountain, Officer Galbraith dropped us at a local café to which my wife was in route to meet us. Two people were there to greet us though, Eric Larson and Steve Chenault, AC7BZ. We enjoyed great conversation and a delicious breakfast (which they insisted they pay for) awaiting my wife's arrival. Then, as I waited for friends to come down to help me pull my vehicle off the mountain, Steve offered his warm ham shack as a place to wait out the two hours. Although near perfect strangers, they fed and housed us.

Thanks to Amateur Radio!

Yes, this was a harrowing experience. If it weren't for Amateur Radio, the associated organizations, willing, and caring individuals, this adventure would have been a tragedy. I don't want to think of the distress it would have caused my family had they not known where we were. (I forgot to mention Eric kept my family informed all night via telephone.) And I try not to think of what could have happened. Instead, we had a great time, spent time laughing (sometimes at ourselves) meeting new friends, and learning how everyday people perform heroic acts when needed.

There were several people other than Eric who were there, on frequency and willing to help. In fact, some filled in for Eric while he grabbed a few minutes of sleep. There were others who offered an encouraging word, and those who tried to keep the frequency clear to ensure our safety. (We encouraged them to go on as usual so we could listen to their conversation and hopefully distract ourselves from our circumstance). I know the majority of the amateur community is of similar character, willing to give of themselves to help others, regardless of the inconvenience.

What a statement this experience makes for Amateur Radio. The area I was in was of little interest to the commercial communications carriers. The expense to provide coverage for a low-powered cell phone into all areas in the Oregon Cascades is still years away. But nearly everywhere I've traveled—even during searches in the remote areas of Wasatch County, Utah, where my cell phone and public service radio went out of coverage—I've been able to reach another radio amateur. I know the events of Thanksgiving have changed my view of Amateur Radio. I also will not forget the words of my son whose interest had waned some over the last few years. Bobby said, "I need to get my license, Dad. That was great!"

What a wonderful "hobby" we have. What a great resource we can be. I realize that this little incident wasn't of near the significance as some of the events that occur in the world where amateurs play an important role. But it is small events like this that help us prepare for the big events, and help others realize the resource that is available. I am so thankful that someone introduced me to amateur radio many years ago. I am proud to be associated with such an important group of individuals who collectively provide so much good in our world.

BPL QUALIFICATION CLARIFICATION

The Brass Pounders' League (BPL) is open to Amateur Radio operators who *manually* perform message-handling functions, eg, those who sit in front of their rigs and transmit radiograms by keying, speaking and keyboarding them into a net or BBS, and who receive radiograms by jotting them down on a piece of paper or writing them to disk for relay or delivery.

When voice repeaters began to be used for message handling at the local and section levels, BPL remained the province of the *operators* rather than of the host who provided the repeater—even though the availability of the repeater was instrumental in making the message handling possible. Installing and maintaining a voice repeater is a big job, as is maintaining a packet or other type of digital bulletin board system. But it's the message handling itself, not the provision of the medium, that we recognize with the BPL.

BBS SysOps are not excluded excluded from BPL recognition, of course. A glance at the BPL column in any issue of *QST* will make that clear. Here are some examples of how that should happen:

A SysOp who manually transfers a radiogram from an NTS net (CW, FM voice, or SSB, for example) into his BBS files for autoforwarding earns two BPL points: one for receiving it on a net and one for "sending" it to the BBS for further relay down the road. When a radiogram is posted on the BBS and the SysOp takes it for delivery or relay to a local net, he may count one point for receiving the message over Amateur Radio and one point for the delivery—if otherwise manually off the air to the addressee—or for sending, if he transmits it to another amateur manually, not automatically. If the SysOp has to manually modify a radiogram posted by a user (to edit an improperly constructed header, for instance), we allow two BPL points—one for receiving it and one for send-

Communications Academy 2002

Communications Academy 2002 is a two-day training conference for volunteer communicators. This is the fourth annual event, sponsored by King County (Washington) Amateur Radio Emergency Service (ARES), the Seattle Auxiliary Communications Service, King County EOC Support Team, Western Washington Medical Services Communications, and Pacific Northwest REACT Council. Dates of this year's conference are March 23-24. It will be held again at the NOAA Western Regional Center in Seattle, Washington.

Proposed topics for this year's conference include presentations on emergency management, technical communication subjects, and lessons learned from various disaster events.

Online Registration will be available by the end of February at **www.academy2002.org**. Pre-registration will be required this year because of increased security at this Federal facility. For additional information or questions, or to request a mailed registration form, contact program chair Marina Zuetell, N7LSL, at **n7lsl@arrl.net**.

ing it. The key is *manual intervention*, which we reward with BPL credits.

A Section Traffic Manager (also a BBS SysOp) once said, "There's something sacrilegious about making BPL on the first day of the month before one's feet ever hit the ground in the morning!"

The Brass Pounders' League is open to all radio amateurs in the United States, Canada and US posessions who report to their Section Managers (or Section Traffic Managers) a total of 500 or more traffic points or a sum of 100 or more origination and delivery points for any calendar month. All messages must be handled on Amateur Radio frequencies within 48 hours of receipt in standard ARRL radiogram format.

(L-R) Bill Read, KB5FYA, Meteorologist-in-Charge of the NWS Houston-Galveston Forecast Office; Jim Robinson, K5PNV; Mike Fleifel; and Robert Timmons, KD5HCR. Assistant Texas State RACES Radio Officer, Jim Robinson, K5PNV, and Robert Timmons, KD5HCR, were part of a trio of Houston, Texas, residents named as 2001 recipients of the National Weather Association's prestigious Walter J. Bennett Public Service Award. The three voluntarily manage operations of EMWIN Houston, which continually broadcasts the National Weather Service's digital datastream in southeastern Texas on 150.435 and 168.435 MHz. EMWIN sends automatic e-mail notifications to emergency managers and to ARES and SKYWARN volunteers in many parts of Texas.

Individual Traffic Count

How are messages counted for BPL credit? The definitions of each message category provide answers.

Originated—One point for each message from a third party for sending via your station. This "extra" credit is given for an off-the-air function because of the value of contact with the general public.

Sent—Every message sent over the air from your station to another amateur receives a point in this category. Thus, a message that is eligible for an Originated point as above receives another point when it is sent on the air. Likewise, a message that is received on the air conveys a Sent point when it is relayed to another station. A message that you initiate yourself, while it gets no Originated point, gets a Sent point when cleared. All Sent points require on-the-air sending.

Received—A message received over the air gets a Received point, whether received for relaying (sending) or for delivery to the addressee. Any message received which is not eligible for a Delivery point (such as one addressed to yourself) is nevertheless eligible for a Received point.

Delivered—The act of delivery of a message to a third party receives a point in this category, in addition to a Received point. This is strictly an off-the-air function and must be coupled with receipt of the message at your station. Thus you can't get a Delivered point unless you first get a Received point.

Field Organization Reports

Public Service Honor Roll December 2001

This listing is to recognize amateurs whose public service performance during the month indicated qualifies for 70 or more total points in the following 8 categories (as reported to their Section Managers). Please note the maximum points for each category:
1) Checking into a public service net, using any mode, 1 point each; maximum 60.
2) Performing as Net Control Station (NCS) for a public service net, using any mode, 3 points each; maximum 24.
3) Performing assigned liaison between public service nets, 3 points each; maximum 24.
4) Delivering a formal message to a third party, 1 point each; no limit.
5) Originating a formal message from a third party, 1 point each; no limit.
6) Serving as an ARRL field appointee or Section Manager, 10 points each appointment; maximum 30.
7) Participating in a communications network for a public service event, 10 points each event; no limit.
8) Providing and maintaining an automated digital system that handles ARRL radiogram-formatted messages; 30 points. Stations that qualify for PSHR 12 consecutive months, or 18 out of a 24-month period, will be awarded a certificate from HQ on written notification of qualifying months to the Public Service Branch at HQ.

759 NM1K
403 K4FQU
391 KB2RTZ
317 AC4CS
293 W7TVA
279 W9VE
269 W9RCW
249 K9JPS
234 NN7H
228 WA5OUV
226 N1SN
225 W4ZJY
221 WA9VND
219 N7CEU
210 KB2VRO N2RPI
203 K8GA KM5VA
193 N5IKN
187 KA4FZI
183 W0WWR
182 K0IBS K2UL
197 AC5XK
195 KA2ZNZ
194 K4RLD
192 K4RBR
190 N2LTC W1GMF
186 KA5KLU
182 W5RDM
181 N2CCN
178 KB8ZYY
177 WA2MWT KB1DSB
174 KK3F
173 W5ZX
171 N8IO AG4DL
169 KA2GJV W4EAT N1LKJ
168 K6YR K9FHI
167 WB5NKC K5UPN
165 K4IWW WN0Y
163 N8FPN
162 WX8Y N8BV W6QZ
161 W6IVV
160 KC2EOT
159 N5NAV WB4GM W6DOB
158 VE3EUI W6QZ KF5A N2OPJ
157 WB2GTG
156 KG4FXG N2JBA
155 KX0N
154 K4SCL
152 N5OUJ KB2KLH WB2UVB KC5OZT
151 W3YVQ W0LAW
150 KC8CON
149 KK1A WA1FNM KV4AN WA2ZCM
148 WX4H
147 KW1U W3BBQ WA5I
145 N4VVX WA4DOX KC4ZHF
144 N9KNJ
143 W8YS
142 W4AUN WA2YL WD9FLJ
141 KM5YL W0OYH
140 W2MTA K3JL KE4JHJ WA4QXT
139 NC4ML W5GKH AF4NS KC2DAA N9BDL
138 N0SU
125 WA1QAA NZ1D
124 W1QU KF4KSN
123 AA2SV N2GJ
122 KA4LRM WB4BHH AA8SN K7GXZ W7QM
121 AC7DD AF4QZ N4TAB KI4YV K5DPG W4WXA WD9F
120 WD4JJ KD1LE KD4GR KF6OIF N9TVT KF4WIJ K1JPG
119 KA2DBD W3OKN W7LG
118 N7DRP KA8WNO K2DN N5SIG W4CKS AA8PI N3WK AB2IZ K4WKT K4MTX N9MH N2BVM
117 W2LC N8EIZ WD0GUF
116 N2WDS W4DGH
115 N3ZKP WB2LEZ KE4UOF WA2YBM K7MQF K8KV WD8GDB
114 WA2GUP
113 W1JX AB4XK K2PB
112 AG9G
111 WD8DHC
110 KB2KOJ KB5WY WA2YOW W4VLL N2VQA KA2CQX W2MTO
109 K8VFZ
108 AF2K WD9HII KJ7SI
107 KB2ETO WA8DHB WA4EIC
106 N8JAT K5MC KC8HTP N8DD WB4BIK WA2CUW
105 KA2IWK W3CB AA3GV KA0DBK WA8SSI K8PJ KG4OTL KC6NBI WA7UVX
104 N8NMA N2RTF KC2ANN
K2DBK
102 WW8D KF4OPT W6JPH KC6SKK
101 WB4UHC KD4HGU KG4CHW K6IUI
100 WB4GSS AA4AT K2YS
99 N3WKE
98 AC5Z
97 WB2IJH AE4MR
96 KC7SGM WA9JWL KB2YJD
95 W1JTH KE4DNO W5AYX
94 KE4GYR W4CC W0FCL WB4PAM KG9B WB7VYH
93 W8IVF KC6SKK
92 AA4YW
91 WA4GLS KG2HA KT4PM KO4OL KU6Z
90 K4BG W2CC
88 KA2BCE K8SH
87 W2PII K8AE KE2SX N3WAV W7DPW
86 WB9OFG KA2ZKM WA4CSQ
85 N1JBD N1IST W8IM
84 K4MVO
83 KE0K KE4WBI WB9GIU
80 W2GUT N4FNT
81 W7VSE N2AVY AA4BN
79 NC1X
78 N1LAH WB4ZNB
77 K8ZJU K3CSX K1TSV
76 WJ2F KA7TTY
75 KC3Y KC8KYP K4YVX
73 KG4FQG W7EP
72 N8PAM
71 N2JRS KD4EFM KC2HUV
70 WA4EYU KJ2N
N2AKZ N2YJZ W7ZIW
137 N8OD
135 W1PEX WB5NKD K9LGU
134 W9CBE NR2F
133 N2KPR K5IQZ
132 NN2H KA1GWE W2AKT
131 AD4XV K4BEH
130 W5PY W2JHO
129 KC7ZZB KA4UIV KG4HDT KB0DTI AA3SB NB4K N3RB
128 KC7SRL WA0TFC W7GB KB5TCH
127 N7YSS WB2QIX WI2G KB0RUU W4NTI WA1JVV K1FP N7YSS K2VX W7GHT
126 W8WWF KG2D KD4CQJ W1ALE

The following stations qualified for PSHR points during November, 2001, but were not previously recognized in this column: W1GMF 173, N1LKJ 154, AA3SB 141, WA1FNM 140, KD1LE 119, NZ1D 135, N1IST 93, KC8HTP 90, K8SH 87, KB6QIB 82, K3CSX 81, K1SEC 80. (Oct) W1GMF 167, N1LKJ 162, W2MTA 152, WA1FNM 147, KD1LE 137, NZ1D 124, N1IST 91, NC1X 84, K1SEC 82, KD1SM 73. (Sep) N3WAV 109, W3OKN 99.

Section Traffic Manager Reports December 2001

The following ARRL Section Traffic Managers reported: AK, AL, AR, AZ, CO, CT, EMA, ENY, EWA, GA, IA, ID, KS, LA, MDC, ME, MI, MN, MO, MS, NC, NE, NFL, NH, NLI, NNJ, NNY, NTX, OH, OK, OR, ORG, SB, SC, SD, SDG, SFL, SNJ, STX, TN, VA, VT, WI, WMA, WNY, WPA, WV, WWA, WY.

Section Emergency Coordinator Reports December 2001

The following ARRL Section Emergency Coordinators reported: AK, AR, AZ, EWA, IA, IN, KS, KY, LA, MDC, MI, MO, NLI, OH, SD, SFL, STX, SV, TN, WCF, WMA, WV.

Brass Pounders League December 2001

The BPL is open to all amateurs in the US, Canada and US possessions who report to their SMs a total of 500 points or a sum of 100 or more origination and delivery points for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL radiogram format.

Call	*Orig*	*Rcvd*	*Sent*	*Dlvd*	*Total*
N2LTC	0	1371	1455	22	2848
KK3F	21	1266	1208	5	2500
W1GMF	0	711	1334	43	2088
NM1K	713	387	715	10	1821
KF5A	0	735	734	0	1469
WX4H	2	572	694	80	1308
W9IHW	0	423	35	379	837
WB5ZED	38	358	379	42	817
KW1U	1	409	362	8	780
W4EAT	0	398	380	1	776
WB2GTG	29	300	424	10	763
K4FQU	279	98	377	7	761
W1PEX	0	91	649	21	761
KA2GJV	0	415	337	1	753
KA5KLU	2	348	369	26	745
W6DOB	0	255	423	21	699
N5IKN	0	343	187	158	688
W0WWR	2	106	557	13	678
KA2ZNZ	29	283	283	28	623
N8IO	0	251	297	73	561
K5UPN	0	281	237	2	547
NG1A	0	267	268	0	535
WA9VND	23	314	163	20	520

BPL for 100 or more originations plus deliveries: WB8SIW 221, W9RCW 208, N9VE 196, K9JPS 194, K9GU 190, W7TVA 165, WA5OUV 140, AA8PI 118, N7CEU 102, KB2RTZ 100,

AA8PI also qualified for BPL in Nov. with 597 points, and Sept. with 547 points.

Ducie Island: The Birth of a New DXCC Entity and the ARRL DX Advisory Committee

[Dedicated readers of this column will surely be looking for the much-anticipated Ducie Island DXpedition, which is scheduled to take place in mid-March. Bill Leahy, K0MP, wrote this for the Mile High DX Association newsletter and graciously agreed to submit for this month's column. Keep an eye on your favorite DX bulletin for the latest news on the DXpedition.]

By Bill Leahy, K0MP, Rocky Mountain Division DXAC Representative

This article is written from the perspective of the "newbie" (as K4UEE calls me) Rocky Mountain representative to the ARRL DX Advisory Committee. In truth, being the gentleman he is, Bob was one of the first to welcome me to the committee and informed me that I had taken the moniker off his back!

After being nominated by Walt, W0CP, I was sent the list of ARRL Division representatives to the DXAC. Most read like a who's who of DXing and DXpeditioning and for a moment I pondered my fate. But then, I realized it was just another challenge and a way to give something back to Amateur Radio, which has been a part of my life for so many years. Anyone who serves on the Committee is fortunate to have the opportunity. This story is written for the purpose of illustrating how the DX Advisory Committee works for you, much of it, behind the scenes.

To be honest, I really didn't know much about what the Committee did. All these years, being a DXer, I took for granted the new DXCC countries that were provided by the ARRL. I worked them, confirmed them and applied for the wallpaper. Well, let me tell you, after I've become more involved, we owe a big thank you to the League and all the DXCC volunteers for the work they do.

About one month after I had been on the committee, we had an administrative assignment. Emails went out to all those on the committee to assist the Section Managers in their respective Divisions in appointing DXCC Field Card Checkers. We were also to investigate the Sections for DX Clubs who would qualify to appoint checkers from their ranks. Many Sections were without Field Checkers and with the League rejuvenating the DXCC program, Field Checkers were a high priority. I am happy to say that the Rocky Mountain Division now has their full allotment of Checkers.

SPACE IMAGING

As you can see Ducie Island is actually more than one island. Acadia is the main island forming a C with three small islets forming a lagoon. North is to the top of the picture.

MHDXA was fortunate to qualify to be able to nominate Barry Mitchell, N0KV. After some inquiries, I was able to suggest to the Section Manager that he appoint Ross Harrell, N0ZA as DXCC Field Checker. I don't need to tell you that both Checkers have done an exemplary job in checking cards. Both hold the DX Challenge Award and know their business. Thanks guys. Several months then went by with no assignments. Then one morning I received an email from K0CA, the Chairman of the DXAC. Wayne Mills, N7NG, Membership Services Manager of ARRL had asked the DXAC to investigate the possibility of Ducie Island becoming a new DXCC entity. In particular, an investigation was to be made as to how far away Ducie was located from other landmasses, atolls, etc. in the area. No announcements of findings were to be made other than to the DXAC. I took this as my first challenge and was determined to find something of use for the DXAC. At this point, we didn't even have coordinates for the island. I knew it was close to Pitcairn so I started there. Looking at my globe, sitting at the station, I looked for Pitcairn and found some nondescript "dots" near by. I was going to have to do better than this! I got out my Rand McNally five-pound atlas that I use for ultimate geographic pinpointing. Hummm, Pitcairn and Henderson Islands. Nothing else. I was getting a sinking feeling in my stomach. This may not be easy. Those of you who have been out to that part of the Pacific know you can fly for hours and not see a thing. It is a very remote part of Oceania.

My next call was to my Uncle in San Diego who had navigated with the Navy for 33 years. He had nothing showing Ducie Is. in his library or Navy charts. Knowing him, he wouldn't let this go unchallenged and neither would I. He went to the local bookstores and I warmed up my computer mouse. We both hit pay dirt.

I found some references to Ducie in a few web pages. One had everything I thought I needed and more. It's a wonderful reference for the most remote islands on earth. The Web page is provided by the United Nations Environmental Program and can be found at **www.unep.ch/islands/isldir.htm**

The Island Directory included *all* the islands in the Pitcairn chain. Pitcairn, Henderson, Oeno and Ducie. As of this writing, only an IOTA DXpedition has landed on Ducie, so a little geography lesson might be in order. Here are some of the features of Ducie Island that I gleaned from this Web page.

Ducie Island is located at 24.67 degrees South, 124.80 degrees West. The area of the island is 0.7 square km. The altitude of the island is 4 meters. The sea level index is 9 (not good for the DXer in high seas). Nearest land is 360 km. The climate is subtropical. Total number of plant species is 1. The island is a sea bird rookery and is the easternmost atoll in the Indo-Pacific and "little" disturbed. Rattus exulans (Polynesian Rats) have been reported on the island as an invasive species. Human occupation is rated, "Uninhabited, seldom visited, largely undisturbed. In other words, "Population = 0."

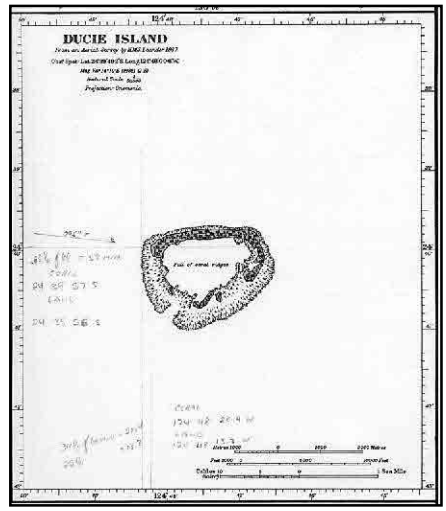
The descriptions of the other islands included the same categories of information. It looked like this Web page had everything needed. The island was 360 km from the nearest land and I had the coordinates. I wanted to confirm this distance myself and it looked like the nearest land was Henderson Island. I quickly loaded a DOS program I had which figured distances from coordinates and came up with a distance of 357 km (the correct distance turned out to be 354 km). The distance was good, but this was getting close with not much margin for error. I quickly got an email off to Cliff, K0CA of my findings. Things were looking good, *but* we need to confirm with maps and anything else we could find. Not only would

we need the general coordinates of Henderson and Ducie, but also we would need to find the closest points of the islands and determine the distance using the most exact information available. Back to the computer.

I found some satellite views of the area but the clouds were large and the islands small. They were not much help. I finally found a personal web page of a person in France. He and his wife had traveled extensively and had "Admiralty" Charts of the region taken by the H.M.S. Leander in 1937 posted on their Web page. I emailed him and asked if he could send me an exploded view of Henderson and Ducie Islands. I didn't hold out much hope for this to happen, but it was the only lead I had. One week later I had PDF maps of both islands. I thanked him very much for his time and explained to him what I was doing with the information. He was not an amateur, so he was interested in our endeavor.

Again, I emailed the maps to Cliff, K0CA. He thanked for me for the "consultation maps" and said they were trying to obtain the original Admiralty Charts but the cost was $500. As the PDF maps were taken from the originals, they may not have been totally accurate after going through the digitizing process. It turned out that the DXpedition group, in particular JA1BK and VE3HO, had the Admiralty Charts for investigating the possibility of Ducie Island becoming a new DXCC entity. The original charts were made available to the DXAC that confirmed the findings we had found by other means.

But what of my Uncle? He called from San Diego and had found a National Geographic atlas in a bookstore, bought it and brought it home. He got out his Navy navigation dividers that hadn't seen daylight in 30 years. He's 76 years old now and always interested in the islands I work DXing. The only map that had Ducie Island on it was of the whole South Pacific, so the scale was quite large. He said the best he could do with his dividers measuring the distance between Ducie and Henderson was 375 km. Not bad for what he had to work with. He doesn't have a computer. I thanked him for his help and told him I'd send him a copy of the QSL to look at when I worked Ducie as it looked like it might qualify. He warned me he had been in the region and that he didn't know how they would operate from there as the seas can be quite high there and it would be very dangerous. Hmmm, guess the veteran from WWII knows what he's talking about. He also mentioned that he had heard of Ducie Island lately. He thought a minute and said that it was referred to in a book that he had read and



Ducie Island, originally called La Encarnacion, was discovered between December 1605 and May 1606 by Portuguese explorer Pedro Fernandez De Quiros. Captain Edward Edwards later named the island after Lord Ducie.

sent to me. I asked which book it was and he said the title was, *In the Heart of the Sea* by Nathaniel Philbrick. I had just started the book but had not gotten to the part mentioning Ducie Island.

In the Heart of the Sea is the true story that prompted Herman Melville to write *Moby Dick*. I encourage you to read it if you like adventure on the high seas. It is proof that truth is stranger than fiction. It is a 1820s, true story of the whaling ship *Essex*, out of Nantucket, that was sunk by a whale approximately 1500 nautical miles west of the Galapagos Islands. The crew of the stricken ship was distributed into three small whaleboats. The closest land was the Marquesas; however it was thought that cannibals lived there. They decided to try for the west coast of South America, which would involve tacking due south for 1500 miles before they even started on an easterly course. The reason for this was the ocean currents and prevailing winds. Needless to say this was not a pleasant journey. There is not much in the way of land in this part of the Pacific and much of the ocean is considered "sterile" of many forms of marine life because of the ocean currents. When they finally saw land, they landed with some difficulty and thought the Island was Ducie. "Pollard and Chase studied their copies of *Bowditch's Navigator*. Judging from the day's previous observation, they determined it must be Ducie Island. After a month at sea, after traveling approximately 1500 nautical miles, they were farther from the coast of South America than when they had started." They really had landed on Henderson Island (37.3 sq km), which is actually larger than Ducie (0.7 sq km). "The men of the *Essex* did not know that they were within just a few hundred miles of saving themselves. Pollard and Chase were mistaken as to their whereabouts. This was not Ducie Island but rather Henderson Island, at virtually the same latitude but 70 miles to the west. [The actual distance is 224 miles.—Ed.] Both islands are part of a group named for its most famous member, Pitcairn, an island whose history was inextricably linked with Nantucket. In 1808, a sealing captain from Nantucket named Mayhew Folger stumbled across Pitcairn (whose location was incorrectly recorded on all available navigational guides) and discovered the answer to a 19 year old mystery; what had happened to Fletcher Christian and the *Bounty*." "They weren't the first to be enticed by Henderson and then cheated. Although they weren't aware of it, in the cliffs behind them was a cave in which lay eight human skeletons. A medical examination performed on the bones in 1966 revealed that they were of Caucasian origin, which suggests that these unidentified people, like the *Essex* crew, had been shipwreck survivors. The examination also revealed that one of the skeletons had belonged to a child between three and five years old. All eight people had died of dehydration." I won't ruin the story for you; however, they then continued to sail toward South America, which was still a thousand plus miles away. If they had sailed west for a few days they would have made Pitcairn Island, which was only recently inhabited by the crew of the *Bounty*; Pitcairn was not listed in their charts, however. I'll leave the story at that. I highly recommend the book.

In a few weeks I received an email from Cliff, K0CA explaining to the DXAC that much of the research had been done. All the DXAC had the opportunity to look at the information in preparation for a vote. The vote was held by email and the results were distributed to the DXAC membership. The vote was 14-0 in favor of Ducie Island becoming the newest DXCC entity. We were cautioned not to distribute this information until the ARRL made the formal announcement.

So that's the story. Thanks to the League from all of us DXers. It was a pleasure to be a part of this process. You now have a good idea how the ARRL works for you and why your support for the League is appreciated. I hope you enjoy working Ducie Island in March 2002 for an ATNO.

WRAP UP

Until next month, see you in the pileups!
—*Bernie, W3UR*

Tropical Storm Barry Proves "Minimalist Radio" Works in Emergencies, Too

"Minimalist Radio." The concept conjures up visions of small rigs and wire antennas pitting the stalwart QRPer against the fickle whims of the Goddess of Propagation and Edsel Murphy. Add a catastrophic occurrence (airplane crash, earthquake, hurricane, etc) and/or some "bad guys" and you have the beginnings of a Walker A. Tompkins novel!

The first weekend in August found Tricia and I, along with two of our grandkids, on the way to Tyndall Air Force Base, located in the Florida panhandle adjacent to Panama City. We weren't the only ones headed there. Several hundred miles out in the Gulf of Mexico, Tropical Storm Barry was slowly, doggedly proceeding northward toward our destination.

We arrived about 2200 CDT at Gwen (KB4UNT) and Kyle's (KF4TIV) home on base. They were overjoyed to get their children back (we had had the kids for about two weeks to give mom and dad a much-needed vacation). Prior to leaving I had been watching The Weather Channel and noticed the tropical depression building in the Gulf. Residents in the Panama City/Tyndall AFB area were not overly concerned, so we headed southward. Out of habit born of boredom, I had included my latest QRP transceiver kit, a Wilderness Radio SST-40, a N2CX Gusher dipole, and a 15-V battery pack made from 10 AA cells. Somehow, in the turmoil of getting two children ready to travel, I managed to forget a telegraph key for the rig.

We pulled into Tyndall base housing under almost cloudless skies, with a near full moon casting enough light to read by. In short, it was a glorious evening on the edge of the Gulf. The weather changed quickly. We awoke Sunday morning (August 8) to torrential rain with wind gusts in excess of 35 mph. Tropical Storm Barry was about to knock on our front door. So much for a cookout!

Gwen and Kyle needed to check out their boat to ensure it was moored correctly and the bilge was pumped out. Upon their return to the house we proceeded to secure loose objects around the outside of the house, tie down garbage cans, and start precautionary emergency projects like taping windows, assembling an emergency kit and laying in a supply of water and food.

Once we had things under control, I decided to erect the Gusher 40-meter dipole. One Appalachian Trail QRPer had offered a suggestion about using a small water bottle in lieu of a slingshot to loft antennas into trees. Take a small (12 oz) plastic water bottle and fill it about half full of water. Place the end of a light nylon line (check Wal-Mart) inside the bottle. Secure the cap onto the bottle, trapping the line inside. Play out some line on the ground, start swinging the bottle around in a circular arc, and, when the timing is right, let go! The bottle should arc through the air, over a nearby limb and sail down the other side, to a point where you can grab it. The plastic water bottle is soft and won't damage things on the way down.

With one end of the dipole in a tree about 25 feet up, I then proceeded to secure the other end of the dipole onto a swing set which placed this end of the dipole about 7 feet off the ground. Hardly a perfect installation, but adequate under the circumstances. This whole project took only 10 minutes but I was thoroughly soaked thanks to the torrential rains and the driving wind. Initial checks proved that the rig and antenna were working well. My first contact was Frank, WA4ZYN, in Memphis, Tennessee, followed by Mike, W3IRZ, in Conyers, Georgia, and Reid, KC0IDI, in Lawrence, Kansas.

An end-on view of the N2CX Gusher 40 meter portable dipole, looking "up" the antenna from the swing set in the backyard into the tree. This antenna withstood 70+ mph winds during Almost-Hurricane Barry at Tyndall AFB, Florida.

A close-up of the launcher system I used to put up the Gusher dipole antenna. The plastic water bottle is soft and won't damage anything on the way to the ground. The fluorescent twine is found at Wal-Mart or many DIY stores.

Rich Arland, K7SZ ♦ 25 Amherst Ave, Wilkes Barre, PA 18702 ♦ k7sz@arrl.org

This is the present configuration of my portable QRP station I use when camping or on trips. I now have all three Wilderness Radio SSTs (pictured is the 40 meter version with custom aluminum knobs). The POQET palm-top computer is used for logging, using the *EQF-Jr* logging software. The Koss headphones fold flat. The 15-V battery pack is visible at the rear of the rig. The paddle set at the right of the SST is a TE-NE-Key that fits nicely into the portable pouch. All this, including the N2CX Gusher antenna, fits into a Case Logic DM-1 portable CD player case for easy transport.

Craig LaBarge, WB3GCK, furnished the plastic case (actually a case used to hold decontamination items for the US military) and the circuit breaker/switch, and I provided the 10 cell AA battery holder and batteries. This is a 15-V battery pack that works very well with the Wilderness Radio SST and the NorCal 40-A radios I use. AA cells are available everywhere on the planet, so there is no problem replenishing the batteries on short notice.

With wind speeds of only 72 mph, Barry never did make hurricane strength (it lacked 3 mph) as it came ashore at Tyndall AFB. In the grand scheme of things 3 mph makes little difference. We were inundated with 8 inches of rain along with heavy winds lasting all evening. The tree that anchored one end of my dipole was dancing like crazy in the high winds, but the Gusher antenna withstood the strain and was usable during the rest of our stay at Tyndall.

The lack of a CW key didn't pose a problem. I found that I could, with practice, send reasonable CW by shorting the tip of the key patch cord to the SST case, and tap out CW at about 15 WPM with few errors. Crude but effective, and it definitely fit into the Minimalist Radio concept.

What were the lessons learned? Borrowing the motto from Marine Force Recon: "Improvise, Adapt and Overcome"! First of all, everything doesn't need to be "textbook perfect" to get a station on the air under extreme conditions. Use what you have (Improvise), make it work (Adapt) and get on the air (Overcome). Now, I am not going to kid myself. This station would not be my first choice for an emergency station. Could I have passed emergency traffic? Without a doubt! Would it have been cumbersome, time consuming and frustrating? Without a doubt! *But I could have done it!* And that's the bottom line, isn't it?

When we QRPers participate in the ARRL Field Day or other To-The-Field exercises, we often use the excuse of having fun. It's much more than that. It's training. Use these times to hone your operating and coping skills. Learn to "think outside the box," to "Improvise, Adapt and Overcome." While Tropical Storm Barry didn't do any real damage on its trip through our front yard, what about the next one? Or the one after that? Emergency communications and QRP are *not* mutually exclusive terms. Train hard and be ready.

PROLOG

This column was finalized the week before the World Trade Center attack. Looking back at the last paragraph, being prepared to furnish emergency communications for a disaster event as huge and horrific as the tragedies in NYC, the Pentagon and the crash site in western Pennsylvania leaves the mind reeling at the sheer magnitude of the response efforts. Never in the history of Amateur Radio have our country and our individual communities needed us more.

Many ARRL members never get a chance to visit Headquarters in Newington, Connecticut. To the left of the main HQ building, on a grassy area, rests a small monument to those radio amateurs who have given their lives in service to their communities during times of disaster. This is a somber place, a place to reflect upon the names listed on the monument and their unselfish acts of community service and patriotic duty. It's also a place to say a prayer for those who have made the supreme sacrifice in attempting to bring order out of chaos.

Our Amateur Radio hobby puts each of us in a unique position. No other "hobby" allows the hobbyist to actively participate in serving their country and community as directly as does ham radio. When chaos reigns and communication needs to be established and maintained, it's the radio amateur who comes through and delivers. No other agency or group can provide the technical creativity, communications diversity or the frequency agility that Amateur Radio provides.

America needs us. As an Amateur Radio operator it's your duty to get involved with ARES/RACES. Train. Improve your skills. Take the Emergency Communications courses sponsored by the ARRL (**www.arrl.org/cce/**). FEMA also has a series of correspondence courses dealing with emergency preparedness, radiological emergencies, HAZMAT events and much more that are free. Log on to their Web site at **www.fema.gov/** and sign up. Individually and collectively we can make a difference. It's our chance to shine.

God bless you and God bless America.

QST

6-Meter Black Holes Fill In

The outstanding conditions on 6 meters during the fall-winter F_2 season has fulfilled nearly everyone's hopes and dreams. Stations claiming that they live in a "black hole," which would forever prevent them from working Europe or some other area of the world, have now been largely quieted. There is hardly a populated place in the US or adjacent Canada that had not worked across the Atlantic by the end of the year. Operators in the eastern third of the US are still waiting for those openings to Japan that so overwhelm stations in the Pacific Northwest, but they have never claimed to live in a black hole as a consequence.

European View of the US

Figure 1 shows grids from which US and Canadian stations worked three progressively distant areas of western Europe—the United Kingdom, Belgium and Slovenia. The map is not intended to be exhaustive, as US operators in other grids undoubtedly made contacts with other Europeans. Nevertheless, the map shows something remarkable at first glance. It was possible to work Europe from any place in the eastern half of the US sometime during the current solar cycle. The colored grids in the western half of the country are widely scattered, and they largely represent population centers. This suggests that alert stations almost *anywhere* in the nation could probably have worked European stations sometime during recent months. Yes, some eager stations have still not heard 6-meter signals from across the Atlantic, but it is not because of any black holes.

Blue grids are those worked by S59A (JN76) in Slovenia. US stations from most anywhere east of a line from the Great Lakes to Texas could have worked Slovenia. This suggests that US stations in this region had a good chance of working adjacent countries as well, such as Croatia, Italy and Austria. ON4GG (JO20) and ON4ANT, who share a station in Belgium, worked US and Canadian stations in the green colored grids, in addition to all of the blue grids that S59A logged. Notice the somewhat more westerly extent of the Belgians' reach and the scattered grids they worked all the way to the Pacific coast.

At least one of the four representative stations in the United Kingdom, GM0EWX (IO67), GI0OTC (IO65), GW3JXN (IO72) and G0JHC (IO83), worked the grids colored in yellow, along with nearly all those in green and blue. The widespread distribution of colored grids suggests that given time, western Europeans could probably have worked nearly every US grid with 6-meter operators, considering the propagation conditions this past fall and winter. Perhaps they still will.

US View of Europe

Figure 2 shows a similar map for Europe, with colored grids keyed to representative stations in three widely separated areas of the US. At least one of four representative stations in the Southwest, K5AM (DM62), W7RV (DM35/43), W7CI (DM41) and WA7JTM (DM33), worked the blue grids. Those in green were worked from the Midwest by K0AZ (EM48) or K5SW (EM25), in addition to nearly every gird worked by those in the Southwest. The yellow grids show the even greater reach of two representative stations in the Northeast, K1TOL (FN44) and W3EP (FN31).

US 6-meter operators contacted stations in more than 300 European grids by the end of December, but there are plenty to go. Some gaps in the European map require brief explanation. Six-meter operation is prohibited in central Spain because of 49.250-MHz television in Madrid. (This station will shut down soon, ending one of the most useful transatlantic propagation indicators.) There have been no 6-meter permits from Corsica (TK) or Hungary (HA), although there are no grids exclusively within Hungary. The status of 6-meter operations from Belarus and Russia are unclear, although Europeans have reported some scattered activity from these places from time to time. There are few active 6-meter stations in Turkey or any of the countries of North Africa, save Morocco.

My thanks to the European operators who provided tabulations and maps of North American grids they have worked. In addition to those mentioned, DL7QY (JN59) and DL2NO (JO43) also provided their lists. The coverage from western Germany coincided very closely with that from Slovenia. Illinois stations K1MOD/9 (EN40) and KA9CFD (EN40) and Texans W5OZI (EM00) and W5UWB (EL17) also provided lists of European

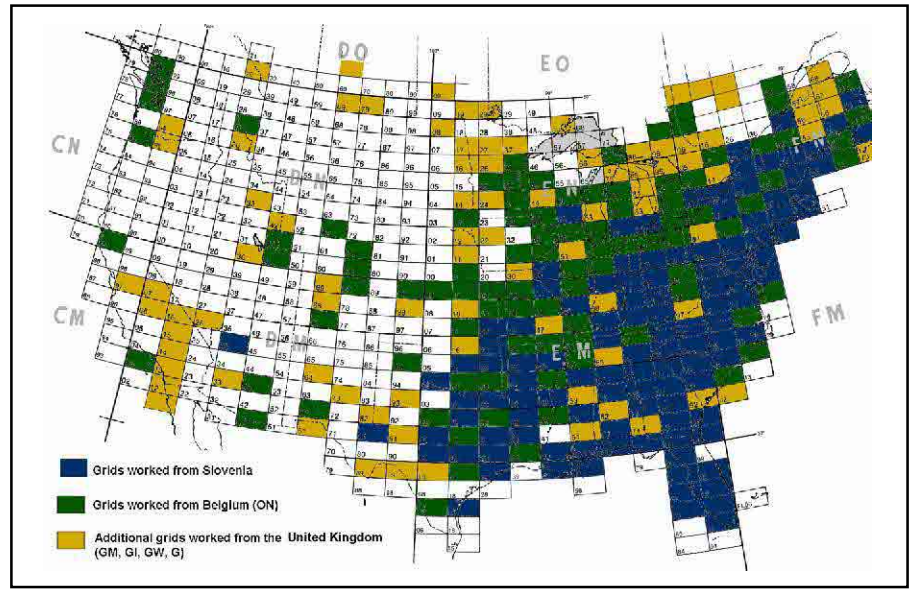


Figure 1—US and adjacent Canadian grids worked on 50 MHz by selected European stations in the UK, Belgium and Slovenia as of late December 2001.

This Month

March 21	Transequatorial propagation peaks ±2 weeks
March 24	Good EME Conditions

Emil Pocock, W3EP ♦ Box 100, Lebanon, CT 06249 (Voice 860-642-4347, fax 860-594-0259) ♦ w3ep@arrl.org

grids worked. The Illinois pair worked somewhat fewer grids in a generally more restricted area of western Europe than K0AZ and K5SW, while the Texans did about as well.

ON THE BANDS

Six-meter DX activities dominated the reports for December. Even the Geminids meteor shower failed to inspire much interest this year. An unusual short-lived daytime aurora on December 29 sparked a lone report from W2CNS (FN13) in western New York. Between 1647 and 1705, he worked a number of stations on 50 MHz with auroral-sounding notes to the south and southwest, as far as W5OZI (EM00). Other than that, the more than 200 e-mail, mail and telephone messages received in December were crammed with 6-meter DX news. Thanks to all who sent in reports, even if space does not permit listing all of your calls or mentioning each of your achievements individually. Nevertheless, all reports contribute to the summaries. Some information was gleaned from the OH2AQ DX Summit. Dates and times are UTC.

Six Meters

Six-meter propagation from much of the US and Canada continued to be quite good through December, as the solar flux remained above 200. East Coast stations worked into Europe every morning without fail. Transcontinental contacts were possible most afternoons, and West Coast stations reported about a dozen days with openings to Japan. Signals were often quite strong, allowing quite a number of stations running 10 W or less and simple antennas (including whips, dipoles, J-poles and various HF antennas) to make DX contacts.

Three unusual circumstances marked 6-meter activity in December. First, northerly paths predominated in openings to Europe and adjacent sub-arctic regions, such as Iceland, Greenland and Alaska. Second, the band reopened for an hour or more to Europe after 1800 on a number of days near the end of the month, a circumstance that is difficult to explain in terms of ordinary F-layer propagation. Third, several of the most intense openings from the US to Eastern Europe took place via paths skewed considerably toward the southeast. Such paths had been reported previously, but openings had never been so intense or widespread. In addition, many stations from the Rocky Mountains to the Pacific Coast made their first contacts into Europe.

It is difficult to chronicle all that took place in December, so the following summaries emphasize new and unusual aspects of activities. Stations throughout the eastern half of the US commonly made contacts into northern Europe as far eastward as Poland, for example, even if it was the first time for many. Similarly, those in the western half of the US and Canada found many afternoons with openings to Japan, some astonishingly intense. Nearly every part of the US and adjacent Canada had opportunities to Caribbean-area stations, often with quite strong signals as well.

Mornings to Europe and the Caribbean

In additional to the usual run of European contacts from the eastern half of the country, several stations in the western US and Canada found opportunities during the first part of the month. On December 1, K0KP (EN36) and others in Minnesota worked GM, GW, PA and F prefixes. VE4AMU (EN19) nabbed G0JHC and VE6PY (DO21) found GM0EWX, perhaps the first contacts from the Canadian prairies to Europe. N7IJ (DN44) in Idaho worked GW4VEQ, EI6IZ, EH1TA and G4CBW on SSB for his first Europeans ever. A sampling of other western stations that worked into Europe early in December are listed in Table 1.

Openings into the Midwest and interior South during this period were impressive. W9UD (EN44) ran a string of G, PA, OZ, SM, OH and SP stations on December 6, for example. W9WI/4 (EM66) also made it to EI, GW, G, SM and SP using just 10 W to a magnet-mounted whip on the rain gutter of his house. K5CM (EM25) worked G, I, LA, SM, S5 and others scattered across the midsection of the county had similar successes. East Coast stations from the Canadian Maritimes to Florida had several opportunities to work into Eastern Europe and the eastern Mediterranean, including numerous OH, ES, LY, YL, YO, UR and SV stations, along with OD, 5B, 4X and JY.

December 6 was especially memorable, as a handful of alert stations worked much farther—to VU2ZAP in India with strong SSB signals. VU2ZAP had worked into Western Europe on December 2 and as far westward as OY9JD the next day. On December 5, his signals into Great Britain reached 40 dB over S9, and English stations stood by as he made contact with KP4EIT. On the fateful December 6, VU2ZAP began hearing W1-area stations as early as 1415, but it took a few minutes before he could attract attention. In rapid succession, he worked VE1YX, W1LP, WA1ECF, K1TOL, W1RA and NY1E on SSB with signals as strong as S7 both ways, to the great astonishment of all.

Conditions during the middle of December were not so consistently good, but there were some surprises. Midwestern and western stations copied the Greenland (OX) and Iceland (TF) beacons more often after 1900, which eventually led to some interesting contacts along far-northerly paths. December 11 led the way. W8 and W9 stations reported OX and OH beacons after 1900, soon followed by widespread contacts with TF, OX and OH after 2000, summarized in Table 2. These

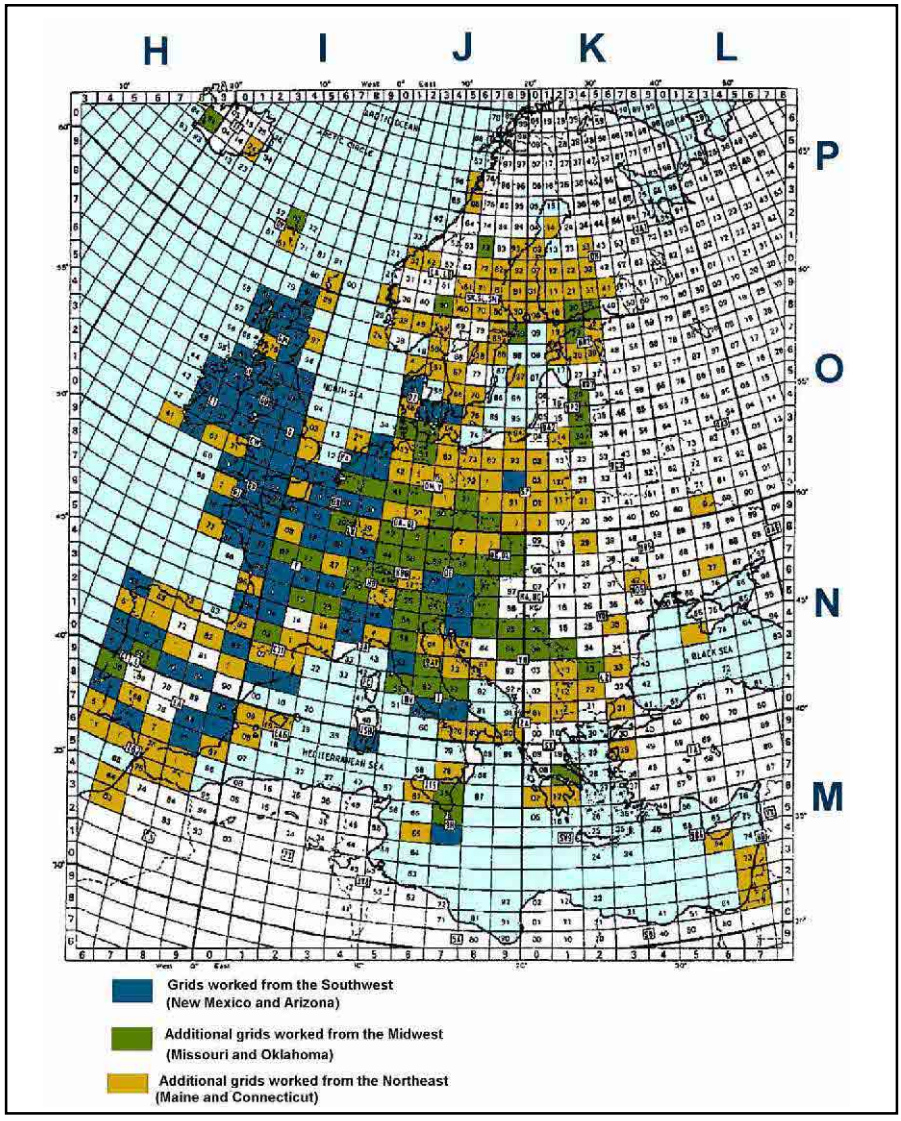


Figure 2—European and adjacent Mediterranean grids worked on 50 MHz by representative US stations in the Northeast, Midwest and the Southwest by late December 2001. For a similar map, see www.conknet.com/~b_mobile/EastGrids.html.

Table 1
Western US to Europe, December 1-10

Date	*US Call (Grid)—European Calls or Prefixes*
1	K7RAT (CN85)—GW3JXN
	AA7A (DM43)—EI7GL
	K7ICW (DN26)—G3FPQ, GW4VEQ, GI0OTC, EI6IZ, MM0AMW, GW3JXN
2	N6CA (DM03)—EI6IZ, GI0OTC, GW4VEQ
4	NN7J (CN85), N7DB (CN85)—EH7KW
8	K5AM (DN62)—G, GM, GW, GU, EI, F, IS0
	W7CI (DM41)—F5JKK
	WA6PEV (DM15)—CT1EEB

Table 2
Western US to Subarctic Regions after 2000 UTC

Date	*US Call (Grid)—European Calls (Heard Only)*
11	KJ9I (EN53)—OH7RJ
	K0YW (DM67)—OH3XA
	K6CH (DM13)—(VE8BY/b)
	N7DB (CN85)—(OX3SIX/b), TF3GW
	W7KNT (DN26)—OX3OX, TF3GW, OH1XT
	W7AL (CN87), KB6NAN (CM87), N6JV (CM98), N7YAP (DN07)—OX3OX
	K6RE (CM98)—(OX3SIX/b)
17	N7DB (CN85)—(VE8BY/b), (OX3SIX/b), TF3GW
	N7DB, WA7RED, WA7GCS (all CN85)—SM3GSK
	W7EW (CN84)—(OH7PI)
20	AA7A (DM43)—OX3FV

Table 3
Skewed Scatter Path to Europe, December 30 and 31

Date	*US Call (Grid)—European Calls or Prefixes*
30	WZ8D (EM79)—SM, OH, SP, LY, ES
	W5ZN (EM45)—OM8NY
	K0AZ (EM48)—OH, YL, LY
	K5SW (EM25)—I, 9A, S5, OE, SP, OH, LY, ES
	W0VD (EM27), N0JK (EM17), W5DB (DM82), N6ZZ (DM73)—S58J
	N0LL (EM09)—EH, EH6, GW, GI, G, F, I, IS0
	N5DDB (EM15), N0VB (EN33), KA0JGH (EN10), K0CS (DM79)—OZ1IEP
31	K2AXX (FN12)—LA, SM, OH, ES, LY, UR; and SV, 5B4FL, JY9NX direct
	WB8XX (EM79)—OK, 9A, S5, YU, OH, LY, LZ, YO, 5B
	W9WI/4 (EM66)—OE, OK, 9A, YO, SP, UT5JAJ

far-northerly paths are quite unusual, as they crossed the auroral zone. Several operators reported auroral-like flutter and Doppler distortion on the northerly stations.

Stations along the East Coast and in the Midwest also found excellent conditions to northern Europe, with many LA, SM, OH, ES and SP contacts reported each morning. Such conditions sometimes extended well into the Midwest. N0JK (EM17), for example, worked OX3FV, MM0AMW and OX3HI just after 1700 on December 20 with just 100 W and an attic dipole. More astonishingly, OX3FV was using an FT-817 with about 5 W to a ground plane.

There were several surprises during the latter part of the month. The openings on the mornings of December 30 and 31 were remarkable not only because eastern Europeans were especially loud and numerous, but because the strongest signals came from paths skewed to the southeast, typically 120° to 140° from the East Coast and Midwest. At times, W1-call area stations found that Scandinavian stations peaked nearly due south, but some operators in northern New England and the Canadian Maritimes complained that they were not hearing much in any direction. Indeed, the opening seemed to favor W4s, but W5, 8, 9 and 0 call-area stations also worked LA, SM, OH, LY, ES and SP over this unusual skewed scatter path. Later in the December 30 opening, skewed-path signals weakened as the direct path intensified. Several stations noticed that two paths existed simultaneously: a skewed path to northern and eastern Europe and the usual direct path to western Europe, including G, F, ON and DL.

Some stations made remarkable runs: W4SO ran 240 Europeans after 1300 on the 30th, including 60 SP and numerous YU, 9A, S5, OM, SP, LY, UR and others. The next morning, he worked several more UR stations, along with S5, YU, OK, OM, YU, LZ and ER. W4MW (EM96) also filled several log pages on the 31st with 30 SP, 10 UR and 7 ES; several YU, OK, OM, OH, LY, YL, LZ, SV and Z32ZM, among others—all on SSB. Other unusual runs and individual contacts are summarized in Table 3.

In addition to the skewed paths, there were some unusual midafternoon openings to Europe. Usually, East Coast stations worked Europe between 1200 and 1700, but on December 24, 25, 26, 28 and 29, Europeans returned after 1830 and stayed in as late 2130 on at least one day. These were not just token openings, either. On Christmas day, many G, GM, EH, F, I, S5 and 9A stations were loud all along the East Coast well after 1930. On December 29, W1, 2 and 3 call-area stations worked GM, G, EH, ON, OE, S5, 9A and likely other countries as well. K1ZZ (FN31) nabbed S58J and 5B4FL during this period, quite astonishing, as it was several hours after sunset in Cyprus.

During all the excitement of the month, US and other North Americans worked several relatively rare stations. Among those were JW5RIA (Svalbard Island), JX7DFA (Jan Mayen Islands) and OH0JFP (Aland Island) in northern Europe; LX2DX (Luxembourg), HB0/HB9QQ (Liechtenstein), T77GO (San Marino), Z32ZM (Macedonia), ER5WU and ER5GB (Moldova), along with more than a dozen UR-UY (Ukraine) stations on the continent; and 5B4FL, 4X1RF, JY9NX in adjacent Asia. In addition to VU2ZAP, one other US first was achieved in December. N4CC (EM80) exchanged 559 reports with A45XR (Oman) at 1353 during the fantastic opening on December 29.

Caribbean-area stations also participated in these openings, typically getting into Europe up to an hour before those on the North American continent did. As many as 50 different Caribbean stations participated, including 6Y5RV, CO8DM, CO8LY, HH7PV, HR3/JA6WFM, YN1AG, ZF1DC and ZF1RC, along with HC2FG, HK4SAN, FY5KE, V31JP and several in Mexico. During the last week of the month, Caribbean stations worked into the US and Europe simultaneously with strong signals, creating huge pileups. Europeans as far eastward as the Ukraine (UR) were eager to work new Caribbean countries. The success of YV4DDK was perhaps typical. On December 30 and 31, he worked nearly 300 Europeans as far eastward as LA, SM, OH, ES, LY, OH, ER and UR. At the same time, he managed to work 150 US stations as far westward as the W5, 8 and 9 call areas.

Transcontinental and Alaska at Midday

Transcontinental openings, typically from VO1, VE1, 9, W1, 2, 3 and 4 to VE6, 7, W6 and 7, began as the Europeans faded from the East Coast sometime after 1630 and lasted for two or three hours. Signals were always exceedingly strong. These openings often extended into Alaska later in the afternoon. More than a dozen Alaskans were logged in every US call area, along with VY1JA, VY1DM and VE8NSD. Many stations found these openings ideal for filling in rare grids and working needed states, such as Vermont, Rhode Island, Wyoming and Utah.

Afternoons across the Pacific to Japan

On fewer days than might have been expected, propagation extended into the Pacific after 2000. V73AT worked as far as the East Coast on the afternoons of December 23 and 29. KH6/K6MIO and other Hawaiians made it that far on December 24 and 28. XE2EED reported FO5RA on Tahiti on the 13th around 2150. ZD7VC found KH6/KF6GYM on December 18 and worked him, along with KH6/K6MIO, KH6IAA, K6IPF and KH6SX, and FM5AD the next day between 2026 and 2059. That is quite a geographical spread for one opening! N1RZ (FN44), W1RMA (FN65) and VE9AA (FN65) found ZL2AGI on December 24 between 2000 and 0150, while K1JT (FN20) worked ZL4AAA.

Operators in the Pacific Northwest found the band filled with eager Japanese stations on

EME Annual Standings

Published Earth-Moon-Earth annual standings include stations with a minimum number of unique initial contacts as of January 1. For a complete list of all reporting stations, check the VHF/UHF/Microwave Standings Boxes at **www.arrl.org/announce/standings**. To ensure that the Standings Boxes reflect recent activity, submit reports at least every two years by e-mail to **standings@arrl.org**. For printed reporting forms, send a request with SASE to Standings, ARRL, 225 Main St, Newington CT 06111.

Call	Initial QSOs	DXCC Entities	US States
6 meters (50 to 54 MHz)			
K6QXY	30	12	10
W7FN	17	5	5
W7HAH	15	5	6
VE1ALQ	12	--	--
2 meters (144 to 148 MHz)			
KB8RQ	1582	143	50
VE7BQH	1270	132	50
HB9Q	913	64	33
N5BLZ	790	93	50
W7HAH	763	90	50
HB9CRQ	725	—	50
W0HP	648	86	50
W7FN	459	67	50
9A9B	449	27	16
W5LBT	375	130	50
WA6PEV	344	52	50
K6AAW	341	51	47
KI3W	337	61	50
S52LM	312	60	33
VE3KH	290	52	50
AA7A	284	47	48
KL7X	277	36	49
PA3DZL	232	46	28
W0PT	229	42	32
SV1BTR	214	52	33
VE1ALQ	204	68	50
K8BHZ	195	44	32
WA4MVI	184	44	46
WA1JOF	179	40	35
WD5AGO	163	33	34
K0FF	162	34	50
WA7KYM	147	29	40
W0VD	136	38	50
SM3AKW	132	29	21
WA2FGK	131	35	43
AF1T	128	28	46
N7EIJ	127	25	39
AL7FS	119	11	49
K6PF	119	27	27
W7EME	114	40	41
W8WVM	111	29	35
KV6J	108	17	27
W5UWB	100	29	36
1.25 meters (222 to 225 MHz)			
W5LUA	29	4	34
W1JR	27	3	27
70 cm (420 to 450 MHz)			
N9AB	378	—	—
DK3WG	362	64	42
SM3AKW	345	55	35
OK1KIR	342	62	44
KD4LT	334	50	37
K0RZ	295	45	39
W7FN	289	58	50
W1JR	228	41	50
W7HAH	220	41	47
W0KJY	207	43	42
W5LUA	201	33	46
W4TJ	190	40	43
VE1ALQ	188	31	33
HB9Q	174	21	10
G4ERG	166	34	30
KL7WE	162	—	50
ON4KNG	146	36	18
W6DF	131	30	26
OE9ERC	127	30	22
PA3DZL	121	38	30
DK3FB	114	32	—
WD5AGO	101	23	25
AL7OB	84	17	26
WA4MVI	79	12	38
SV1BTR	64	25	17
KB8RQ	52	—	—
33 cm (902 to 928 MHz)			
W5LUA	9	2	6
AF1T	7	1	6
W0RAP	6	2	5
WA8WZG	5	5	5
K2DH	4	1	3
VE4MA	4	1	3
23 cm (1240 to 1300 MHz)			
OE9XXI	261	45	37
OE9ERC	206	36	28
W5LUA	204	41	32
HB9BBD	172	36	16
WD5AGO	170	36	33
OK1KIR	164	37	25
ZS6AXT	163	31	—
SM3AKW	154	34	20
G4CCH	140	30	23
VE1ALQ	130	30	23
F5PAU	120	—	—
HB9Q	109	25	17
KD4LT	99	50	20
K0YW	84	24	20
W0KJY	72	22	25
W4TJ	64	23	22
JA9AHB	55	—	—
WA4OFS	55	13	16
WA1JOF	53	15	18
WA6PY	50	13	15
13 cm (2300 to 2310, 2390 to 2450 MHz)			
OE9XXI	56	21	11
W5LUA	49	21	9
OE9ERC	46	20	8
OK1KIR	39	19	9
ZS6AXT	31	16	—
SM3AKW	10	9	2
WA6PY	10	7	2
9 cm (3300 to 3500 MHz)			
ZS6AXT	7	5	—
W5LUA	5	5	1
W7CNK	2	1	2
5 cm (5650 to 5925 MHz)			
OE9PMJ	21	15	4
OE9YTV	21	15	4
W5LUA	21	14	4
OE9ERC	20	14	2
OK1KIR	15	11	3
VE1ALQ	13	9	3
W7CNK	10	6	2
3 cm (10 to 10.5 GHz)			
W5LUA	41	17	6
AA5C	30	16	4
WA5VJB	19	10	5
OK1KIR	12	10	2
OE9ERC	11	7	3
IW5WJD	5	4	1

at least 10 afternoons, generally after 2230. The Japanese worked stations as far eastward as Missouri, Kansas and Texas on several days, but generally a line from Illinois to Florida marked the normal limit of Japanese signals in December. K4RX (EM70) and AC4TO (EM70) in Florida worked a handful of JAs on December 17, for aided by a sporadic-E link. K4RX (EM70), K1MOD/9 (EN40) and W8GF (EN82) made a few contacts each on December 27, for some of the most easterly Japanese contacts during the month.

The most intense opening was surely December 28. K0AZ (EM48) worked over 70 JA stations between 2321 and 0027, some with signals 30 dB over S9—the strongest he had ever heard. K0ETC (EM27) worked 41 Japanese through a huge S9 pileup. Even N0JK (EM17) managed 35 JA contacts with 100 W to his attic dipole. JA1VOK reported working NX4E (EM70) for his best DX of the day, while WB4WXE (EM74) and K6EID/4 (EM73) also snagged a few Japanese. W1LP/mm (DK88) made a run of 70 Japanese contacts in an hour after 2300 on December 21, the best ever from his ship.

Few other Asian stations were reported in the US. W5OZI (EM00) worked DU1EV late on December 16 and W7KQU (CN87) pulled out DU7/N7ET during the opening on the 18th. Other notable contacts from Asia included BD7NI—ON4ANT and VR2XMT's run into Europe on December 21. UA0SC, in the Russian Far East, worked JR6HI and VR2LC on December 30, 0250-0310. Oddly enough, he is only half the distance between Alaska and Japan and may be worth looking for yet.

432-MHz Meteor Scatter

No 432-MHz contacts were reported during the Leonids meteor shower in November, but K1VOW/7 (DM25) and N7CZ (DN47) completed a two-way contact on December 13 during Geminids. It took 100 minutes to exchange complete information over the 1400-km path, using the WSJT digital meteor-scatter program. Both stations ran 100 W to single long Yagis. WSJT is probably the most efficient mode now available for marginal meteor-scatter contacts.

MICROWAVE NEWS

Initials at 241 and 322 GHz

Brian Justin, WA1ZMS, who has been involved in setting several recent microwave records, helped to claim initial contacts on 241 GHz and 322 GHz this past December 15 from Virginia grid FM07. Brian was at the controls of W2SZ/4 when a 50-meter contact was made with WA4RTS/4 on 322 GHz at 0145. An hour later, the pair separated by a whopping 1.1 km to complete on 241 GHz. The 322-GHz contact crossed into previously unexplored territory in the unlicensed portion of the electromagnetic spectrum above 300 GHz, but at frequencies still well below those of visible light. It is not even clear if this is still radio!

The equipment consisted of 80.66 GHz free-running Gunn oscillators driving GaAs diode triplers to provide nearly 1 mW at 241 GHz. A small amount of fourth-harmonic signal yielded a few microwatts at 322 GHz. Modulated CW was used with wide-bandwidth FM gear. The antennas on both frequencies were 6-inch parabolic dishes. There is high water-vapor absorption at 325 GHz, which will severely limit future DXing at 322 GHz. A group working with DB6NT has also completed a 50-meter contact at 411 GHz, which may hold somewhat better prospects for longer distances.

47-GHz Record in England

A British team completed a 47-GHz contact over a 203-km path on October 21, which actually preceded the 151-km mark set in Japan in November, reported in last month's column. According to the RSGB *Microwave Newsletter* for November/December, GW0IVA/p, who set up on Mt Snowden (IO73xb) in Wales, completed CW contacts with GM0HNW/p and GM7MRF/p, situated on Cambret Hill (IO74uv) in Scotland, after first exchanging reports on 24 GHz. Equipment consisted of DB6NT-designed transverters that generated 20 mW into 30 and 90-cm dishes.

NOTES FROM ALL OVER

Weekend Moon Data

Thanks to Derwin King, W5LUU, for providing an assessment of EME conditions for each weekend of the year. Weekends Derwin rates as good or very good for 144 and 432 MHz EME are included in the This Month calendar on the first page of each column. These are probably the best operating times for casual EME operators and those with modest stations.

The primary determinants of EME conditions are Earth-Moon distance and cosmic noise from the sky behind the Moon. Weekends in which 144-MHz path loss is no more than 2.5 dB worse than ideal conditions are rated as good. Path losses can reach nearly 12 dB (as on the weekend of August 18), which makes for very poor conditions.

VHF/UHF/MICROWAVE NEWS

SETI Technical Symposium

The Search for Extraterrestrial Intelligence League sponsors its second Technical Symposium over the weekend of April 26-27 at the Engineering Department of the College of New Jersey, near Trenton. It is cosponsored by the Trenton Chapter of the Institute of Electrical and Electronic Engineers. Details can be found at **www.setileague.org**. QST

Displaying Your Collection

Small displays of radio related items could really dress up your shack. Hams with small apartments or condos sometimes don't have a lot of room for equipment, so they have to look for small things to collect. If you have more room, you probably have more stuff, but you still need a few wall displays to contrast with the bigger things.

This month I have a "Shadow-Box" display with most of my ARRL pins and ribbons in it. I have found these over the last 10 years, mostly one at a time. The display box was purchased at *A. C. Moore*, a local craft store. It originally had some fake golf junk in it and was on clearance sale. It was well made, about 15 inches square, and I knew it would look great hanging on the wall. Out went the golf junk and in went my ARRL ribbons and pins.

Finding Ribbons and Pins

Many of you emailed me about the 1925 hamfest column a few months back, wondering how often the old pins and ribbons show up. My answer is: often enough if you look for them. You have to be patient, though. Here are a few suggestions:

At hamfests, look for someone selling a ham's estate, or someone who is cleaning out his or her cellar. You can spot these kinds of sellers, as they tend to bring much more than they can possibly sell in one day, nothing is priced and everything is a mess. They usually have a lot of boxes full of small items. Look through all the junk boxes. Look for boxes that have items in that might have once been in a desk, dresser or workshop drawer.

At estate sales and moving sales, ask the owner if there are any retirement pins, tie clips, organization pins or lapel pins. If you're lucky maybe someone there had worked in radio at one time. Many did during WW II, and then went on to other careers after.

At Antique Malls and Shops, check out the displays of costume jewelry and fraternity pins. I've been lucky here.

Go to Auction houses, the kind that sells household items. Much of their stock comes from dealers and gleaners who make a living cleaning out old homes. Look through the boxes before the sale and bid on the ones that look most promising. You might find a few nice old radios here, too.

Talk to your friends. Let them know what you're looking for. You'd be surprised how often friends find things for you.

I have found radio pins from old radio schools, radio shows (like Orphan Annie and Gene Autry), manufacturer product pins, employment pins and trade-show pins. The ones I treasure the most, and I only have a couple, are pins from radio clubs. If you look through the 1920s and 1930s *QST*s you see ads from companies that made and sold pins to ham clubs. There were also local and national Short-Wave club pins, some dating back to the late teens and early 1920s. Some are really attractive and you'll catch yourself wearing them from time to time.

One pin that you really want to find is the First National ARRL Convention at Chicago in 1921 (shown here, along with several others). I found this one at an es-

John Dilks, K2TQN ♦ 125 Warf Road, Egg Harbor Township, NJ 08234-8501 ♦ k2tqn@arrl.org

tate sale and have seen one other at a radio auction that was converted into a watch-fob with a small leather belt. I have heard of a few others, but they are rare. How rare?

In the October 1921 *QST* there is a 16-page convention report. It says that, "there were twelve-hundred amateurs from out of town, representing every district and almost every state, augmented by several hundred local fellows," attending. Additionally there were 50 commercial booths, each manned by several persons. All the photos show everyone wearing a pin. So my guess is that about 1600 to 1800 badge/pins were given out.

On page 121 of the same issue there is an ad offering a "limited number" of left over badges for sale as souvenirs. This means there were probably a total of 2000 of them given out, and some went to every state. You'll want to look for them. Some are still around.

The 1921 Convention

It was a huge success. It was the first national gathering of hams, and by the numbers mentioned above, a great percentage attended. All of the ham pioneers were there. They had a great program full of speakers on all subjects, lunches, dinners and banquets. It lasted four days, and all had a good time.

Sales were brisk by the manufacturers and vendors, with many hams picking up some of the very latest radios and accessories to take home.

If you get a chance, get a copy of the article from the *QST View* CD-ROM and read about it. There are seven additional pages about the new products that were introduced there. (I sure would like to have one of each.)

Other Small Displays You Can Build

Small tube collections display well inside a shadow-box. This helps keep little fingers from removing valuable tubes and causing damage. One friend of mine had over 15 displays about 2 feet square and about 6 inches deep, all filled with tubes. His display went from early De Forest to the latest RCA and GE. He would take them to ham clubs and give talks, then return home and hang them back on the wall.

He also had similar displays of resistors, capacitors, relays, IF-cans, old audio transformers (small ones) and Morse telegraph keys. It was always fun to go over for a visit. He'd show me the latest display he had built and I would learn from him.

What I'm saying is, you can have fun collecting almost any radio item, and making a nice display finishes it. You'd be surprised how many different resistors my friend had in his display. Once you start, you'll find more pieces and you'll learn too.

HAMFEST SEASON

This year I'm going to try and get to more local hamfests. I won't always have my museum with me, so if you'd like to see it, check my schedule the week before the hamfest. I'll try to keep it up to date. You can find my Web site at **www.eht.com/oldradio/arrl/index.html.** Click on my Museum to see the schedule.

Good hunting. Look for my call letters on my hat and say hello.—*K2TQN* QST

NEW PRODUCTS

LPT-2250 SPECTRUM ANALYZER

LP Technologies, of Wichita, Kansas, introduces a new high-quality, low-cost spectrum analyzer. The LPT-2250 is said to use the latest in RF technology to give the user superior performance in a lightweight package. Unlike other units in its price class, the LPT-2250 is said to provide stable and accurate frequency displays and sweeps.

The LPT-2250 Spectrum Analyzer has a bandwidth of more than 1 GHz and utilizes a fully synthesized RF system. The LPT-2250 has an integral CRT display with powerful marker and video functions. A four-line LCD provides easy to read instrument settings and measurement values.

The options include a 2 GHz RF power meter, a tracking generator, an AM/FM receiver and Windows-compatible software. The LPT-2250 weighs less than 18 pounds (8 kg) and has a list price of less than $2700. For more information, contact LP Technologies, Inc, Samuel Lee, Marketing Director, 1919 N Amidon, Suite 216, Wichita, KS 67203, tel 316-831-9696, fax 316-831-9692; e-mail **stan.pierson@lptech.com**; **www.lptech.com**.

Previous • Next New Products QST

A Tale of Two Preemption Policies

By Brennan Price, N4QX
ARRL Field and Regulatory Correspondent

It was the best of times, it was the worst of times.

Charles Dickens's opening line in *A Tale of Two Cities* could legitimately be used to describe December 2001's developments in amateur antenna restrictions in the United States. Hams facing unfriendly local zoning regulations were aided by two generally favorable court decisions, which, if published, will supplement an aging body of precedent in amateur antenna cases. On the other hand, the FCC again declined to clarify PRB-1, its limited preemption of land use restrictions affecting Amateur Radio, to the extent that it would apply to private, contractual restrictions, commonly referred to as covenants, conditions, and restrictions (CC&Rs). While hams negotiating with a zoning board received two new useful tools during the holiday season, those of us facing private restrictions, received the proverbial lump of coal in the stocking.

PRB-1 is a common topic on these pages; we last dealt with this topic in the September 2000 issue. Given December's developments, the topic merits further discussion. Our goal, as it was 18 months ago, is to help you understand what PRB-1 does, what it doesn't do, and how it is commonly applied.

This article is not a substitute for the services of a real estate or zoning attorney familiar with the appropriate laws and regulations in your jurisdiction, and it would be quite unwise to use it as such. For an investment as substantial as a new home or an Amateur Radio tower, an attorney's services are usually a cost-effective insurance policy. If you're buying a house or planning a new, elaborate antenna system, we strongly urge you to retain an attorney and educate him or her about issues affecting Amateur Radio. ARRL Volunteer Counsel are lawyers who are hams, and have agreed to provide an initial consultation to other hams free of charge. Refer to **www.arrl.org/FandES/field/regulations/local/vci.html** to be referred to an ARRL Volunteer Counsel near you. Hams facing antenna zoning issues may also be interested in ARRL's *Antenna Zoning for the Radio Amateur*, by Fred Hopengarten, K1VR.

The Best Of Times—Zoning Restrictions

We'll start with the good news.

PRB-1 is somewhat vague. Does it really work?

PRB-1's effectiveness will vary from case to case, given the nature of the antenna installation, the lot and the community involved. However, the plain language of the policy calls on local governments and zoning authorities not to preclude, but to "reasonably accommodate" Amateur Radio communications. Generally, when an amateur has successfully shown that a desired installation is necessary to reasonably accommodate his or her Amateur Radio communications, a permit to proceed with construction is granted. Fortunately, most of these cases are resolved amicably without court intervention. The exceptions to this rule provide precedent to guide us—and local zoning authorities —in the application of PRB-1.

What's to stop a zoning board from being unreasonably stubborn?

The best bet is a municipal attorney whom you and your attorney have educated about PRB-1. Among the cases used to educate the municipal attorney should be the recent decision in *Palmer v. Saratoga Springs*, No. 99-CV-1091 (N.D.N.Y. Nov. 29, 2001). The preceding citation and those that follow are provided for the benefit of your attorney.

United States District Judge Norman A. Mordue's ruling in *Palmer* finally ended Randall Palmer, N2NVH's, three-year battle with Saratoga Springs, New York to erect a 44-foot antenna structure. The Saratoga Springs, New York, Zoning Ordinance limits all antennas to 20 feet in height, allowing exceptions only upon issuance of a special use permit. After three initial hearings, the Saratoga Springs planning board refused to grant such a permit, and continued to deny the permit even after a federal magistrate encouraged reconsideration and Palmer offered concessions. The Planning Board, in its final written denial, even went so far as to decry "the intrusion of the FCC regulations on local police power."

Judge Mordue was not impressed with Saratoga Springs's efforts. He found that "the planning board engaged Palmer in a strictly one-sided negotiation consisting of inflexible demands and the construction of hoop after hoop for Palmer to jump through." By conducting such a one-sided negotiation, Saratoga Springs had failed to meet its obligations under PRB-1. Mordue ordered the city to grant the permit, finding that remanding the case to the recalcitrant planning board would be pointless.

What exactly are a municipality's obligations under PRB-1?

The courts focus on two obligations, the second of which has three parts. First, a municipality may not enact an ordinance that prescribes an unvarying height restriction on Amateur Radio antennas. Such ordinances have been held to be facially invalid. Saratoga Springs does allow for a higher height with a special use permit, however, so their ordinance met this test.

The second obligation of a municipality is to apply the ordinance in such a manner that reasonably accommodates amateur communications. Courts have held that the reasonable accommodation standard requires a municipality to consider a ham's application, make factual findings, and attempt to negotiate a satisfactory compromise with the applicant. Mordue held that Saratoga Springs never attempted to negotiate a satisfactory compromise, and this failure to negotiate sealed the favorable decision for Palmer.

PRB-1, however, as FCC enunciates it, is a three-part test. Municipalities may not preclude amateur communications; they must make reasonable accommodation for the same; and those regulations must be the "minimum practicable regulation" that will accomplish the municipality's legitimate purpose. The courts seldom focus on the third obligation under PRB-1. Most decisions are interpretive of the "reasonable accommodation" obligation.

So I can erect a 44-foot antenna in Saratoga Springs, New York. Big deal. I need an array that's going to bust through the pileups for P5 so I can get that last country on the list. Forty-four feet won't cut it.

There's still hope, as illustrated in the New Hampshire Supreme Court's 4-0

John C. Hennessee, N1KB ♦ Regulatory Information Specialist

decision in *Marchand v. Town of Hudson*, No. 2000-131 (N.H. Dec. 31, 2001). This case involved the antenna installation of Jerry Muller, K0TV, who obtained a permit to erect three 100-foot antenna structures on his six-acre tract. Some of Muller's neighbors sued the town after the permit was issued, and a trial court ordered Muller to dismantle his towers.

Writing for the Court, New Hampshire Chief Justice David A. Brock agreed with the trial court's finding that Hudson's grant of a permit was counter to New Hampshire accessory use law. However, Brock agreed that PRB-1 governed the situation, and that the trial court's dismantling order violated the federal preemption.

The New Hampshire court remanded the case to the Hudson Zoning Board of Adjustment to be reconsidered in the light of PRB-1, and provided the following guidance:

PRB-1 specifically requires the city to accommodate reasonably amateur communications. This distinction is important, because a standard that requires a city to accommodate amateur communications in a reasonable fashion is certainly more rigorous than one that simply requires a city to balance local and federal interests when deciding whether to permit a radio antenna. (Quoting *Pentel v. City of Mendota Heights*, 13 F.3d 1261 (8th Cir. 1994).

In light of the FCC's requirement, a zoning board's fact-finding and analysis should focus, first, on whether the three towers are permitted under local zoning regulations. If, as we have determined here, they are not, the zoning board should then consider what steps must be taken to "reasonably accommodate" Amateur Radio communications. In making this determination, the ZBA may consider whether the particular height and number of towers are necessary to accommodate the particular ham operator's communication objectives.

There was some evidence presented to the ZBA that the tower and antenna operation "was not the typical installation, but rather was something that every ham who was interested in reliable international communication on a regular basis aspired to own." The ZBA, however, did not make any factual findings regarding whether Muller even requires the proposed three radio towers to facilitate his international ham radio operations.

Muller's case is going back to the ZBA, where he will have an opportunity to present his reasons why three towers are needed. His goal, and your goal, is to effectively and articulately explain why what you are asking for is necessary to reasonably accommodate your needs. If you are called upon to make such an argument, preparation of a persuasive presentation is called for.

The Worst of Times—CC&Rs

My property has deed restrictions which preclude ham radio antennas. What can I do?

You can operate another ham's station, operate from your car, find a club station, or move.

You unsympathetic so-and-so, who are you to give me a flippant, unworkable answer like that?!

It's not that I don't have sympathy; I do, and so does ARRL. The issue of antenna restrictions, both public and private, is an organizational priority at the same level as spectrum protection.

And the answer is not mine, it's the FCC's. In an order of December 18, 2001, the full Commission declined to review a staff-level decision expanding PRB-1's reasonable accommodation requirement to private land restrictions, again reiterating its position that these restrictions are contractual obligations into which parties freely enter.

This assertion is dubious in the face of the pervasiveness of CC&Rs attached to most new construction, and ARRL's efforts to obtain a preemption will continue. However, the FCC made it clear that such preemptive relief must be Congressionally mandated. Given the manner in which Congress operates, it is highly unlikely that such relief is imminent, and it would be unwise to assume that it will be obtained.

Federal preemption, however, is not the only legal strategy for dealing with covenants; there are other remedies that an attorney can explore if you, like many hams, can't escape CC&Rs in your area when buying a house. Below is some guidance in avoiding them, or at least finding property with CC&Rs that do not preclude amateur operation.

You've got me convinced to buy a house without restrictive CC&Rs, if I can find one. How do I make sure I'm buying such a house?

Just as you would even if Amateur Radio were not an issue, conduct a thorough title search before you agree to buy the house. CC&Rs are recorded with the deed of the property on file at the appropriate courthouse.

If you must make an offer or sign a contract to purchase before a title search is complete, it is wise to write a clause into the offer or contract allowing rescission of the contract before closing if any CC&Rs are found that preclude the Amateur Radio operation you desire. Your attorney, whom you should consult prior to making your offer or contracting to purchase, can draft such a clause.

I really want to buy a brand new house. Are CC&Rs negotiable?

Once CC&Rs are recorded by the initial developer, often with the subdivision plat, they normally apply to all houses in the subdivision. If you are buying a property directly from the initial developer, however, you may be able to negotiate the language in the deed that applies to your lot relative to the applicability of CC&Rs. Few developers will be willing to do this, and many take a "take it or leave it" attitude. However, if the developer is anxious to sell the house, he or she may take a more conciliatory attitude.

This approach may not work on many properties, but the saying "nothing ventured, nothing gained" certainly applies. If you do find yourself able to negotiate the language of your deed, consult your attorney to ensure that the language you agree to fits your needs.

Never rely solely on a developer's oral representation that Amateur Radio will not be a problem under the CC&Rs. The developer's interest is in selling you the property, not in protecting your interests. If the written CC&Rs at closing conflict with the developer's representation, the written CC&Rs apply.

I've found CC&Rs attached to some property I'm buying. It's not clear to me whether Amateur Radio operation is precluded.

The standard "consult your attorney" advice applies doubly in this situation.

CC&Rs are creatures of contract and property law, which varies from state to state. The standards by which an ambiguous covenant will be judged will vary depending on the state where the property is located. A covenant construed to mean one thing in Oklahoma might be construed to mean another in Pennsylvania.

In evaluating covenants, you should seek the advice of someone who is familiar with the governing law in your state, because state law will govern if a dispute arises.

Correction: The December 2001 Washington Mailbox column (page 86) contained incorrect information concerning the Volunteer Protection Act. RACES *and* ARES volunteers *are* protected under the VPA. QST

A Typical Meteor-Scatter QSO Experience

In November 2001, I wrote about WSJT, *a high-speed communications program developed for meteor-scatter operation.*

Randy Tipton, WA5UFH (wa5ufh@ykc.com) wrote the following scenario to demonstrate the thought processes of a meteor-scatter QSO using WSJT.

I turn the radio on and the receiver comes to life with the sound of static. I carefully tune from 50.090 to 50.145 MHz, but hear nothing. The band is dead, so I decide to work some meteor scatter.

I turn the computer on and load *WSJT*. As it loads, I check that the WWV software updated the computer clock.

Using *WSJT*'s FSK441 mode, I put the program in the monitor mode. After several minutes, nothing is heard, so I log into the Ping Jockey Web site (**www.pingjockey.net**) and request a QSO by typing, "QRV 6 meters . . ." I wonder who will respond.

After a brief period, I receive a response, "Hw abt 50.273 you first STs de W5RUN." W5RUN wants to run on 50.273 MHz and use single-tone messages where applicable.

I acknowledge W5RUN's response and tune to 50.273 MHz.

Hurriedly, I enter "W5RUN" into *WSJT*'s To: radio window and click the Look-Up function to view W5RUN's grid square. Then, I click the Stop button to exit the monitor mode and click Enter Standard Text function, which automatically places "W5RUN" in each message pane. (Once confusing, this set-up procedure is easy now.)

I click the Tx First check box, while verifying that the ST check box is still selected. Finally, I click the Auto Start function and sip my hot coffee, as I am now ready to run.

As I wait for the first transmit sequence, I turn my antenna towards W5RUN and quickly check the distance (1050 miles). I determine that it is a workable distance for meteor scatter, so I ignore *WSJT*'s Hot Directions and point the antenna directly at W5RUN using the azimuth provided by *WSJT*.

The radio transmits and I verify that the first message is being sent and that W5RUN is displayed in the message windows. Everything looks good. In the background, I hear the multiple-tone transmission.

Out of the corner of my eye, I check ALC and power output. "Yes!" no ALC and 100 W output. After a 30-second transmission, the radio switches to the receive mode.

Ping! I hear a short signal. The radio transmits again. Was the signal real? Will it decode? Was the difference in frequency (DF), ok?

WSJT decodes, "W5TIP W5RUN." This is great! Both calls!

I quickly enter my report (27), click the Generate Standard Text button and select Message 2.

I review the MS QSO flow chart, which indicates that W5RUN should next transmit both call signs and his report.

WSJT indicates that DF is –90, so I turn on RIT and set it to about –90 Hz. That should be good enough, but I also adjust the Tot DF to –150. Reception was good, but now I have W5RUN in a narrower search and *WSJT* should be better able to copy W5RUN.

The radio now switches back to receive and I listen intently. Will there be another ping? The radio transmits again. Boy, those 30-second periods pass by quickly!

I didn't hear anything, but watch *WJST*'s green line and see a small spike at 25.5 seconds. I click the spike and *WJST* decodes "5TIP WGRUHH." Only a partial call, which is not uncommon, so I wait patiently.

Back to receive. After about four seconds, I hear a tone on a strong ping. Yep, that's it. My ears tell me that it was 882 Hz or the R26 single-tone message. W5RUN must have received my call and is sending my report. Again a few seconds later, I hear it again, ever so short, but so positively recognizable. There's no doubt in his mind, but I wait for the display to verify what I believe was received.

The radio begins transmitting again and the anticipation ends as *WSJT* displays a bright yellow mark around the 3.4 seconds, and there it is in the ST Decoded Message column of the received-text window: a report of R26.

Now, I will send his report (R27) until I receive his "RRR" or "73." I click the Stop Tx function, select Message 3, and then click the Send 3 button. The radio transmits the second tone—music to my ears!

I look for a second ping. I know I heard it, but I see nothing. Then suddenly in the waterfall window, I see another yellow mark at about 14 seconds. I click the green line below the mark and it appears decoded below the other R26 decoded single-tone message. Amazing, the dB was 5! There is another nice spike at 882 Hz in the passband window, which verifies that it is the correct tone. I guessed correctly when I adjusted the RIT to –90 Hz because the spike was at 882 Hz. That is amazing because single-tone messages have about a 7-dB advantage over multitone messages.

Back to receive again. This is really fast-paced—good rocks tonight!

As the radio switches back to transmit again, I wait for *WSJT* to display something, but nothing appears. Wait, in the receive-text window, I see a single-tone message that reads "73." I notice the DF is –231, which occurred at 16.4 seconds, and now I must make a decision.

I look at the display at 16.4 second and there is nothing. No spike on the green line and no yellow mark in the waterfall. I click on the 16.4-second frame, but there is no indication of a spike in the passband window at 2205 Hz. Too many things tell me this was not W5RUN. The passband window shows no peak under the 73 tone tick and the DF is not as expected. There are no positive indications in the waterfall or passband display. I disregard it and continue on.

That is why some folks don't use single-tone messages, but I know if used properly between two stations, they have a definite advantage over the multitone messages. Meanwhile, the radio switches to receive.

Halfway through the receive cycle, I hear nothing, then out of nowhere, the blue whistler. I know that tone anywhere. I wait for decoding and *WSJT* displays an 880-ms 2205-Hz tone with a dB of 5. Looking at the decoded text, I see "73" in the single-tone decoded text column. A quick glance at the Average Passband Window shows a huge spike at 2205 Hz!

This QSO is complete except for sending my 73. I go to the Ping Jockey Web site and send a message to W5RUN. "W5RUN got ur 73 at 0355, many thanks for the new contact." I am careful not to disqualify the contact by revealing what is heard before receiving "RRR" or "73."

After entering the Message 4, I let *WSJT* cycle through three more periods of sending 73 before clicking the Auto Period Off function, which stops the automatic keying process.

While I read the Ping Jockey Web site message thanking me for the contact from W5RUN, I wonder who else I can work tonight. Maybe I'll see you on the rocks!

Stan Horzepa, WA1LOU ♦ One Glen Ave, Wolcott CT 06716-1442 ♦ wa1lou@arrl.net, www.tapr.org/~wa1lou

AMSAT-OSCAR 40—Status Report

By the time you read this column, the OSCAR 40 satellite will have endured 15 months in space. It hasn't been an easy journey. In the wake of the December 2000 "event" (a possible explosion), the complex satellite has witnessed a string of successes and failures. In fact, the command teams are still involved in the process of determining which systems are truly lost, and which are only temporarily unavailable.

Pointing Away from Earth—Until April

In mid-December the orientation of OSCAR 40 was adjusted so that its solar panels could enjoy adequate illumination by the Sun. The downside of this maneuver is that the satellite's antennas are not pointed directly at the Earth for much of its orbit. A compromise attitude was adopted to allow some continued use of the transponder for several hours after perigee each orbit. By mid-April AO-40 will gradually move back toward its optimal earth pointing position at apogee.

OSCAR 40's orientation in space is controlled though *magnetotorquing*, a technique that involves using electromagnets onboard the satellite to interact with Earth's magnetic field. The ultimate goal is to switch to *three-axis stabilization* using OSCAR 40's mechanical *reaction wheels*. The command team knows that the reaction wheels are working. The question is whether the associated sensors and software can take over the task of maintaining the satellite's orientation, while still allowing a "bailout" return to spin stabilization if necessary. If all goes well, these tests should take place by the summer of 2002. If they are successful, the wing-like solar panels will be deployed and OSCAR 40 can avoid another prolonged period of poor antenna alignment. Three-axis stabilization will allow the antennas to be Earth pointing for most of the orbit, giving optimal signals. Three-axis stabilization will greatly increase available power and eliminate the blurring seen in the SCOPE camera images. It will also allow testing and possible use of the laser beacon, which has too narrow a beam to be of value while OSCAR 40 is in its spin-stabilized mode. When the solar panels are deployed, this will unfold the HF antennas, allowing testing and use of the 21- and 24-MHz receivers.

Figure 1—Our "big blue marble" of Earth as seen by the SCOPE camera aboard OSCAR 40. The slight blurring is caused by the rotation of the spacecraft.

Receivers and Transmitters

The 2.4-GHz S2 transmitter continues to perform flawlessly. In addition, the 435-MHz and 1.2-GHz receivers are working well. Most amateurs have been uplinking to OSCAR 40 on 435 MHz, but we've seen some activity on the 1.2-GHz uplink, too. The 24-GHz transmitter is operating nominally.

With the possible exception of the C-band receiver, which needs further testing, all of OSCAR 40's receivers tested so far (144, 435 and 1200 MHz) are fully functioning. Testing the S-band receivers requires using the K-band downlink and has not yet been done. As noted above, testing the 21/24 MHz receivers requires opening the solar panels to release the HF antenna.

On the downside, it looks like the 2.4-GHz S1 transmitter, along with the 145 and 435 MHz transmitters are nonfunctional and likely to remain so. There is still some uncertainty about the 10-GHz transmitter, but the prognosis is not good.

SCOPE and YACE Cameras

The color SCOPE camera is operational and has been sending some spectacular images of the Earth from space, even with mild blurring due to spacecraft rotation (see Figure 1). The monochrome YACE (Yet Another Camera Experiment) is functioning, but with some debris visible on part of the image.

Global Positioning System Receiver and Other Experiments

OSCAR 40's GPS receiver was tested last year and is working perfectly. The same is true of the CEDEX radiation experiments that have been yielding highly interesting graphs of the outer Van Allen radiation belt. The laser experiment hasn't been commissioned yet, but everyone is crossing their fingers.

RUDAK

OSCAR 40's RUDAK computer is at the heart of its digital communication capability. The good news is that RUDAK is up and running perfectly. The bad news is that due to intermodulation RUDAK will not be able to function simultaneously with the analog transponders as many had hoped. OSCAR 40 has a promising future as a digital communication platform, but this will have to be on a shared, scheduled basis with the analog (phone, CW) transponders.

IHU-2

The IHU-2 experimental computer functions very well. It is turned on intermittently as needed. Currently, for maximum speed and radiation sensitivity testing, it does not have its error detection and correction (EDAC) software loaded, so that it occasionally crashes due to radiation hits. However, it controls no mission-critical functions and is easily reloaded in a matter of seconds from ROM. The IHU-2 is used to control the YACE camera and to store large segments of telemetry for later downloading.

IHU-1

The IHU-1 continues to function perfectly.

The Future

It is reasonable to assume that the receivers, transmitters and other systems that are known to be functioning now will continue to do so for the long haul. We've been living under a cloud of uncertainty about OSCAR 40, but the cloud is lifting. We have much to look forward to in 2002. With luck, the three-axis stabilization and solar panel deployments will be major events this year. Assuming that all goes well, the focus will shift to bringing more receivers on-line. Considering the fact that we nearly lost the satellite altogether, OSCAR 40's recovery and continued operation is cause for celebration. You can keep up to date on the status of OSCAR 40 (and its operating schedule) on the Web at **www.amsat-dl.de/journal/adlj-p3d.htm**.

My thanks to Dr Stacey E. Mills, W4SM, for his assistance with this report. QST

Steve Ford, WB8IMY ♦ *QST* Editor

Defeating Covenants Requires Positive Strategy

By James G. Alderman, KF5WT
2015 Via Miramonte
Carrollton, TX 75006
kf5wt@arrl.net

The ARRL has chosen to undertake the task of limiting the effects of restrictive covenants nationwide as they apply to Amateur Radio. This is not just a worthy cause, it's an *essential* cause. Nothing less than the future of Amateur Radio depends on the success of this initiative.

But selling members of Congress, and members of various administrative committees, on the merits of such a law might be an uphill battle unless we employ a winning strategy.

Marketing Our Virtues

To prevail, our cause must be "spun" or "marketed" in a positive way, and in terms the non-technically-inclined masses can understand. We're already the good guys in the community. We just have to get the word out. Proper terminology is critical here.

First, we should emphasize the "volunteerism" that we do. We routinely volunteer our technical expertise (and elbow grease) at emergency shelters and at schools. We teach radio to Scouts, and risk our own safety spotting storms. And we do it all at no cost to the government.

As the Big Project gets underway, hams will be volunteering at schools more than ever. Our expertise will be needed to get the programs going, make the stations work and Elmer the young recruits.

When discussing our school activities with the powers that be, we must use positive, familiar terms—we are *mentoring* or *tutoring* the students. We're teaching them technical skills that relate to many fields of academic study, *and* that could land them a good job in the wireless industry someday.

Finally, instead of remaining passive and letting hams collectively be known as just a bunch of "tinkerers," clubs must take an active role in portraying themselves as "civic organizations."

Every time we work a bike-a-thon, we should make sure we're visible. That could mean setting up an information table at these events to get the word out about ham radio. We should certainly be present at any event where various civic groups are setting up information tables. We are a civic group! Let's act like it!

Volunteers Under Siege

Since Amateur Radio is predominantly a self-taught hobby, our ability to experiment using real hands-on activities (including using outside antennas) is critical to our technical proficiency and readiness. Would the restrictions we're currently facing ever be tolerated against any other industry or civic organization?

It's never acceptable to reduce skill levels in any field by eliminating practical, hands-on training. No elected official would ever consider writing such a prohibition into law.

Stopping the Talent Drain

Yet because these antenna restrictions are now the industry standard, the effect is the same. As hams, we are being expected to render civic service to our communities while being prohibited from honing our skills in daily life.

Of course, we could choose to live in an older neighborhood. But shouldn't we be allowed to have a nice new home like everybody else? Should we be required to give up our volunteerism, tutoring, mentoring and civic service the day we move into a nice new home? No, that's not an acceptable trade-off.

Those who support restrictive covenants would call our antennas "unsightly" and exclaim: "Can't you do those good civic things without outside antennas? Can't you put an antenna in the attic, or operate from your car? Wouldn't that be just as good?"

The answer is no. We can't expect a ham to successfully set up a Big Project station at the local middle school, or conduct a successful ISS contact, if he's never done it before. We can't expect a ham to teach students about microwave or wireless technology if he has no real experience to draw from. "Book-learning" alone is not enough—not in ham radio or any other field of study.

Stand Aside and Let Us Learn!

It's quickly becoming the case that the only hams who can do these civic activities, and do them well, are the old-timers. They are the only ones whose skills have been perfected by past experience, and past bouts with Murphy.

Younger hams are simply not being allowed to perfect their skills, and they are our future. Younger families tend to buy newer homes, and newer homes often don't allow outdoor antennas. This trend jeopardizes the future of Amateur Radio.

For the good of our communities and our schools, this trend must be stopped! To get these covenants outlawed on a national level, we must all collectively portray ourselves—as those who serve our schools and communities at no cost—in such a way that anybody who stands against us will look bad. When the positive momentum is on our side, we will have an easier time convincing the FCC that we must be freed up to do our civic work.

So let's get busy, folks! We're 600,000 strong. While the ARRL works on the legal front, let's make ourselves seen and heard. Show off Amateur Radio at that next school function, bike-a-thon or community event. We've got some marketing to do. Our future depends on it!

QST Op-Ed Policy

The purpose of Op-Ed is to air member viewpoints that may or may not be consistent with current ARRL policy.

1) Contributions may be up to two-thirds of a *QST* page in length (approximately 900 words).

2) No payment will be made to contributors.

3) Any factual assertions must be supported by references, which do not necessarily have to be included in the body of the article to be published.

4) Articles containing statements that could be construed as libel or slander will not be accepted.

5) The subject matter chosen must be of general interest to radio amateurs, and must be discussed in a way that will be understandable to a significant portion of the membership.

6) With the exception that the article need not be consistent with League policy, the article will be subject to the usual editorial review prior to acceptance.

7) No guarantee can be made that an accepted article will be published by a certain date, or indeed, that it will be published at all; however, only articles that we intend to publish will be accepted, and any article we have decided against publishing will be returned promptly.

8) Send your contributions to ARRL Op-Ed, 225 Main St, Newington, CT 06111.

Foundation Grant Funds Historical Amateur Radio Exhibit

We recently received the following press release from Katherine Duer Marks, Staff Director of the Historical Electronics Museum, Inc, who writes:

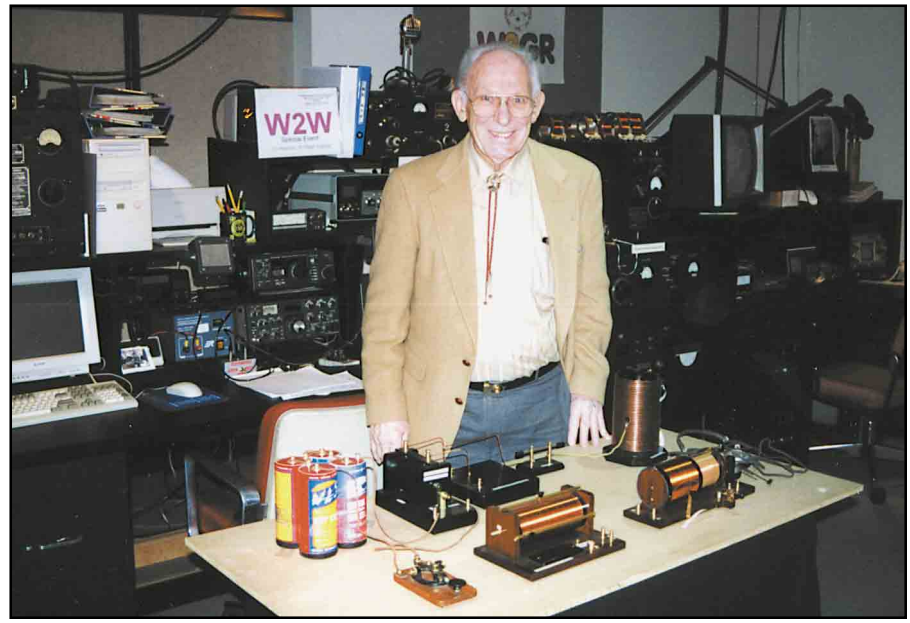
The Historical Electronics Museum in Linthicum, Maryland, has received a grant from the ARRL Foundation, Inc, to expand the role of Amateur Radio in its Communications Gallery. The new exhibit, entitled "From Spark to Space," will focus on the history of Amateur Radio and its contributions to communications technology. The gallery displays communications gear from the last 150 years, much of which is restored, maintained, and operated by the Historical Electronics Museum Amateur Radio Club as part of the museum's ham station, W3GR.

A highlight of the new addition to the exhibit is a replica of a complete 1917-era Amateur Radio spark gap station. The transmitter and receiver were built by Jules Kozma, N3DHM, to specifications found in the museum's library of antique electronics books and publications. Jules, who is a master machinist, not only built the equipment according to plans, but fabricated all metal parts that were no longer commercially available.

The operational portion of the exhibit will feature a number of historic Hallicrafters receivers and transmitters. Amateur gear, a mainstay of the Hallicrafters Company in the 1930s, became the basis for military signal corps equipment manufactured during World War II and beyond. This included the famous BC-610 transmitter. The Hallicrafters radios will join the current working display, which includes not only the '610 but also a TBL-13 submarine transmitter from the late 1930s, an HRO receiver, and many other historic ham and military equipment. The gear is put on the air during annual special events commemorating Pearl Harbor Day (call sign W2W), D-Day, and ham band operations when radio amateurs visit.

Following the museum's overall theme of "Electronics—Yesterday, Today, and Tomorrow," the W3GR station not only showcases antique wireless gear but also includes current and evolving modes such as satellite, ATV, SSTV, and digital communications. The new exhibit will feature the key role that Amateur Radio has played in the development of single-sideband, radio astronomy, space and digital communications, and microwave innovations. For more information, visit the museum Web site at **www.erols.com/radarmus/**.

KATHERINE MARKS



Jules Kozma, N3DHM, proudly poses in front of the museum station W3GR, with the authentic spark transmitter and receiver he built.

Contributor's Corner

We wish to thank the following for their generous contributions to:

The Victor C. Clark Youth Incentive Fund
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C. W. Chong

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PHD-ARA, Inc (Missouri)
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As received and acknowledged during the months of **November** and **December**.

Mary E. Lau, N1VH ♦ Secretary, ARRL Foundation Inc.

Gunnplexers

The Gunnplexer radio system is a combination of a microwave oscillator (based on the Gunn diode), a mixer, an audio amplifier, microphone and a wideband FM receiver. There are some variations on the theme, but every Gunnplexer style radio has at least these components. In Gunnplexers that operate at 10 GHz and higher, the entire microwave system is built into waveguide, and usually a horn type waveguide antenna is connected to complete the system. Figure 1 and the accompanying photo show a typical physical layout, although specific configurations may vary.

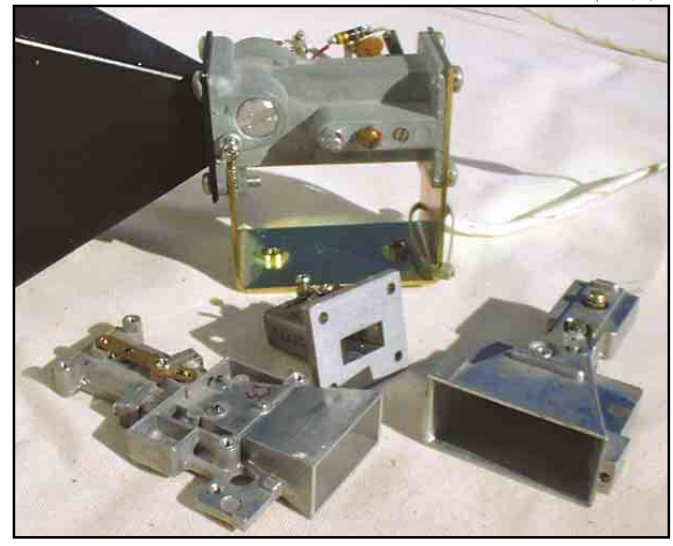
John B. Gunn originally investigated this microwave diode source in the early 1960s. When an applied voltage is increased, current continues to rise to a point called the threshold voltage. As the applied voltage is increased past this point, the current begins to fall and continues to do so until the breakdown voltage is reached. The portion of the curve where the voltage and current move in opposite directions is called the negative resistance region. If the device is made to operate in a resonant circuit and dc biased into this region, it will produce RF. Typical power levels are 5 or 10 mW, but there are 100-mW devices available. The best operating voltage is about three times the threshold voltage. Gunns can be designed and made to oscillate up to about 100 GHz.

As in any free-running oscillator, mechanical stability, constant load, clean power, and stable temperature are needed. In practical terms, a free-running 10-GHz Gunn in a well-designed cavity, at stable temperature and load can keep frequency stable to a few kilohertz over several minutes. Because of phase noise and typical frequency instability, practical free-running Gun-nplexers are used in fairly wide bandwidth communications systems. Amateur Gunnplexers operate at a nominal 75 kHz of deviation, resulting in about 200 kHz of bandwidth for good quality audio.

Q: How is the Gunn oscillator modulated?

We need to frequency modulate the signal with a deviation of about 75 kHz for voice communications. There are two ways to do this. One is called "push" modulation and the other "pull." The push technique modulates the bias voltage that powers the Gunn. The push sensitivity of 10 GHz Gunns runs 10 MHz/V or greater. This means that to get 75 kHz of deviation you need only *7.5 mV* of modulation! Although "push" also amplitude modu-

KENT BRITAIN, WA5VJB



A selection of surplus Gunnplexers from radar detectors and door openers.

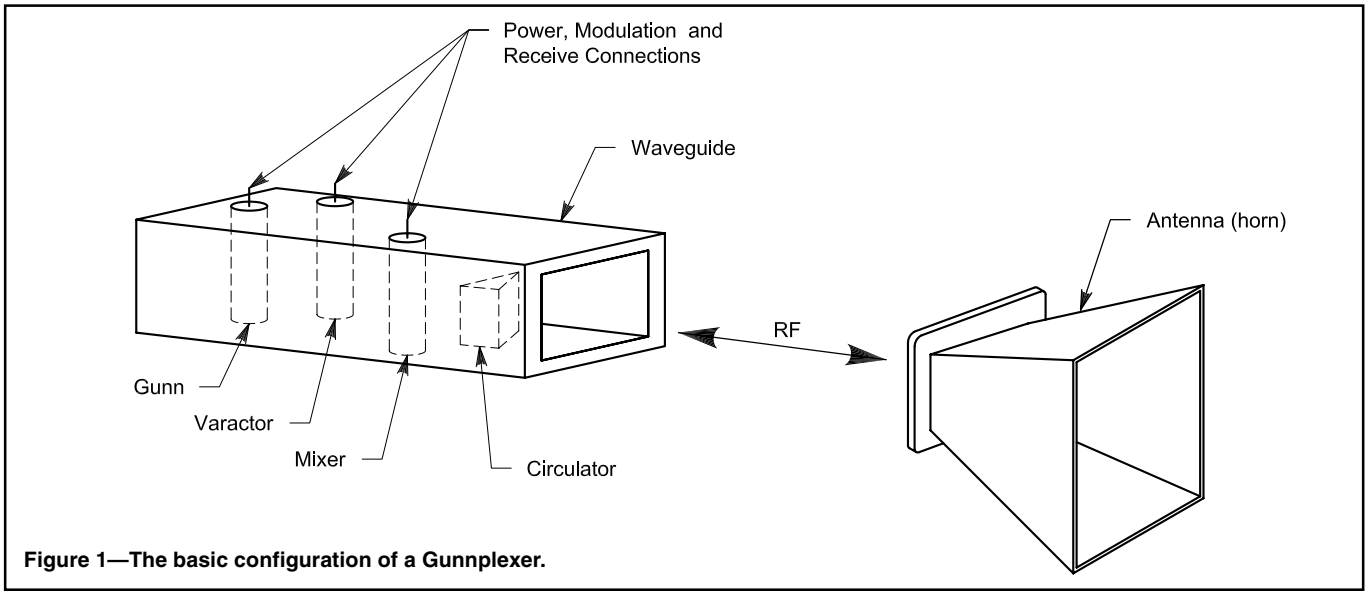


Figure 1—The basic configuration of a Gunnplexer.

Tom Williams, WA1MBA ♦ wa1mba@arrl.org

lates the oscillator, the resulting distortion is unnoticeable. When modifying some surplus Gunn systems such as door openers, push modulation is the way to go.

"Pulling" an oscillator refers to changing the reactance or loading of the cavity. This change is accomplished by placing a varactor diode inside the waveguide, near the Gunn diode. Varactors are chosen that have parameters appropriate to the kinds of tuning range and modulation range desired.

In either type of modulation, the system is fine-tuned for a QSO by adjusting the dc voltage with a multi-turn potentiometer.

Q: What kind of antenna do I need to make contacts? How about contesting?

The modulated signal travels out the end of the waveguide into the antenna and is radiated. Wideband operators use vertical polarization, where the narrow dimension of the waveguide would be vertical, as in Figure 1. When making your first contacts on 10 and 24 GHz it is probably easiest and most rewarding to operate a Gunnplexer with a horn type antenna. After you have mastered the basics of making contacts and want to try for some DX or to make a high score in a contest, you might want to add a dish. W5VSI took third place nationwide in QSO count in the 1999 ARRL 10-GHz and Up Cumulative Contest using a 19-inch dish and a 10-mW Gunnplexer. It is common to use a 2-meter radio as a liaison to help set up, choose frequencies, etc. Your local club or group can advise you.

Q: What does the mixer do in a Gunnplexer?

The receiver for a Gunnplexer is based on a mixer diode. It is possible to use the Gunn itself as a mixer diode, and this is done in some of the very inexpensive door openers, but for useful communications over reasonable distances, a separate mixer diode is needed. A high sensitivity Schottky barrier type is best. It is placed in the waveguide so that it intercepts energy being transmitted and also energy being received. The mixer diode mixes the outgoing and incoming signals and produces the difference signals. These signals are fed into a wideband FM receiver, usually tuned to 30 MHz.

Q: How does a circulator work in a Gunnplexer?

In higher quality Gunnplexers, a *circulator* is employed to separate the transmitted and received signals. The internal workings of a circulator include a piece of ferrite and a magnet that steer the RF signals around the ferrite. A circulator is constructed inside the Gunnplexer waveguide so that a small amount of the transmit energy is "leaked" to the mixer, just enough to make the mixer operate correctly. The circulator further steers as much of the received RF to the mixer diode as possible. This arrangement increases the effectiveness of the receive mixer diode and improves overall performance.

Q: How are Gunnplexers operated?

The mixer will produce frequencies that are the difference between the transmitted and received frequency. Therefore, for two Gunnplexer stations to communicate, their oscillators are adjusted to transmit on frequencies that are different by an agreed amount. The typical offset is 30 MHz, and two common RF frequencies used are 10,250 and 10,280 MHz. When the two systems are pointed at one another, both stations will be receiving a signal at approximately 30 MHz at the mixer output. The receiver is usually a conventional FM radio, modified to operate at 30 MHz or a radio constructed for this purpose. One interesting benefit of Gunnplexer operation is that the radios are full duplex—that is, both operators can speak and listen at the same time.

Q: How do I get Gunnplexers and parts?

There are door openers, police radar detectors and police radars that have been modified with the addition of suitable dc, audio and receivers to operate successfully as Gunnplexer radios on 10 GHz. In the photo that shows the collection of Gunnplexer components, the larger unit in the back is a door opener—the others are radar detectors. It is usually possible to retune the Gunn cavity to move it from the typical door-opener frequency of about 10,500 MHz or a typical radar detector frequency of about 11,500 MHz down to 10,250 or 10,280 for amateur use. Of the most common door-opener units, the ones with two or three electrical connections will have a mixer and varactor, respectively. They are much easier to use than the ones with a single connection.

For new, and generally higher quality and pre-tuned Gunnplexers, there are a few sources of the Gunn assemblies including higher power units, modulators, receivers, power conditioners, horns and various schemes for automatic frequency control. One of the suppliers, Advanced Receiver Research, can deliver a completely operational system. They are regular advertisers in *QST*.

In the next column we'll lift the lid on a microwave *transverter* and begin a series of issues on the components and functions of the type of radio that amateurs use to set DX records, talk way beyond the horizon, scatter signals off of rain, and generally have a blast!

I wish to thank Kent Britain, WA5VJB for his assistance in reviewing the column this month. Kent has been, and continues to be a big promoter of Amateur Radio microwave construction and operation.

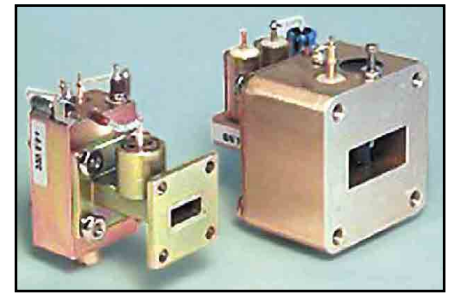
Resources

- VE3SMA from Ontario, Canada has put together a valuable Web page for Gunnplexer information at **www.kwarc.org/10ghz/10GHZ-4.htm**.
- A Web page describing a data (Ethernet type) experiment with Gunnplexers by KE5FX can be found at **www.guerrilla.net/reference/10ghz_link/10ghz_link.html**.
- A very thorough application note on putting a Gunnplexer on ATV is available at PC Electronics. Go to their Web page at **www.hamtv.com** and request document **10 gHz TXapp.pdf**.
- *The Gunnplexer Cookbook*, Bob Richardson, W4UCH, The Ham Radio Publishing Group, Greenville, NH. (This book is out of print, so check your library or used book supplier.)

Gunnplexers, antennas, complete systems, technical notes and related parts

- Advanced Receiver Research, Box 1242, Burlington, CT 06013; tel 860-485-0310; **www.advancedreceiver.com/**.
- SHF Microwave Parts Company, 7102 W 500 S, La Porte, IN 46350; **www.shfmicro.com/**.

ADVANCED RECEIVER RESEARCH



24 GHz (left) and 10 GHz (right) high-quality communications Gunnplexers.

COMING CONVENTIONS

OKLAHOMA SECTION CONVENTION

March 15-16, Claremore

The Oklahoma Section Convention, sponsored by the Green Country Hamfest Assn, will be held at the Claremore Expo Center, 400 Veterans Pkwy, just 30 minutes NE of Tulsa off historic Rte 66 at Hwy 20. Doors are open Friday 5-9 PM, Saturday 8 AM-5 PM. Features include flea market, commercial vendors, forums (Skywarn, NWS and more), VE sessions, free test table, on-site RV parking, free parking. Talk-in on 147.09, 444.35. Admission is $8 in advance, $10 at the door (under 12 free; family of 4 $20). Tables are $8 in advance, $10 at the door (electricity $25). Contact David Jackson, KE4OPA, Box 470132, Tulsa, OK 74147-0132; 918-622-2277; **info@greencountryhamfest.org**; **www.greencountryhamfest.org**.

WEST TEXAS SECTION CONVENTION

March 16-17, Midland

The West Texas Section Convention (47th Annual St Patrick's Day Hamfest), sponsored by the Midland ARC, will be held at the Midland County Exhibit Building, Service Rd; ½ mile E of the intersection of Fairgrounds Rd and old Hwy 80 (also called Front St or Business 20); westbound on I-20, Exit 144; eastbound on I-20, Exit 143. Doors are open Saturday 8 AM-5 PM, Sunday 8 AM-2 PM. Features include huge indoor flea market, many dealers, large tailgate area, T-hunts, VE sessions (Saturday, 1 PM), refreshments. *TI:* 146.76, 147.3, 444.2 (162.2 Hz). Admission is $8 in advance, $9 at the door. Tables are $17 each (for the first 4), $22 (for each additional table over 4). Contact Larry Nix, N5TQU, c/o Midland ARC, Box 4401, Midland, TX 79704; 915-699-5441; **oilman29@home.com**; or Joe Coldewey, KK5ZG, 915-697-7846; **kk5zg@caprok.net**; **www.w5qgg.org**.

NEBRASKA STATE CONVENTION

March 22-23, Norfolk

The Nebraska State Convention, sponsored by the Elkhorn Valley ARC, will be held at the Northeast Community College Lifelong Learning Center, 801 E Benjamin Ave; from the intersection of US Hwys 81 and 275 go N on Hwy 81 (13th St) to Benjamin Ave, turn right (E), proceed E for approximately 1.7 miles to entrance of NECC (on N side). Doors are open Friday 5-9 PM, Saturday 8 AM-5 PM. Features include flea market, dealers, seminars, VE sessions, banquet (Saturday, 7 PM; $12 each or $20 per couple), refreshments. Talk-in on 146.73 (131.8 Hz). Admission is $6 in advance, $7 at the door. Tables are $15. Contact Sam Seikaly, WA6BRE, 55422 835th Rd, Norfolk, NE 68701; 402-379-4073; **sseikaly@compoint.com**; **www.qsl.net/evarc/**; or Dave Thege, N0XBN, 402-371-3550; **n0xbn@arrl.net**.

February 23
Vermont State, Milton*

March 8-10
Louisiana State, Rayne*

April 14
North Carolina State, Raleigh

April 20-21
EMCOMM, Palo Cedro, CA

April 26-28
International DX, Visalia, CA

April 28
Delaware State, New Castle

May 3-4
Missouri State, Lebanon

***See February *QST* for details.**

MAINE STATE CONVENTION

March 29-30, Lewiston

The Maine State Convention (23rd Annual "Andy" Hamfest and Computer Fair), sponsored by the Androscoggin ARC, will be held at the Ramada Conference Center, 490 Pleasant St; take Exit 13 off I-495 (Maine Tpk) to traffic light, take first left after light. Doors are open Friday 7-9 PM, Saturday 8 AM-noon. Features include exhibitors, vendors, new and used radio and electronics gear, computers, forums, VE sessions (Saturday, registration 10 AM, exams start at noon). Talk-in on 146.61. Admission is free Friday evening, Saturday $5, under 16 free. Tables are $6. Contact Rick James, N1WFO, 7 Judkin Ave, Lewiston, ME 04240; 207-784-1266; **rjames@dlois.com** or **n1wfo@arrl.net**; **www.mainearrl.org/w1npp/**.

MARYLAND STATE CONVENTION

April 6-7, Timonium

The Maryland State Convention (31st Annual Greater Baltimore Hamboree and Computerfest), sponsored by the Baltimore ARC, will be held at the Maryland State Fairgrounds, York Rd; I-83 to Exit 17 (Padonia Rd to the E), turn right at York Rd. Doors are open Saturday 8 AM-5 PM, Sunday 8 AM-3 PM. Features include giant indoor electronics flea market, vendors, major manufacturers, commercial exhibitors and displays, outdoor paved tailgating (opens at 6 AM both days), forums, VE sessions (Sunday, 9 AM, Vista Room), QSL card checking (Saturday 9 AM-2 PM, Sunday 9 AM-noon), banquet, refreshments. Talk-in on 146.67, 224.24, 449.625. Admission is $10 in advance for a weekend pass, $6 per day at the door. Contact James Green, WB3DJU, Box 95, Timonium, MD 21094; 410-426-3378; **w3ft@juno.com** or **info@gbhc.org**; **gbhc.org**.

WASHINGTON STATE CONVENTION

April 6-7, Yakima

The Washington State Convention, sponsored by the Yakima ARC, will be held at the Masonic Center, 510 N Naches Ave; Exit 33 off I-82 to Yakima Ave City Center, turn right onto Naches Ave and proceed to site. Doors are open for setup on Friday 4:30 PM; public Saturday 9 AM-4 PM, Sunday 9 AM-1 PM. Features include VE sessions (Saturday, 12:30 PM), banquet (Saturday eve), handicapped accessible, refreshments. Talk-in on 146.66. Tables are $10 each for both days. Contact Jack Wrenn, N7KNO, 621 S 15th Ave, Yakima, WA 98902; 509-249-0897; **n7kno@arrl.net**; **eagle.ykm.com/~w7aq/hamfest.htm**.

Attention Hamfest and Convention Sponsors:

ARRL HQ maintains a date register of scheduled events that may assist you in picking a suitable date for your event. You're encouraged to register your event with HQ as far in advance as your planning permits. Hamfest and convention approval procedures for ARRL sanction are separate and distinct from the date register. Registering dates with ARRL HQ doesn't constitute League sanction, nor does it guarantee there will not be a conflict with another established event in the same area.

We at ARRL HQ are not able to approve dates for sanctioned hamfests and conventions. For hamfests, this must be done by your division director. For conventions, approval must be made by your director and by the executive committee. Application forms can be obtained by writing to or calling the ARRL convention program manager, tel 860-594-0262. **Note:** Sponsors of large gatherings should check with League HQ for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL HQ for up to two years in advance. QST

HAMFEST CALENDAR

Attention: The deadline for receipt of items for this column is the **1st of the second month preceding publication date**. For example, your information must arrive at HQ by **March 1** to be listed in the **May** issue. Hamfest information is accurate as of our deadline; contact sponsor for possible late changes. For those who send in items for Hamfest Calendar and Coming Conventions: Postal regulations prohibit mention in *QST* of prizes or any kind of games of chance such as raffles or bingo.

(Abbreviations: *Spr* = Sponsor, *TI* = Talk-in frequency, *Adm* = Admission.)

†ARRL Hamfest

†**Arkansas (Fort Smith)—Apr 6**; set up Friday 5-9 PM, Saturday 6-8 AM; public 8 AM-2 PM. *Spr:* Fort Smith Area ARC. K of C Hall, 10203 Columbus Ln; I-40 to I-540 to Exit 12, S on US 71, 3 lights, take right onto Broken Hill, go 300 ft to Columbus Ln on left. Indoor flea market, tailgating, dealers, vendors, displays, new and used equipment, computers, ArkieCon QRP forum, demos, speakers, VE sessions (AM), ARRL session, Wx spotters program, refreshments. *TI:* 146.94, 146.64, 444.5. *Adm:* $5. Tables: $10 (electricity $10 in advance). John Eddleman, KC5JBY, 1807 Sunshine Mine Rd, Hackett, AR 72937; 501-996-6511; **kc5jby@arrl.net** or **hamsat1@swbell.net**; **www.fsaarc.org**.

†**Arkansas (Russellville)—Mar 2**; set up Friday 4-8 PM, Saturday 6 AM; public 8 AM-4 PM. *Spr:* Arkansas River Valley AR Foundation. Hughes Community Center, Knoxville and Parkway; Hwy 7 to Parkway, go E on Parkway to junction of Parkway and Knoxville. Flea market, free tailgating, dealers, forums, QSL card checking, handicapped accessible, free parking, refreshments. *TI:* 146.82. *Adm:* $5. Tables: $12 (flea market), $15 (dealers). John Evans, WB5BHS, 107 Nordin Ln, Russellville, AR 72801; 501-967-6001 or 501-968-2938; **jevans@cswnet.com**; **www.cswnet.com/~arvarf/hamfest.htm**.

Colorado (Longmont)—Apr 6. Pat Lambert, W0IPL, **w0ipl@earthlink.net**.

†**Connecticut (Pomfret)—Mar 16**, 8 AM-noon. *Spr:* Eastern Connecticut ARA. Pomfret Community School, corner of Rtes 169 and 101; 4 miles

Gail Iannone ♦ Convention Program Manager

W of Rte 395. Flea market, VE sessions (limited spaces available, must preregister). *TI:* 147.225 (156.7 Hz), 146.52. *Adm:* $2. Tables: $10. Paul Rollinson, KE1LI, 182 Wrights Crossing Rd, Pomfret Center, CT 06259; 860-928-2456; **ke1li@arrl.net**; **www.qsl.net/k1muj**.

†**Florida (Ft Walton Beach)—Mar 16**; set up Friday noon to 5 PM, Saturday 7:30-8 AM; public 8 AM-3 PM. *Spr:* Playground ARC. Okaloosa Fairgrounds, 1958 Lewis Turner Blvd (State Rte 189); I-10, Exit 12, SR 85 S, exit S on SR 123, bypass brings you back to SR 85 (after 4 miles), turn right on SR 189 (intersection with light). Amateur Radio and Computer Show/Swapfest, vendors, RV sites (850-862-0211). *TI:* 146.79. *Adm:* $5 (accompanied ladies and under 15 free). Tables: $10 (includes 1 admission). Louis Carter, KF4HRM, c/o PARC, Box 873, Ft Walton Beach, FL 32549; 850-243-4315 or voice/fax 815-461-0859; **parcfest@w4zbb.org**; **www.w4zbb.org**.

Florida (Plantation)—Mar 23. Robin Terrill, N4HHP, 954-583-3625.

†**Florida (Stuart)—Mar 16**; set up 6 AM; public 8 AM-2 PM. *Spr:* Martin County ARA. Martin County Fairgrounds (North Lot), 2616 SE Dixie Hwy, S of Monterey Rd, follow signs. Swapfest, tailgating (free), free parking, refreshments. *TI:* 147.06. *Adm:* Free. Tables: bring your own. David Millard, KE4AMW, 5 Indialucie Pkwy, Stuart, FL 34996; 561-288-7100; **millard@onearrow.net**; **www.qsl.net/martin**.

†**Georgia (Marietta)—Mar 16-17**; set up Friday 1 PM; public Saturday 8 AM-5 PM, Sunday 8 AM-3 PM. *Spr:* Kennehoochee ARC. Jim Miller Park, Callaway Rd (formerly Cobb County Center Park); from I-75N to Delk Rd, go W to Austell Rd, turn right, go approximately 3 miles and take right onto Callaway Rd, go 1 mile to event site. Hamfest/Emergency Communications Expo, flea market, boneyard, vendors, exhibits, static displays and demonstrations from local and state emergency teams, informational seminars, on site Technician Class "Boot Camp" (Saturday; exams for boot campers at 5 PM), VE sessions (Saturday, 9 AM; First United Methodist Church, Whitlock Ave NW and N Marietta Pkwy; you must provide your own copies of license, no copier on premises), RV hookups ($10 per night; Mike Fisher, KG4DPF, 770-971-3610; **kg4dpf@arrl.net**), free parking. *TI:* 146.88 (100 Hz). *Adm:* $5, under 12 free with adult (good for both days). Tables: $20 (flea market), $10 (boneyard space), $15 (covered boneyard space). Bob Butler, W4RBB, Box 1245, Marietta, GA 30060; 770-579-9420 (before 9 PM EST); **w4rbb@arrl.net**; **qsl.asti.com/hootch/KARC-HamF.html**.

†**Illinois (Grayslake)—Mar 24**; set up 6 AM; public 8 AM. *Spr:* North Shore RC. Lake County Fairgrounds, Rtes 120 and 45; 4.4 miles W of Hwy 94, on Rte 120. Radio, electronics, and computer swapfest; lectures; VE sessions (9 AM-noon); free parking; refreshments. *TI:* 147.345, 146.52. *Adm:* advance $5, door $6 (under 12 free). Tables: wall $20, non-wall $15. Jacob Fishman, NE0NS, 834 Bach St, Northbrook, IL 60062; 847-291-4160; **ne0ns@arrl.net**; **www.ns9rc.org**.

Indiana (Columbus)—Apr 6. Marion Winterberg, WD9HTN, 812-342-4670.

Indiana (Michigan City)—Mar 23. Ron Stahoviak, N9TPC, 219-325-9089.

†**Kentucky (Elizabethtown)—Apr 6**, 8 AM-2 PM. *Spr:* Lincoln Trail ARC. Pritchard Community Center, 404 S Mulberry St; take Exit 94 off I-65, S on US 62 (US 62 same as Mulberry St). VE sessions. *TI:* 146.98. *Adm:* advance $4, door $5. Tables: $7. Leon Priest, N4TFK, Box 342, Vinegrove, KY 40175; 270-351-4721; **n4tfk@qsl.net**; **www.qsl.net/w4bej**.

Maine (Lewiston)—Mar 29-30, Maine State Convention. See "Coming Conventions."

Maryland (Timonium)—Apr 6-7, Maryland State Convention. See "Coming Conventions."

†**Michigan (Farmington Hills)—Feb 24**, 8 AM-12:30 PM. *Spr:* Livonia ARC. William M. Costick Activity Center, 28600 W 11 Mile Rd; 1¼ miles E of Orchard Lake Rd; exit Orchard Lake Rd off I-696, go S ½ mile to 11 Mile Rd, turn left (E) onto 11 Mile Rd; just E of Middlebelt Rd, on N side of road. Swap-n-Shop, electronic equipment, computers, parts. *TI:* 145.35, 145.17. *Adm:* $5. Tables: $16 (8-ft). Bill Johnston, W8WSJ, 248-486-6443; **swap@larc.mi.org**; **larc.mi.org**.

†**Michigan (Marshall)—Mar 16**; set up Friday 6 PM, Saturday 6 AM; public 8 AM-3 PM. *Sprs:* Southern Michigan ARS and Marshall High School Industrial Arts Club. Marshall High School, 701 N Marshall; I-94 to Exit 110, go S on old US-27 to North Dr, go E on North Dr, 2 blocks to school. 41st Annual Michigan Crossroads Hamfest, dealers, free parking, refreshments. *TI:* 146.66, 146.52. *Adm:* advance $4, door $5. Tables: $1 per foot (plus admission; minimum 4 ft, reserved until 8 AM). John Malinowski, N8BGM, c/o SMARS, Box 934, Battle Creek, MI 49016; 616-781-4540; **n8bgm@aol.com**.

Nebraska (Norfolk)—Mar 22-23, Nebraska State Convention. See "Coming Conventions."

New Hampshire (Henniker)—Mar 17, Jock Irvine, N1JI, 603-428-3476 (x-256).

†**New Jersey (Annandale)—Mar 16**, 8 AM-2 PM. *Spr:* Cherryville Repeater Assn. North Hunterdon Regional High School, 445 Rte 31; Exit 17 off I-78, take Rte 31 S to high school on right. VE sessions, handicapped accessible, free parking, refreshments. *TI:* 147.375. *Adm:* $6. Tables: $15. Peter Sneed, K2YSY, 349 Three Bridges Rd, Flemington, NJ 08822; 908-788-4080 or 908-369-5095; **k2ysy@arrl.net**; **www.qsl.net/w2cra**.

†**North Carolina (Kinston)—Mar 24**; set up Saturday 4-9 PM (overnight security provided), Sunday 6 AM; public 8 AM-3 PM. *Spr:* Down East Hamfest Association. Lenoir County Fairgrounds, Fairgrounds Rd; Hwy 11 S. Tailgating, VE sessions (11 AM), meetings (ENC traffic net, Skywarn), free parking, refreshments. *TI:* 146.685. *Adm:* advance $4, door $5. Tables: 8-ft $10 (electricity $5). Doug Burt, W4OFO, Box 1778, Kinston, NC 28503; 252-524-5724 (after 6 PM); **jeanhd@icomnet.com**.

†**North Dakota (West Fargo)—Mar 9**, 8 AM-3 PM. *Spr:* Red River Radio Amateurs. Red River Valley Fairgrounds; from I-94 take Exit 343, go E on Main for ½ mile. Flea market, ARRL forum, seminars, VE sessions, refreshments. *TI:* 146.76. *Adm:* advance $5, door $7. Tables: $8 (flea market), $25 (commercial). Mike Woytassek, N0VGV, 725 42nd St SW, No 219, Fargo, ND 58102; 701-282-2876; **mikew@rrra.org**; **www.rrra.org**.

†**Ohio (Madison)—Mar 24**, 8 AM-2 PM. *Spr:* Lake County ARA. Madison High School, 3100 Burns Rd; I-90 to Rte 528 (Exit 212), go N to Middle Ridge Rd, turn left to Burns Rd, follow signs to High School. Hamfest/Computerfest; flea market; vendors; new and used Amateur Radio, computer, and assorted electronics equipment; VE sessions; paved parking, refreshments. *TI:* 147.21. *Adm:* $5. Tables: 6-ft $8 (2 6-ft tables for $15), 8-ft $10. Roxanne, 440-209-8953 (9 AM-9 PM); **lcarahamfest@hotmail.com**; **hamnet.org/lcara**.

†**Ohio (Maumee/Toledo)—Mar 17**; set up Saturday 3:30-7:30 PM, Sunday 5:30-8 AM; public 8 AM-2 PM. *Spr:* Toledo Mobile Radio Assn. Lucas County Recreation Center, 2901 Key St; S of Heatherdowns and N of Anthony Wayne (Rte 24); Exit 6 off I-475/23. Free parking, handicapped parking. *TI:* 147.27. *Adm:* $6. Tables: regular $25, wall $30 (to order tables send application form and SASE to TMRA Hamfest, Box 273, Toledo, OH 43697-0273 by Feb 28). Paul Hanslik, N8XDB, 419-535-6594 or 419-385-5056; **kb8iup@arrl.net**; **tmrahamradio.org**.

Oklahoma (Claremore)—Mar 15-16, Oklahoma Section Convention. See "Coming Conventions."

Ontario (Brampton)—Mar 23. Lorne Jackson, VE3CXT, 905-858-8574.

†**Pennsylvania (Monroeville)—Mar 17**, 8:30 AM-3 PM. *Spr:* Two Rivers ARC. Al Monzo's Palace Inn, intersection of Rtes 22 and 48, at Turnpike; from E or W take PA Turnpike (I-76) to Exit 6 (Monroeville), take Business 22 ramp, turn left at traffic light, go 200 feet, Palace Inn on left; from N or S take PA Turnpike Rte 48 to Monroeville, Palace Inn is at intersection of Rtes 22 and 48. Forums, VE sessions. *TI:* 146.73, 147.12. *Adm:* $5. Tables: $20. Bill Hetrick, N3LQC, 696 King St, McKeesport, PA 15132; 412-751-1937; **n3lqc@home.com**; **www.qsl.net/w3oc/hamfest.htm**.

Tennessee (Knoxville)—Mar 2. Paul Baird, K3PB, 865-986-9562.

†**Tennessee (Tullahoma)—Mar 30**; set up Friday eve, Saturday 7 AM; public 8 AM. *Spr:* Middle Tennessee ARS. First United Methodist Church Activity Center, Lauderdale St; Hwy 41A to Lauderdale St, go S 1 block. Vendors, tailgating, forums, VE sessions (on site), refreshments. *TI:* 146.7 (114.8 Hz), 146.82. *Adm:* $5. Tables: $10. Larry Marshall, WB4NCW, c/o MTARS, Box 932, Tullahoma, TN 37388; 931-968-0650; **lmarsh@edge.net**; **www.qsl.net/mtars**.

†**Texas (Brenham)—Mar 30**, 8 AM-noon. *Spr:* Brenham ARC. Washington County Fairgrounds, 1305 E Horton Loop (also known as FM 577); just N of Hwy 290 and 105 Horton Loop. Flea market, swap tables, commercial vendors, dealers, covered tailgating (electrical hookups), onsite camping (979-836-4112). *TI:* 147.26. *Adm:* Free. Tables: $10. Dan Lakenmacher, N5UNU, 10312 Hwy 36 N, Brenham, TX 77833; 979-836-8739; **briang@comwerx.net**; **www.alpha1.net/~barc**.

Texas (Midland)—Mar 16-17, West Texas Section Convention. See "Coming Conventions."

†**Texas (Weatherford)—Mar 23**, 7 AM-noon. *Spr:* ARC of Parker County. Hall Junior High School, 902 Charles St; Exit at 406 on Bowie, go N to 4-way stop sign, turn right on Charles, go to 4-way stop sign, go straight to school. VE sessions. *TI:* 147.04 (110.9 Hz). *Adm:* advance $3, door $4. Tables: $10 (outdoor space $10). Jerry Thompson, K5JWT, 302 E Sixth St, Weatherford, TX 76086-1706; 817-594-8091 or 817-597-6789 (Mobile); **k5jwt@arrl.net**.

Washington (Yakima)—Apr 6-7, Washington State Convention. See "Coming Conventions."

†**West Virginia (Charleston)—Mar 16**, 9 AM-3 PM. *Spr:* Charleston Area Hamfest and Computer Show. National Guard Armory, 1707 Coonskin Dr; take Greenbrier Exit off I-64/77 towards airport, veer right past airport exit, at traffic light turn left onto Coonskin Dr, Armory is ¾ mile on left. VE sessions. *TI:* 145.35, 146.52. *Adm:* $5. Tables: $5. William H. (Jack) Kibler, Jr., K8WMX, Box 916, St Albans, WV 25177-0916; 304-722-3150; **k8wmx@juno.com**.

†**Wisconsin (Jefferson)—Mar 17**; set up 7 AM; public 8 AM-2 PM. *Spr:* Tri-County ARC. Jefferson County Fairgrounds Activity Center, Hwy 18 W. Vendors. *TI:* 145.49. *Adm:* $4. Tables: 8-ft $6. John Satterlee, WA9SAB, 213 Frederick St, Ft Atkinson, WI 53538; 920-563-6381 (eves); fax 920-563-9551; **satterle@ticon.net**; or **tricountyarc@globaldialog.com**.

SILENT KEYS

It is with deep regret that we record the passing of these amateurs:

W1BZD, John Audette, Cambridge, VT
K1NXV, Roger H. Beane, Naples, ME
W1RLJ, Earle W. Lymburner, Danvers, MA
K1VSS, Roger J. Landry, Laconia, NH
N2EJB, Paul T. Dressler, Jersey City, NJ
N2ELJ, Dennis G. Mumma, Morganville, NJ
W2GZA, Warren W. Bogin, Mount Sinai, NY
W2LZK, Oscar C. Pater, Pompano Beach, FL
WA2NFW, William A. Hameister, Penfield, NY
WA2PNW, Wilma J. Vrooman, Brewerton, NY
KE2XF, Paul W. Wilson, Stillwater, NY
K2YCO, Charles Oneske, Rochester, NY
W2ZCV, Raymond E. Falconer, Burnt Hills, NY
*WB3CSA, Daniel R. Horninger, Thorndale, PA
WB3FYP, John E. Thompson, Pittsburgh, PA
KE3HA, Melvin T. Goodrich, Feasterville Trevose, PA
K3MZO, Emil Carver, Plymouth, PA
K3NEF, Benjamin L. Blake, Wilmington, DE
WA3RFL, Albert F. Hoffman, Mount Holly Springs, PA
KA4BIQ, Francis W. Turner, McMinnville, TN
W4CFV, Joe Fischer, Norton, VA
KF4DWC, William I. Slagle, Abingdon, VA
*W4FRU, John H. Parrott, Suffolk, VA
N4JTL, Janice L. Martin, Walton, KY
KK4JW, Karl Schultz, Merritt Island, FL
N4KRR, Kevin Mc Elhone, Arlington, VA
KC4KT, Charlotte F. Hill, Fayetteville, TN
KF4LBL, James M. Pittelko, Louisville, KY
W4LDY, Opal D. Haviland, Daytona Beach, FL
W4NTW, Howard D. Ryder, St Petersburg, FL
KD4NYC, David Nicholson, Owensboro, KY
W4OYT, John A. Peterson, McRae, GA
WB4PFE, Stephen C. Allen, Woodstock, GA
KD4PHV, Kenneth B. Wilson, Springhill, FL
W4UCL, Joseph F. Trahan, Fort Lauderdale, FL
K4YSP, Dewey Gilleland, Stuart, FL
W5BCD, Frank C. Meeks, Hurst, TX
KD5BQZ, Ruth A. Wright, Sumrall, MS
WD5EBG, Harry S. Petty, Irving, TX
KC5FAQ, Mary A. Gordon, Benton, AR
W5FWE, Charles M. Stanley, Sierra Vista, AZ
K5GDH, Wendle E. Campbell, Austin, TX
K5INE, Phil Richards, Port Neches, TX
W5KIK, Zoland C. Jacobs, Weatherford, TX
K5KKO, W. H. Raue, El Paso, TX
W5QIQ, John L. Waller, Little Rock, AR
K6DKQ, Adolphus P. Russell, Fremont, CA
KB6ECO, Arthur T. Moore, Clearlake, CA
K6HDG, Don F. Harmon, Clearlake, CA
KA6LKY, Evelyn C. James, Lakeport, CA
WA6MVD, Diane L. Armstrong, Moreno Valley, CA
WB6OWI, Clarence E. Klingenberg, Fresno, CA
KE6SF, Oren W. Winton, Bend, OR
WA6SPE, Paul Relei, Lakeport, CA
KD6TOF, Mariste A. Jaffe, Santa Clara, CA
KA7AID, Ted Conwell, Roseburg, OR
*K7BHE, Jerald B. Wadley, Midvale, UT
W7BYD, Herbert R. Noennig, Billings, MT
K7CIA, Harvey T. Wetterstrom, Lincoln City, OR
KA7IWP, Dale E. Blair, Elk, WA
W7IYU, Jack W. Cowan, Puyallup, WA
N7IZY, Gale F. Sersain, Boise, ID
W7KGO, Dale C. Firebaugh, Dayton, NV
W7LAW, John W. Havens, Tucson, AZ
W7NLF, Earle J. Lander, Vancouver, WA
*WK7P, Melvin E. Hixson, Grand Coulee, WA
K7RAM, Barbara M. Wilson, Walla Walla, WA
KB7SFB, Dean P. Jansma, Billings, MT
WA7WFB, Alvin D. Bausman, Ajo, AZ
WD8BOR, Gilbert Harris, Barnesville, OH
K8BTU, Roy Morris, Odessa, TX
WA8JQV, Rick L. Hayner, Kalamazoo, MI
WA8NPJ, Victor K. Thomas, Columbus, OH
WB8RVI, David J. Reddick, Kimbolton, OH
W9CA, Robert E. Hotz, Oak Lawn, IL
W9ORS, John A. Wolozyn, McFarland, WI
K9OUP, John W. Lantz, Richmond, IN
WG9R, John H. Zeilenga, Oak Forest, IL
KB9USO, Jayme L. Graham, Quincy, IL
*WD0BSB, Virginia Buckhaults, La Junta, CO
W0CLQ, Harry G. Butterfield, Joplin, MO
W0DAL, Robert W. Davis, Raytown, MO
W0ELC, Kenneth D. Anderson, Kerkhoven, MN
WD0GUX, James E. Person, Willmar, MN
W0KLB, Elmer F. Hatch, Grand Island, NE
N0MRA, Robert M. De Wald, Greeley, CO
N0NMQ, Nicholas Comarell, Denver, CO
N0RAB, Roger Marshall, Parker, CO
W0TQY, William Ruzin, Minnetonka, MN
W0YB, Victor H. Beaver, Pueblo, CO
WA0YGZ, Carl J. Christensen, Taylor, NE
DL7VRO, Fritz Bergner, Berlin, Germany

*Life Member, ARRL
**Charter Life Member, ARRL
‡Call sign has been re-issued through the vanity call sign program.

Note: Silent Key reports must confirm the death by one of the following means: a letter or note from a family member, a copy of a newspaper obituary notice, a copy of the death certificate, or a letter from the family lawyer or the executor. Please be sure to include the amateur's name, address and call sign. Allow several months for the listing to appear in this column.

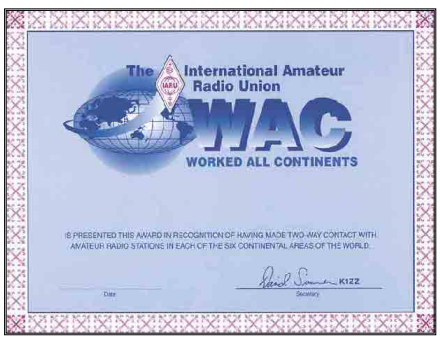
Many hams remember a Silent Key with a memorial contribution to the ARRL Foundation. If you wish to make a contribution in a friend or relative's memory, you can designate it for an existing youth scholarship, the Jesse A. Bieberman Meritorious Membership Fund, the Victor C. Clark Youth Incentive Program Fund, or the General Fund. Contributions to the Foundation are tax-deductible to the extent permitted under current tax law. Our address is: The ARRL Foundation Inc, 225 Main St, Newington, CT 06111. QST

Kathy Capodicasa, N1GZO ♦ Silent Key Administrator

STRAYS

NEED WALLPAPER? TAKE A WAC AT THIS ONE

◊ Sponsored by the International Amateur Radio Union (IARU), the Worked All Continents award is issued for working and confirming all six continents (North America, South America, Oceania, Asia, Europe and Africa) on a variety of bands and modes. A 5-Band WAC certificate and a 6-Band sticker are also available. WAC, a precursor to DXCC, is one of the earliest operating awards to become available. Displaying this certificate on your wall is a great way to demonstrate the capabilities of Amateur Radio.



Earning the WAC award is not as difficult as you may think. Gurnee Bridgman, W9NT, of Bemidji, Minnesota, a self-described "little pistol DXer," wrote to tell us he worked all six continents—plus Antarctica for good measure—over a span of 10 hours on January 6. The contacts, all on 20 SSB, were made with VU2XX (Asia), ZS5DCF (Africa), LU1ECZ (South America), VK3ZZ (Oceania), VE3HZB (North America) and KC4AAA at the South Pole.

For more information about applying for WAC, see **www.arrl.org/awards**.

NEW AWARD FROM THE LIGHTHOUSE SOCIETY

◊ The Amateur Radio Lighthouse Society, the world's largest organization devoted exclusively to maritime communications and light beacons, is proud to announce its "Patriot Award." This award commemorates the disastrous events of September 11, 2001 in New York City and Washington, DC. It is available to anyone worldwide who establishes radio contact with a lighthouse or lightship in each of the original 13 colonies. Shortwave listeners may also apply for the award by submitting written confirmation of having heard a light beacon in each colony. A list of the original colonies and the lights in each, along with complete details about applying for the award, is available on the Society's Web page at **www.waterw.com/~weidner/arlhs/index.html**. For further information, contact ARLHS founder and president Jim, K2JXW, at **k2jxw@arrl.net**.

INTERNATIONAL MUSEUMS WEEKEND 2002

◊ This past June, I ran what proved to be a very popular and enjoyable Amateur Radio event in Great Britain, called the National Museums Weekend 2001 (NMW 2001). The international version, IMW 2002, will take place June 15-16, 2002. Individual operators as well as Amateur Radio clubs from around the world are invited to join in the event by setting up a special event station at your local museum. Free registration via **www.imw.f2s.com/** is required to take part. More information about the event can also be found there.—*Harry Bloomfield, M1BYT*

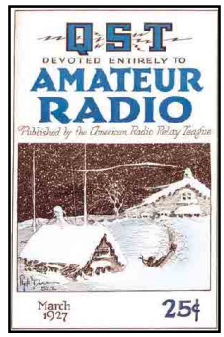
QST congratulates...

◊ J. Frank Brumbaugh, W4LJD, of Bradenton, Florida, whose book, *Basic Boat Maintenance*, won the $2500 first prize for being named Best Book of 1999 in the Eaton Literary contest.

Previous • Next Strays

75, 50 AND 25 YEARS AGO

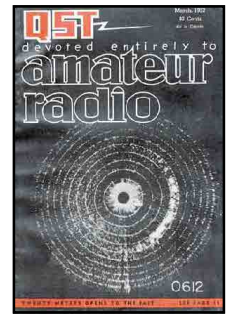
March 1927



◊ The cover art by Clyde Darr, 8ZZ, shows a home and its out-building ham shack during a blizzard, with the ham shoveling his way out to the shack. The editorial reports that hams *almost* have a new radio law, with some final details to be worked out before Senate passage.

Bob Kruse describes "Cures for 'Power Leaks'" that will help eliminate interference from faulty power lines and household appliances. Frequency calibration has become very important—Hugh McCartney tells about "Standard Frequency Station 9XL," and A. Crossley tells how to build "Quartz Crystal Calibrators." Glenn Browning and Frederick Drake explain "The Theory of a Tuned R.F. Transformer." ARRL Communications Manager F. E. Handy announces, "Coming—An International Relay Party." F. J. Marco tells about "A Flexible Transmitter" with bandswitching. Bob Kruse continues his series on "How Our Tube Circuits Work." The first letter in the "Correspondence" column, from the Chief Signal Officer of the US Army, commends the new *ARRL Radio Amateur's Handbook*. Major General Saltzman closes with the remark, "Mr. F. E. Handy, the Editor of the *Handbook*, and the staff of the League's periodical, *QST*, … are to be commended on an excellent piece of work."

March 1952

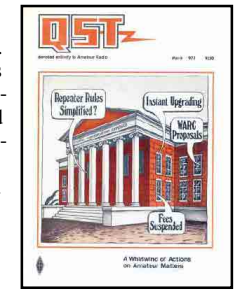


◊ The cover photo is of an oscilloscope image of scatter-sounding imaging, used to find radio transmission paths. The editorial tries to answer the current question, "When do we get the 21-Mc. band?"—it depends on the speed of the bureaucratic process, and could be quite soon, or take another few years.

Oswald Villard, W6QYT, and Allen Peterson, W6POH, discuss "Instantaneous Prediction of Radio Transmission Paths." Basil Barbee, W5FPJ, provides "Pointers on the Installation of Mobile H.F. Converters." Roy Wolfskill, W2RPU, tells about his mobile rig, in "Twenty Watts Mobile for All Bands." Thomas Swafford, W5HGU, describes his compact 20-meter array, "The Twin-Loop Antenna." With the 15-meter band on the horizon, George Grammer, W1DF, gives advice about "Getting Ready for 21 Mc." There's more information on our current ham celebrity, Henrik Kurt Carlsen, W2ZXM/mm, in "*QST* Visits 'Captain Stay-Put.'" In "Some Simple Ways of Erecting Temporary and Semi-Permanent Antennas," Richard Silberstein, W3JQB, talks about rocks and arrows. Dick Smith, W1FTX, tells how to build a small rig with "50 Watts Output on Ten and Six."

March 1977

◊ The cover drawing shows the Federal Communications Commission building, with a "whirlwind of actions on amateurs matters"... WARC proposals, fees suspended, instant upgrading, and simplified repeater rules. The editorial announces that the FCC has approved instant upgrading.



Doug DeMaw, W1FB, and Bill Martinek, W8JUY, write about "Ham-cationing—DX style," their trip to Barbados to operate as 8P6EU. "The CB Slider," by Jay Rusgrove, WA1LNQ, and Stan Brindle, WB5KQJ, tells about their mini-VFO to use with the Tuna-Tin 2 (CB indicates that it was built into a chopped beef can). Ron Tauber, W9QUW, describes "The Equalizer," an improved speech compressor. Ed Wright, KH6BK, tells about "Using the Heath SB-650 Frequency Display with the Yaesu FT-101." Bud Punchard, VE3UD, makes us nostalgic for "40 Years Ago," with his newly built 1927-style rig that runs 5 watts with a single UV202. Budd Meyer, K2PMA, tells how to "Charge It! Your NiCad, That Is." Hardy Landskov, W7KAR, details "The Evolution of a Quad Array" for 20, 15, and 10 meters. Albert Helfrick, K2BLA, describes "A Phase-Locked 2-Meter FM Transmitter." Dave Stephenson, VE5KQ, takes "A Second Look at Linear Tuning." Charles Cotterell, W0SIN, tells about the major flooding in Colorado on that state's 100th birthday, in "Centennial Catastrophe." QST

Al Brogdon, W1AB ♦ Contributing Editor

W1AW Schedule

PACIFIC	MTN	CENT	EAST	MON	TUE	WED	THU	FRI
6 AM	7 AM	8 AM	9 AM		FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
7 AM-1 PM	8 AM-2 PM	9 AM-3 PM	10 AM-4 PM	VISITING OPERATOR TIME (12 PM-1 PM CLOSED FOR LUNCH)				
1 PM	2 PM	3 PM	4 PM	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
2 PM	3 PM	4 PM	5 PM	CODE BULLETIN				
3 PM	4 PM	5 PM	6 PM	TELEPRINTER BULLETIN				
4 PM	5 PM	6 PM	7 PM	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
5 PM	6 PM	7 PM	8 PM	CODE BULLETIN				
6 PM	7 PM	8 PM	9 PM	TELEPRINTER BULLETIN				
6^{45} PM	7^{45} PM	8^{45} PM	9^{45} PM	VOICE BULLETIN				
7 PM	8 PM	9 PM	10 PM	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
8 PM	9 PM	10 PM	11 PM	CODE BULLETIN				

W1AW's schedule is at the same local time throughout the year. The schedule according to your local time will change if your local time does not have seasonal adjustments that are made at the same time as North American time changes between standard time and daylight time. From the first Sunday in April to the last Sunday in October, UTC = Eastern Time + 4 hours. For the rest of the year, UTC = Eastern Time + 5 hours.

♦ **Morse code transmissions:**
Frequencies are 1.818, 3.5815, 7.0475, 14.0475, 18.0975, 21.0675, 28.0675 and 147.555 MHz.

Slow Code = practice sent at 5, 7½, 10, 13 and 15 wpm.

Fast Code = practice sent at 35, 30, 25, 20, 15, 13 and 10 wpm.

Code practice text is from the pages of *QST*. The source is given at the beginning of each practice session and alternate speeds within each session. For example, "Text is from July 1992 *QST*, pages 9 and 81," indicates that the plain text is from the article on page 9 and mixed number/letter groups are from page 81.

Code bulletins are sent at 18 wpm.

W1AW qualifying runs are sent on the same frequencies as the Morse code transmissions. West Coast qualifying runs are transmitted on approximately 3.590 MHz by K6YR. See "Contest Corral" in this issue. At the beginning of each code practice session, the schedule for the next qualifying run is presented. Underline one minute of the highest speed you copied, certify that your copy was made without aid, and send it to ARRL for grading. Please in-clude your name, call sign (if any) and complete mailing address. Send a 9×12-inch SASE for a certificate, or a business-size SASE for an endorsement.

♦ **Teleprinter transmissions:**
Frequencies are 3.625, 7.095, 14.095, 18.1025, 21.095, 28.095 and 147.555 MHz. Bulletins are sent at 45.45-baud Baudot and 100-baud AMTOR, FEC Mode B. 110-baud ASCII will be sent only as time allows.

On Tuesdays and Fridays at 6:30 PM Eastern Time, Keplerian elements for many amateur satellites are sent on the regular teleprinter frequencies.

♦ **Voice transmissions:**
Frequencies are 1.855, 3.99, 7.29, 14.29, 18.16, 21.39, 28.59 and 147.555 MHz.

♦ **Miscellanea:**
On Fridays, UTC, a DX bulletin replaces the regular bulletins.

W1AW is open to visitors from 10 AM until noon and from 1 PM until 3:45 PM on Monday through Friday. FCC licensed amateurs may operate the station during that time. Be sure to bring your current FCC amateur license or a photocopy.

In a communication emergency, monitor W1AW for special bulletins as follows: voice on the hour, teleprinter at 15 minutes past the hour, and CW on the half hour.

Headquarters and W1AW are closed on New Year's Day, President's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving and the following Friday, and Christmas Day. In 2002, Headquarters and W1AW will also be closed on July 5.

CONTEST CORRAL

Feedback

In the **2001 Field Day** results, the **W7DK** entry has been corrected to indicate 1A WWA. **KT4ZX (KG4BIG, op)** should be shown as class 1D with a score of 3660 in the KY section. The call sign of **WA5VKS** 1D NTX was reported as WA5YKS.

In the **2000 ARRL November Phone Sweepstakes**, the entry of **KZ2I** was omitted. His score was 133,600 on 835 QSOs and 80 sections in the NC Single Operator Low Power category.

In the **2001 August UHF Contest**, **WW8M** operated Single Operator High Power. This puts his score of 235,605 in First Place overall in his category. In addition, **K2DRH** operated from the Central Division, not the Hudson.

W1AW Qualifying Runs are 10 PM EST Friday, March 1 and 7 PM EST Thursday, March 21. The K6YR West Coast Qualifying Run will be at 9 PM PST Wednesday, March 13 (10-40 WPM). Check the W1AW Schedule for details.

Abbreviations: SO—Single-Op; M2—Multiop—2 Transmitters; MO—Multi-Op; MS—Multi-Op, Single Transmitter; MM—Multi-Op, Multiple Transmitters; AB—All Band; SB—Single Band; SPC—State/Province/DXCC Entity; HP—High Power; LP—Low Power; Entity—DXCC Entity.

No contest activity takes place on 30, 17 and 12 meters. Refer to the contest Web sites for information about awards.

Mar 2-3

ARRL International DX Contest—Phone, 0000Z Mar 2-2400Z Mar 3; see Dec *QST*, p 113.

Mar 9-11

RSGB Commonwealth Contest, CW, sponsored by the RSGB from 1000Z Mar 9-1000Z Mar 10. Open to UK and Commonwealth stations only; work stations once per band outside own call area. HQ stations may be worked by everyone and count as a separate call area. Frequencies: lower 30 kHz of 80-10 meters, except Novices on 15 and 10 meters. Categories: SO—open (full-time), restricted—(12 hours max), Headquarters—MO and SO; no spotting assistance. Scoring: 5 pts/QSO—1st 3 QSOs with a call area count 20 pts. Keep separate logs and bonus lists per band. For more information, **www.rsgbhfcc.org/**. Logs must be emailed or postmarked within 16 days of the contest to **hf.contests@rsgb.org.uk** or RSGB—G3UFY, 77 Bensham Manor Rd, Thornton Heath, Surrey CR7 7AF, England.

North American RTTY Sprint, sponsored by *NCJ* from 0000Z-0400Z Mar 10. Frequencies 80, 40, 20 meters only. North American stations work everyone; others work NA stations only. Exchange both call signs, serial number, name and SPC. The same station can be worked multiple times provided 3 contacts separate the contact in both logs, regardless of band. QSY rule: Stations calling CQ, QRZ etc, may only work one station in response to that call; they must then move at least 1 kHz before working another station or 5 kHz before soliciting another call. Once you are required to QSY, you may not make a new QSO on the previous frequency until you have made a contact at least 1 or 5 kHz (as required) away. For more information, **www.ncjweb. com/**. Logs must be emailed or postmarked no later than 30 days after the end of the contest to **rttysprint@ncjweb.com** or to Wayne Matlock, K7WM, Rte 2, Box 102, Cibola, AZ 85328.

UBA Spring Contest—CW, 0700Z-1100Z Mar 10 (see Jan *QST*, p 107).

Wisconsin QSO Party, Phone and CW, sponsored by the West Allis RAC, 1800Z Mar 10-0100Z Mar 11. Frequencies: CW—3550, 3705, 7050, 14050 kHz and 15/10/6/2 meters; Phone—3890, 7230, 14290, 21350, 28400 kHz and 6/2 meters. Work stations once per band/mode/county; no repeater QSOs. SO, MS, MM and mobile categories. Mobile operators may not sit on a county line to operate. Exchange SPC or WI county. QSO points: Phone—1 pt, CW—2 pts. Score: Pwr mult × QSO pts × WI counties (max 72); WI stations—QSO pts × WI counties + SPC. WI mobiles/portables add 500 bonus points for each county with 12 or more QSOs. Power multiplier: ×2 (<5 W), ×1.5 (<150 W), ×1(>150 W). For more information, **www.warac.org/**. Logs must be postmarked within 30 days to WARAC, PO Box 1072, Milwaukee, WI 53201.

Mar 16-18

BARTG Spring RTTY Contest, 0200Z Mar 16-0200Z Mar 18. Frequencies: 80-10 meters; work stations once per band. Categories are SO-Expert, SOSB, SOAB (one band change per 5 min), MS, MM and SWL; SO operate 30 hours total with off periods min 3 hours. Operators with a Top Ten log during the past three years must enter as an Expert. Exchange: three-digit serial number and four-digit time. Multipliers: DXCC entities + W/VE/JA/VK call areas, counted once per band. Score is QSOs × multiplier × continents (count only once). For more information, **www.bartg.demon.co.uk/**. Logs in Cabrillo format must be emailed or postmarked by May 1 to John Barber, GW4SKA, PO Box 611, Cardiff CF24 4UN, Wales, UK (only logs with 50 or fewer QSOs may be submitted as printed logs) or by email to **ska@bartg.demon.co.uk** with the call and entry class in the subject line and the log included as an attachment.

Russian DX Contest, CW and SSB, from 1200Z Mar 16-1200Z Mar 17. Frequencies: 160-10 meters; work stations once per band/mode. Categories: SOAB-HP and -LP (<100 W), SOSB, MS (10 min rule), MM, SWL; SO may enter Mixed Mode, CW, or SSB; MO and SWL are Mixed only. Exchange: RS(T) + serial number; RU stations—RS(T) + Oblast designator. QSO points: own entity—2 pts; different entity, same continent—3 pts; different continent—5 pts; with Russians—10 pts. Multiplier: DXCC entity + Oblasts, count once per band. Score: QSO points × multiplier. For more information, **www.rdxc.org**. Logs must be emailed or postmarked within 45 days of the contest to **rusdxc@contesting.com** or to Russian DX Contest, PO Box 59, 105122 Moscow, Russia.

Virginia QSO Party—Phone and CW, sponsored by the Sterling Park ARC, 1800Z Mar 16-0200Z Mar 18. Frequencies: CW—1.805 and 50 kHz up; Phone—1.845 3.860 7.260 14.270 21.370 28.370 kHz; Novice/Tech—10 kHz up and 28.370; VHF/UHF—50.125 144.200, 146.58, 223.50, 446.00 MHz. No repeater or cross-mode QSOs. SO, MS, MM fixed station and mobile categories; no time limit; QSOs once per band/mode/VA QTH, VA stations work everyone; others work VA stations only. Exchange: serial number and SPC or VA county/city. QSO points: Phone—1 pt, CW—2 pts, Mobile—3 pts. Multipliers—VA city/counties + SPC. Score: QSO points × multipliers (counted only once). VA mobiles add 100 pts per VA city/county activated. Add 500 pts for QSO with K4NVA. For more information, **www.qsl.net/sterling**. Logs must be emailed or postmarked by Apr 15 to **ks4ii@arrl.net** or Virginia QSO Party, Call Box 599, Sterling, VA 20167.

Montana QSO Party, Phone and CW/Digital, sponsored by the Flathead Valley Amateur Radio Club from 2300Z Mar 16-2300Z Mar 17. Frequencies: all non-WARC HF bands; no categories or time limit. Exchange RST and SPC or MT county. Work MT stations once per band and mode; if a station changes counties it can be worked again. Score is QSOs × SPC + MT counties (count each only once). Logs must be emailed or postmarked by April 15 to **K7LYY@arrl.net** or **rosscons@ digisys.net** or to FVARC, 117 Rainbow Dr, Kalispell, MT 59901.

YL International Single Sideband System QSO Party—Phone, see Feb *QST*, p 110.

Mar 19-20

CLARA and Family HF Contest, Phone and CW, sponsored by the Canadian Ladies ARA, from 1700Z Mar 19 to 1700Z Mar 20. Frequencies: CW—14.033, 21.033, 7.033, 3.688; Phone— 28.300, 21.225, 14.120 14.285, 7033, 7.200, 3.750, 3.900 MHz, work CLARA and YL stations once per band/mode. Cross-mode contacts count as phone for both stations. SO category only, no time limit. Exchange: RS(T), name, QTH, and whether CLARA member, Family member, non-member YL, or OM. QSO points: 5 pts for CLARA-members; 2 pts for CLARA family members; 3 pts for non-CLARA YLs; 1 pt for OMs. Multipliers are VE provinces and DXCC entities (only if QSO with YL) counted only once. Score is QSO points × multipliers. Logs must be emailed or postmarked by April 20 to **archibal@pubnix.net** or to Helen Archibald, VE2YAK, 130 Embleton Cres, Pointe Claire, QC, Canada H9R 3N2.

Mar 23-24

2002 Oklahoma QSO Party—Phone and CW/Digital, sponsored by the Oklahoma DX Association (OKDXA) from 2300Z Mar 22-2300Z Mar 24. Frequencies: 160-10 and 6 meters and higher; stations outside OK work OK stations only, contact stations once per band/mode/county, no repeater contacts, operate 36 hours max. Categories: SOHF-HP (>100 W) -LP -QRP (<5 W), SO-VHF, MS, OK-Rover. Exchange SPC or OK county. QSO points: Phone—2 pts, CW/Digital—3 pts. Multipliers: OK stations—SPC, others—OK counties, mults counted once only. Score: QSO points × multiplier. For more information, **www.qsl.net/okdxa/**. Logs must be emailed (ADIF or Cabrillo format preferred) or postmarked (<100 QSOs only) by Apr 30 to **w5atv@cox.net** or to OKDX Assn, c/o David Ratliff, W5ATV, 3215 W 40th, Tulsa, OK 74107.

Mar 25

Spring QRP Homebrewer Sprint—CW and PSK31, sponsored by New Jersey QRP Club from 0000Z-0400Z Mar 25. Frequencies: QRP CW and PSK31 frequencies on 80-10 meters; CW and PSK31 are considered separate bands. Exchange: RST + SPC + Output power. QSO points: 2 pts for QSOs made with Commercial Equipment; 3 pts for homebrew xmtr or rcvr; 4 pts for homebrew xmtr *and* rcvr or xcvr; 5 pts for homebrew PSK31 station, kits are okay for homebrew. Multiplier: SPC counted once per band. Power multiplier: 0-250 mW = ×15, 250 mW-1 W = ×10, 1-5 W = ×7, >5 W = ×1. Score: QSO points × SPC (total for all bands) × power multiplier. For more information, **www.njqrp.org/qhbsprint/Fall2001/qrphomebrewersprint.html**. Logs must be emailed (text only) or postmarked 30 days from the contest to **n2cq@arrl.net** or Ken Newman, N2CQ, 81 Holly Dr, Woodbury, NJ 08096.

Mar 30-31

CQ WW SSB WPX Contest—SSB, sponsored by *CQ* Magazine, from 0000Z Mar 30-2400Z Mar 31 (CW is May 26-27). Frequencies: all HF bands; work stations once/band. Categories: SOAB, SOSB, SO-Assisted, -HP, LP and -QRP, MS (10-min rule), MM, SO-Rookie, SO-Tribander-and-Single-Wire, SO-Band-Restricted. SO operate 36 hours max with off times at least 60 min. Exchange: RS(T) + serial number. QSO points: with different continents 3 pts (14-28 MHz) and 6 pts (1.8-7 MHz); with North America 2 pts (14-28 MHz) and 4 pts (1.8-7 MHz); with own country 1 pt. Multipliers: prefixes worked (ie, N8, KA1, HG73, JD1) counted only once. Score: QSO points × multiplier. For more information and instructions on paper logs, **home.woh.rr.com/wpx/**. Logs must be emailed by May 10 (CW, Jul 10) to **wpxssb@kkn.net** (**wpxcw@kkn.net**). QST

H. Ward Silver, N0AX ♦ 22916 107th Ave SW, Vashon, WA 98070 ♦ n0ax@arrl.org

SPECIAL EVENTS

Rapid City, SD: QCWA Dakota Chapter 102, W0DAK. 1500Z **Feb 23** to 0300Z **Feb 24**. Commemorating 25th anniversary of Chapter 102. 21.375 14.275 7.240 3.889. Certificate. Frank Shaw, W0DAK, 118 E Van Buren, Rapid City, SD 57701.

Round Rock, TX: Cen-Tex Contest Group, WA5DTK. 0001Z **Feb 23** to 2359Z **Mar 6**. Commemorating the siege days at the Alamo. 7.265 14.265 21.265 28.465. QSL. Barry Brewer, WA5DTK, 603 Broken Bow Dr, Round Rock, TX 78681-7401. For more information, e-mail **jbrewer@constant.com**.

Arlington Heights, IL: Peace Corps ARC, KA9NLX. 1600Z to 2300Z **Mar 1**. Celebrating the birthday of Peace Corps, and to honor its volunteers. 7.283 14.325 21.375 28.525. Certificate. John Paskevicz, KA9NLX, RPCV, 1423 North Ridge Ave, Arlington Heights, IL 60004.

Port St Lucie, FL: Port St Lucie Amateur Radio Assn, K4PSL. 1500Z **Mar 1** to 2100Z **Mar 15**. Commemorating the arrival of the NY Mets Baseball team in Port St Lucie for their annual spring and summer training. 28.310 21.350 14.250 14.030. Certificate. Dr Maurice I. Sasson, W2JAJ, 8598 Florence Dr, Port St Lucie, FL 34952.

Daytona Beach, FL: Daytona Beach Amateur Radio Assn, Inc, K4BV. 1800Z **Mar 1** to 1800Z **Mar 10**. 2002 Daytona Beach Bike Week Event. 28.450 21.250 14.265 7.210. Certificate. DBARA/K4BV, PO Box 9852, Daytona Beach, FL 32120-9852. Operation plans include HF phone and PSK31, primarily during daylight hours.

Philadelphia, PA: Phil-Mont Mobile Radio Club, W3AA. 0000Z **Mar 1** to 0000Z **Mar 31**. Celebrating the 50th Birthday of W3AA in the Franklin Institute. 28.393 21.350 14.230 7.240. Certificate. Stephen Hoch, WU3I, 4638 Oakland St, Philadelphia, PA 19124.

Wasilla, AK: Matanuska Amateur Radio Assn, KL7JFU. 2100Z **Mar 2** to **Mar 23**. Celebrating the 30th running of the Iditarod Sled Dog Race. Operation will continue through the day after the last sled completes the race. 28.460 21.315 14.246 7.290. QSL and certificate. Len Betts, NL7NF, 3090 Bald Eagle Dr, Wasilla, AK 99654. Will try to operate all bands. For more information, contact **lelbak@yahoo.com**.

Trenton, NJ: Delaware Valley Radio Assn, Inc, 1200Z to 2200Z **Mar 10**. Six months after September 11, honoring all firefighters, EMS, police, and victims and their families. W2ZQ on 12.240 and 7.235, W6OI on 28.400 (10X International). QSL. Harry F. Hochman, K2IQN, FF/EMT, 22 Daisy Ct, Whitehouse Station, NJ 08889.

Brainerd, MN: Brainerd Area Amateur Radio Club (BAARC), W0UJ. 1500Z to 2300Z **Mar 9**. $150,000 Ice Fishing Extravaganza. 28.450 21.350 14.250. Certificate. BAARC, PO Box 801, Brainerd, MN 56401.

Macon, GA: Macon Amateur Radio Club, W4BKM. 1500Z to 2200Z **Mar 16**. Celebrating the 20th Annual Cherry Blossom Festival. 21.335 14.240 voice; 14.055 7.135 CW. Certificate. Macon ARC, PO Box 4862, Macon, GA 31208.

Milwaukee, WI: Milwaukee Radio Amateurs' Club, W9RH. 0000Z to 2400Z **Mar 16**. Commemorating the 85th anniversary of the MRAC. 28.470 14.270 7.260 144.220. Certificate. Tom Schulte, W9RH, 8802 Castle Ct, Franklin, WI 53132. Multiple bands, CW, SSB and FM.

Mount Holly, NJ: NWS-Phi SKYWARN Assn, WX2PHI. 1500Z to 2100Z **Mar 17**. Promoting Hazardous Weather Awareness Week in Pennsylvania. 28.373 14.273 7.273. Certificate. John Holmes, WX3W, WX2PHI Special Event, 126A Worman Rd, Bath, PA 18014-9099.

Certificates and QSL cards: To obtain a certificate from any of the special-event stations offering them, send your QSO information along with a 9×12 inch self-addressed, stamped envelope to the address listed in the announcement. To receive a special event QSL card (when offered), be sure to include a self-addressed, stamped business envelope along with your QSL card and QSO information.

Special Events Announcements: For items to be listed in this column, you must be an Amateur Radio club, and use the ARRL Special Events Listing Form. Copies of this form are available via Internet (**info@arrl.org**), or for an SASE (send to Special Requests, ARRL, 225 Main St, Newington, CT 06111, and write "Special Events Form" in the lower left-hand corner). You can also submit your special event information on-line at **www.arrl.org/contests/spevform.html**. Submissions must be received by ARRL HQ no later than the 1st of the second month preceding the publication date; that is, a special event listing for **May** *QST* would have to be received by **Mar 1**. Submissions may be mailed (Attn: Maty Weinberg), faxed (860-594-0259) or e-mailed (**events@arrl.org**) to ARRL HQ. QST

Maty Weinberg, KB1EIB ♦ Special Events

NEW PRODUCTS

ON AIR ILLUMINATED SIGN

◊ Availablein solid oak cabinets with natural or black finish, these ON AIR signs illuminate when your transmitter is keyed. The sign goes completely black when it is not active. The sign operates on 13.8 V dc (ac wall cube adapter included) and features a built-in relay for universal interfacing. Custom graphics (such as your call sign) are available. $59.95 plus $8 shipping and handling. Contact Nationwide Radio & Equipment Sales, 1490 Norfield Rd, Suamico, WI 54173; tel 920-434-8097; **www.ke9pq.com**.

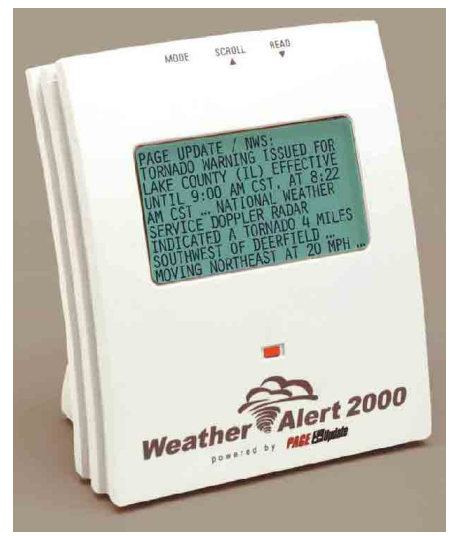
WEATHER ALERT 2000 IS FIRST SATELLITE-BASED "DIGITAL WEATHER RADIO"

◊ The Weather Alert 2000 from Nashville's Page Update is the first of a new generation of digital emergency warning receivers—"dubbed next-generation NOAA Weather Radios"—that can deliver satellite-based weather and civil emergency messages nationwide.

The device alerts users to National Weather Service and Emergency Alert System bulletins (nationwide) within 90 seconds of broadcast. News bulletins from Page Update's own operations center, which includes information from "first-response" and emergency management officials from across the US, make the Weather Alert 2000 a unique early-warning system.

Users in homes, schools, hospitals and businesses will have instant access to real-time, localized severe weather alerts, including tornado, hurricane, flash flood, thunderstorm and winter storm warnings. National alerts, advisories and civil emergency messages might include warnings about terrorism attacks, hazardous materials, fires, explosions and more.

When a warning is received, the Weather Alert 2000 sounds a loud (85 dB) alert tone for 30 seconds and flashes a high-intensity red LED indicator. The receiver features an eight-line display on an oversized backlit LCD message screen that includes alert time stamps and a large digital clock (with an alarm).



The self-contained desktop receiver measures about 4×4 inches. Subscribers pay $9.95 monthly for the 24/7 Page Update monitoring service. The Weather Alert 2000 receiver sells for $129.95. For more information, contact Page Update at **www.pageupdate.com** or call 800-743-4989.

Previous New Products QST

By Dan Henderson, N1ND
Contest Branch Manager

2001 IARU HF World Championship Results

Back in 1900, no one (other than possibly an H. G. Wells) could have fathomed how the world would communicate by the end of the century. An average person transported with Wells' time machine would probably not have believed the evolution, perhaps better called revolution, of how we communicate. The tethers we know as the telephone and telegraph were still relatively new in those days. Imagine the way they would marvel at the wireless age — from broadcast forms to two-way personal communication. The tethers of wire have given way to an ever-expanding wireless age.

Even the fathers of one form of wireless communication —known as radio — with their great vision and imagination would stand amazed at the ease of global communications today.

Perhaps the 2001 IARU HF World Championships, held July 14-15, were an adequate celebration of our innovation and spirit of adventure, as 2105 logs were received from today's generation of telecommunications pioneers. These logs represented a total of over 1,150,000 contacts made in the brief 24-hour period, by over 3000 reported participants. This represents the largest participation ever in this event. Logs were received from a total of 51 IARU zones worldwide, as well as from 105 entities from the ARRL DXCC listings. Not bad for a contest held in the middle of summer for most participants.

In many years, the overall world champions seem to come from around the globe, but rarely from the US. In 2001, two of the four overall category champions hail from the US and Zone 8, while the other two hail from Zone 39 (Cyprus and Israel). In all, Top Ten finishes globally were posted from an even dozen IARU zones — including zones 4, 7, 8, 11, 15, 18, 27, 28, 29, 30, 38 and 39. And while no new worldwide scoring records were set, good contests were seen in each category.

Top Ten World Scores

Mixed Mode	
KQ2M	2,810,088
DL1IAO (@DL0WW)	2,480,775
VE3EJ	2,293,668
UA2FZ (@RK2FWA)	2,210,085
YU7BW	2,091,520
WP2Z (AG8L, op)	1,986,198
M0SDX	1,963,668
YT1AD (Z32ZM, op)	1,891,450
LY9A	1,880,858
OK2FD	1,877,040
Phone Only	
4X1IM	3,117,435
P40B (P43P, op)	2,297,490
LY4AA (@LY7A)	1,976,538
S50A	1,899,412
RM4W (RW4WR, op)	1,816,430
PY2KC	1,813,385
UT7E	1,496,713
RX3DCX	1,484,126
UA2FB	1,341,482
K5TR	1,340,352
CW Only	
K5ZD	2,367,741
HG0D	2,088,528
K1KI	2,032,668
SU9ZZ	2,023,584
F6BEE	1,892,484
UA9CDV	1,809,159
OH0PM	1,766,656
N4AF	1,728,250
WX0B (W4PA, op)	1,713,980
UT5UGR	1,657,611
Multioperator	
P3A	5,411,304
HG6N	3,582,917
HG1S	3,124,576
LY7Z	2,989,980
ZW5B	2,878,896
H2G	2,822,889
RT9W	2,776,670
OH1F	2,710,920
RK9CWW	2,512,692
IR2W	2,460,776

Top W/VE Scores

Mixed Mode	
KQ2M	2,810,088
VE3EJ	2,293,668
K3ZO	1,786,756
K4ZW	1,683,000
K3WW	1,647,945
N3BB	1,261,568
N0AV	1,234,992
N4AO (WC4E, op)	1,214,052
K6LA	869,440
K1VUT	865,449
Phone Only	
K5TR	1,340,352
WB9Z	1,241,175
W7WA	1,224,828
VE1JX	1,068,794
N3HBX	626,750
WS1A	617,686
N4UH	583,478
W0ETC	577,116
N9PQU	485,982
WA4TII	477,567
CW Only	
K5ZD	2,367,741
K1KI	2,032,668
N4AF (W4PA, op)	1,728,250
WX0B	1,713,980
VA3UZ (@VE3OI)	1,649,784
KR1G	1,521,728
W1WEF	1,375,136
W6EEN (N6RT, op)	1,298,276
K9NW (@K9UWA)	1,289,972
VA3RU	1,269,200
Multioperator	
KH6ND (@KH7R)	2,113,350
K2UA	1,941,100
W4AN	1,780,038
K8AZ	1,704,480
W4R (@N4PN)	1,374,468
N3AD	1,142,102
AA5NT	1,128,825
K5NA	1,124,299
W8AV	1,087,728
KB1H	1,076,010

IARU Regional Executive and Administrative Council Members

K1ZZ	2246	220	1,741,520
W6ROD (@W6YX) (+N6DE, W6LD, K6ST, N7MH, W7SW, N6EM, KE6ZZS)	1580	176	926,992
PA0LOU	642	141	279,744
PT2HF	248	88	81,928
9V1UV	116	66	26,136
VK3ADW	92	51	18,258
SP5FM	63	24	3,864

The winner of the worldwide Single Operator CW Only category was Randy, K5ZD. Operating from his shack in western Massachusetts, Randy's score of 2.37M beat out a strong challenge from Laszlo, HG0D, who posted a 2.1M point score. Third place in the category went to Tom, K1KI, who edged out Jaroslav, SU9ZZ, by less than 10k points. Randy's score established a new record for W/VE stations.

Top honors in the Single Operator Mixed Mode category were garnered by Bob, KQ2M, whose score of 2,810,088 was good enough to set a new W/VE category record, though missing out on the worldwide record. Stefan, DL1IAO, finished in second place while John, VE3EJ, and Igor, UA2FZ, filled out the category leaders.

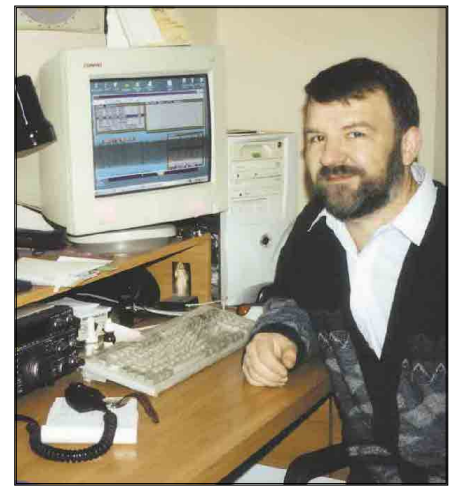
The worldwide Single Operator Phone Only category winner was Serge, 4X1IM, who easily held off the challenge of Jacobo, P43P, who operated as P40B, by just over 800 kilopoints. Saulius, LY4AA, finished in third place in the category while Tine, S50A, came in a close fourth. The top W/VE entrant in the category worldwide was George, K5TR, who finished in tenth place with 1.34M.

The worldwide Multioperator category was won once again by the operators at P3A, operating from Cyprus. Their score of 5,411,304 easily outdistanced a pair of Hungarian stations—HG6N and HG1S. Finishing fourth in 2001 were the operators at LY7Z. The Top W/VE score was posted by KH6ND, who set a W/VE category record while operating from KH7R, with a score of 2,113,350. K2UA, with WRTC 2002 teammate N5RZ, pulled in second from New York.

You always find an extremely strong competition in this contest among the various IARU Headquarters stations. The HQ stations count as a special multiplier

IARU Headquarters Stations

R3HQ (RA1ACJ, RA1AR, RA1ARJ, RA4LW, RA6AX, RA6CM, RA6CO, RN1AM, RN3QO, RN4LP, RN6BN, RU1AA, RU3OM, RU6LA, RV1AW, RW1AC, RW3QC, RX1AA, UA1AKC, UA1ANA, UA1ARX, UA3QDX, UA4LCQ, UA6LV, ops)	20,559,840	16240	406
DA0HQ (DE1DDH, DF8XC, DG1BDF, DH7WW, DJ7AA, DK1BT, DK3WW, DK4WA, DK7YY, DK8YY, DL1AOB, DL1ASA, DL1AUZ, DL1AWD, DL1AWI, DL1AXI, DL1DTL, DL1VDL, DL2ARD, DL2OAP, DL2OBF, DL2OE, DL2SAX, DL3ABL, DL3ALI, DL2AMC, DL3APO, DL3DXX, DL3TD, DL4ALB, DL4ALI, DL4MM, DL5ANT, DL5AOJ, DL5AOL, DL5AWI, DL5AXX, DL5LYM, DL5XU, DL5YY, DL6MHW, DL6MYL, DL7AU, DL7BY, DL7UBA, DL7UFP, DL7URH, DL7UTM, DL7VOA, DL7VRO, DL7ZZ, DL8AKA, DL8AUA, DL8DYL, DL8WAA, DL9AWI, DL9DRA, ops)	17,170,650	19694	395
YL4HQ (YL3DW, YL2KL, YL2GM, YL2KA, YL2TW, YL2KF, YL2AG, YL2LY, YL2PP, YL3CW, YL3GDJ, RA3CW, RA4HTX, RZ4HF, RZ3BW, YL2DX, YL2PJ, YL2GD, YL2KO, YL2SM, YL2BJ, YL3AD, YL2MD, YL2GQT, YL1ZF, YL2CI, YL3FW, YL2GUI, YL3GQG, YL2UZ, YL2VW, ops)	14,906,880	11788	384
SN0HQ (SP2FAX, SP2FOV, SP2JKC, SP2WKB, SP3BLP, SP3DWQ, SP3GEM, SP3HLM, SP3HRN, SP3NGB, SP5WA, SP6AYP, SP6AZT, SP6CZ, SP6HEQ, SP6IXF, SP6RZ, SP7AWG, SP7GIQ, SP7MTF, SP7MTU, SP7NJX, SP7VC, SP8ARY, SP8BRQ, SP8FHK, SP8GQU, SP8GWI, SP8RX(DJ0IF), SP8LBK, SQ4NR, SQ8BGJ, SP4FCG, ops)	14,847,741	13630	389
OM1HQ (OM1CW, OM1KM, OM2DX, OM2RA, OM3BH, OM3CW, OM3EA, OM3GI, OM3JW, OM3LU, OM3NA, OM3PA, OM3RM, OM3RG, OM3TZQ, OM5DX, OM5NJ, OM5NS, OM5RM, OM5RW, OM5ZW, OM5WW, OM6NM, OM8AU, ops)	13,094,193	11521	367
PA6HQ (DH5HV, DL5JQ, JK3GAD, PA2VST, PA3ALK, PA3BAG, PA3CAL, PA3ELD, PA3EPD, PA3EPN, PA3EWP, PA3EZL, PA3FQA, PA3GCV, PA4LA, PA5ET, PA5AT PA7FM, PA7BT, PA7KG, PB0AIC, PB0AIU, PE9DX, PE9PE, PA0LFE, PA0VHA, PE1ALV, + support)	12,896,216	11044	344
EM0HQ (UR3EA, UR3MP, UR4ES, UR4LRG, UR4LTX, UR4LUG, UR5EAW, ops)	12,798,324	11145	378
OL1HQ (OK1ADM, OK1AU, OK1AWZ, OK1AXB, OK1AY, OK1AYE, OK1CF, OK1CM, OK1DC, OK1DG, OK1DRQ, OK1DUO, OK1DUT, OK1EP, OK1FDR, OK1FFU, OK1FHD, OK1FLM, OK1FUA, OK1FUT, OK1HRA, ops)	12,578,684	11856	361
9A0HQ (9A5K,9A9A,9A2AJ,9A2EU,9A4WW,9A5W,9A2DQ,9A7R,9A3GW,9A8A,9A3TR,9A4RX, 9A4PA,9A7V,9A2D,9A9AA,9A5WA,9A9R,9A1AA,9A2VR, ops)	12,107,259	10944	369
4O0HQ (4N7DW, 4N7ZZ, YT7KF, YT7TY, YT7WA, YU1EA, YU1JW, YU1NW, YU1ZZ, YU7AV, YU7BCL, YU7BJ, YU7CM, YU7GO, YU7GW, YU7JX, YU7KC, YU7KW, YU7NU, YU7WW, YU7YG, YZ1AU, YZ7AA, YZ7UN, ops)	12,071,696	11283	364
SK9HQ (SM3SGP, SM0WKA, SM5AJV, SM0NSJ, SM3OSM, SM0OEK, SM5IMO, SM2DMU, SM2HWG, SM3JLA, SM2LIY, SM2NOG, SM2ODG, SM2SYV, SM2VHD, SM3WMV, SM0KCO, SM0MXO, SM5HJZ, SM5AQD, SM7EHU, ops)	10,883,060	9280	340
IU4HQ (I4UFH, I4YSS, IK4MHB, IK4UPB, I4LEC, I4LCK, IV3TAN, IV3TMV, I4IKW, IK2NCJ, I4GHW, IK3VIA, IK4WMH, IK4SXJ, ops)	10,856,781	10100	351
YR0HQ (YO2BEH,YO2DFA,YO2LIF,YO3APJ,YO3FLR,YO3FWC,YO3GDA,YO3GJC, YO3GOD,YO3GRE,YO3JJ,YO3JOS,YO3ND,YO4ATW,YO4CIS,YO4FRF,YO4GDP,YO4NF, YO4XF,YO5TE,YO6AWR,YO6FWM,YO7BGA,YO7LBU,YO7LGI,YO7RFH,YO8BPK, YO8CQQ,YO8DDP,YO8EB,YO8RAW,YO8SSX,YO9FJW,YO9GZU,YO9HP,YO8IGI, ops)	9,655,275	9990	347
W1AW/6 (K6KM, K2KW, N6BT, N6TV, W6OAT, W6EU, K7NV, WJ6O, W6RJ, AI6V, K6XC, KI7WX, W6NL, K6BL, K6AW, K3EST, N6BV, N6RO, ops)	7,588,956	9507	268
S50HQ (S50N, S52QM, S52U, S56A, S57CQ, S57DX, S57IIO, S57KM, S57LWG, S57NRO, S57ONW, S57U, S57XX, S58M, S58MU,ops)	7,457,684	7574	346
ER7HQ (ER1BF, ER1FF, ER1DA, ER1LW, ER1OM, ER1QQ, ER3BAH, ER3DX, ER4DX, ER5AA, ER5AL, ER5DX, ER5OK, UT7ND, UR5NMM, ops)	6,782,897	6938	319
T90HQ (T92T, T93R, T93Y, T94DJ, T94GL, T94KU, T94LA, T94LP, T94MZ, T94NO, T94OL, T94QI, T94QM, T94VT, T94W, T94YT, T95A, T95DVD, T95M, T95MEQ, T97C, T97M, T97Y, T99T, T99Z, ops)	6,388,266	7064	309
NU1AW (W2AX, K2LE, K2SX, K2DO, K2SG, N2FF, N2GA, W1RM, W1VE, KM1P, K2VUI, ops)	5,919,341	7342	263
VA3RAC (+VA2RAC, VE4RAC, VE6RAC, VE7RAC, &VO1RAC) (VE3KZ, VE2ZP, VA2ADB,VE3RZ, VE6MAA, VE6JTM ,VE6JY, VA7DP, VO1MP, VE4YU, VE4GV, VE4VV, VO1MX, VO1HE, VE4SN, VE6MAA, ops)	5,572,273	4477	329
LZ75A (LZ1NK, LZ1QZ, LZ1UQ, LZ2AF, LZ2AU, LZ2CJ, LZ2DB, LZ2FV, LZ2HM, LZ2JE, LZ2PL, LZ2PS, LZ2WF, LZ3ND, LZ3YY, LZ4UU, ops)	5,127,355	6371	305
LX0HQ (LX1AQ, LX1ER, LX1JH, LX1KQ, LX1RQ, LX1TI, K4ZLE, DL1EFD, DL5KUT, DK2OY, ops)	4,534,728	5177	267
LY0HQ (LY1FW, LY2GV, LY2KM, LY2OX, LY3BE, ops)	3,975,872	4320	296
EI0R (EI2CA, EI4FBB, EI5DI, EI5HD, EI6EW, EI7CD, EI8CE, ops)	2,358,180	3674	220
EA4URE (EA4AHD, EA4AMO, EA4BT, EA4EFJ, EA4GW, EA4JW, EC4AHN, EC4WZ,, EB4AKI, EB4EPJ, ops)	2,340,169	3107	221
OZ7D (OZ0RS, OZ1AA, OZ1ETA, ops)	1,945,230	2809	210
9V9HQ (@9V1YC) (9V1YC, 9V1BH, ops)	1,780,974	2536	177
GB5HQ (G4BUO, G4KIU, ops)	1,551,940	2051	235
HS0AC (HS1CKC,HS0GBI,HS2JFW,HS6NDK,JF6DEA,E21EIC, ops)	1,275,774	1758	186
HG5Z	879,589	1369	229
P41HQ	594,205	1121	115
9Q0AR	196,029	625	69
8J3JHQ (JH3AGV,JH3GXP,JR3QHQ,JF3CCN,JF3PLF,JL3JRY,JH5JKH/3,7K2IVK/3, ops)	181,454	1164	91
VU2UR	60,060	193	84
SV1SV	54,296	292	88
ZS6SRL (ZS4BS, ZS4MS, ops)	6,993	64	27



Wojciech, SP9HWN, operating as SP9W, piloted his station to the top Single Operator Mixed Mode from Poland.

and are allowed to operate as true multi-multi stations. This makes for large scores, plenty of operators and exciting finishes across the time zones.

Bragging rights for the year 2001 are held by the Soyuz Radiolyubitelei Rossii [SRR], the Russian Amateur Radio Union. Using the call sign R3HQ, their ops finished with an IARU Society HQ station record score of 20,559,840. Former record holder, the Deutscher Amateur-Radio-Club [DARC], using the call DA0HQ, finished a strong second with a score over 17.1M. A tight race was seen between the third place HQ station finisher, YL4HQ, Latvias Radioamatieru Liga [LRAL], whose score of 14,906,880 edged out the 14,847,741 posted by challengers from SN0HQ—the Polski Zwiazek Krotkofalowcow [PZK], Polish Amateur Radio Union. Congratulations to all of the outstanding competitors in each of the categories.

The 2002 IARU HF World Championship will be held the weekend of July 13-14. Concurrent with the championship will be the World Radiosport Team Championship, which will be held in Finland. Look for more information about this exciting event, which is sponsored by the Suomen Radioamatooriliitto [SRAL]—Finnish Amateur Radio League and Contest Club Finland. Be sure to visit the **www.wrtc2002.org** Web site. If you aren't one of the modern radio pioneers participating in the WRTC, you can still be a pioneer on your own, by participating in the 2002 IARU HF World Championships. And you won't need help from H. G. Wells along the way. Good luck!

Scores

Scores are listed by ITU Zone, and then by country, ARRL Section, or Canadian Province with the zone. Line Scores indicate call, final score, QSO total, Multiplier total, and entry class (A = Single Operator Mixed Mode, B = Single Operator Phone Only, C = Single Operator CW Only, D = Multioperator Single Transmitter).

Zone 2

Alberta

VA6MM	69,190	244	85	A
VA6RC	27,616	263	32	B
VE6BF	164,560	416	110	C
VE6YT	46,060	202	70	C
VE6LB	18,338	105	53	C

British Columbia

VA7QSL	52,960	200	80	A
VE7XO	41,607	155	69	B
VA7DP	36,865	159	73	B
VE7UF	459,515	975	133	C
VA7DER	63,119	266	71	C
VA7LC	41,280	227	60	C
VE7GL (+VA7OO, VA7AO)	500,084	1149	118	D

Zone 3

Manitoba

VE4UG	44,336	138	68	A

Zone 4

Quebec

CG2AWR	233,914	671	109	A
VE2/VE6TC	55,302	239	78	A
CG2GWL	37,062	223	58	B
VE2OWL	3,744	52	24	B
VE2FFE	324	16	6	C

Ontario

VE3EJ	2,293,668	2493	234	A
VE3MQW	256,284	634	126	A
VE3XN	191,761	502	113	A
VE3STT	272,664	614	126	B
VE3BUC	96,612	334	83	B
VE3HG	7,440	60	31	B
VE3YQY	5,304	72	17	B
VA3UZ (@VE3OI)	1,649,784	2022	212	C
VA3RU	1,269,200	1669	200	C
VE3IAY	288,256	658	128	C
VE3KP	223,104	590	112	C
VE3OSZ	71,840	178	160	C
VE3WZ	20,088	128	54	C
VE3MIS (+VE3IMG, VA3UA, VE3XAP, VE3FWA)	504,261	1150	129	D

Zone 6

W6

East Bay

KE6QR	33,060	192	60	A
K6JAT	43,594	181	71	B
KI6OY	6,633	77	33	B
AK6DV	2,856	36	28	B
K6ZM (K6WG,op)	342,846	741	126	C
KK6F	38,532	214	57	C
AD6G	3,190	45	22	C

Los Angeles

K6LA	869,440	1603	160	A
N6ED	612,074	1044	173	A
N6TW	159,093	473	99	A
KU6T	83,372	330	76	A
AI6Z	81,262	317	82	A
K6AQL (K0DI,op)	50,545	265	55	A
K6TV	12,555	99	45	A
W6AFA	210,300	598	100	B
W6AQ	120,280	366	97	B
WB6NFO	47,754	206	63	B
N6IFR	29,600	188	50	B
WO6M	36,960	220	56	C
WA6BOB	17,850	155	42	C
N6GL	7,776	95	32	C
K0INT	396	20	9	C
N6AA (+N6TJ, N6TW, KF6UAY)	559,872	1048	162	D

Orange

AD6WL	88,653	324	87	B
W6TKV	49,715	245	61	B
K6ACZ	32,629	132	67	B
W6EEN (N6RT, op)	1,298,276	1793	199	C
WA6OGO	14,650	101	50	C
AC6H	11,795	107	35	C
W6KP (DL3OI, DK3WE, ops)	883,344	1440	168	D

Santa Barbara

W6TK	346,066	793	133	A
WA5VGI	69,888	256	78	A
KD6PQF	3,300	51	20	B
KE6DKU	54	6	3	B
WA6FGV	134,820	480	90	C
AC6T (+N6VR)	651,710	1035	166	D

Santa Clara Valley

K6XX	693,165	1205	165	A
K6III	86,338	311	98	A
W6ISO	83,340	326	90	A
K6EP	7,995	76	41	A
W0YK	144	14	8	A
W6ZZZ	44	5	4	B
K8PO	589,820	1061	154	C
N6NT	436,494	1002	138	C
AD6E	226,665	564	115	C
K6AT (K6MJ,op)	61,337	221	83	C
W6PRI	90	10	5	C
K6MI	5	1	1	C

San Diego

K6ZH	158,990	345	130	C
AA6EE	11,767	99	41	C

San Francisco

K6CTA	90,335	357	89	C
WW6D	36,417	183	61	C
KQ6NN	4,896	46	24	C

San Joaquin Valley

KA6BIM	793	25	13	A
K6CSL	14,310	114	45	C
NN6NN (W6XK, N6EE, ops)	124,362	412	94	D

Sacramento Valley

KU6J	134,464	501	88	A
K6LRN	22,230	146	57	A
K6TA	11,284	77	52	A
W6NKR	11,830	86	35	C

W7

Arizona

WX7P	58,300	344	55	B
W7YS	89,262	301	87	C
K7ON	49,896	279	63	C

Eastern Washington

KC7WUE	1,083	22	19	B

Idaho

KW7N	36,394	187	62	B

Montana

KS7T	137,428	449	94	A
K7ABV	61,420	279	74	A

Oregon

W7BX	96,129	296	99	A
K7ZSD	431,319	992	133	B
W7ZB	431,112	904	132	B
WA7ND	198,795	652	87	B
N7OR	52,540	202	71	C
W7GG (+K7ZUM)	850,575	1426	165	D

Utah

WA7LNW	108,090	411	90	A
W7HS	27,825	113	75	C

Western Washington

W7OM	271,018	666	127	A
N6HR	193,675	504	127	A
K7BTW	155,584	486	88	A
W7QN	95,586	346	89	A
W7WA	1,224,828	1657	198	B
N7XY	2,106	34	26	B
KC7WDL	1,581	39	17	B
AC7LX	96,127	311	97	C
AB7RW	55,848	224	78	C
N7YX	41,219	249	47	C
W7EAI	5,725	97	25	C
W7DRA	44	9	4	C
K7RI (+N0AX, NW7DX)	877,128	1527	161	D
W7KN (+N7BV, N7WA)	380,562	864	119	D

Zone 7

W5

Arkansas

W5MK	42,735	266	55	A
N5DX (@K5GO) (+K5GO, K5LG, KI0MB, W0JOE, N0EHW, KC0EPD)	687,076	1401	146	D

Louisiana

W5WMU	876,484	1519	161	C
KZ5D	731,906	1367	161	C

Mississippi

WA5OYU	7,046	99	26	B
AC5SU	57,117	293	79	C

New Mexico

N6ZZ	781,434	1343	174	C
W6TER	226,710	628	110	D

North Texas

K5ZO	381,248	1146	112	A
N5DUW	139,356	495	98	A
AA5UN	50,775	241	75	A
W5UQ	45,276	226	66	A
WD5GSL	12,060	126	36	A
KC5NT	6,588	79	27	A
N5TY	239,720	733	104	B
WX0B (W4PA, op)	1,713,980	2220	215	C
N5PO	429,510	896	139	C
W5FO	403,742	892	131	C
N5RG	183,892	422	124	C
W5RYA	103,062	362	89	C
AA5NT (+NM5M, WD5FLK, N5EE, N5NJ)	1,128,825	1906	173	D

Oklahoma

K5PX	109,368	592	62	B
N5PMP	29,238	142	66	B
KC5NYO	20,664	157	42	B
K5YAA	558,158	993	146	C
K5KA	216,354	647	107	C
K0CIE	98,940	372	85	C
AB5FS	324	20	6	C

South Texas

N3BB	1,261,568	2184	176	A
W5WP	248,262	545	138	A
N6NF	109,648	411	88	A
NA4M	13,034	84	49	A
KM5WR	7,680	62	40	A
K5TR	1,340,352	2078	192	B
WM5R (@N5XU)	362,750	960	125	B
AD5Q	1,028,928	1595	184	C
K8EP (@NX5M)	664,581	1458	157	C
KE5C (@N5TW)	133,102	715	61	C
N5ZK (W5ASP,op)	129,168	604	72	C
AC5AA	105,000	350	100	C
KA5KLU	87,482	344	83	C
K5NA (+AF5Z, K5DU, KI5DR, N5ZC)	1,124,299	1949	179	D

West Texas

W5ZO	397,001	1031	121	A
KE5OG	63,075	254	75	B
WA2ZOU	7,112	78	28	B
KD5OJM	216	16	8	B
N5DO	497,826	951	162	C

W7

Montana

KC7UP	8,140	68	37	B

W9

Illinois

K9SD	684,170	1551	155	A
AA9RT	18,096	155	48	B

Wisconsin

KB9S	7,047	106	29	C

W0

Colorado

W0TM	701,349	1268	159	A
K0UK	666	33	9	A
K9MWM	99,093	356	87	B
N2IC	1,238,160	1857	201	C
AE0Q (@N0HF) (+AB0MV)	293,260	751	124	D

Iowa

N0AV	1,234,992	1996	176	A
NE0P	121,885	457	95	A
W5ROK	68,040	401	60	A
W0ETC	577,116	1197	153	B
N0RKX	16,416	116	38	B
W0PPF	15,640	155	34	B
N0NI (+N0AC, K0WHV, WO0V)	840,219	1536	177	D

Kansas

K0BJ	179,424	475	112	A
W0BR	64,515	340	69	A
K0FJ	47,125	238	65	B
WB0YJT	25,536	154	48	B
KC0GL	22,983	155	47	B
W0NXS	64,108	339	62	C
KG0UA	52,960	181	80	C

Minnesota

N0AT	591,306	1275	139	A
K4IU	9,275	130	35	A
K0DI	5,610	99	22	A
W0HW	160,179	488	107	C
KT0R (+N4BP,N0UR)	469,480	1177	121	D

Missouri

WA0SXV	82,908	317	98	A
W0DLS	75,654	297	81	B
K0DAT	28,086	126	62	B
KG0KP	1,444	27	19	B
AE9B	82,544	481	77	C
K2HT	22,185	177	51	C
WA0IYY	16,100	115	46	C
WA0OTV	785	56	5	C
K0OU (+N0XI, KC0ELZ)	504,384	1130	148	D

Nebraska

N0LZ	4,096	40	32	B

Zone 8

W1

Connecticut

KQ2M	2,810,088	2950	248	A
N1MD	39,674	170	83	A
N1ND	143,982	405	114	B
N4QX	6	2	1	B
K1KI	2,032,668	2078	261	C
W1WEF	1,375,136	1905	196	C
W1QK	844,760	1663	140	C
KB1H (K1EBY, N1XS, ops)	1,076,010	1669	178	D

Eastern Massachusetts

K1VUT	865,449	1623	169	A
K1GU	190,373	500	127	A
K1NU	67,890	297	93	A
K1JE	39,438	176	63	A
W1TW	28,950	200	75	A
W1XH	15,150	141	50	A
W1BDB	242,704	377	166	B
W1ZT	930,304	1551	184	C
WO1N	272,937	667	123	C
K5MA	113,256	371	88	C
KR1B	35,310	207	66	C

Maine

W1EL	75,650	268	89	B
N1YIS	816	19	12	B
NY1S	314,571	757	141	C
K1SWG	54,612	206	74	C

New Hampshire

K3MD	206,037	668	117	A
KE1KD	148,920	434	120	A
W1DAD	132,038	452	107	A
WA1S	34,265	144	89	A
WS1A	617,686	1425	122	B
K1WO	75,504	309	78	B
KR1G	1,521,728	1881	208	C
WC1M	1,222,394	1693	194	C
WE1USA (WA1LNP, op)	509,388	1255	132	C
AA1CA	86,597	400	89	C
AA1SB	61,778	258	79	C
AE1T	18,148	117	52	C

Rhode Island

K1PLX	260,568	586	132	B
KB1LN	28,084	162	68	B
AB1BX	29,397	319	41	C

Vermont

N1BCL	30,217	234	41	B
N1RJF (+WL7CMK)	99,099	341	91	D

Western Massachusetts

KM3T	205,768	661	89	A
N6RFM	99,372	327	98	A
KX1X	42,420	187	70	B
N1FUS	41,772	227	59	B
K5ZD	2,367,741	2417	257	C
K1TS	11,656	149	31	C
K1TTT (+NJ1F,W1TO,NU1P)	920,360	1595	173	D

W2

Eastern New York

NA2M	82,712	333	98	A
WF2B	2,140	50	20	A
KC2DTJ	22,695	157	51	B
W2XL	170,640	508	120	C
W2ZU	161,014	410	106	C
K2KQ	144,096	303	152	C

NYC-Long Island

KA2D	186,496	506	128	A
K2QMF	108,476	352	94	A
N2GC	552,720	945	196	C
W2TN	194,814	523	137	C

Northern New Jersey

N2ED	263,398	728	122	A
W1GD	89,964	280	102	B
K2DBK	20,460	147	44	B
WA2BKN	5,698	65	22	B
W2CVW	47,895	213	93	C

Northern New York

W2LE	3,762	70	22	A
NS2P	10,726	100	31	B
N2JNZ	8,320	100	26	C
W2RDX (K2CS, AF2K, N1OKL, ops)	95,787	421	87	D

Southern New Jersey

W2YC	349,264	616	166	A
AD3Y	13,515	84	51	A
WA2IAU	12,628	117	44	A
N3XOF	12,288	90	32	B
WK2G	100,500	461	67	C
N2CQ	19,195	111	55	C

Western New York

W2FUI	53,037	213	71	A
KM2L	39,406	242	61	A
W2EVL	38,430	184	63	A
N2UHI	23,650	179	50	A
WB2OSM	146,955	504	97	B
N2USB	29,707	150	61	B
N2LQQ	11,822	107	46	B
W2TX	62,923	202	89	C
W2EZ	15,680	141	40	C
WA2EYA	8,640	100	30	C
K2UA (+N5RZ)	1,941,100	2225	236	D

W3

Delaware

W3PP	166,176	554	96	A

Eastern Pennsylvania

K3WW	1,647,945	2316	195	A
N3NZ	33,085	226	65	A
N3NR	48,640	218	80	B
K3OK	11,911	102	43	B
N3EVZ	120	14	4	B
AA3B	1,184,493	1612	213	C
WA3AAN	50,080	297	80	C
N3MX	30,003	184	73	C
N3AD (+LU9AY)	1,142,102	1948	169	D

Maryland-DC

K3ZO	1,786,756	2201	226	A
K3TW	41,748	211	84	A
W3DQ	33,428	213	61	A
N3UN	23,108	146	53	A
N3HBX	626,750	1405	125	B
K3GEG	97,858	251	113	B
K3VY	53,009	213	79	B
KF3BN	1,183	27	13	B
W3GG	350,854	709	133	C
W3CP	120,524	341	116	C
K2YWE	52,275	273	85	C
KF3CV	1,008	42	14	C

Western Pennsylvania

N3YEA	12,120	127	40	B
AA3GM	68,978	393	91	C
WA3SES	62,634	304	78	C
N3FR	57,685	244	83	C
WO3Z	41,952	274	57	C

W4

Alabama

K4KR	1,220	31	20	A
WB4HUX	108	7	6	B
KS4YT (+KV4T)	192,465	800	91	D

Georgia

WA4TII	477,567	1243	141	B
K4QGG	370,188	1009	126	C
AC4WO	250,425	688	135	C
N4DU	50,132	234	83	C
W4AN (+K5OT, K4BAI)	1,780,038	2429	234	D

Kentucky

K4WW	52,836	304	74	A
W4LC	85,845	261	97	B
WA4KY	4,950	115	22	B
KT4ZX (KG4BIG,op)	331,110	877	130	C

North Carolina

AD4L	595,302	1481	141	A
N4YDU	504,310	1288	145	A
N4CW	364,824	994	108	A
W4IDX	61,065	348	69	A
AE4Y	23,348	228	52	A
N4UH	583,478	1284	142	B
W4YDY	81,136	343	88	B
NC4MI	66,612	303	78	B
W3GQ	20,466	102	54	B
KV4CN	7,266	68	42	B
N4AF	1,728,250	2152	223	C
KW4DA	309,120	826	128	C
W4CWA	3,936	51	32	C
AE4EC	2,574	53	22	C

Northern Florida

WB4IHI	54,054	254	91	A
KB4N	47,961	233	73	A
K4UCF (KD4RWN,op)	301,818	1184	102	B
N4EK	95,360	524	80	B
W4UEA	63,545	335	71	B
KN4Y	42,316	273	71	C
W4R (@N4PN) (N4OX, N4PN, NF4A, ops)	1,374,468	2341	188	D

South Carolina

W2JJC	154,030	884	73	B
K0COP	8,613	96	33	C

Southern Florida

W4SAA	209,115	590	135	A
K3MTO	38,500	177	70	B
K4RFK	30,008	141	62	B
K1PT	750,092	1292	172	C
W4MOT	251,336	978	89	C
K4PB	194,145	521	129	C

Tennessee

WO4O	406,992	1202	139	A
KW4JS	30,857	252	59	A
W4OGG	2,145	49	13	A
NY4T	200,236	804	113	B
NQ4U	178,155	619	111	B
WA4JA	26,596	150	61	B
AK4ST	19,624	161	44	B
KG4CKX	5,040	69	28	B
KF4GNL	4,755	78	15	B
W4JH	2,496	37	26	B
K4BP	660	20	15	B
N4ZZ	734,734	1615	154	C
K4RO	658,209	1453	151	C
W9WI	594,027	1386	147	C
W4NZ	424,837	1013	137	C
K4LTA	390,676	1114	143	C
N4VV	156,736	421	124	C
NU4B	95,378	337	103	C
W4AUI	16,068	126	52	C
W4TYU	15,250	150	50	C
AA3VA	6,004	68	38	C

Virginia

K4ZW	1,683,000	2355	204	A
AC8Y	362,376	1015	126	A
WA4JUK	210,273	592	119	A
K4UVT	84,164	297	106	A
W2YE	69,600	296	96	A
N4MM	181,761	421	129	B
WA4FXX	6,510	57	35	B
KS4JB	1,311	33	19	B
N8IK	30	8	3	B
W4BQF	135,790	543	74	C
KN1DX (K1SE,op)	49,358	285	74	C
W4ZYT	18,463	160	37	C
W4SD	15,435	98	49	C
K4KDJ (K4EP, KF4YLM, ops)	20,648	163	58	D

West Central Florida

N4AO (WC4E, op)	1,214,052	2012	194	A
K8FK	33,465	167	69	B
K4NNN (K4OJ, op)	639,618	1096	157	C
NJ4M (WD4AHZ, op)	279,250	694	125	C
W4DUG (AF4TK, AF4SR, KG4NVQ, KF4GIQ, K4LAW, W1GUD, N4SEX, ops)	114,062	400	82	D

W5

Mississippi

KB5FET	42,402	191	74	B
N5PA	14,118	130	39	B

W8

Michigan

K8GT	87,590	321	95	A
N8NX	75,960	292	90	A
W8CK	1,587	31	23	B
K8IR	191,704	552	124	C
K8CV	40,257	237	71	C
KB8PGW	12,604	135	46	C
NA8G (AB8FY, KM8I, KB8PNR, KB8QO, ops)	155,290	537	106	D

Ohio

N9AG (@N8NR)	715,512	1329	168	A
W8IDM	6,860	94	35	A
W8KNO	58,007	267	71	B
WQ8Q	25,256	164	56	B
K8AJS	230,394	663	114	C
N8PW	136,323	588	99	C
N8XP	16,414	196	58	C
K8AZ (+K8CC, K8MR, K8NZ, W8AJ, W8CAR, W8KIC, KC8EBR, N8TR)	1,704,480	2207	212	D
W8AV (+K4LT)	1,087,728	1637	186	D

West Virginia

K2UOP	233,448	583	137	A
KV3R	270,920	599	130	B
WV8HAM	7,344	80	36	B

W9

Illinois

W9LYA	65,272	350	82	A
W9YS	34,574	199	59	A
KG9N	11,104	136	32	A
W9HL	7,289	100	37	A
N9KO	3,504	79	24	A
WB9Z	1,241,175	1884	201	B
N2BJ	260,130	914	115	B
W9LYN	51,666	202	79	B
K9KUP	10,602	113	38	B
K9JY	353,705	942	109	C
K9QVB	287,738	797	121	C
AA9D	247,104	645	132	C
K9WA	112,817	430	101	C
K9MMS	64,584	312	78	C
N9BOR	29,068	292	52	C
KD0AV	18,753	172	47	C
K9KM	15,158	108	53	C
N9IJ	9,306	98	33	C
N9GJN	4,147	74	29	C
K9UQN	1,324	446	89	C
AA9NF	1,326	51	13	C
KX9X (+NO9Z)	1,020,768	1982	168	D
K9ZO (+KB9UWU)	855,424	1837	163	D
K9AA (K9PG, KB3AFT, K9XD, ops)	812,570	1741	166	D
K9YY (+KG9OV)	562,296	1160	168	D

Indiana

K9NW (@K9UWA)	1,289,972	1825	202	C
N9RV	748,568	1525	137	C
KJ9C	454,328	1032	152	C
WT9U	97,740	519	90	C
AJ9C (+KE9I)	711,312	1590	146	D

Wisconsin

KB9KEG	57,174	268	78	A
N9PQU	485,982	1231	133	B
KB9Q	12,924	121	36	B
N9FH	208,800	741	87	C
N9XX	54,525	295	75	C
W9HR	5,319	47	27	C

Zone 9

Maritime

VE9WH	1876	45	14	A

Nova Scotia

VE1OP	248,274	630	117	A
VE1JX	1,068,794	1517	173	B
VE1JS	163,668	500	92	B
VE1ZJ	736,874	1031	193	C

Newfoundland-Labrador

VO2/K2FRD	11,583	87	39	B

Zone 10

Mexico

XE1ZOI	113,295	385	83	C
XE1L	101,381	608	49	C

Zone 11

Barbados

8P6EX	59,276	218	73	B

Trinidad & Tobago

9Y4NED	5,304	66	24	B
9Y4TT (9Y4VU, 9Y4NZ, 9Y4NED, 9Y4KLF, 9Y4/DL2RVS, 9Z4CP, ops)	472,784	994	104	D

Cuba

T48Z	348,424	964	97	D

Martinique

FM5CW	56,025	208	75	C

Honduras

HR2CPS	3,519	47	23	B

Dominica

J75KG (K5KG, op)	1,267,200	2092	160	A

Virgin Islands

WP2Z (AG8L, op)	1,986,198	2214	218	A

Puerto Rico

WP3GW	2,070	41	23	B

Aruba

P40B (P43P, op)	2,297,490	2293	215	B
P43DJ	370,740	747	111	B

Netherland Antilles

PJ2T (N8NR, W0CG, N8BJQ, ops)	1,956,864	2644	156	D

Costa Rica

TI2DLL	38,160	218	53	B

Cayman Islands

ZF2AH	266,004	922	81	A

Zone 12

French Guiana

FY5KE	2,205,000	2637	180	D

Colombia

HJ4ZJS	24,372	168	36	B
HK3AXY	18,734	129	34	B

Peru

OA4AHW	63,018	219	81	B
OA4DKC	566,804	986	124	C

Brazil

PV8DX	492,100	821	133	C

Venezuela

YV3BKC	48,545	180	73	B
YV4EWW	13,363	129	23	B
YY5AFD	81	8	3	B

Zone 13

Brazil

PR7CP	41,832	179	72	B
PY7BEL	18,460	112	52	B
PR7FN	13,221	96	39	B
PY6KY	13,143	101	39	B
PS8NF	4,032	50	24	B
PS8HF	1,440	30	16	B
PR7AB	644	21	14	B
PP7CW	33,630	118	57	C
PR7AA	8,188	66	46	D

Zone 14

Chile

XQ1ZW	7,614	75	27	C

Uruguay

CX9AU	186,121	408	103	C

Argentina

LT2D	227,160	464	120	A
LO7H	613,248	1054	128	B
LU1BR	282,240	535	128	B
LU7DW	248,963	458	143	B
LO0D	154,734	663	51	B
LT5H	121,923	398	69	B
LU5EML	59,720	339	40	B
LU2DKN	56,327	191	79	B
LW1EGD	41,600	236	40	B
AY9H	18,624	103	48	B
LU6YAR	12,025	87	37	B
LW7DQW	1,462	32	17	B
LU2DVI	175	11	7	B
LW9DAH	527,730	799	147	C
LU1EWL	293,309	505	131	C
LU5FZ	169,480	487	76	C
LU1DZ	75,454	281	62	C
LR0N (LU2NI, LU1NDC, LU8DW, LU7AWP, LU1NAF, LU1SCV, LU2NAA, LU4NA, LU4NAS, LU4NAZ, LU6HDF, LU7HBO, LU7NN, LU8NA, LU1NAB, ops)	1,113,000	1511	168	D
L30J (LU9JX, LU1JMS, ops)	19,100	106	50	D

Paraguay

ZP6T	761,125	1373	125	D

Zone 15

Brazil

PS2E (PY2EX, op)	294,627	607	109	A
PY2NY	799,216	1030	176	A
PY2NDX	44,992	172	64	A
PY2YU	35,872	155	59	A
PU2PGR	88,976	304	83	A
PY3DX	17,950	118	50	A
PY7IQ	9,307	64	41	A
PY2KC	1,813,385	2110	197	B
PY2MNL	714,840	1119	138	B
PY3FOX	302,180	591	116	B
PY2GA	286,000	603	104	B
PY2LED	101,990	468	47	B
PY3PAM	38,171	221	41	B
PY3FBI	34,240	226	32	B
PY3PA	22,230	112	57	B
PY3KK	15,458	78	59	B
PY7VI	15,064	136	28	B
PY2TST	7,980	71	30	B
PU2SND	2,486	49	22	B
PY3YY	1,562	23	22	B
PY2EDY	1,248	22	16	B
PY3GLR	1,152	25	18	B
PY2SAA	884	18	17	B
PY2ZI	43,350	157	75	C
PY4FQ	23,180	110	61	C
ZW5B (PY5CC, PY5EG, PY1KN, PT2/YU1RL, ops)	2,878,896	2828	222	D
PY1NX	879,552	1332	144	D
PY2ZR	183,632	461	92	D
PY3PXY (PY3GLR, PY3JE, ops)	252	12	12	D

Zone 16

Argentina

LV5V	1,085,460	1481	158	B

Zone 17

Iceland

TF3VS	24,420	141	55	B
TF3KX	35,264	187	58	C

Zone 18

Norway

LA7MFA	702,307	1051	191	C
LA2HFA	245,850	481	165	C
LA9HFA	232,061	694	109	C
LA6PB	200,480	480	140	C
LA5TFA	40,205	186	85	C

Aland Islands

OH0/DL3SEM	48,468	275	84	A
OH0PM	1,766,656	1883	268	C

Finland

OH6NJ	1,257,991	1776	203	A
OH2RA	1,004,296	1486	188	B
OH3OJ	722,108	1332	167	B
OH2BPA	84,448	250	116	B
OI3W (OH2JTE, op)	1,632,534	1983	241	C
OH6NIO	1,284,674	1622	218	C
OH2NFS	342,250	591	185	C
OH2FS	244,644	411	174	C
OH2VZ	122,482	348	94	C
OH3WS	112,112	301	112	C
OH2YL	13,455	83	65	C
OH1F (OH1MDR, OH1NOA, ops)	2,710,920	2616	285	D
OH9W (@OH2AQ) (+OH2TA, OH6EI)	2,240,430	2451	255	D
OH9A (OH1EH, OH1MM, OH3WW, ops)	880,362	1434	189	D

Market Reef

OJ0U	2,360,754	3167	198	D

Denmark

OZ1HET	189,925	492	107	A
OZ5EV	235,848	388	186	B
OZ1ACB	163,471	429	121	B
OZ4PAX	95,692	369	94	B
OZ3ANT	10,411	315	107	B
OZ8SW	209,734	491	142	C
OZ4FF	39,376	162	92	C
OZ5UR	15,088	102	46	C

Sweden

7S3A (SM3CER, op)	916,916	1600	182	A
SM6WQB	358,020	721	170	A
SM6FUD	46,020	247	59	A
SM6DER	43,727	206	73	A
SM7TKR	10,755	91	45	A
SM3LIV	263,176	592	134	B
8S7K	96,480	307	96	B
SM5ARL	91,015	253	109	B
SM5UGC	52,290	200	70	B
SM5UFB	39,732	173	84	B
SM4BTF	38,998	181	74	B
SM7FTG	25,976	139	68	B
SM6AHU	3,360	40	24	B
SM3T (SM3RUJ,op)	1,160	34	10	B
SM5LZT	720	21	16	B
SM2T (SM2EZT, op)	1,027,650	1397	221	C
SM5G (SM5JBM, op)	724,550	991	215	C
SM5NBE	589,336	1020	181	C
SM2CEW	552,684	1042	158	C
7S5Q	146,148	444	114	C
SK6HD	145,990	367	130	C
SM3SX	133,488	371	108	C
SM7BJW	131,984	366	113	C
7S3J	126,440	336	121	C
SM0BDS	112,592	300	124	C
8S6A	74,250	289	99	C
SM6CST	59,073	191	97	C
SM6SRW	41,064	171	87	C
SM6PVB	7,920	74	45	C

Zone 19

European Russia

RW1ZA	1,189,728	1698	204	A
RA1ZZ	500,688	904	171	A
UA1TAN	307,428	772	137	A
RZ1AWO	261,513	687	147	A
UA1AAF	209,751	579	139	A
UA1OAM	105,340	368	115	A
U1BA	123,478	376	107	B
RW1ZN	123,178	270	121	B
RK1NA	122,499	349	117	C
UA1ONG	75,328	392	64	C
UA1OMO	48,048	163	77	C
RK1OWZ (RA2FW, RN2FA, UA1OMS, ops)	677,470	1188	185	D

Zone 20

Asiatic Russia

UA9XAB	324,723	584	141	A
RA9CGK	309,160	576	131	A
UA9CNV	13,728	113	32	A
RA9XA	901	25	17	A
RA9XI	42	8	6	A
UA9XC	293,568	546	132	C

Zone 21

Asiatic Russia

RK9JWV	449,792	823	128	A
RU0BB	406,368	732	144	A
RJ9J	114,270	408	65	A
RU0BW	46,102	182	74	A
RA9KM	40,612	154	71	A
UA0BA	15,764	133	28	A
RA0BA	1,161	33	9	A
UA9KJ	877,296	1225	168	C
RW0BG	168,732	429	109	C

Zone 23

Asiatic Russia

UA0QBR	521,152	942	136	C

Zone 24

Asiatic Russia

UA0IV	43,584	199	64	B

Zone 26

Asiatic Russia

UA0KBG	77,775	262	75	A

Zone 27

Ireland

EI/G3SQX	699,279	1097	201	C
EI4BZ	433,350	837	162	C
EI4DW	330,733	613	169	C

France

F/NH7A	1,284,525	2014	135	B
F5BBD	403,206	807	134	B
F5NZO	322,076	701	146	B
F8BDQ	264,845	538	161	B
F8AAN	66,348	319	76	B
F8DFN	11,792	104	44	B
F6BEE	1,892,484	2044	243	C
F6FGZ	876,960	1166	216	C
F5IN	691,612	1150	172	C
F5NBX	636,758	1097	181	C
F5JBR	386,880	652	186	C
F5NQL	299,796	574	166	C
F5ICC	225,216	484	144	C
F5PLC	221,125	452	145	C
F5RBG	126,440	364	109	C
F6GQO	120,696	342	107	C
F6FXW	111,111	354	91	C
F5ROX	101,626	331	119	C
F5MLJ	15,435	99	63	C
F5NLX	4,004	57	26	C
F5ICX	3,198	53	26	C
F5KEQ	443,948	902	164	D
F6IRA (+F5FLN, F4ARU, F1JRD)	395,094	1565	69	A

England

M0SDX	1,963,668	2255	241	A
M0TTT	637,960	1176	164	A
G0MTN	610,192	1119	176	A
G4VGO	13,021	187	29	A
G3VZT	1,233,265	1659	187	B
G0VSN	402,824	724	172	B
G0WJN	67,362	235	103	B
G0KTH	27,336	149	68	B
G4AXX	25,296	146	62	B
M0COP	21,630	119	70	B
G4OGB	295,934	607	158	C
G3LZQ	213,367	398	163	C
G0ORH	171,120	567	93	C
G3TXF	130,944	349	132	C
G3MPB	99,724	266	107	C
G4WFQ	55,110	238	66	C
G4DDX	39,228	174	84	C
M4T	29,136	186	48	C
M6T (@G4MRS) (G4PIQ, G4BWP, ops)	1,515,898	1894	233	D
G3PJV	59,454	388	54	D

Scotland

MM0BQI	11,685	84	57	A
GM3CFS	276,734	498	179	C
GM2T (MM0CCC, MM0DXC, GM4XZZ, MM0ANT, GM0CLN, MM1CPP, ops)	264,896	1251	64	D

Wales

MW5EPA	163,676	481	116	B
GW7X (GW3NJW, op)	867,060	1479	180	C

Luxembourg

LX1EA	508,849	920	167	B
LX2AJ	382,344	697	178	B

Belgium

ON4CAS	363,825	676	175	A
ON4ADZ	271,752	558	169	A
ON4CHK	34,200	125	95	B
ON4ATW	360,064	823	128	C
ON4XG	182,550	401	150	C
ON6TJ	142,104	372	124	C
ON7SS	28,400	152	71	C
ON5HY	23,121	127	63	C
ON5JD	22,119	122	73	C
ON7CC	12,894	100	42	C
ON4KVA	3,813	50	31	C
OT1N (ON4ACA, ON4ASW, ON4CCE, ON5CA, ON7ON, ON7TQ,ops) (OZ0RS, OZ1AA, OZ1ETA, ops)	401,860	894	142	D

Netherlands

PA0MIR	486,336	800	192	A
PA5TT	51,506	198	91	A
PA0LSK	21,616	146	56	A
PA9RZ	6,840	56	45	A
PA0KHS	219,329	504	157	B
PA0JNH	216,342	469	153	B
PA0IJM	90,948	455	53	B
PA2ALF	76,505	239	107	B
PA3GZC	15,631	111	49	B
PA9JAM	12,366	81	54	B
PA0FEI	7,105	66	49	B
PA1GS	1,827	34	29	B
PA3BFH	699,344	964	218	C
PA3EMN	262,560	543	160	C
PA0JED	199,899	452	133	C
PA3GRM	51,136	189	94	C
PA3AFF	44,528	182	92	C
PA3FDO	11,258	140	26	C
PA3CLQ	275	15	11	C
PI4NYM (PA1TON, PA1PAT, PA3AGW, PE2GER, PE1JGR, PD2LEO, ops + logger)	135,036	379	121	D

Zone 28

Croatia

9A5I	628,712	830	218	A
9A3QB	74,048	274	104	A
9A5KV	252,146	741	139	B
9A7DM	108,960	524	60	B
9A3Z	22,420	141	59	B
9A2GA	924	23	12	B
9A3ZO	1	1	1	B
9A5Y	1,475,820	1711	270	C
9A1AYZ (9A4KW, 9A5TO, ops)	561,475	1052	185	D

Malta

9H3O (+DJ7TO)	237,762	995	111	D

Fed. Rep. of Germany

DL1IAO (@DL0WW)	2,480,775	2471	275	A
DL1WA	276,372	618	162	A
DK0MN	253,890	603	155	A
DL1RNT	194,768	485	148	A
DJ2IA	188,102	432	163	A
DL5IAM	183,540	495	138	A
DK5AI	181,188	463	126	A
DM3HZN	173,906	364	178	A
DJ3XD	111,561	330	123	A
DJ2YE	95,589	353	129	A
DJ9MH	85,519	289	133	A
DL4DRA	83,694	286	111	A
DL2RTJ	73,800	252	90	A
DL0HGW	71,928	268	108	A
DJ1OJ	68,992	245	98	A
DL3ZAI	59,697	257	99	A
DL5MY	48,735	216	95	A
DL2KQ	43,044	190	102	A
DK6YP	36,279	145	87	A
DL4SZB	35,340	139	114	A
DJ6TK	33,066	165	99	A
DL2JRM	27,270	203	54	A
DJ9AO	18,422	137	61	A
DL6UAM	14,357	117	49	A
DK3GO	11,092	99	47	A
DF5AU	10,899	84	63	A
DL3BRA	8,619	77	51	A
DJ5NN	2,925	40	25	A
DL5ZB	2,100	38	28	A
DN3AU	490	22	14	A
DL0GRH	209	15	11	A
DF0JEN	72	12	6	A
DL1EIP	9	3	3	A
DK0WD	9	3	3	A
DH1TW	1,331,424	1684	216	B
DJ6QT	1,004,456	1334	212	B
DL0LD (DL3YEH, op)	559,988	1018	178	B
DF7YU	225,432	569	124	B
DF1ZN	203,224	466	152	B
DF0NF	171,522	574	117	B
DH5AO	119,888	349	127	B
DJ3HJ	89,326	339	118	B
DL2YCA	82,992	311	112	B
DL3JPN	81,641	270	109	B
DA1LDN	75,786	292	102	B
DF0PT	66,560	222	104	B
DF2VD	56,760	258	88	B
DL4RCK	54,162	194	102	B
DL6AKK	46,644	198	92	B
DH5ST/P	41,452	198	86	B
DL9ZWG	38,889	173	87	B
DK8NI	35,432	148	86	B
DL2HUM	31,230	147	90	B
DK3FCP	28,320	142	80	B
DK6AY	28,220	160	85	B
DL5FCV	23,970	120	94	B
DL8UAA	20,223	133	63	B
DJ3XM	12,006	97	58	B
DH4OP	9,152	81	52	B
DH9SBL	7,920	78	30	B
DL3IV	6,820	64	55	B
DL3WB	4,440	64	40	B
DF1IAV	4,142	52	38	B
DJ1VQ	4,026	64	33	B
DF1UU	3,597	44	33	B
DL7LZ	1,460	29	20	B
DK2PC	279	17	9	B
DL3APM	153	9	9	B
DL3YBM	766,120	1152	214	C
DL0LY	567,028	991	196	C
DL5YYM	557,560	880	212	C
DK5IM	534,694	953	202	C
DK3KD	451,720	792	184	C
DH2FW	438,256	898	172	C
DF4XX	326,986	678	167	C
DL6UNF	306,046	700	158	C
DL1JF	261,956	531	172	C
DL5JS	232,102	528	158	C
DL5KUD	209,492	427	166	C
DL4HRM	183,469	479	143	C
DL5ASE	175,686	469	141	C
DL7CF	170,976	347	156	C
DL3KWF	167,024	422	143	C
DL6RDE	158,916	436	114	C
DL7JV	157,080	440	132	C
DH7KU	150,768	448	108	C
DL6JCB	150,676	334	139	C
DL6KVA	148,672	277	184	C
DL7ANQ	132,624	346	144	C
DL5SVB	129,362	352	142	C
DJ9RR	122,213	368	119	C
DK3GI	120,560	325	137	C
DL3HSC	119,180	327	118	C
DL1TH	113,202	336	114	C
DL2ANM	105,040	286	130	C
DL3BQA	98,021	278	133	C
DL1LAW	87,116	339	116	C
DL3KWR	76,041	254	119	C
DL1ARJ	73,715	267	115	C
DL8SCG	73,010	258	98	C
DL5DBH	69,600	260	100	C
DK5ZX	58,140	236	95	C
DL2ZAV	55,488	225	102	C
DL6AG	51,898	221	77	C
DF5ZV	48,880	222	94	C
DL1FMG	37,027	242	61	C
DL3YA	35,850	205	50	C
DL8MUG	20,862	132	61	C
DL2IAN	20,240	112	92	C
DL7UCX	17,904	128	48	C
DK4CU	13,272	125	56	C
DL2YED	8,325	97	45	C
DL9GUN	5,781	69	47	C
DJ4VP	2,698	53	38	C
DM2DXG	836	23	19	C
DL6RAI (+IV3IYH)	2,027,174	2253	254	D
DF0RI (DK3DM, DL8OBQ, ops)	1,842,438	2195	237	D
DF7BL (+DJ9CN, DF5BM, DL6BBT, DK6BW, DG8BR)	570,375	951	195	D
DL1RYD	553,980	874	210	D
DL0GH	510,048	948	198	D
DK0ZD	350,958	779	174	D
DL0WMD (DL6KWN,DK6YA,ops)	255,934	552	181	D
DF0TI (+DK1DX, DH2KA, DH5DAM, DJ2DX, DF2DS, DH5DH, +loggers)	232,712	545	152	D
DF2IAX	207,024	553	152	D
DN2BW (DK9BW, DD8BE, DG6BU, DB4XX, ops)	73,902	293	113	D

Hungary

HA8JV	1,455,324	1858	247	A
HA6NL	963,455	1452	233	A
HA5PP	268,092	648	132	A
HA0HW	193,225	491	131	A
HA5NG	131,040	395	120	A
HA3GN	49,786	222	73	B
HG0D	2,088,528	2123	312	C
HG4I	1,146,961	1492	239	C
HG1R	975,212	1597	203	C
HA3LI	663,201	1171	189	C
HA6PQ	326,942	848	121	C
HA4YF	323,232	558	182	C
HG3G	209,440	519	140	C
HA6IAM	204,130	470	149	C
HA8EN	124,943	403	91	C
HA4YG	99,666	335	98	C
HG6N (HA2NA, HA2SX, HA3OV, HA3NU, HA6ND, HA6NF, HA6NY, HA6OI, HA6ON, HA6PX, ops)	3,582,917	3565	299	D
HG1S (HA1TJ, HA1DAE, HA1DAC, HA1AG, HA1AH, HA1DAI, ops)	3,124,576	3061	296	D

Switzerland

HB9QA	26,187	141	87	A
HB9ARF	317,364	765	159	C

HB9DXC 294,000 618 168 C
HB9HQX 23,310 152 70 C
HB9EP (HB9DOS, HB9FBL, HB9SUL, HB9DQP, HB9FBM, HB9FBS, HB9ODK, HB9TII, HB9DHG, ops)
363,090 997 133 D

Italy

I3MLU 1,421,064 1806 216 A
IO0A 835,002 1408 189 A
IK6SNQ 788,436 1284 198 A
IK2UCK 116,206 431 97 A
IK3SCB 100,332 369 108 A
IO6T 534,006 1127 174 B
IR4B (IK4AUY, op)
513,468 1066 153 B
IZ4DPV 488,652 931 172 B
IK1RLI 462,150 990 158 B
I1COB 407,360 827 160 B
IZ5CML 299,298 576 166 B
IZ0BVU 169,521 475 121 B
IZ5ASZ 131,262 350 131 B
II3L 104,858 407 109 B
IU3G 84,930 272 114 B
IO7Z 78,624 324 91 B
IK3OII 46,080 180 90 B
IZ2ABN 25,986 115 61 B
IZ3CDH 19,312 102 68 B
IK1HSS 18,904 104 68 B
IK2WZQ 12,669 76 41 B
IZ3BUG 9,761 89 43 B
IK0XBX 9,200 89 40 B
IK0YVV 488,136 767 172 C
IQ3X 185,335 662 101 C
IZ1DFI 98,226 344 107 C
I6FDJ 96,822 340 99 C
IK0YUT 66,690 348 65 C
IK2SAE 55,000 255 88 C
IK2NCF 22,509 138 61 C
IR2V 20,540 121 65 C
IK2WYI 11,960 94 46 C
IR2W (IK2QEI, I2VXJ, IK2PZG, I2EOW, ops) 2,460,776 2518 268 D
IT9BLB (+IT9VDQ)
1,260,775 1797 235 D
IO4T (IK4RQJ, IK4VET, IK4XCL, IK4ZHH, ops)
1,095,900 1591 195 D
II1H 996,247 1343 217 D
IU2R (IK2BCP, I2CZQ, IK2GZU, ops)
946,189 1280 223 D

Sardinia

IS0/OE5JKL 22,448 142 61 B
IS0OMH 155,740 448 130 C
IS0IGV 106,240 434 80 C
IS0SDX 30,442 210 62 C

Bulgaria

LZ2GS 119,282 341 146 A
LZ2UZ 97,232 282 103 A
LZ4BU 56,244 206 109 A
LZ1FW 4,550 80 50 A
LZ1HB 174,930 600 119 B
LZ1KSN 71,740 348 85 B
LZ1NG 71,344 583 52 B
LZ5PL 54,824 246 89 B
LZ2ZY 15,820 249 28 B
LZ5Z 9,541 99 29 B
LZ1RAY 7,680 168 24 B
LZ6C (LZ2TF,op)
276,336 691 144 C
LZ1OJ 120,819 330 103 C
LZ2FM 60,019 220 123 C
LZ2PB 49,077 281 57 C
LZ5ZI 24,150 178 50 C
LZ2DL 12,150 273 50 C
LZ2LDS 4,650 66 25 C
LZ1NJ 3,993 43 33 C
LZ2RS 2,114 65 7 C

Austria

OE4C (OE1DIA, op)
1,702,701 1988 273 A
OE75CWL 700,400 1318 170 A
OE1TKW 14,991 93 57 A
OE8SKQ 1,283,400 1699 207 B
OE75WWL 2,340 35 26 B
OE1ZKC 20 2 2 C
OE2S (OE2GEN, OE2LCM, OE2MON, OE2VEL, ops)
1,830,270 2114 247 D

Czech Republic

OK2FD 1,877,040 2026 270 A
OK2MBP 484,800 896 200 A
OK2HI 258,400 576 160 A
OK2PTZ 234,388 570 154 A
OK2PCN 228,456 512 167 A
OK1FM 173,548 401 172 A
OK1KZ 145,125 368 129 A
OK2PMG 65,826 283 106 A
OK1AOU 45,396 172 97 A
OK1HCG 23,484 159 76 A
OK1RR 13,334 91 59 A
OK2ABU 11,739 129 91 A
OK1SI 7,650 80 50 A
OK2BDF 4,066 73 38 A
OK6A 57,456 277 84 B
OK1LO 49,470 198 102 B
OK2PMS 6,509 74 23 B
OK1CAZ 3,888 58 24 B
OK2BHE 3,460 43 20 B
OK1DVK 2,706 43 27 B
OL0E (OK2ZU, op)
1,238,512 1595 227 C
OK2PP 937,250 1323 230 C
OK2ZI 898,690 1269 223 C
OK1DRU 718,620 1156 203 C
OL4M 578,095 977 199 C
OK2BGK 549,214 848 194 C
OK1HX 506,478 767 217 C
OK2DU 405,904 742 184 C
OK1AOV 375,440 612 190 C
OK2QX 354,618 593 199 C
OK1FCA 249,300 519 150 C
OK2BND 160,881 429 141 C
OK1GS 133,400 347 116 C
OK2VP 92,512 290 118 C
OK1AYY 18,690 128 42 C
OK5SWL 5,434 72 26 C
OL7R (OK1XUV, OK1ZMS, OK1WMV, ops) 937,594 1436 193 D
OL7C (OK1FKV, OK1AW, ops)
408,000 899 170 D
OK1KAO (OK1FMX, OK1MPM, ops)
297,108 701 162 D
OK2SWD 22,173 150 57 D

Slovakia

OM3PQ 155,608 444 106 A
OM3CDZ 125,552 452 112 A
OM3YK 101,574 287 114 B
OM7YC 6,240 69 32 B
OM0WR 525,616 1026 133 C
OM1GM 384,936 691 172 C
OM1II 259,148 641 148 C
OM5AR 178,350 530 123 C
OM7PY 158,188 370 142 C
OM7VF 31,046 155 86 C
OM3KHU (OM3JS,OM0ATO, OM3-0001,ops)
200,175 483 157 D

Slovenia

S51TA 1,712,304 2070 253 A
S50R 963,438 1457 203 A
S52JK 355,260 755 155 A
S59L 170,053 602 103 A
S50A 1,899,412 2035 254 B
S53DX 76,451 297 89 B
S59AA 1,548,281 1753 263 C
S53AU 95,550 226 147 C

Poland

SP9W 1,193,400 1786 225 A
SP9XCN 795,400 1267 205 A
SP3HUU 491,057 798 203 A
SN4T 363,690 1096 162 A
SP2GJV 344,358 678 189 A
SP6CDP 334,240 620 160 A
SP2AYC 318,159 757 159 A
SP5LCC 177,468 489 138 A
SP4IGV 115,584 307 112 A
SP6GNJ 89,838 277 126 A
SP6JKH 82,503 284 103 A
SP5CGN 82,128 270 116 A
SP7FBQ 74,760 298 84 A
SP5ICS 73,290 298 105 A
SP2MKI 46,725 201 89 A
SP4GFG 43,320 200 114 A
SP4KSY 42,394 162 94 A
SP3JUN 37,376 214 73 A
SQ9DXN 32,850 197 73 A
SP8GNF 27,735 210 43 A
SP3DOF 25,792 139 64 A
SP2DKI 22,494 147 69 A
SP3BYZ 19,437 126 57 A
SP6OPC 19,038 103 57 A
SP9MCU 17,157 104 57 A
SP8NTW 16,571 103 73 A
SP2DNI 15,125 134 55 A
SP3MY 13,135 103 71 A
SP3BGD 12,090 104 65 A
SP5ELA 9,900 73 44 A
SQ1EID 8,448 66 44 A
SP2UKB 7,453 73 29 A
SP1MHV 6,396 63 52 A
SP6AYP 4,176 47 24 A
SP8BVN 494 20 13 A
SN2A (SQ2EAK,op)
144 12 12 A
SP6ORR 119 13 7 A
SP6ALE 119 13 7 A
SP5PBE (SP5ELA, op)
84 12 7 A
SP7PS 72 12 6 A
SP6AEG 72 12 6 A
SP2FMN 24 8 2 A
SP9DAE 16 4 4 A
SP8LBK 8 3 4 A
SP2KFU 7 7 1 A
SP5OXJ 2 2 1 A
SP9QMP 708,792 1258 168 B
SN2X (SP2DWG, op)
594,945 990 195 B
SP6IHE 438,012 862 207 B
SP6LUV 409,578 678 177 B
SP7SEW 257,958 684 153 B
SP6FJ 210,456 436 148 B
SP3NUN 174,156 473 138 B
SP9MRO/8 164,255 566 95 B
SP6NVK 161,460 435 138 B
SP2QG 135,190 518 110 B
SP2CMD 135,093 353 147 B
SP2QVU 131,544 388 126 B
SP6IEQ 128,142 345 126 B
SP5BB 105,393 269 129 B
SP3GHK 86,110 297 109 B
SP6TRX 83,448 271 122 B
SQ8FEW 74,418 353 79 B
SQ7BCG 68,139 260 113 B
SP6OPY 62,790 212 115 B
SP1EOI 52,598 221 91 B
SP9MRQ 51,887 198 89 B
SP6AXW 47,104 210 92 B
SP8OOB 43,412 175 95 B
SP4AAZ 41,478 165 93 B
SP4CJA 39,249 273 63 B
SP4SHD 30,072 272 42 B
SQ6FHP 27,892 119 76 B
SQ9AOR 15,210 119 39 B
SP9HZF 12,361 89 47 B
SP3WVG 5,356 90 26 B
SP3XR 2,884 33 28 B
SP7CKF 1,430 42 26 B
SP1MVG 1,020 25 20 B
SP6CZ 946 22 22 B
SP6FIB 880 17 16 B
SQ5ABG 861 19 21 B
SP3BOL 819 21 21 B
SP/DL3KDC 615 15 15 B
SQ1FTT 305 35 5 B
SQ9ANT 33 7 3 B
SQ2DMR 4 2 2 B
SP2AVE 448,818 821 186 C
SP5ATO 273,129 486 181 C
SP3CW 229,320 575 140 C
SP6XP 170,751 441 141 C
SP3VT 134,934 400 129 C
SP3LWP 131,971 336 119 C
SP2BLC 111,720 346 105 C
SN8A (SP8AQA,op)
110,119 320 109 C
SP8BAB 106,524 454 66 C
SP4Z 105,080 250 142 C
SP5GDY 104,252 279 134 C
SP2JGK 92,778 386 94 C
SQ9CAQ 86,376 242 122 C
SP2EPV 69,276 259 92 C
SP1EG 56,900 232 100 C
SP6SYF 43,710 173 93 C
SP7FGA 42,944 206 88 C
SP3AZO 39,303 142 99 C
SP9NSV 31,443 220 47 C
SQ9FMU 15,834 101 42 C
SP8FHJ 14,410 110 55 C
SP6BEN 2,000 32 25 C
SP3GTS 407 17 11 C
SP5ZCC (SP5UAF, SQ5EBL, SQ5EBJ, SQ5BPT, ops)
595,010 1082 199 D
SP3PLD 372,141 740 189 D
SP9KRT (SP9ADU,SP9EMI,SP9-1753,ops) 348,751 633 193 D
SN0DO (SP1RXE,SP1TMA,SQ2DPG, SP3HC,SP6LV,ops)
209,304 509 136 D
SP9KJU (SP9MDY,SP9-31078,ops)
118,404 335 138 D

Greece

SV1DKL 89,960 280 104 A
SV1MF 74,060 284 92 A
SV1DNW 56,939 221 97 A
SV1DZB 167,424 504 128 B
SV1DPI 140,843 407 127 B

Bosnia-Herzegovina

T94FC 43,674 459 29 C

Romania

YO3FRI 347,679 730 163 A
YO4CSL 80,166 291 93 A
YO4AAC 70,720 366 80 A
YO3FF/P 41,783 269 47 A
YO8BPY 14,190 80 55 A
YO2KCB 520 14 20 A
YO8DHD 516 17 12 A
YO2LLG 224 12 16 A
YO2LLF 130 10 13 A
YO2LWP 117 9 13 A
YO2MBA 39 9 13 A
YO5CYG 348,530 704 182 B
YO5OHZ 123,876 410 124 B
YO3FLQ 106,495 354 95 B
YO9XC 77,224 314 98 B
YO7ARY 67,158 242 82 B
YO8CRU 26,082 136 69 B
YO3III 17,472 116 56 B
YO4RHK 14,718 181 33 B
YO5TP 8,742 112 31 B
YO6QT 6,831 75 33 B
YO9BXE 3,078 73 18 B
YO9KPJ 1,400 44 14 B
YO9AGI 194,090 529 130 C
YO6ADW 148,737 337 129 C
YO6BHN 145,431 384 143 C
YO5OHO 129,320 390 122 C
YO5CL 74,784 278 82 C
YO8MI 11,750 83 50 C
YO9OC 3,078 42 27 C
YO4FZX 1,520 45 16 C
YO9HG 360 23 18 C
YO9KVV (YO9GJY,YO9FNR,ops)
146,900 389 130 D
YO2KJI 480 13 20 D

Yugoslavia

YU7BW 2,091,520 2307 256 A
YT1AD (Z32ZM, op)
1,891,450 2132 275 A
YU1OL 872,993 1301 209 A
YZ1V 588,064 1144 184 A
YU1PJ 179,172 521 126 A
YU1LM 128,349 391 117 B
YT7KM 606,462 1100 183 C
YU7LS 591,591 1013 197 C
YU1OJ 406,038 758 177 C
YU7KM 192,485 483 137 C
YU1QW 177,320 468 110 C
YT1AT 110,880 374 110 C
YU7SF 63,112 58 28 C
YT6A (+YU1AU, YU1EW, YU7YU, YT1AT) 1,500,866 1959 229 D
YT9X (@ YU1AAX) (YT1RU, YT1RX, YU1UH, +loggers)
1,085,832 1622 216 D

Macedonia

Z36W 10,692 75 44 A
Z31GX 1,064,115 1583 221 C

Zone 29

Azerbaijan

4K9W 62,881 204 91 C

Georgia

4L1DA 64,944 314 66 B

Estonia

ES1QD 140,712 480 104 A
ES6PZ 60,894 221 102 B
ES5CX 1,008 60 9 B
ES2DJ 351,726 615 186 C

Belarus

EU2MM (UW3DI,op)
33,132 195 44 A
EU4LY 25,185 124 73 A
EU6TV 18,619 135 43 B
EU1EU 3,588 70 23 B
EU1DX 1,362,690 1644 245 C
EU1AZ 850,650 1342 214 C
EW8DX 518,026 1011 179 C
EU1MM 462,786 986 137 C
EW1CQ 220,950 482 150 C
EU5F (EU6DX, EU6TT, EW6AF, EW6AW, EW6MM, EW6OO, EW6YF, ops) 1,290,054 1935 211 D

Lithuania

LY9A 1,880,858 2237 259 A
LY1BA 240,462 458 183 A
LY2OU 69,052 200 122 A
LY3BU 4,840 75 20 A
LY4AA (@LY7A)
1,976,538 2163 258 B
LY3BH 394,020 846 132 B
LY3CY 175,223 434 137 B
LY1FW 21,816 118 101 B
LY2BET 7,854 85 42 B
LY2CY 1,311,408 1619 252 C
LY2MM 687,684 1052 204 C
LY2HN 498,150 756 225 C
LY1DT 452,030 924 170 C
LY2BBF 300,471 737 141 C
LY1BW 255,925 536 145 C
LY2TE 138,474 421 126 C
LY2GW 95,319 324 89 C
LY3AV 47,124 316 42 C
LY2FN 22,843 166 53 C
LY7Z (LY2TA, LY1DS, ops)
2,989,980 2983 294 D

Kaliningrad

UA2FZ (@RK2FWA)
2,210,085 2509 243 A
UA2FF 549,720 914 216 A
UA2FT 12,285 115 39 A
UA2FC 3,570 50 30 A
UA2FB 1,341,482 1705 229 B
UA2CZ 82,164 230 123 C
RN2FF 37,744 210 56 C
RA2FDG 574 17 14 C

European Russia

RK4FF 1,598,850 2014 255 A
RA3AJ 1,505,556 1989 234 A
UA4LU 1,044,459 1558 237 A
RA6LW 863,460 1231 246 A
RW3WWW 783,264 1329 199 A
RZ4FA 728,416 1170 206 A
RA3WA 687,140 1066 215 A
RK3DZD 584,844 1235 163 A
RA3NN 458,712 926 184 A
RK6BZ 434,142 930 178 A
RX3RZ 402,160 817 176 A
RA3OU 370,047 758 173 A
RZ4AG 322,644 648 161 A
RA1QFX 318,164 720 154 A
RN3OG 280,720 561 176 A
RU3HD 245,232 577 156 A
RX3AEX 244,035 631 153 A
RZ1AZ 227,520 458 160 A
RA6LBS 154,290 421 139 A
RV3YR 144,942 422 119 A
RW3VZ 137,104 353 152 A
RU3WR 133,000 372 133 A
RK3AW 127,252 784 58 A
UA6JY 122,194 386 107 A
UA4LL 112,770 496 90 A
RV4LC 92,582 302 119 A
RK3UWA 85,359 291 111 A
RA3FH 81,508 304 82 A
RW6HJV 81,172 283 91 A
UA3UMT 77,467 279 101 A
RX3DTN 61,920 269 90 A
RX3QDI 50,745 221 85 A
RA6AR 49,966 256 86 A
UA3PM 49,848 193 93 A
RK3WB 42,344 217 79 A
UA4PI 33,330 172 66 A
RQ4L 32,524 250 47 A
RU3AT 27,860 180 70 A
RU6AR 26,866 117 101 A
RZ3EM 26,412 131 93 A
UA3RE 24,494 127 74 A
RA3FC 23,940 145 70 A
UA3GX 23,714 94 71 A
UA4CIF 21,609 134 49 A
RW6CW 20,295 158 45 A
UA3AB 20,124 107 52 A
RZ3EC 19,491 113 73 A
RZ3QY 18,585 130 63 A
UA4LM 16,952 130 52 A
UA4LBQ 13,740 205 30 A
RV6AB 12,606 116 33 A
RA3VR 11,826 108 54 A
UA4LDP 10,472 132 34 A
RZ3PS 10,011 87 47 A
UA4LCV 9,844 98 46 A
RV6FG 6,405 67 35 A
RA3NZ 6,162 56 39 A
RN3DN 5,950 65 35 A
RK3DN 5,875 67 47 A
RV6LFE 5,868 60 36 A
UA3SGQ 5,313 95 23 A
RA4AR 4,340 56 31 A
RW3RN 3,250 45 25 A
UA4LCH 3,200 61 20 A
UA4TO 3,071 44 37 A
RA4UAT 3,038 43 31 A
RZ3FA 2,952 48 36 A
RZ6FA 2,952 39 24 A
UA3PW 2,860 38 26 A
UA3EKG 2,704 38 26 A
RW6FO 2,604 44 31 A
RU6FA 1,968 37 24 A
RV6BO 1,955 38 23 A
RA1WZ 1,564 30 23 A
RN1CX 1,558 32 19 A
RK6AXS 1,547 31 17 A
UA1WEZ 1,232 29 16 A
RK3FV 1,128 31 24 A
UA6ATG 1,121 23 19 A
RN6FO 1,044 25 18 A
UA1WA 986 27 17 A
UA6LCF 918 26 17 A
RW6AWW 897 32 23 A
RW3WV 885 23 15 A
UA1ABO 825 27 15 A
RX3VM 825 31 15 A
RZ6BJ 820 27 20 A
UA6AUK 810 26 18 A
UA6AAW 782 25 17 A
RA6FM 768 26 16 A
UA1WDZ 742 26 14 A
UA6BHL 740 27 20 A
UA3QJJ 735 20 15 A
RV6FZ 714 24 17 A
RX6LG 714 26 17 A
RW6HKF 672 25 16 A
RZ6BSW 570 24 15 A
RA3QH 560 19 14 A
RW6ALA 544 24 16 A
RZ6HGG 544 22 16 A
RA6HV 507 23 13 A
RZ6CY 465 22 15 A
RK3QWM 407 22 11 A
RW6ALB 364 17 14 A
UA3GH 300 20 15 A
UA6LDD 216 21 12 A
RX6LL 198 18 11 A
UA4LY 171 11 9 A
RA1WL 165 14 11 A
RZ6AJU 154 14 11 A
RA1WR 135 13 9 A
UA1WER 91 11 7 A
UA4LUO 77 9 7 A
RA6CE 72 12 6 A
RA4LBE 2 2 1 A
RX3DCX 1,484,126 1896 227 B
RZ6HWA 1,311,288 1476 264 B
RV3ACA 821,215 1320 193 B
UA3BL 764,883 1207 213 B
RN3RQ 691,296 1011 228 B
RW3DU 345,631 765 143 B
UA6ADC 222,270 490 155 B
UA3LHL 194,919 506 129 B
UA6HON 125,118 298 126 B
RU3DVR 104,643 319 99 B
RA6AFB 98,294 354 98 B
RZ1AK 97,643 332 91 B
RK3AIO 63,270 196 95 B
UA3BZ 60,681 195 113 B
UA6JAD 31,464 246 46 B
RA3NY 29,510 150 65 B
UA4SZ 28,575 177 75 B
RA3DGH 25,901 149 59 B
UA3LBE 21,022 152 54 B
RA6LIS 10,974 114 31 B
UA4UAR 4,071 56 23 B
RV6LA 3,480 75 20 B
RW4LDA 564 21 12 B
UA4LLH 108 6 6 B
RA6HFK 54 7 6 B
RX6CO 24 5 6 B
RZ3AZ 1,247,746 1730 226 C
RU3RQ 1,223,660 1516 244 C
RN6AL 1,141,448 1692 218 C
RU4HP 1,037,760 1317 235 C
UA3TU 781,704 1265 216 C
RK3AD 735,137 1222 193 C
RN6CF 636,864 1086 192 C
RN3BK 509,949 948 187 C
UA3AMY 470,850 1074 150 C
RU4LM 368,368 715 182 C
RV1CC 347,800 658 185 C
RN4SS 274,666 643 161 C
RV3DAK 192,747 445 141 C
RW3DY 191,880 495 130 C
RN6AI 183,612 507 143 C
UA6LAM 155,475 559 75 C
UA4AO 152,600 371 140 C
RX3RB 122,322 421 111 C
RK6CM 111,300 376 100 C
RV3PN 99,281 328 91 C
RK3BA 94,744 340 104 C
UA3AKI 82,524 300 92 C
RA3AF 63,833 262 77 C
RW1ZQ 60,465 259 87 C
RA3UAG 47,748 173 92 C
RA1TV 43,050 209 75 C
RX6LGE 42,864 265 47 C
RX3AP 25,194 170 39 C
UA0KCL/3 20,217 119 69 C
UA6ACK 15,960 116 56 C
RZ4AA 13,332 109 44 C
UA4QK 10,500 114 25 C
RA3LDP 6,697 60 37 C
RK3DOV 6,634 84 31 C
RA4AG 4,958 61 37 C
RW4FX 4,389 82 21 C
RN3FT 4,290 57 30 C
RV3QH 3,775 59 25 C
UA3NFG 2,832 49 24 C
UA3UOW 2,060 59 20 C
RZ3TWW 660 16 15 C
UA3TT 624 18 13 C
UA1ADV 570 17 15 C
RW3TX 468 17 12 C
RN4LP 380 19 10 C
RW3TV 320 15 10 C
RW4LE 297 13 11 C
RA4LNJ 1 1 1 C
UA4LMP -1 0 1 C
RU1A (RV1AW, RA3AUU, ops)
1,975,120 2178 280 D
RZ6LZL 1,921,596 2558 237 D
RI3A 1,780,884 2230 252 D
RU6LWT 674,492 1246 182 D
RK3EWA (RA3EA, UA3ERD, RU3EQ, RK3ER, UA3EAN, UA3EDQ, RZ3EP, ops) 508,086 860 194 D
RK3RWA 13,176 97 54 D
RK3VWA (RK3VA, RW3VZ, ops)
7,250 66 58 D
RV6AWS 720 29 18 D
RK6AYX 720 28 20 D

Asiatic Russia

UA9QCP 22,200 125 60 A
RK9KWB 41,262 218 46 B

Ukraine

UZ7U 1,442,112 1825 232 A
UZ4E 947,439 1553 207 A
UV5U (UX1UA, op)
674,025 1123 209 A
UW2F (UT0FT, op)
362,894 823 161 A
UT8IT 202,998 574 138 A
U5EX 184,144 479 136 A
UX8IX 161,586 575 94 A
UY5ZZ 149,247 487 103 A
US3IZ 133,596 511 108 A
UR7IKU 109,500 378 100 A
UT4EO 101,016 315 122 A
US0HZ 69,324 388 53 A
US5MTJ 26,432 167 64 A
US0YA 5,203 59 43 A
UX1IL 3,105 56 45 A
UT5RP 846 27 18 A
UR4III 375 25 15 A
UR9MO 180 12 9 A
UT7E 1,496,713 1798 251 B
UR6F 1,211,272 1564 232 B
UV7D 1,012,682 1575 191 B

UX3MR	345,200	958	100	B
UY7C	203,750	588	125	B
UR7EM	128,355	374	129	B
UR8QR	84,700	289	100	B
UT1WA	77,561	255	121	B
UT7MD	59,696	214	82	B
UR4EI	50,463	202	81	B
UT7QL	49,280	242	70	B
UR6MX	39,900	322	42	B
UR5WBQ	31,768	129	76	B
UR5KBY	8,046	108	27	B
UR5KEF	4,525	57	25	B
UT4MW	572	16	11	B
UT5UGR	1,657,611	2108	261	C
UW5Q	1,504,188	1723	254	C
EO1I (UT1IA, op)	1,395,504	1712	264	C
UT4FJ	1,185,724	1485	251	C
UR5HAC	607,230	1054	195	C
UR3PDT	413,772	838	164	C
UR6QS	385,950	690	186	C
UY3QW	370,018	990	139	C
UY5TE	262,050	612	150	C
US7IGF	255,750	525	165	C
UT5IZO	228,732	749	98	C
UR7QM	181,146	558	114	C
UT5SI	172,356	389	159	C
UT7WR	128,688	455	84	C
UY5WA	123,906	454	60	C
UY2RO	114,345	326	105	C
UY5ZI	101,292	323	92	C
UU2JA	59,184	180	137	C
US1PM	58,448	342	52	C
UR6IGG	54,768	230	84	C
US3QW	44,986	201	83	C
UT3EK	20,496	152	42	C
UT3IB	18,216	155	44	C
US9QA	6,105	65	37	C
UT5UGQ	168	10	7	C
UW7W	244,068	518	132	D
UR4MWU (UR5MB,UR5MA,UR5MCB, UR5MCA,ops)	51,744	265	88	D
UT4YWA	1,196	32	23	D
UT4YZZ	828	30	23	D
UR4EYN (+ US-E-655, US-E-634, logger)	72	12	6	D

Latvia

YL2NN	144,560	424	139	A
YL2CA	30,798	142	87	A
YL5W	880,685	1284	221	C
YL2MR	604,384	1149	187	C
YL2CV	90,082	184	159	C

Zone 30

Kyrgyzstan

EX2T	159,048	400	94	B
EX2A	147,602	400	91	C
EX2X	95,468	403	58	C

European Russia

RN4WA	397,011	779	177	A
RW4PL	227,614	549	146	A
RA9AN	55,361	203	83	A
UA4PFO	3,969	56	27	A
UA4RF	3,800	60	25	A
UA4PXR	1,738	44	22	A
RU4PU	1,474	31	22	A
UA4PXA	1,000	29	20	A
UA4PT	765	29	17	A
RA4PJY	308	18	11	A
RM4W (RW4WR, op)	1,816,430	2009	245	B
RW4PJ	512	19	16	B
RU4WE	242,242	589	143	C
RU4WT	84,777	331	77	C

Asiatic Russia

RW9TA	1,343,251	1569	203	A
RK9CZO	1,296,890	1573	194	A
UA9CLB	1,054,434	1352	186	A
RA9DZ	581,258	891	163	A
UA9FM	523,056	903	136	A
RW9QA	425,316	786	134	A
RN9RZ	414,036	672	159	A
RA9AC	319,771	621	131	A
RX9TX	265,302	493	153	A
UA9AX	237,250	487	130	A
UA9WQK	142,956	534	66	A
RA9ST	130,732	382	92	A
UA9APA	126,862	304	137	A
UA9SG	119,805	316	105	A
UA9AM	102,690	286	105	A
RX9WN	100,905	251	105	A
RA9DA	98,382	264	114	A
RU9CI	81,606	272	87	A
RA9AUH	65,520	234	78	A
RW9WA	46,398	175	74	A
RV9COI	40,800	176	60	A
RU9LA	35,640	226	36	A
RZ9AM	33,040	162	59	A
RV9WA	23,496	125	66	A
RW9QW	16,262	103	47	A
UA9DT	16,240	103	56	A
RV9WB	6,580	66	35	A
UA9CKS	3,401	47	19	A
UA9RA	3,000	41	24	A
UA9RL	2,948	42	22	A
UA9QQ	2,783	38	23	A
UA9LP	2,662	40	22	A
RW9QP	2,511	37	27	A
UA9BS	2,464	38	16	A
UA9QCQ	2,376	39	27	A
UA9RN	2,226	36	21	A
RW9QM	2,225	35	25	A
UA9QK	1,995	36	19	A
UA9LBQ	1,955	32	17	A
UA9LGL	1,904	32	17	A
UA9RM	1,767	33	19	A
RX9CCI	1,716	32	22	A
UA9LJA	1,692	32	18	A
UA9LF	1,430	31	13	A
UA9LR	1,426	33	23	A
RK9LWA	1,375	35	11	A
UA9LAU	1,372	38	14	A
RW9LL	1,144	31	11	A
RX9LF	1,128	30	12	A
RK9CC	1,104	25	16	A
RZ9WM	1,008	24	16	A
RZ9MYA	980	30	10	A
UA9CID	833	19	17	A
RX9LW	804	29	12	A
UA9LDM	756	24	12	A
RU9CZO	595	25	17	A
RN9CWB	570	24	15	A
RN9CWF	495	23	15	A
RZ9CX	297	16	11	A
UA9WEE	60	10	6	A
UA9MA	1,310,430	1507	209	B
RZ9SR	386,850	621	150	B
RM9A (UA9ACJ,op)	218,316	429	138	B
UA9MO	124,209	448	111	B
RA9FDR	88,371	271	81	B
RU9WZ	84,189	289	57	B
UA9CDV	1,809,159	1927	219	C
RT9T (RW9SW, op)	1,601,472	1602	228	C
RW9UW	450,772	883	119	C
RW9MJ	107,520	284	84	C
RA9SO	83,176	268	74	C
UA9LAC	75,460	316	55	C
RV9SV	58,392	208	72	C
UA9CR	24,603	120	59	C
RU4HH	10,800	64	60	C
RT9W (RU9WX, RX9WR, RW9WW, RW9WY, RX9WI, RA9WR, ops)	2,776,670	2472	265	D
RK9CWW (RZ9CO, RA9CMO, RA9CKQ, UA9CIR, ops)	2,512,692	2465	236	D
RZ9AWK (RZ9AE, RV9BB, ops)	324,480	546	156	D
RK9CYA (RK9CR + logger)	78,037	303	73	D

Uzbekistan

UK8IWW	49,302	237	54	A
UK8CK	138,460	222	172	C

Kazakhstan

UN4PG	103,170	458	57	A
UP5P (UN5PR, op)	354,904	638	148	B
UN7PJO	208,171	563	89	C
UN7CZ	59,297	352	43	C
UN8FM	10,770	98	30	C

Zone 31

Kyrgyzstan

EX2M	380,928	1381	62	A
EX8O	301,167	673	109	B

Asiatic Russia

RZ9IR	1,366,407	1589	207	A
UA9OS	39,270	157	77	A
UA9OSV	33,790	162	62	A
RA9OW	18,414	102	54	A
RZ9HG	14,898	106	39	A
UA9YAB	8,100	64	45	A
UA9OWS	3,276	47	18	A
UA9OMT	232,500	425	124	B
RZ9UGN	115,345	333	85	B
UA9ORQ	56,364	310	42	B
RX9UKF	26,112	140	48	B
RG9O (RZ9OU, op)	577,672	1198	163	C
UA9OA	391,856	650	152	C
RN9HM	94,140	364	60	C
UA9URF	87,780	292	77	C
RA9HO	63,750	200	85	C
RU9UN	20,414	102	59	C

Kazakhstan

UN5J	20,502	118	51	A
UN8FZ	200,934	440	122	C

Zone 32

Asiatic Russia

UA0ACG	388,240	811	115	A
RW0AR	91,500	321	75	A
UA0ANW	56,234	233	62	A
RU0AT	29,640	196	39	A
RA0AM	22,630	120	73	A
UA0YAY	16,856	98	56	A
UA0WL	196,044	515	93	B
RV0AR	46,978	162	83	B
UA0AGI	53,483	199	79	C
UA0WGK	43,173	267	39	C
UA0SBQ	33	3	3	C

Zone 33

Asiatic Russia

UA0DC	368,250	778	125	A
UA0UV	78,570	225	90	A
RW0UM	69,388	238	83	A
RA0JX	161,000	448	92	C

Zone 34

Asiatic Russia

RZ0CQ	75,864	237	87	A
RS0F	970,456	1375	178	B
RA0CAH	26,884	141	52	B
RU0LL	780,102	1160	171	C

Zone 35

Asiatic Russia

UA0ZS	244,790	504	130	C

Zone 36

Madeira Islands

CT3KN	411,880	679	140	A
CT3HF	42,230	155	82	A
CT9KY	15,651	82	47	C

Canary Islands

EA8AD	156,216	382	92	B
EC8AUZ	148,200	774	40	B
EA8BXQ	9,288	66	36	B
EA8DY	186,098	360	121	C
EA8ASJ	51,831	304	39	C

Zone 37

Morocco

5C8A	695,277	1492	99	A
CN2HK	686	18	14	A

Portugal

CT1AOZ	523,752	1051	139	A
CT1GFK	29,718	218	39	C

Spain

EC5CEK	191,754	830	67	A
EA2CR	4,560	46	30	A
EA3BOX	531,764	1073	148	B
EA3BWF	193,914	552	114	B
EA3NP	119,991	365	111	B
EA5EG	95,793	292	111	B
EA3DTQ	85,833	293	99	B
EA2CCG	52,899	232	77	B
EA1BIM	42,900	295	44	B
EA1AAW	36,960	162	70	B
EA1OT	28,056	327	28	B
EA5DFX	23,904	247	32	B
EA4EMC	22,839	105	69	B
EA7FRX	20,988	128	53	B
EA3ATO	8,820	104	28	B
EA3DUZ	7,280	70	35	B
EA7EXY	2,196	36	18	B
EC1CZA	936	22	13	B
EC3AMJ	248	12	8	B
EA1BVP	216	12	12	B
EA5FV	1,094,724	1688	188	C
EA5FID	501,721	816	187	C
EA4DRV	376,950	803	150	C
EA4NP	158,080	382	130	C
EA7CA	85,158	249	114	C
EA5EOH	78,667	247	97	C
EA5YU	73,425	279	89	C
EA1DGG	71,289	258	89	C
EA2AOI	46,852	166	106	C
EA7AAE	37,345	244	55	C
EA5DFV (+EA5ON)	1,417,520	1940	208	D

Balearic Islands

EA6LP	121,080	334	120	B
EA6TC	33,132	338	33	C

Zone 38

Egypt

SU9ZZ	2,023,584	2006	214	C

Zone 39

Israel

4Z5SFW	24,327	191	27	A
4X1IM	3,117,435	3177	205	B
4Z5FL/M	44,226	143	91	B
4X6HP	28,518	153	49	B

Cyprus

5B4KH	671,976	1367	108	B
P3A (RA3JX, RZ9UA, RW9UP, RV9UP, UA9UHD, ops)	5,411,304	3972	306	D
H2G (5B4AGC, 5B4AGN, ops)	2,822,889	2845	213	D

Turkey

TA3J	80,678	214	107	B

UK Sov. Base Areas on Cyprus

ZC4BS	494,649	772	153	B
ZC4DW	390,476	720	124	C

Zone 40

Iran

EP3PTT	9,344	89	32	B

Zone 41

India

VU3BKY	7,930	83	26	C

Zone 44

Taiwan

BV7FF	51,759	213	71	C

China

BD5WW	115,842	412	86	C
BA4TB	8,480	79	32	C
BY4BZB (BG4AGY, BG4ELV, BG4EMA, + loggers)	150,220	663	70	D

South Korea

HL5UOG	234,738	457	138	C

Hong Kong

VR2BG	711,840	1112	160	C
VR2KW (+VR2MY)	396,869	1009	109	D

Zone 45

Japan

JH4UYB	1,634,600	1900	200	A
JA8RWU	1,202,410	1630	170	A
JI2KVW	762,465	1151	165	A
JA2ZJW	682,836	1177	132	A
JH4UTP	622,776	1132	132	A
JA0QWO	509,180	870	140	A
JR7OMD	336,708	618	141	A
JR4GPA	308,890	676	115	A
JA3AA	143,840	324	116	A
JR9NVB	137,984	422	77	A
JM4WUZ	127,000	276	125	A
7L4IOU	120,268	301	107	A
JE1REU	117,130	344	85	A
JA3PYC	101,192	256	104	A
JA1XRH	96,642	299	91	A
JK2VOC	81,312	274	96	A
JA0BMS/1	69,550	276	65	A
JR1PPT	60,606	203	78	A
JA2FSM	54,417	273	51	A
JN7OJA	51,086	161	82	A
JA7DNO	40,416	212	48	A
JA1BNW	35,530	171	55	A
JA8GTO	32,500	134	65	A
JR1SGU	27,744	122	68	A
JA1BUI	23,868	125	52	A
JG3NKP	21,054	102	58	A
7M4KSC	19,968	122	48	A
JE3UHV	18,768	104	51	A
JR3AAZ	18,265	89	65	A
JK3GWT	15,314	83	62	A
JJ2QXI	14,946	80	53	A
JF2FIU	12,126	89	43	A
JA6QDU	11,220	96	33	A
JO7BBS	8,610	68	42	A
JE1YEY	6,552	72	28	A
JG3DOR	4,860	56	27	A
JA3WFQ	1,079	21	13	A
JA6GCE	652,545	1118	153	B
JA4DPL	223,450	492	109	B
JA2BNN	174,173	397	103	B
JA1SWB	109,650	321	86	B
JH1UUT	74,970	220	85	B
JL3VUL	60,800	262	50	B
JG7AMD	60,014	204	74	B
JG4OOU	57,825	195	75	B
JA5EO	57,250	313	50	B
7N4JZK	56,280	206	67	B
JA3AOP	51,903	199	73	B
JA9SCB	49,358	214	58	B
JG3UOB/1	36,358	150	53	B
JE7DOT	35,175	135	75	B
JG2CNZ	34,146	140	63	B
JR1MRG	24,720	108	60	B
JR7LVK	21,266	114	49	B
JH2BTM	20,520	100	60	B
JG2REJ	19,649	98	49	B
JA2BEY	15,386	82	49	B
JA2GHP	14,398	89	46	B
JA7DOT	12,702	69	58	B
JM1GHT	11,736	86	36	B
JA8IJI	10,461	85	33	B
JL3RDC	9,972	77	36	B
JA1KK	9,879	73	37	B
JI8BUR/8	7,533	67	31	B
JH3OXM	7,047	74	27	B
JA1ALX/9	5,983	55	31	B
JA1PYP	4,048	50	23	B
JA7ADV	2,508	33	22	B
JK1BII	2,000	28	20	B
JM4UZM	1,125	24	15	B
JR1BSV	728	16	13	B
JH1OXX	264	11	8	B
JR3KAH	252	12	6	B
7L2ICS	150	6	5	B
JG1OTQ	1	1	1	B
JG1GCO	1	1	1	B
JG1ILF	995,072	1350	169	C
JR7ZIT	426,190	658	170	C
JI3BFC	357,255	572	153	C
JA3YPL	350,692	608	146	C
JA9CWJ	196,206	439	106	C
JA2KKA	155,184	322	122	C
JA7IC	150,462	328	117	C
JA1XEM	138,180	340	105	C
JF1SQC	112,963	326	83	C
JR3WXA	106,400	268	100	C
JG3LGD	90,598	259	97	C
JH3LFL	85,443	369	57	C
JA0XD	83,711	197	97	C
JA2VZL	59,290	200	77	C
JH7IMX	55,671	185	77	C
JA2AXB	55,200	195	75	C
JA1CP	53,207	177	77	C
JA1PS	50,676	138	82	C
JA2OJ	46,230	168	69	C
JA4BAA	44,928	108	42	C
JH1JGZ	42,240	152	80	C
7K4XNN	40,436	240	44	C
JH0NVX	38,304	152	63	C
JR7CHU	37,303	141	73	C
JA5ATN	32,188	159	52	C
JA2QVP	31,920	118	76	C
JP1SRG	26,598	113	62	C
JF1HPC	22,797	114	51	C
JA7COI	22,700	122	50	C
JO2EHD	16,155	91	45	C
JO1QZI	16,044	96	42	C
JH3JYS	14,586	79	51	C
JG0EXP	10,824	85	33	C
7K1CPT	10,108	76	38	C
JK1VSL	10,010	62	55	C
JA1GS	9,916	74	37	C
JA3MIB	6,200	55	40	C
JA3BQC	5,820	52	30	C
JH1PXY	5,356	50	26	C
JA7ARW	4,826	56	19	C
7J1ABD	4,080	40	30	C
JH1NXU	3,483	41	27	C
JL2OGZ	3,172	43	26	C
JF2VUF	2,800	39	20	C
JA3KZE	2,461	32	23	C
JQ2BJK	2,289	45	21	C
JH7QNG	1,168	21	16	C
JG1BUG	260	12	5	C
JO1WIZ	161	9	7	C
JE4VVM (+JG4CLV, JH4UHW)	1,695,200	1854	208	D
JA7YAA (JO7FTJ, JO7DJT, 7M1JAS, JG7PSJ, JH0NZN, ops)	1,028,445	1469	165	D
JH7PKU (+JM1CAX,JO1BMV)	979,776	1396	162	D

Ogasawara

JD1BIA	3,906	66	21	B

Zone 49

Vietnam

3W2US	81,354	269	78	B

Thailand

HS0ZCW	163,125	470	87	B
HS9EQY	10,545	81	37	B

Zone 50

Philippines

4D9RG	913,332	1186	166	B
4F3XX	490,420	861	124	B
DU1IVT	115,192	457	56	B
DU1UGZ	108,633	447	49	B
DU3FSK	47,583	210	51	B
DU1DX	20,412	136	36	B
4F2KWT	397,110	711	122	C
DU3NXE	52,832	217	52	C

Zone 51

Papua New Guinea

P29IO	235,098	504	111	A

Zone 54

West Malaysia

9M2TO	284,472	810	81	A
9M2JI	200,753	478	119	C

Indonesia

YE1A	93,605	264	97	A
YB0A	366,886	785	103	B
YB0LBK	271,254	566	106	B
YC3TT	5	1	1	B
YC3LVR	16,416	127	32	C
YE1ZTC (YC1VBH, YC1WAE, YB1BOD, ops)	194,271	595	77	D

Zone 55

Australia

VK4EMM	844,522	1035	179	A
VK4TT	13,200	88	33	C

Zone 56

East Timor

4W6MM	177,230	517	74	A

Zone 57

South Africa

ZS1NF	38,208	145	64	A
ZS5T	348,516	717	108	B
ZS6HO	2,210	31	17	B
ZS4TX	1,283,381	1474	187	C
ZS0E	16,677	94	51	C
ZS5RON	12,648	101	34	C
ZS6DDX	61,540	188	85	D
ZS6WR (ZS6BSF, ZS6ENK, ZS6TC, ZS6FJ, ZS6RDP, ZS6PVT, ZR6SS, ZR6SAN, ZR6COB, ZR6OST, ops)	27,389	145	61	D

Zone 59

Australia

VK5GN	649,630	883	167	A
VK2CZ	277,518	477	138	B
VK2MSC	22,365	113	45	B
VK5EMI	504	14	9	B
VK2APK	619,400	846	163	C
VK2QF	42,824	189	53	C

Zone 60

New Zealand

ZL1TM	470,906	646	173	A
ZL1ANJ	754,446	1014	161	B
ZL2BR	269,204	496	124	C
ZL1BYZ	51,456	185	67	C

Zone 61

Hawaii

NH7/N6HC	197,450	850	50	A
KH6ND (@KH7R)	2,113,350	2300	193	D

Zone 64

Mariana Islands

KH0/KI8CT (JJ1CRV,op)	60,544	308	43	A
KH0/KD1OS (JH1ORA,op)	177,030	398	105	C

Guam

KH2/KJ1C	5,032	62	17	A

Checklogs: 3Z0I, 4Z4TA, CE5GO, DH5MM, DJ0MAQ, DK9KW, DK0ABG, DL1JFM, DL1JMS, DL2ARG, DL2BQD, DL2GBB, DL2HRZ, DL2VB, DL3MG, DL4KUG, DL5ANS, DL5CX, DL5DWW, DL5NA, DL6UD, DL7UXG, DL7VMM, EA2AAZ, EA3AEI, EA3ALV, EA3AXM, EW8DA, G0WHO, HA3OU, IO2A, I0ZUT, JH0OQL, KG6EFU, LT1F, LZ1CW, LZ1FJ, LZ2RF, N4PL, OK2OU, OK2ZW, ON7ON, OZ6TL, PA3AEX, PA3FFM, PA3HGF, PA7DVD, PA0RBO, PA0SIM, PY2MTF, PY2SP, PY2TSM, RA1QDP, RA3DNC, RA4UEI, RA4UF, RA4UN, RA6LQ, RA9CO, RA9OY, RK1WWW, RK3DSW, RK3WWS, RK4WWA, RK6LWB, RN3ZZ, RT3A, RV3DUT, RW3DIA, RW3FO, RW3TN, RZ6ANK, RZ9MWD, RZ9MYL, RZ9OXJ, RZ9OZA, SM4BNK, SM6DUA, SM7AIL, SP1DMD, SP1EGN, SP1PBT, SP1RKB, SP1YFK, SP2DWA, SP2DX, SP2GUC, SP2HMT, SP2IW, SP2IW, SP3BLT, SP3BVA, SP3BVI, SP3CUG, SP3JIA, SP5AHR, SP5AHY, SP5CEQ, SP5FLB, SP5JSZ, SP5ULV, SP6CES, SP6RLK, SP6RYC, SP6YIT, SP6YYP, SP7CKP, SP8DEE, SP8DYY, SP8GEY, SP9CLO, SP9CQ, SP9EB, SP9FTJ, SP9GFI, SP9HQJ, SP9IQO, SP9JBX, SP9ODY, SP9PEE, SP9VRB, SP9YDX, SP0PZK, SP0ZHG, SQ2AJI, SQ2DPC, SQ2DPT, SQ5TT, SV1JA, UA3AVR, UA3DEE, UA3MDX, UA3RF, UA3XBB, UA4ARL, UA4LBK, UA4LCN, UA4LFC, UA4YJJ, UA6LTO, UA9CLE, UA9JMS, UA9MIL, UA9XIF, UA0QNV, UQ1D, UR3PDT, UR4MU, UR4MWF, UR4YET, UR5GJP, UR5MC, UR5MK, UR6MD, UR6MR, UR7MI, US1MS, US-Q-2115, UT1EO, UT1MC, UT1MM, UT2MF, UT3GB, UT3MV, UT3MW, UT4MF, VE3KLM, VK6AJ, W6ISQ, W6IXP, W9OBG, YO2CMI, YO2IS, YO6AJI, YO6EZ, YO8AII, YO8COK, YO8MF, YO9DAF, YO9FL, YO9FYP, YO9KPM, YO9-081/DB, YO9-082/DB, YO9084/DB, YO9-085/DB, YO9-086/DB, YU1AAT

By Dan Henderson, N1ND
Contest Branch Manager

September 2001 VHF QSO Party Results

"The best tropo conditions for a September contest since about 1985!"—*K1WHS*

Going into every VHF contest, experienced operators wonder "Will this be the year?" Every so often, the contest weekend coincides with a great propagation event—aurora, sporadic-E or tropo—and lucky souls in some part of the country get to work some terrific DX or new grids. For those operating from the northeastern US during the September 8-9 contest weekend, this was "the year" for extended tropo openings through the microwave bands. A quick scan of the boxes reveals some truly stunning scores and QSO/grid totals from entrants in all categories. Just to make things interesting, several West Coast stations reported contacts with KH6HME via the transpacific duct.

The comments included among the 553 logs received, representing over 850 participants, seemed to indicate a fun event even in the areas not blessed by this year's tropo openings. Individual challenges were met; first time contesters got their feet wet; old timers commented on how good it is to see "old friends" on the bands every year; and some folks tried new bands or modes, including the new WSJT meteor scatter mode. (See December 2001 *QST* and the Digital Dimension column in this issue for more information about WSJT. It offers a great way to increase your multiplier totals, particularly during the slow overnight periods.)

The biggest contest scores come from those all-band beacons in the Multioperator Unlimited category. W2SZ (the RPI Radio Club), operating from Mt. Greylock in northwestern Massachusetts, has been entering this category for a long time, and they usually win. They won this year—no big surprise. The surprise is that they ended up with just over 3.2 megapoints—3478 QSOs and 517 grids. That's 1.3 million points, 812 QSOs and 134 grids better than the category record they set just last year! This is the first time any station has scored more than 3 million points in any ARRL VHF contest.

Right on the heels of W2SZ is perennial rival K8GP (the Delmarva VHF and Microwave Society), operating from Spruce Knob in West Virginia. Since 1997, K8GP and W2SZ have battled for top Multiop Unlimited honors in this event. Usually K8GP ends up with the most grid multipliers, but not enough to overcome W2SZ's QSO advantage, particularly on the microwave bands. This year the K8GP crew also shattered the old record with 2.7 megapoints, 3094 QSOs and 545 grids. The tropo this year helped K8GP's QSO total considerably—879 more than last year—but only 90 more grids as they have consistently done a great job in that department even without unusual propagation. The intense competition between K8GP and W2SZ in this contest and in the June event has redefined our view of what can be done in a VHF contest. What's next?

The Limited Multioperator category (maximum of 4 bands) continues to see lots of participation and great scoring opportunities as groups of friends and club members pool resources and have fun. The winning team of NC1I in western Massachusetts rode the outstanding tropo duct to a new overall category record above 700k with 1978 QSOs and 278 grids. They faced stiff competition from K3YTL in eastern Pennsylvania, who at 621k also broke the old mark set by K3MQH last

Affiliated Club Competition

	Score	Entries
Medium Category		
Potomac Valley Radio Club	4,290.914	21
North East Weak Signal Group	3,770,248	18
Northern Lights Radio Society	457,337	27
Mt Airy VHF Radio Club	416,010	12
South Jersey Radio Assn	299,376	8
Western States Weak Signal	292,632	7
Downey ARC	216,405	3
Society of Midwest Contesters	214,181	9
Badger Contesters	168,153	19
Rochester VHF Group	164,026	7
Mad River Radio Club	99,196	4
Yankee Clipper Contest Club	26,589	3
Local Category		
Northern New York Contest Club	6,692	5

Top Ten

Single Operator, Low Power

K1TR	306,660
WB1GQR (W1SJ, op)	274,668
AF1T	139,564
K2DRH	101,088
W1BQ	88,704
W1PM	76,874
KB8U	75,168
K1JT	59,857
W3KJ	55,002
K4ZOO	54,522

Single Operator, High Power

K1TEO	542,984
KA1ZE	452,387
K1RZ	329,156
W4RX	297,937
K1FO	263,874
K1GX	262,548
K1UHF	251,049
VE3AX	213,010
K2SMN	186,240
K4QI	159,424

Single Operator Portable

K6MI	37,665
WG1Z	24,786
KF0Q	16,240
N8XA	12,922
N9MYK	5,680
W6AXX	4,092
K4NGA	3,096
N7IR	1,562
KE4VCS	1,484
K2QO	1,400

Limited Multioperator

NC1I	720,020
K3YTL	621,426
W4IY	528,640
AA4ZZ	401,555
N3EMF	347,380
W2ODH	225,720
N2NK	219,780
K2BAR	213,367
W3SO	155,097
W1QK	152,278

Multioperator

W2SZ	3,221,427
K8GP	2,703,200
K1WHS	1,085,422
W2EA	214,347
W4NH	199,808
W0ZQ	149,625
N8KOL	136,315
K1ZE	121,524
W6TOI	111,840
W1XM	83,578

Rover

ND3F	294,063
W3IY	188,895
N2JMH	134,758
K1DS	109,480
N6TEB	103,872
N0DQS	71,131
N7CFO	69,842
VE3OIL	60,455
AL1VE	57,036
W7DHC	44,398

Regional Leaders

Northeast Region (New England, Hudson and Atlantic Divisions; Maritime and Quebec Sections)

K1TR	306,660	A
WB1GQR (W1SJ, op)	274,668	A
AF1T	139,564	A
K1TEO	542,984	B
KA1ZE	452,387	B
K1RZ	329,156	B
WG1Z	24,786	Q
W6AXX	4,092	Q
K2QO	1,400	Q
NC1I	720,020	L
K3YTL	621,426	L
N3EMF	347,380	L
W2SZ	3,221,427	M
K1WHS	1,085,422	M
W2EA	214,347	M
ND3F	294,063	R
N2JMH	134,758	R
K1DS	109,480	R

Southeast Region (Delta, Roanoke and Southeastern Divisions)

K4ZOO	54,522	A
KU4R	22,250	A
AD4DG	17,082	A
W4RX	297,937	B
K4QI	159,424	B
W4DEX	36,630	B
K4NGA	3,096	Q
KE4VCS	1,484	Q
W4SW	1,305	Q
W4IY	528,640	L
AA4ZZ	401,555	L
W4EUH	36,050	L
K8GP	2,703,200	M
W4NH	199,808	M
W3IY	188,895	R
W4/ON1CFX	15,861	R
K8DXN	4,320	R

Central Region (Central and Great Lakes Divisions; Ontario Section)

K2DRH	101,088	A
KB8U	75,168	A
K8MR	48,688	A
VE3AX	213,010	B
N2BJ	158,776	B
K8TQK	153,216	B
N8XA	12,922	Q
N9MYK	5,680	Q
N9OU	372	Q
N8ZM	59,704	L
W9ICE	56,816	L
K8CC	50,000	L
N8KOL	136,315	M
VE3OIL	60,455	R
N8KWX	10,360	R
N9RLA	4,332	R

Midwest Region (Dakota, Midwest, Rocky Mountain and West Gulf Divisions; Manitoba and Saskatchewan Sections)

K0MHC	50,228	A
N0LL	15,792	A
WA2HFI	15,732	A
KM0T	131,144	B
N0LL	15,792	B
N0KQY	13,160	B
KF0Q	16,240	Q
KF0GX	560	Q
N5XU	7,470	L
W0JH	4,096	L
NE0P	966	L
W0ZQ	149,625	M
KA0MR	16,640	M
W0KVA	3,300	M
N0DQS	71,131	R
K0PG	30,294	R
K9ILT	29,467	R

West Coast Region (Pacific, Northwestern and Southwestern Divisions; Alberta, British Columbia and NWT/Yukon Sections)

N6MU (@N6NB)	34,370	A
KC6TEU	28,652	A
W7GHZ	22,040	A
K6TSK	35,574	B
N7EPD	30,646	B
W6KBX	23,030	B
K6MI	37,665	Q
N7IR	1,562	Q
KQ6EE	896	Q
W2ODH	225,720	L
KF6YYV	10,261	L
K7JMH	6,960	L
W6TOI	111,840	M
K6WLC	11,682	M

Division Leaders

Single Operator Low Power

Atlantic	K1JT	59,857
Central	K2DRH	101,088
Dakota	K0MHC	50,228
Delta	KU4R	22,250
Great Lakes	KB8U	75,168
Hudson	K2MLB	41,700
Midwest	N0LL	15,792
New England	K1TR	306,660
Northwestern	W7GHZ	22,040
Pacific	N6MU (@N6NB)	34,370
Roanoke	K4ZOO	54,522
Rocky Mountain	NJ7A	1,190
Southeastern	W4OZK	7,238
Southwestern	AC6TA	9,324
West Gulf	W3XO	11,946
Canada	VE3KZ	24,682

Single Operator High Power

Atlantic	KA1ZE	452,387
Central	N2BJ	158,776
Dakota	K0SQ	13,110
Delta	K8WW	19,170
Great Lakes	K8TQK	153,216
Hudson	W2FCA	51,816
Midwest	KM0T	131,144
New England	K1TEO	542,984
Northwestern	N7EPD	30,646
Pacific	W6KBX	23,030
Roanoke	W4RX	297,937
Rocky Mountain	W6OAL	10,314
Southeastern	W4ZRZ	24,140
Southwestern	K6TSK	35,574
Canada	VE3AX	213,010

Limited Multioperator

Atlantic	K3YTL	621,426
Central	W9ICE	56,816
Dakota	W0JH	4,096
Great Lakes	N8ZM	59,704
Hudson	N2NK	219,780
New England	NC1I	720,020
Northwestern	K7JMH	6,960
Pacific	KF6GFG	4,992
Roanoke	W4IY	528,640
Southeastern	W4EUH	36,050
Southwestern	W2ODH	225,720
West Gulf	N5XU	7,470
Canada	VE7NUT	2,016

Multioperator Unlimited

Atlantic	W2EA	214,347
Dakota	W0ZQ	149,625
Great Lakes	N8KOL	136,315
Hudson	N2UZQ	20,740
Midwest	KA0MR	16,640
New England	W2SZ	3,221,427
Roanoke	K8GP	2,703,200
Rocky Mountain	W0KVA	3,300
Southwestern	W6TOI	111,840

Single Operator Portable

Atlantic	W6AXX	4,092
Central	N9MYK	5,680
Dakota	KF0Q	16,240
Delta	KD4NOQ	4
Great Lakes	N8XA	12,922
New England	WG1Z	24,786
Pacific	K6MI	37,665
Roanoke	KE4VCS	1,484
Southeastern	K4NGA	3,096
Southwestern	N7IR	1,562

Rover

Atlantic	ND3F	294,063
Central	N8KWX	10,360
Dakota	K0PG	30,294
Delta	WA4JA	3,675
Great Lakes	NE8I/R	816
Hudson	WA2IID	34,342
Midwest	N0DQS	71,131
New England	AL1VE	57,036
Northwestern	N7CFO	69,842
Pacific	K7XC	17,424
Roanoke	W3IY	188,895
Southeastern	AB4WL	1,254
Southwestern	N6TEB	103,872
West Gulf	KI5DR	4,879
Canada	VE3OIL	60,455

year, and from W4IY in Virginia.

This is the second year for the Single Operator Low Power category, and low-power entrants account for about 70% of single-op scores reported here. Congratulations go to Ed, K1TR, in New Hampshire; Mitch, W1SJ (operating as WB1GQR) in Vermont and Dale, AF1T (also from New Hampshire) who each managed to top the old record of 137k, set by K2DRH last year. In the end, Ed's score of just over 300k outdistanced the others and is now the overall category record.

Jeff, K1TEO, had another great contest from his home station in Connecticut. Jeff took top honors in the Single Operator High Power category and became the first single operator to break the half-million point barrier in this contest at 542k. Stan, KA1ZE, took his traveling station to western New York this year, finished second, and at 452k came within a whisker of also breaking the old record set by WA8WZG in 1998.

Though undergoing a name change from QRP Portable, the Single Operator Portable category continues to pose challenges to those gallant warriors who choose to leave the comforts of home and established antenna farms and take on the challenges of operating with 10 W output or less. The winner's laurel for the category in this first year of the new name goes to a station on the West Coast. John, K6MI, had the winning total of 37k. The number 2 score came from the other coast — Joe, WG1Z, at 24k.

These days when you think about rovers, Brian, ND3F, usually comes to mind. While not setting a category record this time, Brian and his partner (and son) Adam, N3SLN, put together the top rover entry. Their score of 294k stood up against the challenge of 51 other rover entries, lead by Bill, W3IY, who took second place honors with a score of nearly 189k.

In the Affiliated Club competition, the 21 entries of the Potomac Valley Radio Club took the Medium Category gavel by with 4.2 million points. Not far behind (and much closer than in the past several years) is the North East Weak Signal Group at 3.7 meg. The Northern New York Contest Club earned the gavel in the Local club category.

The skills contesters bring to the table are yet another reason Amateur Radio continues to grow in respect and service.

Multiplier Leaders By Band

Single Operator, Low Power

50 MHz

K1TR	47
WB1GQR (W1SJ, op)	47
N4GN	40
K8MR	37
KB8U	36
K2DRH	36

144 MHz

WB1GQR (W1SJ, op)	57
K1TR	49
N4GN	47
KB9NKM	46
K2DRH	43

222 MHz

WB1GQR (W1SJ, op)	40
K8MR	31
WA3EOQ	31
K1TR	31
KB8U	28
KA3SSD	28

432 MHz

WB1GQR (W1SJ, op)	44
K1TR	42
WA3EOQ	32
WA8RJF	32
KB8U	32

902 MHz

K1TR	21
K2DRH	13
W1PM	12
AF1T	9
K2HZN	9

1296 MHz

K1TR	24
WA3EOQ	19
K2DRH	18
W1PM	15
K0MHC	13

Single Operator, High Power

50 MHz

KA1ZE	56
N2BJ	54
K1TEO	53
W1VHF	51
K4QI	46
VE3AX	46

144 MHz

K8TQK	65
N2BJ	64
K1UHF	63
KA1ZE	61
K1TEO	61
K4QI	61

222 MHz

VE3AX	53
KA1ZE	44
K1TEO	43
K8TQK	37
W4RX	37

432 MHz

VE3AX	54
K1TEO	50
KA1ZE	49
K1FO	48
K4QI	47

902 MHz

K1TEO	24
K1RZ	22
W4RX	20
KA1ZE	20
KM0T	19

1296 MHz

K1TEO	29
KA1ZE	28
VE3AX	26
K1RZ	26
K1FO	24
KQ6EE	5

Multioperator

50 MHz

K8GP	101
W2SZ	86
NC1I-L	77
AA4ZZ-L	74
K3YTL-L	73
W4NH	71
K1WHS	69
N3EMF-L	67
W4IY-L	65
W3SO-L	62

144 MHz

K8GP	100
W2SZ	87
NC1I-L	81
AA4ZZ-L	79
K3YTL-L	76
W4IY-L	76
K1WHS	71
N3EMF-L	70
N8KOL	67
W4NH	65

222 MHz

K8GP	69
W2SZ	66
W4IY-L	58
NC1I-L	54
K3YTL-L	50
K1WHS	49
AA4ZZ-L	45
N8KOL	39
N3EMF-L	39
N2NK-L	37

-L denotes Limited Multioperator

432 MHz

K8GP	79
W2SZ	74
NC1I-L	66
K3YTL-L	58
W4IY-L	57
K1WHS	48
AA4ZZ-L	47
N3EMF-L	44
N8KOL	39
N2NK-L	37
W3SO-L	37
W2SA	37

902 MHz

K8GP	41
W2SZ	40
K1WHS	30
W0ZQ	13
K3EOD	11
K1ZE	11
W6TOI	8
WA3ZKR	5
W4NH	4
KA0MR	1
W1XM	1
N2UZQ	1
K6WLC	1

1296 MHz

K8GP	51
W2SZ	44
K1WHS	31
W2EA	18
W6TOI	13
W0ZQ	13
K3EOD	12
K1ZE	12
N8KOL	10
W4NH	9

QSO Leaders By Band

Single Operator, Low Power

50 MHz

WB1GQR (W1SJ, op)	348
K1TR	252
N6MU (@N6NB)	166
W1BQ	146
AF1T	123

144 MHz

WB1GQR (W1SJ, op)	441
K1TR	244
KB0LYL	194
WB2CUT	194
AF1T	177

222 MHz

WB1GQR (W1SJ, op)	135
K1TR	87
AF1T	63
K1JT	57
W3KJ	57

432 MHz

WB1GQR (W1SJ, op)	201
K1TR	146
KE6GFF	143
N6MU (@N6NB)	88
W1BQ	82

902 MHz

K1TR	45
AF1T	20
W1PM	20
K2DRH	15
W1BQ	15

1296 MHz

K1TR	60
W3KJ	33
W1PM	32
WA3EOQ	28
K2DRH	27

Single Operator, High Power

50 MHz

W1VHF	350
WA2WQZ	249
KA1ZE	238
K1TEO	224
K1RZ	193

144 MHz

K1UHF	422
K3TV	417
K1TEO	399
K1FO	352
KA1ZE	313

222 MHz

K1TEO	123
K1FO	106
K1UHF	103
KA1ZE	100
VE3AX	100

432 MHz

K1FO	210
K1TEO	188
KA1ZE	143
K1RZ	135
VE3AX	128

902 MHz

K1TEO	49
K1RZ	38
K1GX	36
KA1ZE	31
W4RX	30

1296 MHz

K1TEO	68
KA1ZE	61
K1GX	58
K1FO	56
K1RZ	55

Multioperator

50 MHz

K8GP	957
W2SZ	873
K3YTL-L	677
NC1I-L	628
K1WHS	507
W4IY-L	483
AA4ZZ-L	469
N3EMF-L	454
K2BAR-L	445
W1QK-L	404

144 MHz

K8GP	963
W2SZ	953
NC1I-L	738
K3YTL-L	683
W4IY-L	610
AA4ZZ-L	572
K1WHS	539
N3EMF-L	489
K2BAR-L	436
N2NK-L	407

222 MHz

W2SZ	351
K8GP	261
NC1I-L	214
K3YTL-L	194
W4IY-L	181
K1WHS	155
W2ODH-L	140
AA4ZZ-L	118
N3EMF-L	116
N2NK-L	105

-L denotes Limited Multioperator

432 MHz

W2SZ	590
K8GP	443
NC1I-L	398
K3YTL-L	335
W4IY-L	305
K1WHS	236
W2ODH-L	220
N3EMF-L	202
AA4ZZ-L	181
W2EA	152

902 MHz

W2SZ	144
K8GP	103
K1WHS	66
W0ZQ	20
K3EOD	16
K1ZE	16
W6TOI	10
WA3ZKR	9
W4NH	4
N2UZQ	3

1296 MHz

W2SZ	177
K8GP	145
K1WHS	88
W2EA	40
W6TOI	39
W0ZQ	34
K1ZE	22
K3EOD	20
WA3ZKR	19
N2UZQ	13

The 2002 ARRL September VHF QSO party will be held the weekend of September 14-15. Good luck as you plan your participation and find ways to challenge your personal talents. And if you weren't in on the big tropo openings of 2001, maybe 2002 will be "the year."

SOAPBOX

We worked Europe on 50 MHz in June and 144 MHz in September (DL5MAE on EME). I guess we need to try 432 next (AA4ZZ)… Super conditions, and I'm stuck with small antennas again. What a bummer! (AD4TJ)… First time rover on the East Coast, way different from the West! (AL1VE)…Very nice opening to KH6 on 2 and 432 on Sunday—especially strong signals on 2 meters. Thanks also to W1LP for activating several maritime grids (K0DI/6)… This was the best rover score ever for me—cooperative conditions and equipment, despite no QSOs on 5 or 10 GHz or LASER (K1DS)… Best September Contest Tropo Conditions in many years. This caused bump in my score from past operations (K1RZ)… Great tropo up to the Canadian maritimes and down to Tennessee made it a fun contest (K1UHF)… The best tropo conditions for a September contest since about 1985! I am glad we had all our microwave bands working to take advantage of it! (K1WHS)… Very good band conditions, except 6 meters (K2SMN)… Great Conditions (for a change) all the way up and down the East Coast (K3TV)… Not my best Rover effort but the best we have ever done north of Sacramento. Our treatment by the folks in Williams, CA was excellent, Thank you! (K7XC)… Saturday fair, Sunday dismal pickings (K8AB)… Fantastic conditions Saturday really helped the score, not to mention the outstanding contribution by ALL the Rovers; GREAT job to them all! (K8GP)…The CW mode is still conspicuously missing… why? (K8KFJ)… Conditions were poor to ugly. No openings and very little scatter in Florida (K9HUY)… Propagation conditions were quite flat, so I had to work hard for the contacts I managed to get. But I enjoyed the challenge anyway. Thank goodness for the rovers out here in the Midwest! (KB0ZEV)… We had a great time working this contest. We used 2 and 6 meters (KB1HAR)… This is my first-ever contest! I hope I do well!!! I am 11 years old, and I just got my license on July 1, 2001 (KB3GWB)… My first contest as a new ham, thanks to all the operators who were patient with my inexperience (KC2IDT)… I heard what I thought was a local station in DM06, so I skipped by. Hours later I realized that it was a long DX station in Hawaii. KH6HME had a wonderful signal into CM98. It was one of the most fun contacts I had. My two 400 mile 432 contacts were awesome! Thanks, KI6FF and K6TSK. (KC6TEU)… The contest bug has bit again and this has been my first serious effort in 7 years! (KF6AJ)… What a fun weekend! First full Rover effort. Lots of things to improve on—bigger antennas, more powerbetter locations to select. It was great to hear everyone on! Looking forward to the next contest! (KI5DR)… Bad propagation for tropo, 6M was dead, worse than a January Contest! Still had lots of fun however! Oh—had a surprise opening on 2M to Colorado, did not last long, however. Lots of mults on 2.4 and 3.4!

(KM0T)… Enjoyable weekend, picked up a couple new states on 2M. The band could have cooperated a little more, though (KV4EB)… Mr. Murphy was in full attendance this Contest (N2GKM/R)… My first try at contesting (N2TEE)… Good time had by all. Exciting results on 1296 (N2UZQ)… Was interesting to work contest mobile while on vacation! (N3GWZ)… Storms in the area seemed to dampen activity (N4GN)… Worst Contest I have ever worked (N4JZH)… Did better than last year primarily due to the addition of another band (N7IR)… Conditions were poor here, but I made my first WSJT QSO, which made up for that. Also was first VHF contest from my new QTH (NE0P)… Despite completely flat conditions, I made a personal best score. I was very pleased to work several stations on all four of the bands for which I am equipped. Thanks to those who turned their beams north once in a while (VE2ZP)…Best Ever September Contest! Beat both my old Grid and Contact numbers! No real openings, but everything came together Sunday (W1DYJ).

Flat conditions except for tropo to Hawaii (W1LP/MM)… First time in VHF contest. Borrowed 2M beam, amp and used my 20-year-old multi-mode 2M rig. Didn't do great but survived. Heard several weak ones but couldn't get them to hear me (W3CB)… Most memorable contacts: W2SZ/1 1030 KM on 8 bands 50 through 2304 + 10 GHz. (W4DEX)… Always nice to see old friends during the contest (W9GM)… It just doesn't get any better than this! Best conditions in a lifetime! Trying to keep up with 4 SSB and 3 FM radios simultaneously during wide open conditions is the definition of insanity. When K8GP keeps the S-meter pinned all night from 455 miles away, that is the essence of great conditions (WB1GQR).

Christophe, ON1CFX/W4, demonstrates his beams at the Virginia Arboretum near Winchester in grid FM09.

Scores

Each line score lists call sign, score, stations worked, multipliers, and bands (A= 50 MHz, B = 144 MHz, C = 222 MHz, D = 432 MHz, 9 = 902 MHz, E = 1296 MHz, F = 2304 MHz, I = 10 GHz). A = Single Operator Low Power, B = Single Operator High Power, Q = Single Operator Portable, L = Limited Multioperator, M = Multioperator Unlimited, R = Rover.

1

Connecticut

KF6AJ	42,816	342	96	A	**ABCD**
K1WVX	6,811	96	49	A	ABCD**E**
W1QJL	5,104	84	44	A	ABCDE
WA1GTP	1,980	55	33	A	ABC
KA1KOJ	1,152	48	24	A	B
K1JN	966	42	23	A	AB
W1DMM	945	44	21	A	ABD
N1PNR	12	4	3	A	B
K1TEO	542,984	1106	299	B	**ABC**D9**EFGI**
K1FO	263,874	898	199	B	ABC**DE**
K1GX	262,548	670	221	B	ABCD9EFG**HI**
K1UHF	251,049	852	201	B	**ABC**DEFI
W3EP	63,612	410	124	B	ABDE
W1AN	21,040	209	80	B	ABD
WA1FVJ	980	44	20	B	ABD
K1MAP	756	27	18	Q	ABDEF
N1QVQ	65	11	5	Q	BD
W1QK (+K1PHG, K2ZZ, N1ABY)					
	152,278	896	146	L	ABCD
KB1DFB (+KB1H, N1XS)					
	22,464	268	72	L	ABD
N1NW (+W1AMF, KE1IU, KB1FMM, KA1KOJ, KB1FUO, KB1FKL, ops)					
	3,094	86	34	L	ABD
K1ZE (+N1DGF)					
	121,524	520	156	M	ABCD9E

Eastern Massachusetts

W1PM	76,874	357	133	A	**ABCD9E**
WB1FKF	28,712	151	97	A	ABCD9E**FGHI**
KA1EKR	20,951	174	73	A	BCDE
W1LP/MM	13,448	245	41	A	ABDEI
N1EKV	7,296	92	57	A	ABCDI
WA1ENO	6,534	112	54	A	ABD
W1DYJ	4,788	114	42	A	AB
N1VQR	1,836	59	27	A	ABD
KC1MA	1,180	59	20	A	B
N1GJ	36,300	231	100	B	**ABCD9EF**
W1GHZ	19,422	159	78	B	ABCD9E
N1FDX	3,240	81	40	B	AB
K1EJ	180	18	10	B	A
N3GWZ	48	8	6	Q	AB
N1MPT (+KA1EZH,KB5TBB)					
	629	37	17	L	AB
W1XM (KB1CGZ, KB1FMS, KB1GRS, KB9IJB, KB1FMP, KB1FCL, W1GSL, WA1VRB, KT1D, KB1EUQ, ops)					
	83,578	498	131	M	ABCD9EI

Maine

W1BQ	88,704	470	128	A	**ABCD9EF**
AA1UT	3,528	77	42	A	ABD
N1HL	2,080	65	26	A	AB**I**
K1OYB	1,508	48	26	A	ABCD
W1XX	74,812	480	118	B	**ABCD**
WG1Z	24,786	205	81	Q	ABCDE
K1WHS (+W1MRQ, W2PED, K1BX, K1DY, K1TOL, K7KX, WA8WZG, N1LBI, N2CEI, logger)					
	1,085,422	1727	383	M	ABCD9EFGHIJ

New Hampshire

K1TR	306,660	851	228	A	**ABCD9**EFI
AF1T	139,564	518	164	A	ABCD9E**FGHIP**
K2HZN	54,516	297	118	A	ABCD9E
KU2A	38,250	226	102	A	ABCD9EFG
AC1J	24,716	240	74	A	ABCDE
AA1YN	10,860	151	60	A	ABD
N1JHJ	2,356	60	31	A	ABCD
W1DAD	70	10	7	A	A
K1MOM	30	6	5	A	A
W1ZC	11,232	125	54	B	**BD**
K1SIX	100	10	10	L	A

Rhode Island

W1CPC	1,323	41	27	A	A**BD**
KB1LN	525	35	15	A	**A**
WB2VVV	23,288	190	82	B	A**BCD9EF**
W1VHF	17,850	350	51	B	**A**
KB1HAR (+ N1YKH)					
	1,508	58	26	L	AB

Vermont

WB1GQR (W1SJ, op)					
	274,668	1125	188	A	**ABCD**
K1LPS	18,644	150	79	A	ABCD**9EI**
W1KMH	6,390	115	45	A	ABCD
W1AIM	64,052	311	134	B	**ABCD9EFI**
AA1TW (N1UQT, op)					
	27,440	184	98	B	ABCD9E

Western Massachusetts

K1ISW	5,922	93	47	A	**ABC**D
K1VU	4,095	82	39	A	**ABD**
N1MHH	2,880	66	36	A	ABCD
N1VOR	1,800	72	25	A	**B**
WA1MBA	8,366	81	47	B	**BCD9EFGHI**
N1RSY	406	29	14	B	B
NC1I (+K9PW, KA1QFE, N1DPM, N1HS, N1MT, N1MUW, W1QA, WA1LPJ, WZ1V)					
	720,020	1978	278	L	ABCD
W2SZ (K1DH, K1EP, K1IM, K2AD, K2JJB, K2TR, KB0WJO, KC2FQD, N1FGY, N1SV, N1SZ, N1XSY, N2XRE, N2YCA, N2YZO, W1RZF, W1SZ, W1UW, W1VE, WA1ZMS, WA2AAU, WA2SPL, WA8USA, ops)	3,221,427	3478	517	M	ABCD9EFGHIJKLP

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Eastern New York

WB2SIH	41,613	284	97	A	**ABCDE**
W4GFY/2	2,625	64	35	A	ABD
WA2YEI	2,201	58	31	A	ABCD
WA1RKS	1,450	40	29	A	ABCD
W2BEJ	741	37	13	A	ABCD9E
KC2HZW	528	30	16	A	ABD
WB2OEE	126	18	7	A	B
W2FCA	51,816	284	127	B	**ABCD9**
WA2WQZ	10,458	249	42	B	**A**
W3HHN	6,426	80	54	B	ABCD9**E**
N2UZQ (+W2FW, WA2BAH)					
	20,740	215	68	M	ABCD9E

NYC-Long Island

K2OVS	15,762	175	71	A	A**BD**
KF2XF	3,668	131	28	A	**B**
WB2AMU	3,441	72	37	A	ABD
KA2VZX	2,905	83	35	A	AB
N2TEE	78	13	6	A	B

Northern New Jersey

K2MLB	41,700	273	100	A	A**BCD9E**
K2KIB	36,057	235	101	A	ABCD9**EF**
WB2CUT	6,984	194	36	A	**B**
W2UDT	4,995	106	37	A	ABCD
AK2F	4,329	99	39	A	ABCD
W2YR	3,960	70	44	A	ABCD
K2YSY	3,432	77	39	A	ABCD
WB2IDV	784	49	16	A	B
WA2NXK	560	20	20	A	BD
W2JEK	375	25	15	A	AB
W2CVW	312	24	13	A	A
K2JT	96	12	8	A	A
K2SZ	36	6	6	A	AB
N2MH	24,888	313	61	B	**ABCD**
N2NK (+K2BM, WD3R, N2WM, K2BJG, N2IEL, N2HMM, WV2V, WB2UFF)					
	219,780	964	185	L	ABCD
K2BAR (K2AMI, WA2LXE, KC2DTA, K2YLH, KC2FBK, KO2OK, WA2QHL, NA2AA, WI2W, W2JEK, KA2NJP, WK2M, KB21OCW, K21PJM, NO2T, ops)					
	213,367	1095	163	L	ABCD

Northern New York

N2YEV	6,720	117	48	A	**ABD**
NS2P	4,830	101	42	A	**ABC**D
K2CS	2,205	63	35	A	AB
NT2W	987	38	21	A	ABD
KC2GHT	703	37	19	A	AB
NG2C	64	14	4	A	BD
K3KYR	4,646	101	46	B	**AB**
KC2BEZ	108	10	9	Q	ABD

Southern New Jersey

K1JT	59,857	384	119	A	**ABCD**
W2PAU	5,934	105	46	A	ABD
N2MPU	864	48	18	A	AB
WA4FRA	310	29	10	A	ABD
W5KI	285	19	15	A	AB
KR2T	100	23	4	A	BD
K2SMN	186,240	612	194	B	**ABCD9EF**
W2SJ	21,456	163	72	B	ABCD9EF**G**
N2HQL	348	29	12	B	B
K2AA (KD4HZW, N2MM, K2BL, ops)					
	12,208	168	56	L	ABCD
K3EOD (+WR3P, W2SJ)					
	80,228	463	124	M	ABCD9E

Western New York

N2WK	11,591	173	67	A	**AB**
W2WGL	6,750	96	54	A	**ABD**
WA2ZNC	2,106	64	27	A	ABCD
AF2K	1,274	49	26	A	AB
KB2NFS	832	47	13	A	ABC**D**
N2USB	448	28	16	A	AB
KC2GJX	378	27	14	A	AB
KA1ZE	452,387	936	299	B	**ABCD9EFGHI**
NQ2O	19,992	137	84	B	ABCD9EF
KC2IDT	11,644	119	71	B	ABCDE
KC2FNE	408	29	12	B	ABD
K2QO	1,400	44	25	Q	ABD
K2ANE	234	15	13	Q	ABD
K2IWR (KB2LUV, KB2NCW, N2MRE, ops)					
	1,363	36	29	M	ABCDE

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Delaware

KA3IJO	1,860	61	30	A	**ABD**
W3OR	61,899	292	141	B	**ABCD9EFG**

Eastern Pennsylvania

W3KJ	55,002	294	103	A	**BCDEF**
W3KM	43,981	248	103	A	ABCD**9**EF
KI3W	6,160	125	40	A	ABD
N3OGF	4,232	77	46	A	ABD
K3ZK	4,004	114	28	A	**ABC**D
KB3EXB	2,210	63	34	A	ABCD
N3XJX	1,950	65	30	A	AB
KB3GWB	858	36	22	A	ABC
WA3CSP	779	41	19	A	A
WT3P	722	38	19	A	AB
KB3FCS	600	25	20	A	ABC
KE3TC	441	32	9	A	BCD
WA3ELQ	385	30	11	A	BCD
N3CFO	234	18	13	A	B
WA3DRC	45,032	236	104	B	ABC**D9EFG**
K3TV	33,361	442	73	B	**ABD**
K3GNC	27,216	211	81	B	**BC**DE
N3ADC	26,240	209	82	B	**A**BCD9E
KB3ZS	17,873	201	61	B	ABCDE
N3NGE	17,280	123	72	B	ABCD9E**FGH**
K3MD	8,555	109	59	B	ABCDE
W3SZ	4,428	72	36	B	BDEF
K3IB	2,400	75	32	B	AB
AA3GN	2,117	40	29	B	ABCD9EF
K3YTL (WA1HHN, K3MKZ, N3WV, N3FA, N3TKK, N3PBH, W3DZH, KE3OA, N3RN, KA3EEO, WB3FKQ, N3IKO, ops)					
	621,426	1889	257	L	ABCD
N3EMF (+N2DHH,N2DVQ,N2FMC,N2GCZ, N2NWZ,WB2NHC)					
	347,380	1261	220	L	ABCD
N3JFM (+NM3N, N3JXB, W1LBY, W9QY, KB3FYE)					
	59,325	430	105	L	ABCD
W3HZU (AD3E, N3NBT, WB3CQN, N3JDQ, WS3C, WA3IKQ, AB3BB, ops)					
	9,282	173	51	L	ABD
K3DMA (+logger)					
	1,820	52	26	L	ABCD
W2EA (N2SCJ,N2FY,N2XYZ,N1RK,KV2M,KV2R, K2WB, KF2YX,W2MC,W2RDS,ops)					
	214,347	875	177	M	ABCDE
KF3DT (+KB3CPL)					
	11,001	146	57	M	ABCDE

Maryland-DC

WA3EOQ	44,268	211	119	A	B**CDE**
K3IXD	18,034	192	71	A	ABCDE
N3II	13,504	211	64	A	**AB**
K3GEG	7,446	145	51	A	ABD
N2RF	6,272	104	49	A	ABCD
WN3C	4,446	101	38	A	ABD
N3UM	2,697	87	31	A	AB
K3DSP	1,650	55	30	A	AB
WA4PRR	1,458	48	27	A	ABD
K3TW	882	42	21	A	AB
WA3GYW	510	30	17	A	AB
N2TDT	240	30	8	A	AB
W2GG	200	18	10	A	ABD
K1RZ	329,156	844	244	B	**ABCD9EFI**
K3DNE	155,660	592	172	B	ABCD9E
AK3E	74,458	524	118	B	ABD
K3ZO	30,498	391	78	B	AB
W3CB	1,656	72	23	B	B
W3GN	688	43	16	B	AB
W6AXX	4,092	124	33	Q	B
W3IP (+K3FFT, K3MLA, WG3R, W3NLB, N6OBP)					
	105,696	556	144	L	ABCD
N3VOP (+ N8AAY, KB3EKI)					
	7,920	150	45	L	ABD
WA3ZKR (+KA3EJJ)					
	44,086	285	94	M	ABCD9EFGI

Western Pennsylvania

KA3SDD	28,016	189	103	A	**ABCD**
W8IJ	48	6	6	Q	ABD
WB0IWG	45	9	5	Q	AB
W3SO (K4VV,WR3Z,W3TEF,AI3M,K3RUQ, W9NET,W3YOZ,ops)					
	155,097	785	171	L	ABCD
K3MJW (N3GJ, KA3WSW, N3MRU, N3NOS, N3OEX, N3WAV, N3WMC, N3APZ, ops)					
	30,470	210	110	L	ABCD
W3KWH (W3SVJ,WA3VXJ,W3IOH,WA3TTS,ops)					
	8,294	114	58	M	ABD

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Alabama

W4OZK	7,238	128	47	A	**ABDE**
W4ZRZ	24,140	215	85	B	**ABCDE**
KU4IU	8,586	136	53	B	ABCD
AJ4W	1,175	43	25	B	ABD
KF4INA	80	8	8	Q	ABD
N4ION (+N4JDB,N8MHC)					
	5,043	109	41	L	ABD
WA4DYD (+KB4BKV)					
	4,141	85	41	L	ABDE

Georgia

K4KAZ	5,424	78	48	A	**ABCDE**
NY4F	300	21	12	A	ABD
W4WDH	12,236	123	76	B	**ABCD**
KD4K	176	12	11	B	ABCD
K4NGA	3,096	77	36	Q	ABD
W4EUH (+W3EUH)					
	36,050	290	103	L	ABCD

Kentucky

N4GN	14,355	165	87	A	**AB**
W4FVQ	7,680	86	60	A	AB**CD9E**
KD4EVB	1,196	46	26	A	AB
KE4KWR	432	27	16	B	**B**
K4SJA (+K4ITF,K4TDO,AK4U,KS4XL,KN4M)					
	14,350	146	82	L	ABCD

North Carolina

NX9T	975	39	25	A	**AB**
W4FAL	112	15	7	A	AB**D**
K4QI	159,424	514	212	B	**ABCDE**
W4DEX	36,630	208	110	B	ABCD9**EFGI**
W4VHH	20,655	147	81	B	BDEFG
AA4ZZ (+AA4S, K2SD, K4DXA, K4MQG, W4MW, W4VHF)	401,555	1340	245	L	ABCD
W4NH (K4EA, K4RF, K4SZ, K4TW, KB4IDC, KD4HLG, KE8FD, NX9O, W4EGT, W4KXY, W4SKI,ops)					
	199,808	693	224	M	ABCD9EFHI

Northern Florida

KE4YYD	800	40	20	A	**B**

W2BZY 4,699 92 37 B **ABCD9EF**
N3AWS 168 22 7 Q ABD

South Carolina

N4AOE 1,357 53 23 A **ABCD**
W4WRL 5,616 108 52 B **AB**
K4YTZ 9,350 144 55 L ABCD

Southern Florida

K0VXM 3,270 75 30 A **ABCD9EF**
KE4JZT 1,178 48 19 A ABCD
KF4FAJ 440 35 10 A ABCD
WA4OFS 216 17 8 A ABCD**E**
NJ2F 2,808 83 26 B **ABCD**
K4PKY (+KG4LBB,op)
264 23 11 L ABD

Tennessee

KU4R 22,250 172 89 A A**BCDE**
KV4EB 4,416 92 48 A A**B**
AD4F 432 21 16 A ABCD
KA4CHT 312 26 12 A AB
KB4NVD 5 5 1 A B
K8WW 19,170 158 90 B **ABCD9E**

Virginia

K4ZOO 54,522 326 117 A AB**CDE**
AD4DG 17,082 169 73 A ABD**9E**
KB4OLM 16,698 197 69 A ABCD
N4MM 14,136 248 57 A **AB**
K4FTO 10,260 130 60 A ABCD
AD4TJ 7,728 124 48 A ABD
K4FJW 5,513 117 37 A ABCD
NC4S 2,240 64 35 A AB
WM3T 1,770 59 30 A AB
K4MTS 464 29 16 A AB
K4ME 351 27 13 A B
W4RX 297,937 683 251 B **ABCD9EFGHIJ**
W4MYA 32,088 317 84 B ABD
KC4AUF 28,980 229 90 B ABCDE
KN4SM 27,249 235 93 B ABD
WF4R 10,126 134 61 B ABD
K4WYS 3,393 72 39 B ABD
KE4VCS 1,484 53 28 Q AB
W4SW 1,305 34 15 Q BCFGHIJ
N4EVK 200 25 8 Q A
W4IY (+W4NF, W4AD, W4RM, W7IY, WA0DYJ, W4DAV, W4CE, KA4CKI, K8MLM, N1TXI, N2PJ)
528,640 1579 256 L ABCD
WB4WW (+K4WWA)
8,978 115 67 L ABD
W8MOP (N8RIG,N8GK,KF4YGL,K8WBS,KG4MCC, WW8D,N8JO,W4OF,ops)
2,926 62 38 L ABD
KZ5RO (+KG4MPO,N4YCX,KB4GET)
1,170 45 26 L AB

West Central Florida

K9HUY 3,540 59 59 A **ABD**

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Arkansas

W5MRB 4,257 76 43 B **ABDE**

Louisiana

K5ER 448 27 14 A **ABD**

Mississippi

KJ5RC 682 31 22 A **AB**
KD4NOQ 4 2 2 Q B

New Mexico

NK5W 1,105 53 17 A **ABD**
N5XZM 2,525 68 25 B **ABCD9EI**
KB5ZSK 440 27 10 B ABCDE

North Texas

K5LOW 5,412 90 44 A ABC**DE**
WA5VKS 5,358 104 38 A A**BCDE**
KM5OL 4,026 91 33 A **BCD**
AD5AC 1,672 53 22 A BCD

Oklahoma

WO7GI 2,697 73 29 A **ABCD**
WH6LR 1,298 55 22 A A**BD**
KM5NU 360 30 12 A AB
KD5OMJ 208 23 8 A ABD
NL7CO 56 10 4 A ABCD
NE0P (+ net) 966 42 21 L ABD

South Texas

W3XO 11,946 124 66 A **ABCD9EF**
N5BA 3,404 71 37 A ABCD
N5XU (W5JLP, KB5LBN, KM5TY, WM5R, ops)
7,470 130 45 L ABCD

West Texas

AE5B 1,056 43 24 A **ABD**
NN5DX 12 4 3 A A

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East Bay

KE6QR 1,395 76 15 A **ABD**
K6HEW 918 29 18 A AB**CDE**
KD6WAB 114 18 6 A BD

Los Angeles

AC6TA 9,324 205 36 A **ABD**
KD6RUH 7,440 168 31 A AB**CDE**
KE6AXJ 1,540 70 14 A ABCD
KE6UMW 1,296 32 36 A ABD
KG6DHQ 1,065 59 15 A ABD
K0DI 1,008 42 21 A ABD
W3SE 738 32 18 A ABD
KF6EOJ 248 21 8 A ABD
K6HLH 3,724 74 38 B **BDEF**
K6NT 504 30 12 B A**BCD**
KQ6EE 896 42 14 Q ABCDE
KF6YYV (+K6OUE)
10,261 256 31 L ABCD
W6TOI (KB6WKT, KE6HPZ, N6RV, ops)
111,840 606 120 M ABCD9EFI

Orange

N7EME 7,332 122 47 A A**B**D
KE6GFF 5,434 143 19 A **D**
KE6GFI 693 43 11 A ABD
K6TSK 35,574 306 77 B **ABCDE**

Santa Barbara

N6ZE 4,160 94 32 A ABC**DE**
KC6NBI 2,170 70 31 A **AB**
W9EC 2,108 48 31 A ABCDE
KE6RCI 1,530 81 15 A **BD**
W2ODH (+N6RMJ, WA6HXD, K6KWQ, KR6DR)
225,720 960 171 L ABCD
K6WLC (+K0BGL,AB6CF)
11,682 132 59 M ABCD9EF

Santa Clara Valley

NR6CA 8,785 178 35 A **ABCDE**
W6GYD 7,638 129 38 A AB**CDE**
W6IT 4,758 85 39 A ABCD
KF6MXK 1,926 86 18 A ABD
KF6IHL 500 39 10 A ABCD
WA6AZP 208 26 8 A AB
K6MI 37,665 242 93 Q ABCD9EF

San Diego

KF6JBB 5,811 115 39 B **ABCD**

San Francisco

K6PZB 1,020 51 20 A **AB**

San Joaquin Valley

N6MU (@N6NB)
34,370 403 70 A **ABD**
K6YK 4,368 73 39 B **ABCD**
KG6GMT 144 13 8 Q ABD

Sacramento Valley

KC6TEU 28,652 268 76 A **ABCDE**
KC6ZWT 19,380 219 60 A AB**CD**
KC6SEH 7,396 127 43 A ABCD
K6ME 1,071 51 17 A ABD
W6KBX 23,030 218 70 B **ABCDE**
W6IZU 13,000 182 50 B A**BCD**
KF6GFG (KB6OLL,N6SPE,KC6UDS,KC6YFG,ops)
4,992 91 39 L ABCD

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Arizona

KE7FC 5,750 85 50 A **ABCDE**
K6IAH 1,104 34 24 A AB**C**
KE7NR 3,840 73 40 B **ABCDE**
NA7D 98 14 7 B AB
N7IR 1,562 60 22 Q ABCD
WA9TKK 220 14 11 Q ABCDE

Eastern Washington

W7GHZ 22,040 167 76 A **ABCD9EF**
N7AU 11,098 131 62 B **ABCDE**

Idaho

W7USB 1,625 52 25 A **ABD**
KK7AT 616 41 11 A ABD
W7MEM 2,139 53 31 B **ABD**

Oregon

KI6FF 9,360 168 45 A A**BD**
N7DB 6,384 142 38 A A**BCD**
K7HSJ 2,300 60 25 A AB**CD9EF**
W7QH 308 28 11 B **AB**
K7JMH (+KD7NBI, W7GRN)
6,960 160 40 L ABD

Utah

NJ7A 1,190 60 14 A **ABCDE**
KC7PVD 104 10 8 A ABD

Western Washington

N7NGO 2,875 104 23 A **ABD**
WA1IED 440 36 11 A AB**C**
N7EPD 30,646 250 77 B **ABCD9EF**
KE7SW 9,100 120 50 B ABCD9EF
KI7EL (+KB7PSG)
189 26 7 L ABC

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Michigan

KB8U 75,168 312 162 A **ABCD9EF**
KF8QL 18,252 166 78 A ABCD9E
N8JFH 510 30 17 A AB
W8RU 68 13 4 A ABD
K8MD 61,180 311 133 B **ABCD9E**
K2YAZ 35,164 195 118 B ABCD9E**F**
NE8I 969 31 19 B ABCD9E**F**
K8CC (+K9TM, WX3M)
50,000 306 125 L ABCD
W8DF (W8WDX,AB8IN,KC8JLI,KC8PRL,AA8KS, KC8MUC,WB8LJC,N8UFK,K8LSH,ops)
3,034 82 37 L AB

Ohio

K8MR 48,688 266 136 A **ABCD**
WA8RJF 48,387 242 127 A ABCD**9EF**
KC8CCD 17,280 145 80 A ABCDE**F**
KB8JVH 6,156 91 57 A ABD
K8AB 4,995 87 45 A ABD
N8BJQ 2,800 70 40 A AB
KB8UUZ 1,000 50 20 A A
W8IDM 608 26 19 A ABD
N8LGP 480 32 15 A B
KU8E 440 22 20 A AB
KC8OHQ 372 31 12 A AB
W8KNO 170 17 10 A A
KC8CFI 35 5 5 A BD
K8TQK 153,216 440 224 B **ABCD9EF**
N8XA 12,922 117 71 Q ABCD9EI
N8ZM (+KB8ZR, KC8MWY, KD8FO, W8PLZ)
59,704 357 136 L ABCD
N8KOL (+ KI8L, K8ROX)
136,315 515 199 M ABCDEF

West Virginia

K8KFJ 1,394 41 34 A **AB**
KC8KSK 1,008 36 28 A AB
WR0N 525 35 15 A **B**
K2UOP 32,010 199 97 B **ABCD9EFHI**
K8GP (K8ISK, K6LEW, W4XP, N4UK, W3ZZ, K3SX, K3MM, KE2N, KA1TB, K1HTV, K1RA, ops)
2,703,200 3094 545 M ABCD9EFGHIJKP

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Illinois

K2DRH 101,088 420 162 A **ABCD9E**
N9TF 27,156 246 73 A ABCDE
K9YR 20,276 194 74 A ABCD
NV8V 12,190 191 53 A ABD
WO9LF 4,148 100 34 A ABD
KG9IL 3,844 106 31 A ABCD
N9RK 2,760 76 30 A ABD
KC9IL 2,125 72 25 A ABD
N9OBB 1,128 44 24 A ABD
W9SZ 154 14 11 A B
W9LYA 91 10 7 A ABD
N2BJ 158,776 495 223 B **ABCD9EF**
WB9SNR 23,408 186 77 B BCD9E
AA9D 3,978 102 39 B AB
N9OU 372 24 12 Q BCD
KG9PF (+K9IJ, KB9WUU)
17,220 211 60 L ABCD

Indiana

WA1MKE 13,320 130 74 A AB**CD9EIJ**
KB9NKM 5,428 118 46 A **B**
K9MQ 2,944 88 32 A A**BD**
K9RU 1,860 51 30 A ABCD
K9EA 52,360 292 136 B **ABCD**
W9ICE (WB9YCZ,WB8ERB,N8NQG,N9QQY, N8JLZ,K9YDO,K9ZX,KA9BFM,KB9NWP,ops)
56,816 337 134 L ABCD
KG9BV (+KB9VZJ)
13,376 146 76 L ABD

Wisconsin

N9LLT 11,966 143 62 A AB**CD**
KB9PJL 9,744 171 48 A **ABD**
N9REP 6,327 126 37 A ABCD**E**
N9FH 5,670 102 42 A ABCD
WA1UJU 3,672 108 34 A AB
K9DQ 2,800 83 28 A BCD
K9VS 2,210 85 26 A AB
N9NDP 2,175 85 25 A ABC
KB9TLV 1,976 76 26 A AB
W9JOT 1,764 50 28 A ABD
KB9Q 1,584 47 24 A ABCD
W9GM 1,125 45 25 A AB
KB9VUG 555 37 15 A AB
W9KHH 364 22 13 A ABD
W9PHJ 363 33 11 A B
W9GA 41,004 282 102 B **ABCD9E**
N9DG 5,632 113 44 B ABCD
WA9LZM 4,935 86 47 B ABD
ND9Z 4,173 75 39 B ABCDE
N9MYK 5,680 105 40 Q ABCDE

0

Colorado

W6OAL 10,314 125 54 B **ABCD9EFGHI**
W0KVA (+W0KU,N0WBW)
3,300 84 30 M ABCDE
KB0HH (+K0UO)
1,768 47 26 M ABCDE

Iowa

N0URW 4,232 90 46 A **ABD**
AB0HF 544 34 16 A AB
N0TCT 160 20 8 A AB
N0TCX 78 13 6 A AB
KM0T 131,144 351 194 B A**BCD9EFG**
K0MQS 7,980 140 57 B **B**

Kansas

N0LL 15,792 141 84 A **ABCDE**
N0KQY 13,160 136 70 B **ABCDE**
W0EKZ 3,542 59 46 B ABCDE
W0RT 500 22 20 B BD
KA0MR (+KA0KCI)
16,640 148 80 M ABCD9E

Minnesota

K0MHC 50,228 251 116 A A**BCD9EFG**
WA2HFI 15,732 173 57 A ABCD9E
K0SHF 13,376 203 44 A ABCD9EF**I**
KB0ZEV 11,925 198 45 A ABCD
K0CJ 7,995 131 41 A ABDE
W0OHU 5,130 86 38 A ABDE
WB0LJC 3,234 93 21 A ABCD9EF**I**
KB0LYL 2,910 194 15 A **B**
KC0HTB 2,530 75 23 A ABCDE
K0KFC 2,068 77 22 A ABD
W0PHD 630 23 18 A ABDE
KB0DCO 429 30 11 A ABD
KB0N 387 35 9 A ABCD
KC0HEW 270 27 10 A AB
NF0G 216 24 8 A ABD
WA2MNO 168 21 7 A ABD
N0QHP 90 12 6 A ABD
N0NAS 84 16 4 A ABD
KB0OBT 4 2 2 A AB
K0SQ 13,110 161 57 B **ABDE**
W0GHZ 9,702 105 49 B AB**CD9EFG**
K0AWU 1,420 54 20 B ABDE
N0UK 1,245 48 15 B BC9E
WA2VOI 385 23 11 B ABCD
KF0Q 16,240 135 70 Q ABCD9EFG
KF0GX 560 29 14 Q BD
W0JH (+WB0VHF, N0MR, W0SEI, WA0RKE)
4,096 103 32 L ABD
W0ZQ (+W9FZ, WA2PHW, WB0GGM, N0HJZ, KC0FXY)
149,625 547 175 M ABCD9EFIP

North Dakota

NT0V 780 25 20 B **ABCDE**

South Dakota

WB0HHM 4,366 86 37 A **ABCD**
WB0ULX 3,344 60 38 A ABC**D**
WA0TDK 1,224 41 24 A ABD

Quebec

VE2ZP 11,760 133 70 A **ABCD**
VE2SMG 3,135 60 33 A **BCDE**
VE2UG 1,250 38 25 A ABD
VA2OOI 10,270 116 65 B **ABCD**
VE2JWH 5,220 75 45 B ABCD**9E**
VA2TU 12 4 3 B B

Ontario

VE3KZ 24,682 243 86 A **ABD**
VE3TMG 15,840 191 66 A **ABD**
VE3AJY 15,330 165 70 A AB**DE**
VE3SXE 11,960 153 65 A ABCD
VE3FHU 10,758 122 66 A ABC**DE**
VE3CVG 5,566 88 46 A ABCDE
VE3AX 213,010 601 238 B **ABCDE**
VE3BFM 7,581 80 57 B ABCD9E
VA3OR 299 23 13 B A
VE3CG (+VE3EGQ,VA3MD,VE3TD,ops)
2,142 57 34 L ABD

British Columbia

VA7DX 3,240 105 27 A **ABD**
VE7IHS 1,408 60 22 A ABD
VE7NUT (VE7BEE,VE7RJ,VA7GER,VE7DXS,ops)
2,016 66 28 L ABD

Fed. Rep. of Germany

DL5MAE 1 1 1 B B

Rovers

Atlantic

ND3F (+N3SLN)
294,063 716 201 R ABCD9EFGHIJL
N2JMH (+N2WVK)
134,758 572 142 R ABCD9EFGL
K1DS 109,480 529 115 R ABCD9EFG
N2GKM (+KC2EBH)
23,485 210 64 R ABCD9EF
N1MU 14,336 122 64 R ABCD9EFGH
W3HMS 1,863 45 23 R BGHI

Central

N8KWX (+NA9D)
10,360 182 40 R ABCD9
N9RLA 4,332 114 38 R AB
KB9IVB 2,324 63 28 R ABDIJ
WB8BZK 1,376 67 16 R ABD
N9UUR (+N9VSV)
1,302 62 21 R AB
NE9O 966 34 23 R ABCD

Dakota

K0PG 30,294 276 81 R ABCDE
K9ILT 29,467 271 79 R ABCDE
KB0THN/R 6,204 119 33 R ABDEG
W0AMT 4,088 114 28 R ABD
KG0DX (+KC0JVI)
705 28 15 R ABDEF
KC0P 560 41 10 R ABD
AC0W 160 11 10 R BD

Delta

WA4JA 3,675 103 35 R ABD

Great Lakes

NE8I/R 816 32 16 R ABDF

Hudson

WA2IID (+KB2SSS)
34,342 245 77 R ABCD9EFGHIJ
K2OEQ 60 10 5 R BD

Midwest

N0DQS 71,131 452 83 R ABCD9EFG
N0LNO (+K0DAS)
9,515 129 55 R ABCD9E
N0JK 429 20 13 R ABDE

New England

AL1VE 57,036 423 97 R ABCD9
KB1EFZ (+KB1EAU)
33,215 356 73 R ABDE
KJ1K (+WB2VVQ)
16,801 155 53 R ABCD9EFGH
N1JEZ 12,272 103 59 R ABCD9EFI

Northwestern

N7CFO 69,842 420 85 R ABCD9EF
W7DHC (+logger)
44,398 353 79 R ABCD9EF
KA0TP 4,896 129 32 R ABD
N4SL (+WB7FJG)
2,618 69 34 R ABD
KA6T 36 6 6 R AB

Pacific

K7XC (+NS9E)
17,424 278 44 R ABCD
WB9NJS 6,549 122 37 R ABCD
N3VM (NI6G,N1VM,ops)
874 28 19 R BD9F
KE6FI 630 45 14 R B

Roanoke

W3IY 188,895 654 147 R ABCD9EFGHIJ
W4/ON1CFX
15,861 250 51 R BD
K8DXN 4,320 76 45 R ABD

Southeastern

AB4WL 1,254 48 22 R ABD
K4GSX (+KF4KND)
99 11 9 R AB

Southwestern

N6TEB (+N6DN)
103,872 613 96 R ABCD9EF
AD6HT (+AJ6CW)
25,652 274 53 R ABCD9EF
KC6UIX 16,568 157 76 R ABCD
K6LMN 6,665 162 31 R ABCDE
AD6AF (+KC6WWR)
1,904 78 16 R ABD

West Gulf

KI5DR 4,879 98 41 R ABD
KD5EJO 2,322 86 27 R AB

Canada

VE3OIL (+VE3NPB)
60,455 382 107 R ABCD9EF

Checklogs: KA2MCU, KR5V, NH6CJ

By Dan Henderson, N1ND
Contest Branch Manager

2001 ARRL 10 GHz and Up Cumulative Contest Results

Recently, I had a great conversation with a long-time friend who has spent hundreds of thousands of hours chasing DX. He prides himself (rightfully so) as a great HF operator, as well as someone who has spent many hours reading, learning and experimenting in our hobby. We have shared many stories—and a few tall tales—over the years, as well as spent quite a few nights huddled around the HF rig. He has forgotten more about radio than many of us ever knew—and has been more than ready to share his passion for the hobby with anyone. It doesn't matter if you are an old-timer, who used to wrap your own coils and can remember the glow that a well-used pair of finals can produce, or a youngster whose only exposure to radio has been to push a button and let the ICs do the rest. My old friend is a treasure to the hobby.

During the conversation, he asked about what I had learned since taking my current job at ARRL Headquarters. After sharing a few stories, I mentioned that one thing I have learned is how much I don't know about certain parts of the hobby. He agreed there were lots of things still to learn, and he asked, if I had to pick one thing I wish I knew more about, what would it be. Pretty much without hesitation, I stated that I wish I knew as much about the microwave world as I knew about other aspects of Amateur Radio. His response really didn't surprise me. He nodded his head and agreed that was one part of the hobby he wished he had experimented with.

The fact that one of the people whose knowledge I most respect in the hobby admits he knows so little about microwave operating makes me all the more impressed by those who leap into the fray on the microwave bands in the annual ARRL 10 GHz and Up Cumulative Contest. This annual experimenter's delight was held the weekends of August 18-19 and September 8-9 during 2001. The contest's unique scoring format—combining both points for each QSO as well as distance points for each km between the stations—makes it one of the most challenging events on the ARRL contest schedule.

Steve, KB8VAO, and Tony, WA8RJF, display some of the apparatus from their operating site at grid EN92xa.

Like the HF contests, higher power levels help compensate for broader radiation patterns on antenna systems, the relative low power of microwave signals means that an important key to success is a properly tuned and aligned antenna system. It is not uncommon for HF stations to work others off the back or side of their beam. At the microwave levels, stronger signals have a greater propensity to be reflected off objects. Of course where 100 or 1000 W may do the job on HF, microwave stations regularly operate in the 100-mW to 3-W range.

After the QSOs were completed and the scores calculated, John, WD4MUO, emerged with the top score in the 10 GHz only category. His 416 QSOs were the most recorded in the category and accounted for 24,393 kilometers and a final score of 65,993. Finishing in second place was Richard, WA6CDR, whose 206

Top 10

10 GHz Only

WD4MUO/0	65,993
WA6CDR	38,783
N0IVN	35,945
N0KE	28,624
W6YLZ	28,098
AF1T	25,746
W6QI	25,253
W1GHZ	24,317
KK6MK	22,826
K0OXU	20,460

10 GHz and Up

K0RZ	73,195
N0UGY	52,216
AD6FP	39,586
AA6IW	27,294
WA6CGR	26,478
WB1FKF	18,419
W6BY	17,276
KA1OJ	14,775
W6OYJ	13,416
WA6QYR	12,297

QSO Leaders

10 GHz Only

WD4MUO/0	416
N0IVN	206
N0KE	155
AF1T	144
WA6CDR	135
K0OXU	133
W1GHZ	127
KK6MK	121
W5VSI	118
N6CA	115

10 GHz and Up

K0RZ	507
N0UGY	360
AD6FP	155
WA6CGR	131
WB1FKF	116
AA6IW	110
KA1OJ	102
WB0LJC	102
W6BY	83
WA6QYR	70

Different Calls Worked

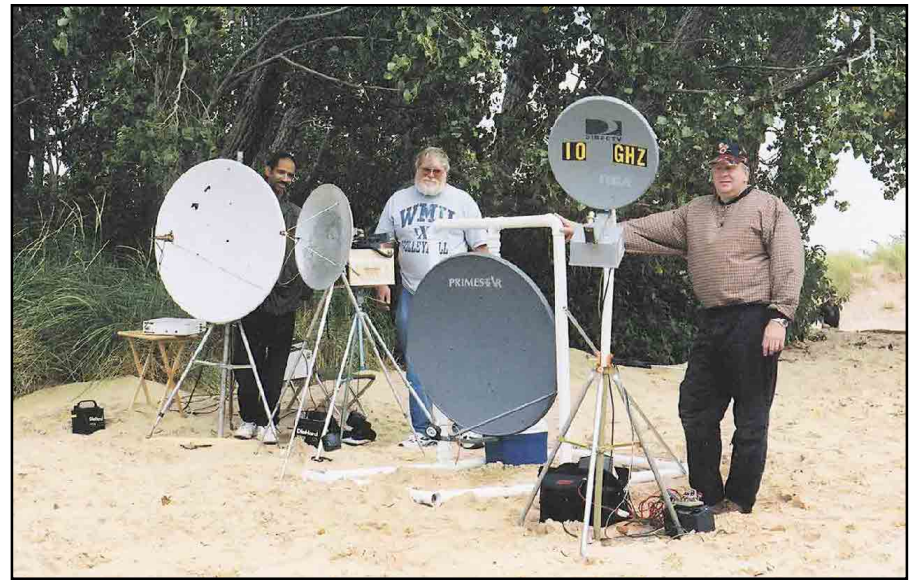
10 GHz Only

W6YLZ	46
W1GHZ	45
WA6CDR	45
W6QI	42
AF1T	42
W1AIM	40
N6CA	38
WB6CWN	37
KE6HPZ	36
N1JEZ	34

10 GHz and Up

AA6IW	48
AD6FP	44
WA6CGR	43
WB6DNX	39
WB1FKF	39
KA1OJ	35
W6OYJ	35
WA6QYR	33
W1RIL	31
WA1MBA	31

10 GHz comes to the Anchorage, Alaska Hamfest as Tom, AL0V, Gordon, WB6NOA, and Ed, AL7EB, check out part of the equipment to be used.



Bob, WA8VPD, Mark, WA8TGY, and Neil, WB9SPT, met up at Shauger Hill at grid EN64xu, about 400 feet above Lake Michigan.

QSOs carried a total of 18,163 km. Michael, W6LYZ, worked the most unique call signs in the category with a total of 46.

In the 10 GHz and Up category, Bill, K0RZ, led the way with a final score of 73,195 points. His category leading 507 QSOs accounted for a total of 22,495 kilometers. Don, N0UGY, took second place with both a score of 52,216 and a QSO total of 360. His distance points totaled 16,216 km. Lars, AA6IW, completed QSOs with the most different calls (48).

A record number of logs were received for the 2001 ARRL 10 GHz and Up Cumulative contest, with logs being received from 120 different stations. This is an increase of over 30% from participation in last year's event and a trend that we hope holds up in this challenging event. The 2002 competition will be held the weekends of August 17-18 and September 21-22. It takes a lot of planning, experimentation and enthusiasm to broaden your skills. To help you in your preparation, visit the Web site set up by the ARRL Technical Information Service to help both newcomers and old timers learn more about the challenges and adventures of microwave operation. You will find that **www.arrl.org/tis/info/microwave.html** is an excellent resource. Good luck if you decide to accept the challenge of exploring this fascinating area of Amateur Radio operation.

Scores

Scores are listed by call areas. Within each call area, scores are listed in descending order. Score lines indicate call sign, score, QSOs, number of different call signs worked, and best DX in kilometers. I = 10 GHz, J = 24 GHz

10 GHz Only

1

AF1T	25,746	144	42	401-I
W1GHZ	24,317	127	45	419-I
W1AIM	19,607	101	40	364-I
K1LPS	16,279	75	32	377-I
K1TEO	15,397	44	29	366-I
WA1ECF	14,501	61	32	363-I
N1JEZ	13,081	61	34	377-I
N1HL	12,350	72	33	290-I
K1MAP	12,346	92	33	250-I
N2MSS	12,326	71	33	290-I
W1VT	11,975	47	32	651-I
NS1O	8,736	40	23	401-I
K2CBA/1	8,688	45	25	270-I
N1EKV	6,679	36	25	238-I
KT1J	6,553	33	22	256-I
KB1DXD	6,268	38	23	238-I
WA2IID	4,842	18	15	271-I
K1TR	2,300	13	11	171-I
K1NCO	482	3	3	119-I

2

K2DH	6,660	48	14	479-I
AA2WV	3,363	33	12	407-I
N2JMH	3,006	30	11	217-I
W2DYY	2,796	24	11	408-I
WO2P	2,371	13	10	408-I
KB2VGH	136	1	1	36-I

3

W3RJW	4,678	14	12	407-I
W3KJ	2,063	9	7	371-I

4

WA4DFS	1,560	7	3	204-I
W4DEX	1,413	9	4	373-I
KG4DGF	909	11	3	91-I
AB4YK	906	11	3	100-I

5

WA5TKU (+N5MWS)	1,512	15	8	354-I
N5PYK	610	11	4	50-I
WA5YWC	304	4	2	40-I

6

WA6CDR	38,783	135	45	801-I
W6YLZ	28,098	109	46	551-I
W6QI	25,253	99	42	551-I
KK6MK	22,826	121	23	439-I
N6CA	19,489	115	38	458-I
WB6CWN	19,236	87	37	772-I
KE6HPZ	17,769	97	36	549-I
KC6UQH	13,655	65	31	515-I
AD6A	10,908	57	23	439-I
K7RO	9,989	54	17	359-I
WA6JBD	9,969	42	17	468-I
KJ6HZ	9,096	59	24	332-I
WB6DTA	7,940	49	31	248-I
W6QIW	7,639	28	23	344-I
KC6QHP	7,532	29	17	332-I
K6JMA	6,797	44	28	239-I
N6LL	6,349	37	26	271-I
N6EQ	6,072	39	27	485-I
WA6EXV	6,039	12	9	489-I
W6ASL (+N6BBQ)	5,303	36	18	439-I
AA6HA	4,915	17	8	351-I
K6JEY	4,615	26	20	527-I
W6SYA	4,131	22	19	208-I
WA6KBL	3,854	19	12	425-I
K6JRR	3,834	17	8	410-I
KG6HTT	3,144	18	11	439-I
K6RRA	2,070	10	10	166-I
K6HLH	1,580	9	9	102-I

8

K2YAZ	1,646	17	5	294-I
KB8VAO (+WA8RJF)	1,015	4	2	216-I
WA8VPD	605	7	3	135-I

9

K0GCJ/9	3,079	49	10	142-I
WB9SPT	2,501	15	4	294-I
N8KWX	546	6	3	81-I
AA9IL	444	5	3	44-I

0

WD4MUO/0	65,993	416	15	259-I
N0IVN	35,945	206	14	250-I
N0KE	28,624	155	13	260-I
K0OXU	20,460	133	15	213-I
W5VSI	16,213	118	7	247-I
KB0LP	10,734	70	4	247-I
K0SHF	5,367	100	15	79-I
W0AUS	5,204	87	17	142-I
WA2VOI	5,021	89	13	105-I
N0NAS	3,775	73	9	64-I
N0UK	3,198	57	10	64-I
KC0P	1,612	14	6	142-I
KB0ZEV	807	9	7	38-I
KB0TZA	559	8	4	53-I
W0LCP	498	3	3	7-I

VE

VE3FHM	2,943	15	9	239-I

10 GHz and Up

1

WB1FKF	18,419	116	39	290-I	102-J
KA1OJ	14,775	102	35	269-I	102-J
W1RIL	8,747	48	31	336-I	99-J
WA1MBA	8,681	52	31	304-I	41-J

2

K2AXX	5,674	46	16	485-I	1-J

4

K4EFD	8,096	46	14	651-I	100-J
W4SW	5,225	53	9	222-I	100-J

5

W5LUA	4,484	32	14	617-I	1-J
WW2R/5	4,097	26	6	245-I	110-J

6

AD6FP	39,586	155	44	801-I	232-J
AA6IW	27,294	110	48	544-I	144-J
WA6CGR	26,478	131	43	492-I	68-J
W6BY	17,276	83	22	492-I	232-J
W6OYJ	13,416	66	35	523-I	9-J
WA6QYR	12,297	70	33	584-I	170-J
WB6DNX	10,263	62	39	488-I	170-J
K6GZA	10,236	33	21	551-I	144-J
K6VLM	6,035	41	30	141-I	37-J
NE6O	3,257	13	11	250-I	9-J

8

NE8I	1,658	22	13	138-I	46-J
WB8TGY	1,395	23	7	146-I	7-J

0

K0RZ	73,195	507	22	249-I	246-J
N0UGY	52,216	360	20	246-I	246-J
W6HCC/0	9,598	64	14	246-I	246-J
WB0LJC	5,350	102	17	79-I	39-J
N0IO	2,628	32	12	71-I	64-J
KC0LEF	2,282	28	10	64-I	64-J
KC0LEG	1,265	16	6	64-I	64-J
KE6LHL	1,265	16	6	64-I	64-J
K5RHR/0	1,257	17	6	68-I	68-J
KC0LEE	1,249	15	6	68-I	68-J
K0KFC	758	11	6	38-I	38-J

VE

VE3SMA	3,950	24	15	239-I	6-J
VE3OLK	2,515	14	12	287-I	5-J
VE3EZP	841	7	6	80-I	6-J

Checklogs: AL7EB, WB6NOA

QST

STRAYS

NEW ARRL W6 INCOMING QSL BUREAU ADDRESS AND MANAGER

◊ Effective December 1, 2001 the ARRL W6 Incoming QSL Bureau has changed its address and Manager. The new managers are Arlette (KO6IS) and Chuck (KD6WP) Marshall, ARRL 6th District Incoming QSL Bureau, PO Box 530, Weed, CA, 96094-0530.

78 YEARS AND COUNTING

◊ It was just after midnight on November 7, 1923, when Bob, U8CWR (now W9NN), in Dayton, Ohio, and Al, 9BBI (now K4FW), in South Bend, Indiana, had their first QSO. Exactly 78 years later, on November 17, 2001, they had another one. The recent QSO was no accident, however—they've been friends all these years. "78 years of QSOs with two 95-year-old pals!" Bob wrote on the QSL card he sent to Al.

Previous Strays

SECTION NEWS

The ARRL Field Organization Forum

ATLANTIC DIVISION

DELAWARE: SM, Randall Carlson, WBØJJX—As you read this, the hamfest season in the Atlantic Division will be starting to get underway. There are very few weekends during the spring and summer where there is not a hamfest or two in the Atlantic Division. It's important that we show support for these efforts. Hamfests not only provide much-needed revenue for the clubs putting them on, but they are good opportunities for hams to get together and see old friends and to make new ones. The Delaware convention is tentatively scheduled for April 28, 2002 at the Nur Temple. Watch the hamfest schedules for confirmation. I certainly hope to see you all there. Delaware traffic nets meet as follows. DTN meets nightly Monday thru Friday at 18:30 local time. The Delaware Emergency Phone Net meets on Saturday at 18:00 local time. Stop in and say hello. Traffic (Dec) DTN QNI 157 QTC 21 in 21 sess. DEPN QNI 38 QTC 0 in 5 sess. K3JL 41. PSHR: K3JL 140. 73 Randall.

EASTERN PENNSYLVANIA: SM, Eric D. Olena, WB3FPL – SEC: Michael O. Miguelez, N3IRN. ACC: Steve Maslin, N3ORH. BM: Fredric Serota, K3BHX. OOC: Alan Maslin, N3EA. PIC: Robert Josuweit, WA3PZO. STM: Paul Craig, N3YSI. SGL: Allen Breiner, W3ZRQ. TC: Lawrence Thomas, AA3PX. ASMs: Robert Josuweit, WA3PZO, Pietro DeVolpi, K3PD. George Law, N3KYZ, L. James Dibble, W3DCL. Vincent Banville, WB2YGA. DXCC Card Checker E. Pa.: Glenn Kurzenknabe, K3SWZ. It seems redundant, at times, to mention the Traffic Handlers. However, the tremendous good that they do is at the top. Recently, K2BCL was faced with delivering a piece of traffic to a non-Ham. Unfortunately, this person responded with an attitude that gave Gail second thoughts on handling traffic. After catching his breath and having time to reflect on all of the great responses he had received in the past, Gail returned to his untiring task of handling traffic. Knowing Gail, K2BCL, I am proud to say that he is simply the greatest and he makes the E. Pa. Section outstanding. With my HF rig at the repair shop for quite sometime I feel as though I am missing out on half of the Section activities because the Traffic Handlers do so much. With my rig on the shelf also missing are the weekly contacts with the Emergency Communications nets needless to say being a Ham without an HF rig make one feel like your missing most of life. Speaking of Emergency Communications, from the Marple-Newtown ARC's newsletter, "The Dipole," comes information that development of the ARES/RACES station at the Delaware County 9-1-1 Center is progressing very nicely thanks to efforts by Dan Amoroso, W3DI, Dennis Silage, K3DS, Walt Faust, N3FXR and Bob Fritz, N3ZSF. Congratulations, to this group for an outstanding job. I will be attending an Emergency Communications meeting on March 6th at the Lycoming County EOC. The Lycoming County group, headed by Jon Rymell, N3PFF, and Ken Krah, N3NUV, is doing an outstanding job in the Northwestern part of the Section. The folks in Lycoming County have become a leader in demonstrating that Amateur Radio is a vital part of Emergency Preparedness. I am most pleased to see a great increase in the number of persons who are seeing the value Emergency Communications Course sponsored by ARRL. Congratulations to Phil Wheeler, N3XGT, taking over as EC in Berks County. Phil has a back round in public and emergency service and should do an excellent job as EC. Tfc: My original statement here was that I had received word from STM, N3YSI's XYL that Paul was sick and could not do the monthly report. A very few short hours later, a member of the RF Hill ARC called to advise that Paul is now a Silent Key. Words fail me. Paul Craig, N3YSI, was and always will be at the top of everyone's outstanding person list.

MARYLAND/DC: SM, Tom Abernethy, W3TOM, 301-292-6263 (w3tom@arrl.org)—ASM/RACES Al Nollmeyer, W3YVQ (w3yvq@arrl.net). BM: Al Brown, KZ3AB, 301-490-3188 (kz3ab@arrl.net). SEC: Mike Carr, WA1QAA (bamcc@erols.com) 410-799-0403. STM: Bruce Fleming, N3EGF, 301-863-6582 (megaswoop@aol.com). Check out the MDC Section Web Homepage: http://www.qsl.net/w3tom/ . Congratulations to J. Frank Winner, N3SEO, appointed as the EC for ANAR. CALV EC N3QHC reports 24 members & 4 sessions of CALV ARES net with discussions focussing on Winter Weather Preparedness, CALV ARES Call Out Tree, CALV RACES Issues, & Open Discussion Night. CARR RO & Acting EC WX3F reports 31 members and 2 sessions of the CARET net. CHAR EC KA3GRW reports 29 members, 3 sessions of CHAR Emergency Services Net. NTS "Basic Traffic Handling 101" class training with WA1QAA for Amateurs in CALV & CHAR attendance included ARES/RACES members: KR3A, N3VUA, KB3HHB, AA3WS, N3YWZ, KB3GHI, & KA3GRW. FRED EC N8AAY reports 26 members & 4 sessions of FRED ARES Net. Congratulations to N8AAY for completing Level III of the ARRL CCEP! HOWA EC K3EF reports 22 members & 2 sessions of HOWA ARES/RACES Net. KENT EC WA6LHQ reports 3 sessions of KARS Net on 147.375 MHz. PRGE EC WI3N reports 55 members, an increase of eight, 2 sessions of PRGE ARES Net, 1 drill, & 1 meeting. WI3N was invited to speak about ARES/RACES at a conference on Bio-Terrorism given for senior officials of 28 PRGE Municipalities. 73, Tom. With the nets - Net/NM/QND/QTC/QNI: MSN/KC3Y/31/51/382, MEPN/N3WKE/31/76/446, MDD/WJ3K/56/156/559, MDD Top Brass K3JL 168, AA3GV 124, W3YVQ 117, BTN/AA3LN/31/76/300, Nov BTN/AA3LN/30/51/298, MEPN/N3WKE/32/68/485. Tfc: KK3F 2500, W3YVQ 177, AA3SB 105, AA3GV 98, N3DE 66, N3KGM 56, K3CSX 51, WA1QAA 45, N3WK 39, KC3Y 37, N3WKE 29, W3CB 28, KJ3E 26, N3OR 24, N3ZKP 11, WA3GYW 8, KE3FL 0. Nov: K3CSX 34, AA3SB 72. PSHR: KK3F 174, W3YVQ 151, AA3SB 129, WA1QAA 125, N3WK 118, N3ZKP 115, W3CB 105, AA3GV 105, N3WKE 99, K3CSX 77, KC3Y 75, Nov AA3SB 141, K3CSX 81.

NORTHERN NEW YORK: SM, Thomas A. Dick, KF2GC—http://www.northnet.org/nnyham. E-mail: kf2gc@arrl.org. ASMs: KD2AJ, WZ2T, WB2KLD, N2ZMS, WA2RLW. ACC: WA2JPM. BM: KA2JXI. OOC: N2MX. PIC: N2SZK. SEC: WN2F. STM: N2ZGN. TC: N2JKG. Terrific job on the Winter Carnival Special Event Station ...TLARC and Roland Patnode WA2RP, President. The CVARC's Chuck Orem, KD2AJ, president with their new mobile bus command center is an excellent addition to ARES and Emergency Communications in Clinton Co. The MVARC/NNY net is alive and well on 3.955 LSB every Saturday Morning at 9:00 AM. February's meeting was a celebration for W2TDD, Herb Potter, one of the founding members of the Club/Net. Look forward to hearing check-ins from all across our Section etc. OVARC's Kerry Bickford, President, has a new young ham Michael Burns, KC2IXA, of 8 years on the airwaves. Congratulations from NNY. We look forward to hearing from you in the years to come. Richard Burns, NT2W, is a proud Dad and Elmer ... rightly so. PSARC is back on the air with 10 students working for their licenses & having lots of fun doing it. Check out our Web page www.slcs.org/psarc.

SOUTHERN NEW JERSEY: SM, Jean Priestley KA2YKN (@K2AA)e-mail ka2ykn@voicenet.com—ASM: W2BE K2WB W2OB N2OO N2YAJ N2XYZ. SEC: KC2GID. STM: K2UL. ACC: KB2ADL. SGL: W2CAM. OOC: K2PSC. TC: W2EKB.TS: W2PAU, WB2MNF, AA2BN, KD4HZW, WB3IJB, WA2NBL, N2QNX, N2XFM. Look for Lites Lighthouse QSO Party March 29 thru April 7. Details at http://arlhs.com or contact. Jim at k2jxw@arrl.net. Some traffic nets aren't well attended. Let's not lose nets. Traffic nets seem quiet but they exit for good reasons. Be a part of our traffic system. It's not rocket science. Do you enjoy reading the Section News each month? Let me know. When checking into nets, it's good form to stay for 5 to 10 mins at least. Net control's time is as valuable as is yours. December net QNI rpts: NJM 67 WA2OPY; NJPN 220 W2CC; NJSN 213 K2PB; NJN (E) 205; AG2R NJN (L) QNI 172 AG2R; JSARS 303 K2ATQ; SJTN 70 KB2RTZ; CMCNTS 119 KB2YJD; SJVN 253 WB2UVB. SAR: KB2RTZ 255, K2UL 192, K2UL-4 171, N2VQA 118, WA2YL 108, WA2CUW 91, AA2SV 91, WB2UVB 90, N2WFN 52, WJ2F 28, KA2CQX 23, KB2VYZ 20, KB2YJD 20, N2ZMI 9, W2AZ 8, KA2YKN 8, KB2YMB 2, KB2VSR KC2ETU 1. PSHR: KB2RTZ 391, K2UL 182, WB2UVB 152, AA2SV 123, N2VQA 110, KA2CQX 110, WA2CUW 106, KB2YJD 96, WJ2F 76, KA2YKN 65, N2WFN 54, N2HQL 50.

WESTERN NEW YORK: SM, Scott Bauer, W2LC— I have just finished my second year as Section Manager. My personal and sincere thanks to the following Amateurs for their dedication to Amateur Radio. WNY ARRL Section Leadership Officials: Assistant Section Managers: Don W2AC, Lloyd WB2EFU, Ed K2MP, Ed N2EH, Jim W2BCH, Don N2ZWO, Bill WA2UKX, Fred K2DN, Richard K2EY, Dick K2ZR. Section Traffic Manager Bruce KA2GJV. Section Emergency Coordinator Al N2CCN. Affiliated Club Coordinator Ed N2EH. Public Information Coordinators Vivian WA2PUU and Ed W2GUT. Technical Coordinators Richard K2QR and Bill WB2VUO. Official Observer Coordinator Duane WV2B. Bulletin Manager Dwight K2KWK. State Government Liaison Bob N2KYZ. Next time you see them say hello and ask them how everything is going! The Pioneer Radio Operator's Society set up a station for the Jamboree on the Air at Camp Duffield with Troop 147. The Radio Association of WNY had over 75 guests for their 12th "Youth Night" where they show case Amateur Radio. Terry K2OO and Jim N2SKT had 12 successful graduates of their license class with the SUNY at Buffalo radio club. Great activities for clubs and individuals to participate in. Thanks to all the WNY clubs who send me their bulletins, I read and enjoy all of them. Please welcome new Official Observer Coordinator Duane WV2B, and Bill AA2RM new Emergency Coordinator for Delaware County. How about that 7 feet of snow in Buffalo! Sure brings back memories of my old days walking 5 miles to school during blizzards in East Aurora, just to find the school closed and have to walk home again. Well it seems like 5 miles when you're in elementary school. Net Summaries (Dec 2001): Net Manager (Sessions) QNI QSP. Sessions in ( ) if less than 31. BRVSN N2OYQ 113 7; CNYTN WA2PUU 362 91; ESS WI2G 406 109; NYPHONE N2LTC 292 637; NYPON N2YJZ 422 164; NYS/E WB2QIX 343 190; NYS/L W2YGW 249 197; NYS/M KA2GJV 162 99; NYSCN W2MTA (5) 13 2; NYSPTEN WB3CUF 409 52; OARCN N2KPR (4) 45 5; OCTEN/E KA2ZNZ 1428 416; OCTEN/L KA2ZNZ 617 361; OMEN N2UC (1) 10 0; STAR N2NCB 283 14; TIGARDS W2MTA (5) 33 4; WDN/E N2JRS 499 114; WDN/L W2GUT 447 71; WDN/M KA2IWK (10) 125 14. Traffic (Dec 2001), * for PSHR, # for BPL: N2LTC#* 2848, KA2GJV#* 753, KA2ZNZ#* 623, W2MTA* 457, WB2IJH* 423, NN2H* 337, KB2KOJ* 305, N2KPR* 239, WB2QIX* 184, WI2G* 171, KC2EOT* 141, N2CCN* 139, KG2D* 110, W2LC* 106, KA2DBD* 94, W2PII* 84, KA2IWK* 55, AF2K* 46, KB2CCD 46, W2GUT* 43, WA2GUP* 39, N2JRS* 38, KA2BCE* 26, KB2ETO* 22, N2WDS* 16, K2DN* 15, W2RH 12, KG2HA* 1. Digital, Rx/Tx: KA2GJV 17/2, N2LTC 719/1811.

WESTERN PENNSYLVANIA: SM, John Rodgers, N3MSE—ASM: N3MYZ. SEC: N3SRJ. ASM-ARES: WB3KGT. ASM-Packet: KE3ED. OOC: W3ZPI. PIC: W3CG. STM: N3WAV. TC: WR4W. DEC: N3YEA, DEC-SO: KD3OH. DEC-N1: KB3A DEC-N2: KA3UVC. DEC-S1: KA3HUK. DEC-S2: (vacant) DEC-Rapid Response: N3ZZI. DEC-OES: K3TB. Hamfest season is about to begin in the Western Pennsylvania Section. Washfest 2002 will be held on February 24. On March 3, Foothills ARC will hold their hamfest. Two Rivers ARC will have their hamfest on March 17. More information is available in the hamfest section of *QST* or on the ARRL Web site. Stop by the league table and say hello. Recently a few changes have been made in the ARES structure in Western Pennsylvania. Chris Robson, KB3A, has replaced Mary Householder, N3QCR, as DEC for the North One district. Paul Oliastro, N3ZZI, has replaced Mark Seighman, N3HJY, as the DEC for the rapid response team. Mary and Mark recently resigned because of increased responsibilities in their regular jobs. I want to thank both of them for all their help. In South Two, Jim Metzler, N3BZW, has also resigned because of a new job that requires more of his time. We are currently looking for a replacement for Jim in that region. Thanks, Jim, for all of your help as well. Operators that are interested in becoming designated as Official Emergency Stations should contact Tim Bartlow, K3TB, to apply. Tim is looking to find many stations for this important function. Contact Tim at k3tb@arrl.net. Any club or group that would like to have me speak at a meeting, please feel free to contact me. I am looking for someone interested in becoming the Affiliated Club Coordinator and someone for the Assistant Section Manager for Youth and Education. Please contact me if you are interested in either of these positions. 73 de John Rodgers, N3MSE, WPA-SM n3mse@arrl.org.

CENTRAL DIVISION

ILLINOIS: SM, Bruce Boston, KD9U—SEC: W9QBH. ACC: N9KP. STM: K9CNP. PIC: N9EWA. OOC: KB9FBI. DEC-Central: N9FNP. DEC-S/W: KB9AIL. The Starved Rock RC, at last report, was working to solve a problem with their HF beam. The driven element was loose and they were looking for a climber. Their December newsletter contained an interesting article on QSL'ing. St. Clair ARC reports they now have an e-mail reflector on Yahoo Groups. Contact KB9WZT for the details. The most recent club-sponsored Technician class produced five new operators. The St. Clair group is also working on a backup two-meter repeater. According to the KARC newsletter, the club has purchased a new tuner for use at Field Day and other events. The group discussed the FCC's CORES registration system at the November meeting. The club holds a net each Monday at 9 PM on 146.73 MHz. Their ARES net operates each Thursday at 7 PM. The December meeting of North Shore RC featured a program on the Aurora Borealis and its impact on Amateur Radio. The Schaumburg ARC hopes to schedule a contact with the International Space Station in November. During that time, the space shuttle is scheduled to dock with the station, and will carry an experiment developed by Schaumburg High School students. The Sangamon Valley RC has decided to purchase a set of ARRL books as a gift for the Springfield library. The officers of the Egyptian RC remain the same for 2002. They are: Pres N9OQK, VP KB9OHJ, Sec W9PAT, Trea KB9AIL. ERC plans to hold the next hamfest on June 9. The club is considering a dues increase, which has not changed in 12 years. The club plans to replace the feedline and antenna on their packet repeater. The group also agreed to purchase two-meter equipment for the club van. The January meeting of the ERC featured a program on marine radios. December traffic: WD9F 70, WB9TVD 35, NN9M 50, WB9TVD 35, KA9IMX 33, KD9YV 31, W9HLX 18, W9FIF 13, NC9T 12, N9PLM 9, WA9RUM 7. ISN via WB9TVD QNI 215, QTC 83, Sessions 30. D9RN report for cycle 1 & 2, traffic 200. 91% of Illinois traffic handled by: N9PLM, NN9M, KD9YV, W9HLX and KA9IMX. Ninth region C4 report for Dec: traffic 187, sessions 62, time 360 min, average 3.01, rate .519, percent rep 92% on ILN by K9CNP NS9F WD9F. W9VEY. Memorial Net report de K9AXS 7 with 197 check-ins. W9VEY 2001 net totals were: Traffic 78, check-ins 2,555.

INDIANA: SM, Peggy Coulter, W9JUJ—SEC: K9ZBM. ASEC: WA9ZCE. STM: WA9JWL. OOC: AA9WD. SGL: K9JZZ. PIC: KB9LEI. TC: W9MWY. BM: KA9QWC. ACC: N9RG. Sympathy extended to the families and friends of Silent Keys: Nov.7, Betty L. Taylor, WB9IGY, Greenfield and Dec. 27, Kenneth Robbins, W9QZE, Columbus. They will be missed. There will be an IN QSO Party in May. Info from Web site www.hdxcc.org/inqso. Thanks to the ECs who sent in their monthly report. KG9LX, WD9BKA, N9YNF, WB9NCE, N9MUS, N9ADS, K9GPS, N9IOD, KB9OLZ, N9FEB, N9MOX, WB9UNL and KB9BBI. Now is the time for all emergency communicators to consider starting the ARRL's on-line course EC-001 "Introduction to Emergency Communications." Even if you aren't on-line or don't have a home computer your local library likely does. The course can be taken from this location. EC-001 is well worth the time and money for any amateur interested in education about amateur radio emergency communications. Registration starts on the first Monday of every month. Don't overlook this valuable opportunity to improve your knowledge and skills. Go to the ARRL's Web site: www.arrl.org\cce for further information. NM's ITN/WA9JWL, QIN/K9PUI/KJ9J, ICN/K8LEN, VHF/WA9JWL.

Net	*Freq*	*Time/Daily/UTC*	*QNI*	*QTC*	*QTR*	*Sess*
ITN	3910	1330/2130/2300	2752	232	1478	85
QIN	3656	1430/0000	153	47	656	52
ICN	3705	2315	55	22	278	19
Hoosier VHF nets (10 nets)			513	10	998	44

D9RN Total QTC 200 in 62 sessions IN represented 100% by WD9QPA, KE9AK, N9KNJ, KB9NPU, WA9JWL, K9GBR and K9GGG. 9RN Total QTC 187 in 62 sessions represented by

Continued on page 124.

Steve Ewald, WV1X ♦ Public Service Specialist

ANAHEIM, CA
(Near Disneyland)
933 N. Euclid St., 92801
(714) 533-7373
(800) 854-6046
Janet, KL7MF, Mgr.
anaheim@hamradio.com

BURBANK, CA
2492 W. Victory Bl., 91506
(818) 842-1786
(800) 854-6046
Eric, KA6IHT, Mgr.
Victory Blvd. at Buena Vista
1 mi. west I-5
burbank@hamradio.com

OAKLAND, CA
2210 Livingston St., 94606
(510) 534-5757
(800) 854-6046
Mach, K6KAP, Mgr.
I-880 at 23rd Ave. ramp
oakland@hamradio.com

SAN DIEGO, CA
5375 Kearny Villa Rd., 92123
(858) 560-4900
(800) 854-6046
Tom, KM6K, Mgr.
Hwy. 163 & Claremont Mesa
sandiego@hamradio.com

SUNNYVALE, CA
510 Lawrence Exp. #102
94085
(408) 736-9496
(800) 854-6046
Mark, WI7YN, Mgr.
So. from Hwy. 101
sunnyvale@hamradio.com

NEW CASTLE, DE
(Near Philadelphia)
1509 N. Dupont Hwy., 19720
(302) 322-7092
(800) 644-4476
Jim, KA3LLL, Mgr.
RT.13 1/4 mi., So. I-295
newcastle@hamradio.com

PORTLAND, OR
11705 S.W. Pacific Hwy.
97223
(503) 598-0555
(800) 854-6046
Leon, N7IXX, Mgr.
Tigard-99W exit
from Hwy. 5 & 217
portland@hamradio.com

DENVER, CO
8400 E. Iliff Ave. #9, 80231
(303) 745-7373
(800) 444-9476
Joe, KDØGA, Mgr.
John, N5EHP, Mgr.
denver@hamradio.com

PHOENIX, AZ
1939 W. Dunlap Ave., 85021
(602) 242-3515
(800) 444-9476
Gary, N7GJ, Mgr.
1 mi. east of I-17
phoenix@hamradio.com

ATLANTA, GA
6071 Buford Hwy., 30340
(770) 263-0700
(800) 444-7927
Mark, KJ4VO, Mgr.
Doraville, 1 mi. no. of I-285
atlanta@hamradio.com

WOODBRIDGE, VA
(Near Washington D.C.)
14803 Build America Dr.
22191
(703) 643-1063
(800) 444-4799
Mike, N4MDK, Mgr.
Exit 161, I-95, So. to US 1
woodbridge@hamradio.com

SALEM, NH
(Near Boston)
224 N. Broadway, 03079
(603) 898-3750
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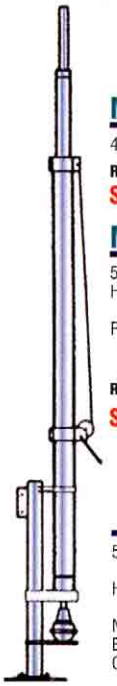

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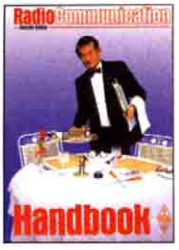

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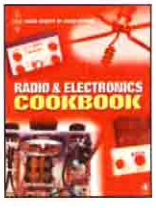

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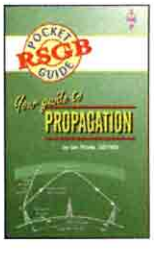

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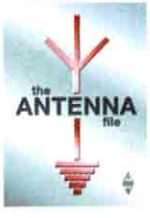

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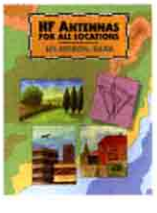

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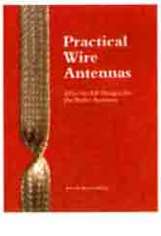

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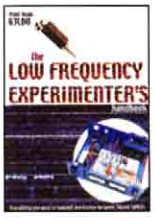

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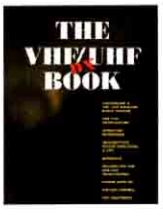

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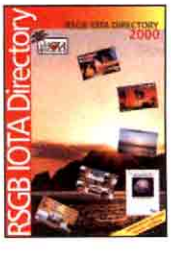

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KO9D, K9PUI, WB9OFG, N9HZ, WB9UYU and W9FC. Traffic: W9FC 244, WA9JWL 117, K9PUI 109, N9KNJ 97, KO9D 62, KB9NPU 48, K9RPZ 40, K9JUJ 40, K9GBR 33, WD9HII 32, WB9OFG 30, KA9EIV 27, KA9QWC 21, WB9QPA 13, W9EHY 12, K9ZBM 8, AB9AA 8, WB9NCE 6, K9CUN 5.

WISCONSIN: SM, Don Michalski, W9IXG—SEC: WB9RQR. STM: K9LGU. ACC: K9FHI. SGL: AD9X. OOC: W9DGI. PIC: W9UQ. TC: K9GDF. BM: WB9NRK. ASM: K9UTQ. W9RCW, W9CBE. K9ZZ, Jim Romelfanger, 60, passed away from a heart attack on December 22. Jim was the editor of BSSS, charter member of Yellow Thunder ARC and former Wisconsin section Public Information Coordinator. WB9JJP, Tom Stecker, 59,is a S.K. Tom was a member of the QCWA. Jim Hively, K9GCZ, 70, passed away on December 28. Jim was a past member of WARAC. Chuck Scholten, W9BZU, 94, is a S.K. Chuck was first licensed in 1928 and was a charter member of Mancorad. Justin Donovan, K9UKH, 82, is a SK. Our STM, Denny, K9LGU, reports the QNI count for 2001 was 37,439 and QTC of 21,865! This ranks us in the top 20 Sections. Thanks to all net participants and let's continue to support our nets in 2002! Our thanks go to Dick Isely, W9GIG, for attending the WARAC hamfest. Dick will be at the AES Superfest on April 5 & 6 so stop by the ARRL table and meet him and other visiting staff from headquarters. Gary Petersen, KA9BAE, is the RRRC Ham of the Year! The Petersen family now can claim 3 of these awards! 9RN report for December shows Wisconsin with 100% attendance in all sessions! Phil Neumiller, KC9IS, TS, has established a Communication Technology Net on 3994 kHz every Monday evening at 8 PM local time. It has been well received. Hope you can check in! 73, Don. Tfc: W9IHW 837, W9RCW 452, W9YPY 445, K9JPS 426, N9VE 423, K9GU 404, N9TVT 382, W9CBE 199, K9LGU 151, N9BDL 101, W9UW 97, KG9B 96, N9KHD 85, AG9G 74, K9FHI 69, KE9VU 50, KB9ROB 46, WA7UVX 29, W9BHL 28, WB9ICH 26, KN9P 22, AA9BB 20, WD9FLJ 19, N9JIY 13, W9RSX 11, W9PVD 5.

DAKOTA DIVISION

MINNESOTA: SM, Randy Wendel, KMØD—For Minnesota Section news, go to Web site: http://www.arrl.org/sections.de KMØD.

Net	*Freq*	*Time*	*QNI/QTC/Sess*	*Mgr*
MSPN/E	3860	5:30 P	881/125/31	KBØOHI
MSPN/N	3860	12 P	480/103/31	WAØTFC
MSSN	3710	6 P	N/A	Vacant
MSN/1	3605	6:30 P	308/99/31	KØWPK
MSN/2	3605	9:50 P	125/27/23	KØPIZ
PAW	3925	9A-5P	3341/102/93	KAØZA

SAR: WAØTFC, KBØOHI, WØLAW, KØWPK, KXØN, KBØAII, W3FAF, WØHPD, KCØHAW, KØPSH, KBØIJ, KN9U, WDØGUF, NØJP, WAØYSL.

NORTH DAKOTA: SM, Kent Olson, KAØLDG —Spring is just around the corner, so keep a good thought. Had a nice visit with the Jamestown Club in January. Nice to meet you & connect names with call signs. We need ECs for many ND counties and DECs for districts 2, 3, 5, & 6. Many other section posts available - check Web site and please consider joining the team. Congratulations to Val Tareski, KØQYW, Fargo's Ham of the Year. Grandin repeater tuned up by Fargo hams. Jamestown hams put a new controller on their repeater, which is on the Superlink. Dickinson hams got antenna work and winterization completed on their repeaters. Thanks to those hams for their hard work keeping these valuable sites working. Time to start coordinating for severe weather spotting training (SKYWARN). The season is right around the corner. Section's Web site at: http://home.earthlink.net/~qtipf16/. Fargo hamfest to be held on March 9th. HF NM KEØXT reports Goose River Net, 5/66/0; WX Net 54/1074/17; Data Net 30/745/17.

SOUTH DAKOTA: SM, Roland Corey, WØYMB—The South Dakota New Year's Eve QSO Party resulted in 69 check ins with net control stations NØMEA and WØHYQ. Sioux Falls ham NØPV, after a long fight with City Hall and two turn-downs and obtaining a lawyer, won his fight to put up a 64 ft Amateur Radio tower on his property. The City of Sioux Falls would not allow a tower in excess of 35 ft. Funeral Services for AAØBB was held on Dec 10 at Wallace SD. Nolan Thompson, age 9 and a third grade student at Parker Elementary School has obtained his Amateur Radio license, NØLAN. He has already worked all continents on 6 meters. Novice net manager reports an increase in participation in the Novice Net. Check into the Novice Net that meets every Sunday evening at 7 PM CST on 3700. Activity was down on the Northeast SD 2-meter net. However, 2 pieces of traffic were passed on the net. Congratulations to Myron, WØVH, on his graduation from the South Dakota School of Mines. Black Hills ARC annual auction was scheduled for Feb 16 with a VE session. I regret to report NØDFJ, Norma Jean Forette, who was killed when her car hit ice. Total traffic reported was 359.

DELTA DIVISION

ARKANSAS: SM, Bob Ideker, WB5VUH—Let me start this month by saying a big THANK YOU to each of YOU for several reasons. The first reason is for becoming a ham. The second is for your interest in our chosen hobby by your participation in a club & the activities that you help make successful as well as for the position you hold within your club. Thank you for volunteering for hamfest assignments. Another is for becoming an ARRL member & supporting not only the national organization, but also in supporting our section by accepting an appointment & for wanting to see us become stronger as a TEAM & family which we have become. Thank you for your participation on nets & actively handling much needed traffic, for your participation in emergency coordination efforts & helping with emergencies as they've occurred, for volunteering to help with the countless requests for communications at local community events, for the administration for the VE program, for participation in HF contests & other events available for your participation, for reviewing our section Web site regularly, & in general, for everything YOU continually do to make our hobby more interesting. Let me assure all of you that from my point of view, we are an active section, & you are a big reason for its combined success. The biggest astonishment & pleasure I get is watching hams grow by their efforts in the success of a planned activity for other hams. Truly, without your interest & help, many things would go undone. Keep up the good work & please accept my gratitude for everything that is being doing by our active section. Traffic: K5BOC 61, KC5TMU 55, K7ZQR 36, WA5KQU 23, WB5HIL 18, W9YCE 16, AD5AM 7, W5RXU 6, AD5BV 2, KA6VAN 2. Thanks to many of the above plus K5GBT, N5QDD & AB5AU for going to Region 5 for the many messages they bring to our nets too.

LOUISIANA: SM, Mickey Cox, K5MC— ACC: KM5YL. OOC: WB5CXJ. PIC: K5IQ. SEC: AC5TM. SGL: KD5KNZ. LCW NM: W4DLZ. LTN NM: WB5ZED. New officers for the SWLARC are KI5EE, President; KK5AP, Vice President; KD5KSR, Secretary; KD5GHQ, Treasurer; AA5OZ, Training Coordinator; WA5LQZ, Recruiting Coordinator; and KC5FGO, News Letter Editor. K5AAM, President of the Plantation District Radio Club, reports that N5WXC, KC5MFU, K5LGO, KC5PBN, KD5KWQ, KD5LEH, KC5TVD, KC5PEJ, and K5AAM provided route communications for the annual Andouille Festival Run/Walk in LaPlace. In addition, N5WXC, K5LGO, KD5LEH, W5LUS, WD5BLL, and K5AAM served as volunteer communicators in St. John Parish for the biannual FEMA-evaluated Emergency Drill with the Waterford 3 nuclear power station. KM5YL earned her PSHR Certificate from HQ. W5PY is a new OBS and ORS. The AARA will host the 2002 LA State Convention on March 9 and 10 in Rayne. Let's make it the best state convention ever! At the convention the BRARC (W5GIX) will be presented the LA Section Top Club Award for best score in 2001 FD. Six meters had some fantastic openings during December, including Europe! DXers everywhere await P5 and Ducie Island (VP6) in March. Good luck in the pileups! Tfc: K5IQZ 149, K5MC 81, KM5YL 63, W5PY 56, K5DPG 14, N5JU 5. PSHR: KM5YL 141, K5IQZ 133, W5PY 130, K5DPG 121, K5MC 106, N5JU 45. Net Reports: sessions/QNI/QTC. LTN: 31/357/91. LCW: 28/203/56.

MISSISSIPPI: SM, Malcolm Keown, W5XX—Section Web Site: www.arrlmiss.org. The Tupelo ARC received a very complimentary letter from the Executive Director of the NE MS Red Cross commending the club on communications support in Quitman, Panola, and Tate Counties during flooding in early December. The cell phones were out! The Laurel ARC recognized the following for 2001 accomplishments: Ham of the Year, Allen Matthews, KB5VLA; Technical Award, Mike McCraw, KB5YDR; DXer of the Year, Billy Gray, KB5FET; and Emergency Award, Mark Brown, N5NQ. Congratulations to all! New officers of the West Jackson ARC are WM5W Pres, KB5HJC VP, KC5JHW S/T, and W5OXA Editor. In Vicksburg it will be KJ5RC Pres, KB5QZW VP, N5EZX S/T, KB5CQX EC, WB5YKR Rpt Coor, and KE5K Prop Officer, and in Laurel N5KKG Pres, K5MCW VP, N5NQ Sec, KC5YDR Trea, and N5PA Act Chm. The Jackson ARC honored Ken, KG5YV, with a plaque in recognition of his 10 years as VEC Coordinator. Congratulations to AC5SU who completed the ARRL Level II Emergency Communications Course. The MSPN held its YK+2 New Year's Eve Party hosted by our Cajun Humorist N5JCG. A good time was had by all! Regret to report the passing of W5ITL. Brownie was one of the founders of the Jackson ARC. We also note the passing of K5UTH and WA5INV of Lucedale. PIO Rpt: W5KWB, KB5MPW. DEC/EC Rpt: AB5WF, NN5AF, WØCIR, N5NQ, WB5OCD. Net Reports: sessions/QNI/QTC. MSPN 32/3726/69, MTN 31/106/27, MSN 31/1122/12, PBRA 31/779/9, Jackson Co ARES/RACES 31/315/9, MSSN 21/72/0, West Coast MS ARES 13/121/11, Bluff City Em Net 5/89/1, MBHN 5/33/0, MLEN 5/64/0, MAEN 5/69/0, Attala Co ARES 5/55/1, LARC and Jones Co ARES 4/74/0, NW MS Skywarn 4/33/0, JARC EN 3/63/0, Central MS Skywarn Net 1/22/0. PSHR: WB5ZED 248, K5VV 128, W5XX 82, KJ5YY 77. Tfc: WB5ZED 817 (BPL), K5VV 65, KJ5YY 14, W5LEW 13, KM5WN 4, W5XX 3.

TENNESSEE: SM, Terry Cox, KB4KA—Tennessee Section cabinet appointees so far are: ASM: Ken Gregg, K4DIT. STM: Tim Walker, KR4TT. SEC: Sheila Tallent, KB4G. SGL: Dwayne Byrd, KC4POI. OOC: Mike Boyea, KE4KMG, and continuing as TC, James Butler, KB4LJV. The new Tennessee Section Web page is at www.tnarrl.org. Check it out. *This article was written by O.D. Keaton, WA4GLS, outgoing SM*: Since this is my last SM report, I want to extend my appreciation to those who contributed to the success of my tenure as Section Manager. A special thanks to Milo Ward, WB4DYJ, ASM; James Jarvis, WD4JJ, SEC & Wylodean England, WA4HKU, STM, for serving with me the entire ten years. Also thanks to all the rest of you who served a part of that time but had to retire somewhere along the line. I enjoyed working with all of you because it was your contribution that made our administration so successful. Last but not least, thanks to all ARRL members in the Tennessee Section for placing your trust in me as your Section Manager. For without your support, this would not have been possible. May I request that you support Mr. Cox, KB4KA, as Section Manager and the ARRL because these are the leaders of the future for ham radio in Tennessee. UCARS 2002 officers are: Lucy, KF4FLW- Pres; Angie, KF4FLU, VP; Bob, KS4NG, Sec/Treas; Doug, KD4YGP, NM; Clyde, KF4FLV, & Danny, KF4FLQ – Asst NMs. NARC 2002 officers are: Bob, WB4ZDS, Pres; Wayne, WB4FFW, VP, Windy, K3OI, Sec; Anne, W4HCL-Treas. CARC 2002 officers are: Joseph WA4MKA- Pres, Kenny KG4CKX- VP; Dennis, KF4VBD- Sec; Jack AD4LP- Treas; Barbara, WA4RMC, Hamfest Chair; Charles, AD4F, Editor.DRN 5 Report for December 2001: In 62 sess, QTC 669, QTR 1329. TN rep. 81% by W4OGG, KE4GYR, WA4FNY and KG4GCZ. Net Sess'QTC/QNI: TEPN 25/78/2613: TSCWN 26/7/150; TEMPN 21/55/766; TMPN 31/67/2685; TCWN 28/31/218. Tfc: KE4GYR 117, K4QQ 60, WA4HKU 59, W4SQE 36, N4PU 24, WA4GLS 16, WB4DYJ 10.

GREAT LAKES DIVISION

KENTUCKY: SM, John D. Meyers, NB4K—I want to thank Bill Slayman, KE4JFS, for his time given to the STM position. His health needs his attention at this time and we all wish him well. Tom Lykins, K4LID, has graciously agreed to take that position and all reports needs to be sent to him by the 5th of each month. Silent Keys for December WD4KYD, KD4NYC, N4JTL and N4ITM. SKYWARN classes are being scheduled for early spring 2002. Locate a class nearest to you by checking http://www.qsl.net/kd4pwl/skywarn.html on the Kentucky Amateur Radio Web site. The new Kentucky Emergency Response Reference became available on the Web site in mid January at http://www.qsl.kd4pwl/library.html. Update

telephone numbers and new frequency information are among the changes. Older versions of the plan should be considered out of date. NWS SKYWARN Severe Weather Spotter Classes March 12, 2002, Tuesday, 7 PM @ the Georgetown/ Scott County EOC. Section Nets:

Net	*Sess*	*QTC*	*QNI*	*Mgr*
WARN	5	6	115	KA4MAP
WTETN	4	27	1	KO4OL
KEN	4	6	91	KA4MAP
NKEN	4	34	4	WD8JAW
7-DARN	4	41	10	WD8JAW
TSTMN	31	36	480	KB8GWL
KYN	30	62	301	K4AVX
KTN	61	96	1964	KB4VKS
KSN	31	24	255	KO4OL

PSHR: NB4K 129, KO4OL 91. Tfc: NB4K 24, K4TXJ 41,WD8JAW 22, KO4OL 29, K4DZM 21, K4AVX 52, K4MHL 7, WB4ZDU 23.

MICHIGAN: SM, Dick Mondro, W8FQT (w8fqt@arrl.org)—ASM: Roger Edwards, WB8WJV (wb8wjv@arrl.net). ASM: John Freeman, N8ZE (n8ze@arrl.net). ASM: Lyle Willette, AB8CB (ab8cb@arrl.net). ASM: Deborah Kirkbride, KA8YKK (ka8ykk@arrl.net). SEC: Ray DeVlieg, kb8vni@arrl.net. STM: Joe Turner, K8CQF (k8cqf@arrl.net). ACC: Sandra Mondro, KG8HM (kg8hm@arrl.net). OOC: Donald Sefcik, N8NJE (n8nje@arrl.net). PIC/SNE: David Colangelo, KB8RJI (kb8rji@arrl.net). SGL: Ed Hude, WA8QJE (wa8qje@arrl.net). TC: Dave Smith, W8YZ (w8yz@arrl.net). Youth Activities: Steve Lendzion, N8GQ (n8gq@arrl.net). BM: Thomas Durfee, Jr.,WI8W (wi8w@arrl.net). Congratulations go out this month to Joe Turner, K8CQF of Saginaw for accepting the appointment as our new Section Traffic Manager (STM). Many of you may remember Joe when he served as our Section Emergency Coordinator during the early 80's and the fine job he did managing the last ARRL National Convention held in Saginaw. I am proud to have Joe once again serving the Section. Please join me in welcoming him back. I would also like to take this opportunity to thank Jim Wades, WB8SIW, for serving as our STM for many years. Jim did an outstanding job using his many talents. He has always supported our Section Activities and Training Programs while volunteering his services with the National Weather Service and the Red Cross as an instructor. Jim has traveled all over the state in his quest to educate us and his efforts have had a positive effect on our amateur radio service in Michigan. Please join me in thanking Jim for being there for us. Jim is not going away, just channeling his talents in other areas. It is still not too late to think about Skywarn Training. Ask your club officers to contact NWS to set it up before the rush. 73, Dick Traffic reports for December 2001: K8GA 441, KB8ZYY 340, N8FPN 301, K8LJG 206, W8RTN 163, AA8PI 162, N8EIZ 151, WX8Y 124, K8AE 114, VE3EUI 99, AA8SN 69, WR8F 55, W8RNQ 55, WI8K 55; N8UN 41, K8ZJU 35, K8UPE 33, N8JAT 30, WA8DHB 27, KA8DDQ 21, K8YB 21, K8FE 19, W8YIQ 18, K8AMR 18, W8WOJ 15, KI8GR 13, NX8S 12, W8NGO 2. Deadline 5th of the month. Please support the following SECTION NETS:

Net	*QNI*	*QTC*	*Sess*	*NM*	*Freq*	*Time*	*Day*
QMN	711	398	70	WB8SIW	3.663	6:30&10 PM	Daily
MITN	441	266	31	N8FPN	3.952	7 PM	Daily
GLETN	621	116	31	WB8ICN	3.932	8:30 PM	Daily
UPN	1238	47	36	AA8SN	3.921	5 PM	Daily (Noon Sun.)
WSSBN	860	43	31	K8CPW	3.935	7 PM	Daily
SEMTN	247	67	31	WI8K	145.330	10:15 PM	Daily
MACS	241	87	31	W8RNQ	3.953	11 PM	Daily (1 PM Sun.)
MI-ARPSC	69	2	5	W8FQT	3.932	5 PM	Sunday (Alt. 7.232).

OHIO: SM, Joe Phillips, K8QOE, Fairfield, (to contact me, see page 12 and check out the Section Page at www.maser.org)—ASM-NE: Bob Winston, W2THU, Cleveland; ASM-NW: Ron Griffin, N8AEH, Findlay; ASM-Central: Mary Carpenter, N8OAM, Westerville; ASM-SW: John Haungs, W8STX, Cincinnati; ASM-SE: Connie Hamilton, N8IO, Marietta. SEC: Larry Rain, WD8IHP, Mansfield. STM: Jack Wagoner, WB8FSV, Hilliard. ACC: Brenda Krukowski, KB8IUP, Toledo. TC: Tom Holmes, N8ZM, Tipp City. PIC: Scott Yonally, N8SY, Mansfield. OOC: Alan Cook, N7CEU, Newark. SGL: Jeff Ferriell, K8ZDA, Columbus. The Ohio Section welcomes a new cabinet member this month. Alan Cook, N7CEU, Newark, took over as Official Observer Coordinator February 1. He succeeds Richard Kuns, KC8TW, Fairfield, who retired due to increased responsibilities to ham radio groups in the Cincinnati area. Mr. Kuns recommended Mr. Cook's appointment. Alan has served the Ohio Section as EC of Licking County and has been president of the Newark ARA. With 22 years experience in this hobby, Alan is most proud of his 20 years service in ARES programs both in Ohio and Utah. Most important QSO? Alan lists exchanging cards with King Hussein of Jordan, JY1, (sk) on 15 meters in 1981 while operating a special event station for Collins Radio Division. He is now computer manager for the Boeing Company in Newark. Many Ohio ham radio clubs are offering special bus trips to the May Dayton Hamvention. Check with your local club to see if it is one and if you want to participate. Congratulations to Ashland Area ARC as being officially designated as a Special Service Club and West Chester ARA as becoming affiliated with the ARRL. Want to know how your club can join these two. Contact the ACC at kb8iup@arrl.net for all the details...The Canton ARC is hosting a multi-club Meeting at the Stark County Community College March 27. All hams are invited...OHIO SECTION CONGRATS TO: (A) Richard Kuns, KC8TW, for his service as Ohio OOC. Richard isn't going anywhere - he continues to run several web pages for Cincinnati area groups, edits one newsletter and is Secretary of the very active Greater Cincinnati Local Interference Committee; (B) Bob Steele, K8RLS, Alliance ARC, and Joe Vasko, N8SEJ, Youngstown (Mahoning Valley ARA) for being named Ham of the Year by their respective clubs; (C) Paul Valley, KC8AMD, as new treasurer of Cuyahoga County ARS; and (D) George Horning KA8CXG, Cincinnati for taking net manager post of TATN traffic net. OHIO SECTION MARCH HAMFESTS: (17) TMRA of Toledo at Maumee and (24) Lake County ARA at Madison. de K8QOE. Now for the December traffic reports.

Net	QNI	QTC	QTR	Sess	Time	Freq	NM
BN (E)	119	72	236	31	1845	3.577	WD8KFN
BN (L)	193	95	309	31	2200	3.577	NY8V
OSN	134	43	469	31	1810	3.708	WB8KQJ
OSSBN	2185	729	2760	93	1030, 1615, 1845	3.9725	N8IO

Tfc: N8IO 561, WD8KFN 294, N8BV 267, N7CEU 226, N8IXF 216, WB8KVM 210, KD8HB 205, W8STX 132, WA8SSI 125, KA8VWE 124, KC8HJL 118, WB8SIQ 116, N8OD 105, AB8KB 102, N8TNV 95, WA8EYQ 78, KA8FCC 74, N8DD 66, W8QIW 66, N8CW 65, N8IBR 64, NS8C 61, W8BZY 54, W8PBX 53, W8RPS 51, KC8DWM 50, WB8HHZ 50, KI8IM 50, KC8HTP 46, K8CAV 44, N8YWX 44, N8GOB 41, W8BO 38, WB8PMG 36, KD9K 36, WD8KBW 35, KB8ESY 33, K8PJ 33, NY8V 29, W8RG 28, K3RC 27, N8GP 26, KB8SBK 23, KC8PDY 22, KI8O 19, N8WLE 19, KB8FIA 16, KC8KYP 12, N8RRB 12, K8QIP 7. (Nov) W8PBX 163, W8BO 44, WD8KBW 23, KB8SBK 18, KC8HTP 17.

HUDSON DIVISION

EASTERN NEW YORK: SM, Pete Cecere, N2YJZ— STM: Jim Peterson, K2CSS. SEC: Ken Akasofu, KL7JCQ. ACC: Sylvia Stone, K2SLY. SGL: Herb Sweet, K2GBH. PIC: John Farina, WA2QCY. BM: Ed Rubin, N2JBA. OOC: Hal Post, AK2E. TC: Rudy Dehn, W2JVF. ASM: Tom Raffaelli, WB2NHC. ASM: Bob Chamberlain, N2KBC. ASM: Andrew Schmidt, N2FTR. ASM: Richard Sandell, WK6R. ASM: Phil Bradway, KB2HQ. Point your browser to the ARRL home page and click on the link in the right column for ARRL Sections. Then click on Eastern New York. Check often for up to date section info. Congratulations to Sylvia, K2SLY, our new ACC. Thanks to Shirley, N2SKP, for serving as ACC over the years. Also congrats to Adam KC2DAA – newly appointed Dutchess Co. R/O. Happy Spring to all. 73 de Pete, N2YJZ, n2yjz@ arrl.org. December - PSHR: N2JBA 156, WA2ZCM 149, KC2DAA 139, N2YJZ 138, W2AKT 132, W2JHO 130, WA2YBM 115, K2YS 100, KC2HUV 71. Station Traffic: K2YS 115, N2YJZ 110, N2JBA 75, KC2DAA 60, W2JHO 57, N2TWN 55, WA2ZCM 55, KC2HUV 38, WA2YBM 36, WA2BSS 29, W2AKT 18, K2AV V 8, N2FTR 3, KC2BUW 2, KC2HRP 2, KL7JCQ 1, KC2HRP 1. Net Reports: QNI/QTC+QSP CDN 219/174 CGESN 18/16 ESS 406/218 HVN 657/336 SDN 450/216 NYPHONE 292/1293 NYPON 422/341 NYS/E 343/400 NYS/M 162/211 NYS/L 249/415 NYSPTEN 409/104 CHN 176/66.

NEW YORK CITY / LONG ISLAND: SM, George Tranos, N2GA. ASM: KA2D, N1XL, K2YEW, W2FX, KB2SCS. SEC: KA2D. ACC: N2MUN. PIC: K2DO. TC: K2LJH. BM: W2IW. OOC: N1XL. STM: WA2YOW. SGL: N2GA. This may be the last edition of Section News in *QST* - plans are to move Section News to ARRL Web. This decision may be made by the ARRL board at its January meeting. The NLI Section News will continue in this fashion - hopefully with more timely information. Thanks for reading and thanks to all those who have submitted articles over the years. SEC Tom KA2D reports the following DEC's reporting activity in December: N2NOV for NYC reports 26 hams participated in Operation Santa on Dec. 5, WA2WKV for Nassau reports 20 new 2002 ARES applications and a monthly meeting on Dec. 11, N2NFI for Suffolk received reports from Islip and Smithtown ARES and a donation of handhelds and mobiles from Suffolk County PD. SEC KA2D has continued to answer questions about the events of 9/11. Tom also participated in NWS/Skywarn Recognition day and was a speaker there. STM Charlie, WA2YOW, reports Bill, WB2GTG has made the BPL again this month. The NLI Web site has moved - its new address is www.hudson.arrl.org/nli - please make a note of it. Thanks and congratulations to all who participated in HRU 2002, the ARRL NYC/LI Section Convention. Special thanks to HRU Chairman Phil, N2MUN, and the entire HRU committee, plus to sponsoring club GSBARC. Please e-mail me with your club's information, and I will get it in my monthly newsletter and on the web. Volunteer Exam sessions, club listings, upcoming events and more are available on the NLI Web site – Report all changes to N2GA before the 12th of the month. Tfc: WB2GTG 763, N2AKZ 171, KB2KLH 168, WA2YOW 97, KA2YDW 52, KE2SX 36, AB2IZ 31, KA2UEC 29, N2AVY 20, K2GCE 9, N2TEE 5, WA2VZK 2.

NORTHERN NEW JERSEY: SM, Bill Hudzik, W2UDT—ASM: K2WJ. STM: WB2FTX. ACC: N3RB. SEC: K2SO. OOC: K2ZD. SGL: K1VX. Web page:www.arrlhudson.org/nnj. Please send your club info and any events to our Webmaster N2WZB to keep the NNJ Web page updated. Our License Plate Bill was signed into law on December 28th! New fees became effective on January 28th. The ham radio plates will say "Amateur Radio" at the bottom. Now those NJ hams who have leased vehicles are included and can finally get plates. K2WJ's long journey of 8 years to get that phrase on the license plates is finally over! Check the section Web page for info on what form is needed. Our license plate group received a lesson in government and politics on getting this through the Legislature. This is an example that all of us need to be tuned in to our local and county governments. Just writing letters does not always do the job. KNOW your representatives; meet them; even invite them to your club meetings. After all, we are a voting base. Congrats to the new officers of the Raritan Valley Radio Club: WA2C-President, KB2VRM-VP, W2OU-Secretary, and K2YUD-Treasurer. The club will be celebrating its 75th anniversary this year with some special events. Also, welcome to the Middletown ARC as a new ARRL affliated club. They have a good core membership and should continue to grow. Our STM WB2FTX has posted the various section nets on the NNJ Web page. Listen awhile and then take part. Newcomers are always welcome. You may be surprised how interesting traffic handling can become. Invitations to speak at NNJ clubs are coming in and I hope to visit as many this year as I can. 73, Bill Hudzik, W2UDT.

Net	NM	Sess	QNI	QTC	QSP
NJPN	36	220	79	72	
NJSN	K2PB	31	213	28	26
NJN/E	AG2R	31	205	138	102
NJN/L	AG2R	31	172	90	75
CJTN	KB2VRO	31	207	74	56
NJVN/E	N2RPI	31	465	93	89
NJVN/L	N2OPJ	31	476	57	56

Tfc: W2MTO 153, KB2VRO 133, K2VX 58, N2OPJ 57, WA2MWT 44, KC2ANN 40, N2RPI 39, N2GJ 33, K2DBK 26,

MFJ Apartment Antenna

Covers 40 thru 2 Meters . . . Mounts outdoor to windows, balconies, railings . . . works great indoors mounted to desks, tables, bookshelves

MFJ-1622 **$99.95** *New!*

New MFJ-1622 Apartment Antenna lets you operate 40 thru 10 Meters on HF and 6 and 2 Meters on VHF with a single antenna!

Its universal mount/clamp lets you easily attach it to window frames, balconies and railings. It also works great indoors mounted to a bookshelf, desk, or table. It's not a 5 element yagi, but you'll work your share of exciting DX!

Highly efficient air wound "bug catcher" loading coil and telescoping 5½ foot radiator lets you really get out! Radiator collapses to 2½ feet for easy storage and carrying.

It includes coax RF choke balun, coax feed line, counterpoise wire and safety rope. Handles 200 Watts PEP.

Operating frequency is adjusted by moving the "wander lead" on coil and adjusting counterpoise for best SWR.

MFJ Ground-Coupled Portable Antenna Base

Provides effective RF ground and stable mount for vertical antennas . . . Antennas radiate well with low SWR

MFJ-1904 **$99.95** *New!*

MFJ *Ground-Coupled Portable Antenna Base*™ provides an *effective* RF ground 160 through 2 Meters and a stable mount for vertical antennas.

Capacitive coupling to ground is a *time-proven* principle. It needs no tuning and antenna radiates well and gives good SWR on all bands. Performance is similar to mobile stations when using a mobile antenna but is far better with longer antennas.

The base can support a lightweight multiband vertical antenna -- like the all band Hy-Gain 18AVS and the bandswitching MFJ-1795 -- and provide a semi or permanent installation.

You can easily set up and take down vertical antennas for stealth operation and hide the base by covering it with dirt.

The MFJ-1904 is a 2x2 foot *stainless steel* square with reinforcing bends that greatly strengthens it. Folded and tapered six-inch *stainless steel* legs firmly anchor the MFJ-1904 into the ground.

Built-in antenna mount with SO-239 coax connector and two U-bolts lets you mount most standard and homebrew vertical antennas.

Standard 3/8-inch x 24 mobile mount is built-in for MFJ Mobile Whips, bug catchers, *Hustlers* and screwdriver antennas.

Two handles make carrying and removing the base fast and easy. You can also attach radials for improved performance.

33 Feet Telescoping fiberglass Mast . . .

Collapses to 3.8 feet, weighs 3.3 lbs.

Super strong fiberglass mast has huge 1¾ inch bottom section. Flexes to resist breaking. Resists UV. Put up *full size* inverted Vee dipole/vertical antenna in minutes and get *full size performance!*

MFJ-1910 **$79.95**

MFJ Vertical

for Antenna Restricted Areas

40, 20, 15, 10 Meters, Automatic Band Switching

Perfect for permanent or portable operation in antenna restricted areas. Hide behind trees, fences, buildings, *in* bushes -- only 7 to 10 feet tall (adjustable).

MFJ-1795 **$149.95** *New!*

Low angle of radiation for DXing, omni-directional, handles 1500 watts PEP, low SWR.

Highly efficient end-loading. Entire length radiates.

Ground mounts with suitable ground such as MFJ-1904 *Ground-Coupled Antenna Base*, radials or ground rods. Or roof mount with radials.

HF mini-Bugcatcher

Highly efficient 40 - 6 Meter base-loaded 5½ foot Bugcatcher mobile antenna . . . Use light duty mounts

Become an *"HF Mobileer"* almost instantly with this *new* MFJ high-efficiency *mini-bugcatcher* mobile antenna! Have tons of fun rag-chewing and DXing on the HF bands. Turn boring drives into fun-filled ham adventures.

MFJ-1624 **$79.95** *New!*

Attach a simple mount to your vehicle (*mounts*: trunk lip, MFJ-347, $39.95; mirror or luggage, MFJ-342, $9.95; tri-magnet, MFJ-338T, $19.95) . . . **Screw** in your MFJ *mini-bugcatcher* . . . **Throw** your rig into your car, plug into cigarette lighter and turn power down to 20 Watts (to avoid overloading your cigarette lighter; MFJ-1624 handles 300 Watts PEP). **Operate!**

Bugcatcher design uses large highly-efficient *air-wound* inductor -- far out performs other compact HF antennas. *Exclusive* built-in inductive matching network keeps SWR low. 5½ foot whip collapses to 2½ feet for easy storage and low garages. Base loaded for minimum wind load and light duty mounts. Change band by moving *wander lead*. 3/8x24 in. mount.

MFJ Portable Antenna

MFJ-1621 **$89.95**

Operate from apartments, homes, hotels, campsites, beaches or any antenna restricted area. Work all bands 40, 30, 20, 17, 15, 12 and 10 Meters.

DXCC, *WAZ, WAC, WAS have been won with the MFJ-1621!* Compact 6x3x6 inch cabinet has 4½ foot telescoping whip, built-in antenna tuner, field strength meter and 50 feet coax. Handles 200 Watts.

MFJ Super High-Q Loop

MFJ's *tiny* 36 inch diameter *high-efficiency* loop antenna performs like a *full-size* dipole! Operate 10 thru 30 MHz *continuously* -- including WARC bands!

MFJ-1786 **$379.95**

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

Mounts vertically or horizontally. Low angle radiation gives you excellent DX.

Super easy-to-use! Remote control autotunes to desired band, then beeps. No control cable needed. Handles 150 watts.

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 -- *gives you highest possible efficiency*. Heavy duty thick ABS plastic housing has ultraviolet inhibitor protection.

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FAX:(662)323-6551 8-4:30 CST, Mon.-Fri. ***Add shipping.***

Prices and specifications subject to change.

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

N3RB 22, N2BVM 22, K2PB 21, W2CC 18, KJ2N 17.

MIDWEST DIVISION

IOWA: SM, Jim Lasley, NØJL—ASM: NØLDD. SEC: NAØR. BM: KØIIR@WØCXX. SGL: KØKD. STM: KBØRUU. The Ottumwa club did a display at the mall in January. They showed video tape, had a key and keyer available, demo of SSTV and PSK. Several showed interest. Time will tell. The Davenport club has laid out the meeting sched through June. Contact WØOMV. FMARC says that it is time to start planning for FD. Wow! Let me know if you would like me to visit and work some CW. I really enjoy roaming on FD. I should have a new keyer this year. Was Santa good to you this year? What did you add to the station? I have a new antenna, paddle and keyer. I know of a couple of fellas that have gotten TS2000s over the last several months. Exams are in the planning stages at FMARC. Contact WBØB. I stopped by the shack of NØSM in time to hear him work a couple of Italians on six meters. Daytime CAN is needing some help. If you have the skills, check with the manager. GRARC has fixed their repeater! They also have a small article on the formation of the club. I find I worked WA9SLZ when we were both novices! In Dec we made TEN at 97% with WØSS, WBØB, WØYLS, NØJL, and NØSM. On the daytime TEN (cycle 2) it was 93% with WAØAUX, WAØKLD, and KBØRUU. Richard has also made PSHR for the last several months. Newsletters were received from OARC, DARC, FMARC, GRARC, DMRAA. Tfc: WØSS 246, KBØRUU 168, NØJL 40, WBØB 26, KBØFB 14. 73 de NØJL.

KANSAS: SM, Orlan Cook, WØOYH— ASM/ACC/OCC: Robert Summers, KØBXF. SEC: Joseph Plankinton, WDØDMV. STM: Ron Cowan, KBØDTI. PIC: Scott Slocum, KCØDYA. TC: Rick Carver, WAØKS. SGL: Steve Hamilton. Our Directors will be soon voting to move all Section News columns in *QST* to the ARRL Web. This will help with the financial needs of printing. You can read the Kansas News in the KAR, Kansas Amateur Radio Web site, http://www.ksarrl.net/ and in the KAR newsletter. Subscribe via orlan@swbell.net. Our Vice Director, Bruce Frahm, KØBJ was at the Jo Co RAClub to present a 60-year ARRL plaque to Wilbur Goll, WØDEL and a 50-year plaque to Jim McCoy, WØLQV. Bruce surprised every one by presenting a 40-year ARRL certificate to our club trustee, Gary Yantis, WØTM. The club also has an SK this month, Melvin T. Hyatt, WBØRHR. A big thank you to all of our ARRL Kansas appointees for aGreat Section. Nov. Kansas Nets: sessions/QNI/QTC, KSBN 30/1206/85 KPN 21/318/31 KMWN 30/820/568 KWN 30/877/563 CSTN 26/1949/90, QKS 60/287/72, QKS-SS 9/24/9, SEC 55/561/13, QNS KBØAMY, KCØAUH NØBTH KCØCIG WDØDDG NØNXS AAØIQ NØOBM NØLKK KBØWEQ KBØZWK WDØDMV Joseph SEC. TEN Ks 88% 60/QNI/182AAØFO KØPY WØWWR NBØZ WØSS/Mgr. TRN 60/587/381 Ks 98.3% with KBØAMY WØFE NØKJ AAØOM WØWWR. Ks tfc WØWWR 678, KBØDTI 59, NBØR 26, WØYH 24, NØRZ 17, NØIZ 17, KCØJCQ 15 WØFCL 11, KCØGL 6, KØRY 3.OBS KØRY R/19 S/6. BPL WØWWR 678, congrats.

MISSOURI: SM, Dale Bagley, KØKY—ASM: John Seals, WRØR. ASM: Bill Coby, KBØMWG. ASM: Larry Ballew, ABØHP. ACC: Keith Haye, WEØG. BM: Brian Smith, KIØMB. OOC: Mike Musick, NØQBF. STM: Charles Boyd, KEØK. SEC: Patrick Boyle, KØJPB. March will be an active time for Hamfest in western MO. The Nevada Hamfest will be at the American Legion Hall March 2nd and the Ararat Shrine Hamfest will be in Kansas City on March 9th. We need to get out and support these efforts. MO Section SEC Patrick Boyle, KØJPB, has been hard at work after the terrorist attack on Sept. 11, 2001, signing up EC, DEC and OES appointments. Joe Counsil, KØOG, has been appointed the EC for Phelps County and DEC for District I. Jerry Broadaway, KCØIZZ is Morgan County's new EC. Cass County's new EC is Irv Ostrick, WA7VGH, Carol Willis, KCØLTQ, and John Hooper, KC7RJJ, were appointed OES for Phelps County. Several Amateur Radio Clubs updated their information on the ARRL Web site and were reactivated. This could happen to any club that didn't fill in the new officers and mailing address for over two years. Congratulations to Trico ARC in Sikeston, Blue Springs ARC, MARAC of St. Louis, Monsanto ARA in St. Louis, Lake of the Ozark ARC and the OBP #1 of St Louis. Net sess/QNI/QTC/NM: MTN 31/495/96/KØDAT; Audrain Co ARC 4/50/2/WBØSEN; Sullivan ARC 5/57/3/KBØROX; Rolla Billboard 30/511/16/NAØV; Jackson Co ARES 5/59/0/KØUAA. MON 55/157/49/K9ZTV; WAARCI 5/121/0/KBØVZP; NØATH Rep 5/86/0/NØØATH. Tfc: WAØYJX 35, KEØK 31.

NEBRASKA: SM, Bill McCollum, KEØQ—ASM: WØKVM, NØMT, WYØF, WBØULH & WBØYWO. It is with deep regret to inform you of the following Silent Keys: WAØYGZ, WØLB & NØMKV. I am pleased to announce the following ARECC Level I graduates: KCØHFT, KB5TLZ, WØATU, N6KVA, NØTRK, KØBWJ, KØNSA, WØNSA, AJØ, N5RIG, KCØHLD, KAØKCV, KD7GSW, KCØMCC, KCØKKF & KCØHLB. The class was conducted under the auspices of the AKSARBEN ARC. The Lincoln ARC ran up an impressive 5,455 volunteer hours for public service last year. The Bellevue ARC has almost 800 hours of public service for 2001. Congratulations go out to the newly elected club officers across the state. Be sure you notify ARRL HQ of these leadership changes. Net Reports: NESN, QNI 996, QTC 21 & 31 sessions. NCHN QNI 129, QTC 7 & 30 sessions. MIDNE 2m ARES, QNI320, QTC 3 & 31 sessions. MARES, QNI 187, QTC 2 & 5 sessions. NMPN, QNI 1720, QTC 2 & 31 sessions. WNE Net, QNI 1370, QTC 84 & 25 sessions, NPPARC, QNI 17, QTC 2 & 3 sessions. NE40, QNI 448, QTC 8 & 29 sessions. Tfc: KØPTK 92, KEØXQ 24, WYØF 8, WAØZCM 7, WAØZCN 6, WØUJI 6, KAØDOC 4, WØDED 2, WØEXK 2, KAØO 2.

NEW ENGLAND DIVISION

CONNECTICUT: SM, Betsey Doane, K1EIC—ASMs: KZ1Z, NK1J, N1API, K1STM. BM: KD1YV. OOC: W1GC. PIC: W1FXQ. SEC: KB1CTC. SGL: W1UTQ. STM: K1HEJ. TC: W1FAI. By now, some of you know that the ARRL has given each Section space on its Web Page where we can post current news and even pictures! From the ARRL homepage, click on ARRL Connecticut Section. Alert messages requiring immediate attention will also be posted there. I plan to regularly update this Page often so watch for items of interest. Many thanks to Bulletin Manager Jim, KD1YV and Section Emergency Coordinator Mike, KB1CTC, for helping me with this project. Many of you have told me that you appreciate the e-letters you receive via e-mail. I still plan to get these to you-thank you for your support. If you are not receiving e-letters, be sure that you are properly registered on the Members-Only Page and sign up for Section and Division e-letters. Some members of the Candlewood Amateur Radio Association visited with Eric, operator of T30S and learned about life on Buratitari, Kiribati. Eric was formerly a student in the Bethel Education Amateur Radio Society and is now in the Peace Corps operating the station sponsored by CARA. Eric showed a video of a day in the life of a schoolchild and showed some crafts made by the residents. One such was a model of a sword made with real shark's teeth that they caught and ate for his birthday. For more information see the new Connecticut Section Page at http://www.arrl.org and http://people.mags.net/boem/kiribati1.htm. Your SM attended the Division cabinet meeting in January and was pleased to see Paul, N1TUP, of the BEARS of Manchester and Jeff, K1ZN, of CARA in there. Our Director routinely invites club presidents to his meeting in order to gather input for the upcoming Board meeting. SEC Mike, KB1CTC will be speaking at The Southern Berkshire ARC. Sky Warn training is being planned throughout the State for the Spring. Watch for further word on date and place. Net sess/QNI/QTC/NM: WESCON 30/298/80/KA1GWE. ECTN 31/245/205/WA4QXT; NVTN 29/173/58/KB1CTC. CPN 31/213/88/N8DIO. CN 30/90/30/N1AEH. Tfc: NM1K 1821, KB1CTC 380, WA4QXT 309, K1UQE 233, KA1GWE 174.

EASTERN MASSACHUSETTS: SM, Phil Temples, K9HI—ASMs: WA1ECF, N1GTB, WA1IDA, N1UGA, AA1MO. ACC: N1DHW. BM: N1IST. OOC: K1LJN. PIC: N1PBA. SEC: W1MPN. SGL: K3HI. STM: NZ1D. TC: N1UEC. e-mail list: ema-arrl@qth.net, Web: http://www.qsl.net/ema-arrl. The EMA ARRL Staff held its quarterly meeting recently in Burlington. Boston ARC is planning a Tech course for youths in Everett. EMA Amateurs responded to a mobile APRS packet emergency call! An auto driven by a ham's wife slid off the road in a remote area near Keene, NH. W1XS, KA1EIV and N1VUX were able to pinpoint the vehicle's exact location and summon help via the NH State Police. Harvard Wireless Club to hold a license upgrade session. Framingham ARA has scheduled another of its ever-popular License In A Weekend programs. Visit http://www.fara.org for details. As of this writing, EMA ARES is planning an Emergency Communications Workshop in Peabody. W1MPN spoke about emergency communications at a recent Acton-Boxboro ARC meeting. The folks at the Billerica ARS have a new breakfast QTH on Saturday mornings: they now meet at the Courtyard Hotel in Lowell. N1FDX demo'ed his new PSK-31 system at a Massassoit ARA meeting. Isn't it amazing how many friends and acquaintances still don't know what our hobby is about? Take a moment and explain it to them! Let's promote Amateur Radio at the grass-roots level. Framingham ARA has hit upon an innovative idea: members can shop on Amazon.com via a link on FARA's Web page. A percentage of the money they spend comes back into the club coffers. Sturdy Memorial Hospital ARC's Emergency Communications Committee is drafting plans to define presentations to local emergency management officials. Do you know how to compose and send a radiogram? N1LKJ and W1GMF have created a new web site for EM2MN at: http://www.qsl.net/n1lkj/. Northeastern Univ. Wireless Club members getting in some antenna work before bad weather arrives. Minuteman Repeater Assoc. to feature a talk by a National Disaster Medical Systems Boston team member describing the NDMS efforts at World Trade Center/Ground Zero. MMRA conducts a weekly net on Tuesdays at 2000 ET on its linked repeater system. USS Salem ARC's scouting program was featured in an excellent write-up on the ARRL Web site, at: http://www.arrl.org/news/stories/2002/01/08/1/. Recent statistics show that EMA leads all New England sections in numbers of individuals who have successfully completed the ARRL Certification/Continuing Education courses on Emergency Communications. 73 de K9HI. Tfc: W1GMF 2088, KW1U 780, NG1A 535, N1LKJ 305, KD1LE 101, WA1LPM 99, K1SEC 90, N1AJJ 83, WA1FNM 79, N1TPU 64, K1BZD 61, K8SH 60, NZ1D 54, KB1EB 53, N1LAH 44, N1IST 31, NC1X 21.

MAINE: SM, Bill Woodhead, N1KAT— ASMs: WA1YNZ, KA1TKS. STM: N1JBD. BM: W1JTH. SGL: W1AO. ACC: KA1RFD. OOC: N1RY. PIC: KD1OW. SEC: N1KGS. Asst. Dirs: KA1TKS, K1NIT. Web Site: N1WFO. After attending the New England cabinet meeting in January, along with N1RY and KB1AQE, I will tell all of you that the Hams in the state of Maine are setting a high standard, not just for New England, but for the rest of the country to look at everything from education to public service events. You all get a "well done!" The lack of precipitation is bordering on the critical; it's the first week of January, and there is as much green grass as snow showing in my yard. We should all hope that we get adequate rain and snow to keep the forests from drying out, to prevent having to work with the Forest Service as a public service in fighting forest fires. Now is a good time to start thinking about Field Day. This can be the best way to show off our hobby to the community. Try to get out in the public eye - be someplace special. See you at the Maine State Convention March 29 & 30 at the Ramada Inn in Lewiston, ME, Exit 13 of the Maine Turnpike. 73, Bill, N1KAT. Tfc: W1KX 237, W1QU 122, W1JX 68, N1JBD 47, KA1RFD 33, W1JTH 32, AF1L 24, KA2ZKM 22.

NEW HAMPSHIRE: SM, Al Shuman, N1FIK (n1fik@arrl.org)—(www.nhradio.org). Dale, AA1QD the Section ACC sent a letter to NH clubs to establish a list of willing Elmers for referral to new licenses and those seeking practical knowledge in our hobby. If interested, contact Dale at AA1QD@arrl.net. At the time of this writing the NH-ARRL sponsored QSO Party is gaining renewed interest. Expect contest results in May. Congrats to new officers: NCARC, P-WB1ASL, VP-N1UZA, S-N1PCE and T-WA1JVV. John Pate KB4UTV is working with the Maple Ave Elem. School in Goffstown to make contact with the Space Station. A request by me via the e-mail lists netted a number of volunteers. In January, I attended planning meetings for both NH-VOAD and NH-ARES. Both organizations provide volunteer services in the event of disaster. There were 9 new NH hams in Dec; bring our total to 4999. There were 14 MARS stations participating in the joint NH/MARS S.E.T. Interested in joining MARS? Contact Jerry Blanchard, K1BBQ, for more info. Finally, this may be one of the last SM columns to appear in *QST*. Should HQ decide to suspend the column, rest assured the NH Field Org will continue to support you. 73, Al, N1FIK. Net NM/Sess/QNI/QTC/

1.8-170 MHz *plus* 415-470 MHz
MFJ HF/VHF/UHF Antenna Analyzer

All-in-one handheld antenna test lab lets you quickly check and tune HF, VHF, UHF antennas anywhere. Covers 1.8-170 MHz and 415-470 MHz

Measures: SWR…Return Loss…Reflection Coefficient…Antenna Resistance(R), Reactance(X), Impedance(Z) and Phase Angle(degrees) . . . Coax cable loss(dB) . . . Coax cable length . . . Distance to short or open in coax … Inductance . . . Capacitance . . . Resonant Frequency . . . Bandwidth . . . Q . . . Velocity Factor . . . Attenuation . . . Has: LCD readout . . . frequency counter . . . side-by-side meters . . . Ni-MH/Ni-Cad charger circuit . . . battery saver . . . low battery warning . . . smooth reduction drive tuning . . . One year No Matter What™ warranty . . .

NEW

MFJ-269 **$359.95**

You can instantly get a complete picture, check and tune any antenna from 1.8 to 170 MHz and 415 to 470 MHz -- an MFJ-269 exclusive -- with this rugged easy-to-use handheld antenna test lab! You can measure virtually every antenna parameter.

You won't believe its capability and versatility. This rugged handheld unit literally replaces a workbench full of expensive delicate test equipment.

SWR Analyzer

You can read SWR, return loss, reflection coefficient and match efficiency at any frequency simultaneously at a single glance.

Complex Impedance Analyzer

Read Complex Impedance (1.8 to 170 MHz)as series equivalent resistance and reactance (Rs+jXs) or as magnitude (Z) and phase (degrees). Also reads parallel equivalent resistance and reactance (Rp+jXp) -- *an MFJ-269 exclusive!*

Coax Analyzer

You can determine velocity factor, coax loss in dB, length of coax and *distance to short or open in feet (it's like a built-in TDR).*

CoaxCalculator™ lets you calculate coax line length in feet given electrical degrees and vice versa for any frequency and any velocity factor -- *an MFJ-269 exclusive!*

Use any Characteristic Impedance

You can measure SWR and loss of coax with *any* characteristic impedance (1.8 to 170 MHz) from 10 to over 600 Ohms, including 50, 51, 52, 53, 73, 75, 93, 95, 300, 450 Ohms -- *an MFJ-269 exclusive!*

Inductance/Capacitance Meter

Measures inductance in uH and capacitance in pF at RF frequencies, 1.8-170 MHz.

Frequency Counter/Signal Source

You can also use it as a handy frequency counter up to 170 MHz and as a signal source for testing and alignment.

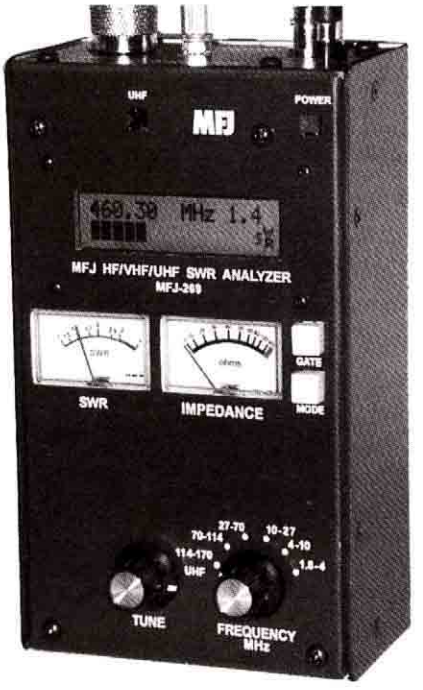
Digital and Analog displays

A high contrast LCD gives precision readings and two side-by-side analog meters make antenna adjustments smooth and easy.

415 to 470 MHz Range features

Just plug in your UHF antenna coax, set frequency and read SWR, return loss and reflection coefficient simultaneously. You can read coax cable loss in dB and match efficiency.

You can adjust UHF dipoles, verticals, yagis, quads and others and determine their SWR, resonant frequency and bandwidth.



You can test and tune stubs and coax lines. You can manually determine velocity factor and impedances of transmission lines.

You can adjust/test RF matching networks and RF amplifiers without applying power.

Has easy-to-read LCD *logarithmic* SWR bargraph and SWR meter for quick tuning.

Much Better Accuracy

New 12-bit A/D converter gives much better accuracy and resolution than common 8-bit A/D converters -- *an MFJ-269 exclusive!*

Super Easy-to-Use

Select a band and mode. Set frequency. Your measurements are instantly displayed! Smooth reduction drive tuning makes setting frequency easy.

Take it anywhere

Take it anywhere - to remote sites, up towers, in cramp places. Fully portable -- battery operated, compact 4Wx2Dx6¾ in., weighs 2 lbs. *Free* "N" to SO-239 adapter.

Has battery saver, low battery warning and built-in charging circuit for rechargeables.

Use 10 AA Ni-MH or Ni-Cad or alkaline batteries (not incl.) or 110VAC with MFJ-1315, $14.95.

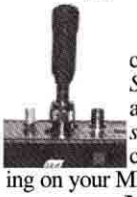
MFJ SWR Analyzer Accessories

MFJ-39C, $24.95.

Tote your MFJ-269 anywhere with this *genuine* MFJ custom carrying case. Has back pocket with security cover for carrying dip coils, adaptors and accessories. Made of special foam-filled fabric, the MFJ-39C cushions blows, deflects scrapes, and protects knobs, meters and displays from harm.

Wear it around your waist, over your shoulder, or clip it onto the tower while you work -- the fully-adjustable webbed-fabric carrying strap has snap hooks on both ends.

Has clear protective window for frequency display and cutouts for knobs and connectors -- use your MFJ *SWR Analyzer*™ without ever taking it out of your case. *Authentic MFJ leather logo distinguishes the real thing from imitators!*



MFJ-66, $19.95.

Plug these MFJ dip meter coupling coils into your MFJ *SWR Analyzer*™ and turn it into a sensitive and accurate *band switched* dip meter. Set of two coils cover 1.8-170 MHz depending on your MFJ-269 *SWR Analyzer*™.

MFJ-99C, $34.95.

SWR Analyzer Power Pack. 10 Pack MFJ *SuperCell*™ Ni-MH batteries, and MFJ-1315 Power supply for MFJ-269 SWR analyzers. *Save $5!*

MFJ-98, $54.85.

MFJ-269 Accessory Pack. MFJ-39C *custom* Carrying Pouch, MFJ-66 dip coil adapters, MFJ-1315 power supply for MFJ-269. *Save $5!*

MFJ-98B, $77.85.

MFJ-269 Deluxe Accessory Pack. Complete accessory pack! MFJ-39C Pouch, 10 Ni-MH batteries, dip coils, power supply. *Save $7!*

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The finest parts, and not a DOG in the pack.

PL-259ST	Silver-Teflon®, USA	SALE $1.00
PL-259GT	Gold-Teflon®, USA	$1.49 or $30 pk of /25
N/9913	For 9913, 9086, 9086, Flexi, etc.	$3.25
N-200ST	"N" Silver-Tef, installs like PL-259	$3.25

Coax and Cable Prices <100'/100'+

RG-8X+	95%, Type IIA, non-contaminating	26¢/22¢
RG-213+	Top quality, 97% shield, IIA jacket	45¢/38¢
International 9096	flexible 9913-type Highest quality	65¢/59¢
International 9086,	the best solid 9913-type	56¢/51¢

RG-8X Premium, 95%, black 14¢
RG-213 95%, Mil-Type Excellent 35¢

R1 Rotator	8 cond. (2 x #18, 6 x #22)	SALE 26¢/20¢
R2 Rotator	8 cond. (2 x #16, 6 x #18)	SALE 47¢/35¢
#14	Hard-drawn, 7x22, all copper, bare	8¢
#14 FlexWeave™	168-strand, bare copper	14¢
#12 FlexWeave™	259-strand, bare copper	19¢
HD Ladder Line	450 ohms, stranded #16 cond.	22¢/17¢
Super Ladder Line,	stranded #14 cond. Sale	30¢/26¢
1/2" Tinned Copper Braid	ground strap, any length	65¢
LadderLock™	Center insulator for ladder-line	$11.95
Copper Ground Strap,	6" all copper	$1.49

Custom Coax Jumpers - made to order.

Pulleys - for antenna support rope. Highest quality, sailboat-type. Small & lightweight. #224 for 3/16" rope @ $11.95 and #082 for 5/16" rope @ $14.95

RFI Quick Fix
Built-in ground strap
Breaks up ground loops
Ends RF feedback problems

For really tough RFI problems, the T-4G is the ultimate fix by shunting stray RF on your coax directly to ground. Stray RF and feed line radiation doesn't have a chance. It solved all my RF feedback problems in my second floor shack. (W4THU) Don't be misled by $100 imitations. Our Line Isolators are still unequaled.

Antenna Support Line

Mil Spec, **Dacron® Antenna Support Line,** single braid, sun resistant, 3/16" 700# test 100' hank $8

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Antenna Fever

For 16 years, The RADIO WORKS has brought you the best made, best performing wire antennas. No warmed over handbook designs - just performance engineered antenna systems.

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CAROLINA WINDOM 160, 265', 160 - 10 m.	**Big Sig on 160, Killer Sig on 80**	$135
CAROLINA WINDOM 80, 132' long, 80 - 10 m	**If you hear one, you'll want one!**	$95
CAROLINA WINDOM 40, 66' long, 40 - 10 m.	**It helped set two 40 meter records.**	$90
CAROLINA WINDOM 40 Plus	**18' vertical radiator increase 40-15 performance**	$105
CAROLINA WINDOM 160 Special, 160 - 10m, 132' long.	**All bands 160 - 10**	$125
G5RV Plus, 80 - 10 m, 102'	High Power Current Balun, heavy-duty Ladder-line	$59.95

Jim's New Book - "Frequently Asked Questions about Antenna Systems and Baluns."
This revealing 124 page book answers questions and dispels myths. The material is presented in a style that's easy to read and Jim, W4THU, is not beyond poking fun at jealously held concepts. However, at the book's heart are questions that hams ask over and over. Available now - $12.95 + $3 postage.

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Models for every application

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Y1-5K	1:1	5 KW	Current YagiBalun	160 -10	$37.95
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B4-1.5K	4:1	1.5 KW	Voltage-type	80 -10 m	$32.95
B4-2K	4:1	2 KW	Voltage-type	80 -10 m	$39.95
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NEW! B1-5K+		5 KW	Current-type	160 - 6 m	$35.95

Here's the new Super Line Isolator Lineup

T-4	Ultra Line Isolator, 160 - 10m	$34.95
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MFJ *Sound Card-to-Rig* Interface

Use sound card and rig for all digital modes!

Plug and Play! Includes software, audio cables, power plug . . . RFI-proof . . . Isolation transformers -- no hum, noise, distortion . . . Operate PSK-31, packet, APRS, AMTOR, RTTY, SSTV, CW, Meteor Scatter, others . . . Use as Voice Keyer, CW Contest Memory Keyer . . .Monitor On/Off Switch . . .

New!

MFJ-1275/MFJ-1275M

$89.95

Plug this new MFJ-1275 sound card interface between your transceiver and computer and enjoy operating all digital modes.

Everything you need is included -- software, audio cables and power plug.

The MFJ-1275 provides fully automatic operation with audio and push-to-talk control. It matches sound card audio, eliminates ground loops and provides microphone override.

Works with all transceivers with 8-pin round or modular microphone plugs.

Operate PSK-31, packet, APRS, AMTOR, RTTY, SSTV, CW, high speed CW Meteor Scatter and many others. Also use as Contest Voice Keyer and CW Contest Memory Keyer.

Digital Modes or Normal Operation

Choose digital or normal transceiver or computer operation with the push of a switch.

Selecting the ON digital mode, all connections are made between your rig and computer for instant digital operation.

In the BYPASS normal mode, your transceiver and computer connections are restored for their normal operation.

Audio Isolation Transformers

Audio isolation transformers and relay eliminate ground loops, audio hum, noise and distortion.

RFI-Proof

Extensive RF suppression and line isolation eliminates RF feedback problems.

Automatic Microphone Override

You can override any digital mode and transmit microphone audio at any time by pressing mic PTT -- great for SSTV and Contest Voice Keyer operation.

More Impressive Features

Serial port -- lets computer control your radio to override and/or interrupt digital transmissions.

VOX Control -- lets you use automatic VOX control when not using computer serial port control.

Level Controls -- for transmitter drive and for receiver-to-sound card drive level. No need to adjust microphone gain or sound card level when you change modes.

Stereo or Mono Audio Input -- A front panel switch selects left, right, or both sound card audio output channels to accommodate various programs.

Off-the-air recording -- for replaying or for use with spectrum analyzer programs.

Monitor on/off switch lets you have a normal QSO and receive SSTV pictures at the same time in the *"monitor on"* position. This is great for modes like SSTV and Voice Keyer operation that may require listening to receive audio during operation.

Rugged Construction -- All aluminum cabinet and surface-mount construction gives you years of trouble-free service.

Use any Transceiver with 8-pin Mic

Internal jumpers program microphone wiring for any brand or model radio -- no soldering required. Order **MFJ-1275** for 8-pin *round* mic plug. Order **MFJ-1275M** for 8-pin *modular* mic (RJ45) plug.

Everything you need is included

MFJ-1275/MFJ-1275M includes audio cables, power plug and a CD with a collection of the most popular amateur radio software to operate PSK-31, RTTY, SSTV, PACKET, AMTOR, CW, HSCW Meteor Scatter, Contest Voice Keying and other modes. Uses 12 VDC or 110 VAC with optional adapter (**MFJ-1312B, $14.95**).

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Protected by MFJ's famous *No Matter What™* one year limited warranty. MFJ will repair or replace (at our option) your MFJ-1275/MFJ-1275M *no matter what* for one full year.

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Operate PSK-31 with your MFJ-1278, MFJ/TAPR TNC 2 Clones

MultiCommHost™ for MFJ-1278 Multimode TNCs. **MFJ-1289H, $79.95.** Supports all packet, HF modes. *Adds PSK-31.* 32-bit host mode runs under Windows 95,98,Me,NT,2000,XP™. Syncs with popular logging programs. Toolbar, Hotkeys, user defined macros, quick connects, receiver buffer, more!

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RHODE ISLAND: SM, Bob Beaudet, W1YRC—After many weeks of battling recurring renal cancer, your SM, K1FLD was SK on New Year's Eve, 2001. I certainly speak for most hams in RI when I say how much I will miss him. His unique sense of humor and "can-do" spirit of helping everyone was truly special. His unconditional love of Amateur Radio was without limits and he often would simply and quietly smile in approval when he witnessed an active group at Field Day, enjoying camaraderie and fellowship. We'll miss seeing that special outback hat bobbing around boxes of "treasure" at Boxboro and Forestdale flea markets. The BVARC cancelled its holiday season dinner in respect of its president's passing. I will continue as your SM for the remainder of Armand's term. Please send me news of your club or individual events so I can give proper credit. Go work 10 and 6 meters while they still are active, and have fun. 73 and health for 2002, Bob, W1YRC, RI SM.

VERMONT: SM, Bob DeVarney, WE1U— During the holidays, a new resource became available for the ham radio community. A DX cluster, named DXBVT, is now online and open to all Amateur Radio operators. This cluster, that can be reached anywhere in the world via the Internet, (telnet://n1zuk.dyndns.org:8000) or by 2 -meter radio (145.030 MHz connect to DXBVT) in the greater Burlington area, runs 24 hours a day, 7 days a week, to bring you information that can assist your radio operations. As of the end of my term, I will be stepping down as Section Manager. I have enjoyed the opportunity to serve you as your SM, but 4 years of anyone in office is long enough. My heart is no longer in the job. I look forward to someone with the time, energy, and commitment to step in and take the reins.73 de WE1U. Net sess/QNI/QTC/NM: VT YL Net 5/48/1/KA1LDS; Green Mtn Net 26/707/20/N1HXC; VTNH 31/148/160/WA1JVV; VPEN 5/33/0/WA1DLA; VPTN 31/196/69/KB1DSB; CVTN 26/138/44/KB1DSB. Tfc: KB1DSB 202, WB1EYP 31, AA1PR 29, W1RFP 12, W1KMH 11.

WESTERN MASSACHUSETTS: SM, William C. Voedisch, W1UD, w1ud@arrl.org—ASM N1MAP. ASM (digital) KD1SM. STM: NZ1D. SEC: K1VSG. OOC: WT1W. The traffic nets were exceptionally busy during December with Christmas and New Year's greetings. The Mt Tom group has linked their two repeaters with the Mt Greylock repeater. This 440 system should extend coverage to more than half the state. One more link, Wachusetts, and the whole state would be covered. Just a thought. Jerry, AA2T, reports that the Leominster Emergency Management is in the process of finishing their new hq. A 100 ft tower and operating room for a ham station is one of the features. KD1SM, KD1LE, and W1XP article on their Fox Finder was published in *QST*. Congratulations on a well-written construction article. The January edition was excellent and reflects a great amount of work. I hope the HCRA group appreciates the excellent job you and your crew are doing. I'm still looking for help with Western Mass seven day commitment to the first region cycle four net. This is a CW net. If interested, contact me at my e-mail address or by telephone. All traffic handlers, please get your reports to NZ1D before the 5th of the month. I have a deadline for my reports to get into HQ. Tfc: K1TMA 258, N1WAS 160, N1RLX 40, W1ZPB 45, W1UD 307.

NORTHWESTERN DIVISION

ALASKA: SM, David Stevens, KL7EB—The Iditarod Dog Sled Race needs help at the Mulliuniam Hotel in Anchorage. The race starts the first Saturday in March (3rd). Ed Trump, AL7N, did it again. A CW traffic net is up and running at 3535 and 7042 from 1930 to midnight. AL7N, N1TX in Fairbanks and KL5T, KL7FH in Anchorage are primary operators but you are invited to join. Ed's, AL7N, e-mail is 1.trump@worldnet.att.net. Other nets are Snipers 3920 1800 AST, Bush Net 7093, 2000 AST, Motley Group 3933 2100 AST, and Alaska Pacific Net M-F 14.292 0830.

EASTERN WASHINGTON: SM, Kyle Pugh, KA7CSP—In December and January there have been some rare but excellent 6-meter band openings to the east coast with lots of stations being worked. What fun. The Northwest VHF Society has been formed to promote weak-signal operation on VHF, UHF, and microwave. Log onto their reflector at: nwwsvhf@qth.net. Sorry to report that Ruby Peterson, WO7C of Spokane, had a serious debilitating stroke in December. She was always helpful and cheerful on the repeaters. In memoriam: Ron Moore, K7HNT, of Moses Lake and formerly Spokane, became a Silent Key. STM Don, W7GB, reported that quite a bit of Christmas message traffic was handled in December. Much of it came from Alaska. Also a fair amount of written message traffic has showed up in January. Tfc: W7GB 155, K7GXZ 81, KA7EKL 63, K7BFL 46, KK7T 21. PSHR: W7GB 128, K7GXZ 122.

IDAHO: SM, John Cline, K7BDS — OOC: W7ZU. SEC: AA7VR. STM: W7GHT. TC: N7ZFE. Members of Treasure Valley ARES/RACES conducted another very successful "Santa's Workshop" for Cancer Kids at St. Luke's Mountain States Tumor Institute. Thank you to all those who participated. Rod Greene, W7ZRC and LeMoyne Schafer, K7QD, were recognized at the VOI Club meeting in January for High Group Score in the Idaho Section during Field Day 2001 with 8,000 points. ARES breakfast was held at Raedean's in Boise on Janaury 12th. All hams are invited to the ARES breakfast, which is held on the second Saturday of each month. Please check idahohamradio.com for further information. Tfc: W7GHT 302, KB7GZU 94, WB7VYH 51, W6ZOH-37. PSHR: W7GHT 127, WB7VYH 94. Nets: FARM-31/ 3170/45/W7WJH; NWTN 31/1345/74/ KC7RNT; IDACD 21/418/3/WB7VYH; IMN 31/552/ 129/W6ZOH.

MONTANA: SM, Darrell Thomas, N7KOR—A very big congratulations goes out to the Butte Amateur Radio Club in Butte Montana. They are probably the oldest affiliated club in the Montana Section and are starting their 66th year as an Amateur Radio Organization. They have a very active membership and participate in many events. One of their members Lori Hamner, N7NNR, was honored by being selected as one of 7,200 torchbearers nationwide who will carry the Olympic Flame as it travels to the 2002 Winter Olympics in Salt Lake

MFJ *Speech Intelligibility* Enhancer

. . . makes barely understandable speech highly understandable!

MFJ-616
$169.95

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Try it for 30 Days

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

MFJ Contest Voice Keyer

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

MFJ-434
$179.95

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

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

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

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

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

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

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

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

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

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

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

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

60 dB Null *wipes out* noise and interference

MFJ-1026
$179.95

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

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

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

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

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

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

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

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

MFJ-1025, $159.95. Like

MFJ-1026 less built-in active antenna, use external noise antenna.

MFJ *tunable* Super DSP filter

MFJ-784B
$249.95

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

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

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

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MFJ *Switching* Power Supplies

Power your HF transceiver, 2 meter/440 MHz mobile/base and accessories with these new 25 or 45 Amp MFJ MightyLite™ Switching Power Supplies!

No RF hash . . . Super lightweight . . . Super small . . . Volt/Amp Meters . . .

MFJ's new adjustable voltage switching power supplies do it all! Power your HF or 2M/440 MHz radio and accessories.

MFJ's *MightyLites*™ are so light and small you can carry them in the palm of your hand! Take them with you anywhere.

No more picking up and hauling around heavy, bulky supplies that can give you a painful backache, pulled muscle or hernia.

MFJ's 25 Amp *MightyLite*™ weighs just 3.7 lbs. -- that's *5 times lighter* than an equivalent conventional power supply. MFJ's 45 Amp is even more dramatic -- *8 times lighter* and weighs just 5.5 pounds!

No RF hash!

These babies are clean . . . Your buddies won't hear *any* RF hash on your signal! *None* in your receiver either!

Some competing switching power supplies generate objectionable RF hash in your transmitted and received signal.

These super clean MFJ *MightyLites*™ meet all FCC Class B regulations.

Low Ripple . . . Highly Regulated

Less than 35 mV peak-to-peak ripple under 25 or 45 amp full load. Load regulation is better than 1.5% under full load.

Fully Protected

You won't burn up our power supplies!

No RF Hash!

MFJ-4225MV
25 Amp
$149.95
plus s&h

MFJ-4245MV
45 Amp
$199.95
plus s&h

No RF Hash!

They are fully protected with Over Voltage and Over Current protection circuits.

Worldwide Versatility

MFJ *MightyLites*™ can be used anywhere in the world! They have switchable AC input voltage and work from 85 to 135 VAC or 170 to 260 VAC. Replaceable fuse.

MightyLites™ . . . Mighty Features

Front-panel control lets you vary output from 9 to 15 Volts DC.

Front-panel has easy access five-way binding posts for heavy duty use and cigarette lighter socket for mobile accessories. MFJ-4245MV has two sets of quick-connects on the rear for accessories.

Brightly illuminated 3 inch meters let you monitor load voltage and current.

A whisper quiet internal fan efficiently cools your power supply for long life.

Two models to choose from . . .

MFJ-4225MV, $149.95. 25 Amps maximum or 22 Amps continuous. Weighs 3.7 pounds. Measures 5¾Wx4½Hx6D in.

MFJ-4245MV, $199.95. 45 Amps maximum or 40 Amps continuous. Weighs 5.5 pounds. Measures 7½Wx4¾Hx9D in.

NEW! 25 Amp MightyLite™

MFJ-4125
25 Amp
$109.95
plus s&h

Super light, super compact switching power supply delivers 25 Amps maximum/ 22 Amps continuous at 13.8 Volts DC. Low ripple, highly regulated. ***No RF Hash!*** Five-way binding posts for high current. Quick connects for accessories. Over voltage/current protection. 110 or 220 VAC operation. Meets FCC Class B regs. 3.5 lbs. 5½Wx2½Hx10¾D in.

MFJ 35/30 Amp Adjustable Regulated DC Power Supply

Massive 19.2 pound transformer . . . No RF hash . . . Adjustable 1 to 14 VDC . . .

MFJ-4035MV
$149.95
plus s&h

MFJ's heavy duty conventional power supply is excellent for powering HF or 2 Meter/440 MHz transceiver/accessories.

A massive 19.2 pound transformer makes this power supply super heavy duty! It delivers 35 amps maximum and 30 amps continuous without even flexing its muscles. Plugs into any 110 VAC wall outlet.

It's highly regulated with load regulation better than 1%. Ripple voltage is less than 30 mV. *No RF hash* -- it's super clean!

Fully protected -- has over voltage protection, fold back short circuit protection and over-temperature protection.

You get front panel adjustable voltage from 1 to 14 VDC with a convenient detent set at 13.8 VDC. A pair of front-panel meters let you monitor voltage and current.

Three sets of output terminals include a pair of heavy duty five-way binding posts for HF/VHF radios, two pairs of quick-connects for accessories and a covered cigarette lighter socket for mobile accessories.

A front-panel fuse holder makes fuse replacement easy. Whisper quiet fan speed increases as load current increases -- keeps components cool. 9½Wx6Hx9¾D inches.

MFJ *High Current* Multiple DC Power Outlets

Power two HF/VHF transceivers and six or more accessories from your 12 VDC power supply

MFJ-1118
$74.95
plus s&h

MFJ-1116
$49.95
plus s&h

MFJ-1112
$34.95
plus s&h

New!
MFJ-1117
$54.95

MFJ-1118, $74.95. This is MFJ's most versatile and highest current *Deluxe Multiple DC Power Outlet*. Lets you power two HF and/or VHF transceivers and six or more accessories from your transceiver's main 12 VDC supply.

Two pairs of super heavy duty 30 amp 5-way binding posts connect your transceivers. Each pair is fused and RF bypassed. Handles 35 Amps total.Six pairs of heavy duty, RF bypassed 5-way binding posts let you power your accessories. They handle 15 Amps total, are protected by a master fuse and have an ON/OFF switch with "ON" LED indicator.

Built-in 0-25 VDC voltmeter. Six feet super heavy duty eight gauge color-coded cable with ring tongue terminals. Binding posts are spaced for standard dual banana plugs. Heavy duty aluminum construction. 12½x2¾x2½ in.

MFJ-1116, $49.95. Similar to MFJ-1118. No 30 amp posts. Has "ON" LED and 0-25 VDC voltmeter. 15 amps total.

MFJ-1112, $34.95. Similar to MFJ-1116. No on/off switch, LED, meter, fuse.

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OREGON: SM: Bill Sawders, K7ZM—ASM: KK7CW. SEC: WB7NML. STM: W7IZ. SGL: N7QQU. OOC: NB7J. STC: N7LA. ACC: K7SQ. The Central Oregon DX Club will again sponsor the 2002 Oregon QSO Party on Saturday, May 11th. Details will be in the May *QST* Section News, but thought I'd let you know the date, so you can plan on getting on-the-air that day. Many Amateurs throughout the world need Oregon for their Worked All States and Worked All Counties awards. Some hams take their R.V.'s and mobiles to "rare counties" to operate. Did you know some Oregon Counties have as few as three hams? And...some of them aren't active! More later. The 7th District ARRL QSL Bureau reminds everyone that they have a HUGE number of unclaimed DX cards at the bureau. DX includes Canada. Details for claiming cards are at: www.qsl.net/wvdxc or stop by the ARRL booth at most ham conventions for more details. The "Boise to Portland bike-a-thon" takes place from July 7th through the 13th. They have requested Amateur Radio emergency communications. This is a great opportunity for your emergency group or club to receive much-needed experience in a safety and emergency environment. Information about the ride, including a daily itinerary, can be found at www.aridetoremember or contact John Cline, K7BDS, at k7bds@arrl.org. Keep in touch. NTS Traffic totals for December 2001: W7IZ 221, KC7ZZB 69, KK1A 60, KC7SRL 59, AC7DD 53, N7TSS 45, W7VSE 44, K7NLM 40, N7DRP 33, KC7SGM 8.

WESTERN WASHINGTON: SM, Harry Lewis, W7JWJ— One of the online services offered is weather alert information. Several times in January such notices were sent with Amateurs standing by in case of a call up for river flood watch. Reporting via the SEC Whatcom Co. EC. Matt, KC7UHN reports his first activation when his team was put on alert in response to a combination of high tide and wind. The concern was for property damage and flooding. 36 Clark and Cowlitz Co. members participated in the Walk-N-Knock food drive. Donations were down from last year, and the weather was miserable. An exercise in lieu of a meeting had 40 members of Clark Co. ARES check in on 2-meters; 35 of those checked on 440; the 15 checked in on HF and 8 of the 40 checked in on Packet. EC K7YFJ was very pleased with the turnout and the various modes available. Many of the check-ins could have operated on emergency power. Has your unit thought about how to obtain mutual aid? Do you know what information is needed to request mutual aid? Check out the appendices in the State RACES Plan which may be found at: http://www.wa.gov/wwem/2-ops/ops-plans/races/racesplan-idx.htm. The National Traffic System (NTS) Section and regional nets are composed of dedicated traffic handlers that spend many hours sending, relaying and receiving messages on the behalf of others. A very few are honored by accumulating enough points to qualify for the coveted Brass Pounders' League. Total station traffic for December: N7AJ 154, K7BDU 222, W7DPW 17, W7LG 128, K7MQF 207, W7QM 282, KJ7SI 28, KA7TTY 4, W7TVA 440, N7YSS 45, W7ZIW 111, K7BDU, mgr day cycle RN7, reports a change in schedule for the Region Net. STM W7ZIW filed reports for the Section NTS nets which appear in the EWA report. Here in WWA Clark Co. ARES & Info net had a QNI of 71, WSN QNI 917, West Coast Net QNI 173, NWSSB QNI684. Are you having a bit of trouble studying for your General Class license? Perhaps the 5th and 6th graders of Franklin Elementary School in Kirkland can help. Most of the class have now passed the General exam and 27 new students have signed to take the next class taught by Dave Condon, KI7YP. Look for more Section News on the Web. http://www.arrl.org/Section/. — 73

PACIFIC DIVISION

EAST BAY: SM: Andy Oppel, N6AJO—ASMs: NJ6T, KE6QJV. SEC: KE6NVU. DECs: KE6QJV/Alameda County, KO6JR/Contra Costa County, WA7IND/Napa County, K6HEW/Solano County, N6UOW/Training, W6CPO/Technical Services, KQ6TM/Section Plans and Administration. OOC: KD6FFN. STM: W6DOB. ACC: NJ6T. EB Web Page: http://www.pdarrl.org/ebsec/. Webmaster is KB6MP. MDARC elected 2002 officers: KE6WRE/Pres, KG6CSJ/VP, KD4YEQ/Sec, WA6JAU/Treas, K6HS/EC, KT6Y/Dir, NN6E/Dir. VVRC officers for 2002 are K6DME/Pres, KA6FDI/VP, KF6VBJ/Treas, KC6BXN/Sec and Directors N6ZGB, K6ZU, K6HEW and WH6AB. HRC elected 2002 officers: K6BIR/Pres, KE6PID/VP, N6OJJ/Treas, KF6HFK/Sec, KC6QHM/Par, KF6GZX/SAA. EBARC welcomes new member KF6ZBH and congratulates a bumper crop of upgrades to Extra: KA6BQF, KQ6QH, AE6AW, N6MNL, WA6QJT, WB6PIV and K6USW. In December, NALCO elected the following club officers: George Nace, KD6WZY, is now president, Don Stiver, NN6RF, is vice-president. Dan Thornton, KF6JRM, was re-elected as treasurer, and Jim Johnston,K6APW, is secretary. December tfc: W6DOB 699, AK6DV 76, WB6UZX 55, KE6QR 23. PSHR: W6DOB. BPL: W6DOB. Tfc nets: NCN1/3630/7PM; NCN2-SLOW SESSION/3705/9 PM; NCN-VHF/145.21/7:30 PM; RN6/3655/7:45 PM & 9:30 PM; PAN/3651/7052/8:30 PM. Your check-ins are always welcome.

NEVADA: SM, Jan Welsh, NK7N—SEC Paul Cavnar, NN7B, conducting a round-up to help with Olympics, is busy with Net Control program. Field Day 2002 is 4th full weekend in June guys. The 22nd and 23rd. I checked into the W7LKO -Elko clubs Web page at www.qsl.net/w7lko and enjoyed the slides. Well done! LVRACs APRS Tracker building party at N LV airport project funded by club for members. The CVRCs extra class will wake up the amateurs that conduct the class and remind them of things forgotten if unused. SNARS 'BOB DAVIS MEMORIAL AWARD' will be something for members to work for, and it couldn't have had a better person to hold in memory. SIERA members appearing in the 'Sierra Magazine' section of the 'Nevada Appeal' in Carson City have given the public a special view of Amateur Radio's purpose with the Pony Express communication project they conduct yearly. RARAs newest project, activation of the Elko chapter, brings more variety to a hobby we all enjoy. The FARS newsletter editor, NW7O-Jim, reminds all he does WAS-VUCC- DXCC, e-mail nw7o@anv.net. The year 2002 is new, and I hope it stays bright, shiny and fulfilling. 73 to all, Jan nk7n@aol.com. Tfc: W7TC 156, K7NHP 61, W7VPK 51, N7CPP 40, W7YDX 8, NV7YL 6, KD7MXR 6, KD7NGY 1.

PACIFIC: SM, Ron Phillips, AH6HN— It is with great sadness

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MFJ uses super heavy duty components to make the world's finest legal limit tuner

MFJ uses super heavy duty components -- roller inductor, variable capacitors, antenna switch and balun -- to build the world's most popular high power antenna tuner.

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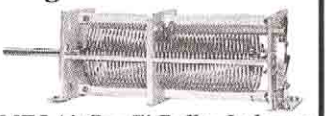
The rugged world famous MFJ-989C handles 3 KW PEP SSB amplifier input power (1500 Watts PEP SSB output power). Covers 1.8 to 30 MHz, including MARS and WARC bands.

MFJ's *AirCore*™ roller inductor, new *gear-driven* turns counter and weighted spinner knob gives you exact inductance control for absolute minimum SWR.

You can match dipoles, verticals, inverted vees, random wires, beams, mobile whips, shortwave -- nearly any antenna. Use coax, random wire or balanced lines.

You get everything you've ever wanted in a high power, full featured antenna tuner -- widest matching range, lighted Cross-Needle SWR/Wattmeter, massive transmitting variable capacitors, ceramic antenna switch, built-in dummy load, *TrueCurrent*™ Balun, *scratch-proof* Lexan front panel -- all in a sleek compact cabinet (10¾Wx4½Hx15D in).



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Two knob tuning (differential capacitor and *AirCore*™ roller inductor) makes tuning foolproof and easier than ever. Gives minimum SWR at only one setting. Handles 3 KW PEP SSB amplifier input power (1.5 KW output). Gear-driven turns counter, lighted peak/average Cross-Needle SWR/Wattmeter, antenna switch, balun. 1.8 to 30 MHz. 10¾Wx4½Hx15 in.

MFJ-962D *compact* Tuner for Amps

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A few more dollars steps you up to a KW tuner for an amp later. Handles 1.5 KW PEP SSB amplifier input power (800W output). Ideal for Ameritron's AL-811H! *AirCore*™ roller inductor, gear-driven turns counter, pk/avg lighted Cross-Needle SWR/Wattmeter, antenna switch, balun, Lexan front, 1.8-30MHz. 10¾x4½x10⅞ in.

MFJ-969 300W *Roller Inductor* Tuner

MFJ-969 **$199.95**

Superb *AirCore*™ Roller Inductor tuning. Covers *6 Meters* thru 160 Meters! 300 Watts PEP SSB. *Active* true peak reading lighted Cross-Needle SWR Wattmeter, *QRM-Free PreTune*™, antenna switch, dummy load, 4:1 balun, Lexan front panel. 3½Hx10½Wx9½D inches.

MFJ-949E *deluxe* 300 Watt Tuner

MFJ-949E **$149.95**

More *hams use MFJ-949s than any other antenna tuner in the world!* Handles 300 Watts. Full 1.8 to 30 MHz coverage, 48 position *Precision48*™ inductor, 1000 Volt tuning capacitors, *full size* peak/average lighted Cross-Needle SWR/Wattmeter, 8 position antenna switch, dummy load, *QRM-Free PreTune*™, scratch proof Lexan front panel. 3½Hx10⅝Wx7D inches. **MFJ-948, $129.95.** Economy version of MFJ-949E, less dummy load, Lexan front panel.

MFJ-941E *super value* Tuner

MFJ-941E **$129.95**

The *most for your money!* Handles 300 Watts PEP, covers 1.8-30 MHz, *lighted* Cross-Needle SWR/Wattmeter, 8 position antenna switch, 4:1 balun, 1000 volt capacitors, Lexan front panel. Sleek 10½Wx2½Hx7D in.

MFJ-945E HF+6 Meter *mobile* Tuner

MFJ-945E **$119.95**

Extends your mobile antenna bandwidth so you don't have to stop, go outside and adjust your antenna. Tiny 8x2x6 in. *Lighted* Cross-Needle SWR/Wattmeter. Lamp and bypass switches. Covers 1.8-30 MHz *and* 6 Meters. 300 Watts PEP. **MFJ-20, $4.95,** mobile mount.

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Tunes coax, balanced lines, random wire 1.8-30 MHz. Cross-Needle Meter. SWR, 30/300 or 6 Watt QRP ranges. Matches popular MFJ transceivers. Tiny 6x6½x2½ inches.

MFJ-901B *smallest* Versa Tuner

MFJ-901B **$79.95**

MFJ's smallest (5x2x6 in.) and most affordable wide range 200 Watt PEP Versa tuner. Covers 1.8 to 30 MHz. Great for matching solid state rigs to linear amps.

MFJ-16010 *random* wire Tuner

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Operate all bands anywhere with MFJ's reversible L-network. Turns random wire into powerful transmitting antenna. 1.8-30 MHz. 200 Watts PEP. Tiny 2x3x4 in.

MFJ-906/903 *6 Meter* Tuners

MFJ-906 **$79.95**

MFJ-906 has lighted Cross-Needle SWR/wattmeter, bypass switch. Handles 100 W FM, 200W SSB. **MFJ-903, $49.95**, Like MFJ-906, less SWR/Wattmeter, bypass switch.

MFJ-921/924 *VHF/UHF* Tuners

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MFJ-921 covers 2 Meters/220 MHz. **MFJ-924** covers 440 MHz. SWR/Wattmeter. 8x2½x3 inches. Simple 2-knob tuning for mobile or base.

MFJ-922 *144/440 MHz* Tuner

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Ultra tiny 4x2½x1¼ inch tuner covers VHF 136-175 MHz and UHF 420-460 MHz. SWR/Wattmeter reads 60/150 Watts.

MFJ-931 *artificial* RF Ground

MFJ-931 **$89.95**

Creates artificial RF ground. Also electrically places a far away RF ground directly at your rig by tuning out reactance of connecting wire. Eliminates RF hot spots, RF feedback, TVI/RFI, weak signals caused by poor RF grounding. **MFJ-934, $169.95**, Artificial ground/300 Watt Tuner/Cross-Needle SWR/Wattmeter.

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that I report the passing of Les Whiteley, AH6OV (formally FO5GZ). Les was very active in the Pacific Maritime Net for many years, both in Tahiti and on the Big Island. He was also an active member of BIARC, and will be greatly missed. Aloha, Les. The ham club in Kona, (HWARS) has changed their name to the Kona Amateur Radio Society. They have a new set of officers, and have many good things planned for 2002. Check out their Web site. The HI QRP Club again joined forces with Hilo ARC for the ARRL 10 Meter Contest December 14-15-16. The location was Laupahoehoe Point Beach Park and the club call used was KH6IN. QRP 5 watts was used in a multi-operator effort. QSO points: 1770, state/province/DX entity multiplier: 125, claimed score: 221, 250. The event was attended by AH6HB, KH6BMM, KH6KT, KH6ZM, KH6AVF, KH6AFQ, NH6XB, KH6B, W6ORS, NH7HF, WH6BBK, AH6NK, NH7AU, NH7EA, and NH7IR. Thanks Dean for your report. Much discussion is ongoing about the proposed ham convention for Hawaii in October, 2002. There may be more than one convention, as some hams on the Big Island are looking into a much larger event than in previous years on Oahu. More later as things get resolved. All those members who are interested, please provide your comments. My thanks to all those who contributed their inputs and thoughts for the Pacific Section's future.

SACRAMENTO VALLEY: SM, Jerry Boyd, K6BZ—Another reminder regarding EMCOMM 2002. Next month at Bishop Quinn High School near Redding. Info via K6SOJ@arrl.net. N6NPN is a busy guy. He's EC for Butte & Glenn Counties and President of GEARS. His ARES group is in the process of receiving an 18 ft comm trailer in an agreement with Butte CO REACT. Congrats to new officers of North Hills RC: KE6UUG, KE6RKK, WB6SNU, KF6VMY & W6RWL. Several took the time to respond personally to my January column about giving something back to Amateur Radio in the New Year. Thanks for the comments! If you haven't checked it out yet, the Section has a new ARES Web site ...www.qsl.net/K6soj/. It's worth looking at. This is the month the new DXCC Country (Ducie Island) is scheduled to hit the airwaves as a result of a DX-pedition. Give the HF bands a listen and you may pickup this all time new one. Speaking of DX, the Section has several DXCC card checkers available to check your QSL cards for DXCC credit. Beats sending all the cards to Newington both in terms of cost and speed. I'm back into HF mobile after an absence. That's one of the many things I like about this great hobby. You can try something, put it aside for awhile, and then experience the fun of picking it up again. Until next month. 73 de K6BZ.

SAN FRANCISCO: SM, Len Gwinn, WA6KLK—ASM: KH6GJV. SEC: KE6EAQ. Glad to announce that Marci Campbell, KE6IAU, of Eureka, is the new Assistant SEC and is covering Humboldt and Del Norte Counties for the section. A new DEC for Humboldt is being appointed also. REDXA had a lot of participation in the Cal QSO party and it is understood that they had several members in the top scores. VHF activity in the weak signal modes has been very active from the section also with a few European contacts made. Your SM suffered a nearby lightning strike in December that took a few things off the air. Check your grounds for good connections!! Please share your speaker lists with me so that they can be sent to all the clubs. Ideas also wanted. The section, at this time of writing, has been very quiet with news so please send in news items. Time to think about what needs to go to the swap meet piles now. San Francisco Section Convention is planned for Humboldt County again in late June.

SAN JOAQUIN VALLEY: SM, Donald Costello, W7WN — ASM: Mike Siegel, KI6PR. ASM: John Lee, K6YK. ACC: Charles McConnell, W6DPD. OOC: Victor Magana, N1VM. STM: Fred Silveira, K6RAU. Kent LeBarts, K6IN. STM activity report: PSHR = (1) 11, (2) 01, (6) 20 / Ttl = 32 KB6QIB Nov. report rec. 3, sent 11, DLD 1, Ttl. = 15 (1) 54, (2) 14, (3) 3, (4) 1, (6) 10, TTl = 82 A reminder of the International DX Convention that takes place in Visalia April 26-28, 2002. This World-Class event takes place in S.J.V. Section every year and is well worth your attendance. So, put that weekend on your calendar. The location is the Holiday Inn in Visalia. ICOM, Kenwood and Yaesu will be there. I hope to see you there. Speaking of DX, one of the worlds finest antenna design and manufacturing companies is located in S.J.V. Section. M2 Enterprises has moved from their old location in Fresno to 4402 N. Selland, Fresno, CA 93722. Mike Staal, K6MYC, is the designer and moving force behind M2. Performance is the key to M2 antenna designs. If you are into six meters, you will doubtless hear Mike on the magic band and me, too. If your radio club would like publicity of a future event, please contact me with full information two months in advance and I will be very pleased to include it in the Section News. My e-mail address is: w7wn@arrl.org.

ROANOKE DIVISION

NORTH CAROLINA: SM, John Covington, W4CC — SEC: KE4JHJ. STM: NØSU. BM: KD4YTU. TC: K4ITL. PIC: KN4AQ. OOC: W4ZRA. SGL: AB4W. ACC: vacant. http://www.ncarrl.org. Skywarn training will soon be held in many parts of our state. If you haven't taken such a course recently, please take one this year. Skywarn is an important way that we can contribute to our community, and it can save lives. Amateur Radio is a big part of the Skywarn program, let's keep it that way. If you are a newly elected officer for an ARRL-affiliated club, please make sure your club files the Annual Report. This can be done online and updates ARRL on your club's officers, telephone numbers and other information we use to contact you. Even if your officers have not changed in a while, check your record and make sure area codes and phone numbers are up to date. I also need updated Club and County ARES web page links for the ncarrl Web site. It has been undergoing an extensive revision, and we need information from you that should be on there. Congratulations to our 2001 ARECC graduates: Level I: KF4OYT, KD4CLJ, WD8KEL, WA4NC, KV4CN, W4YBQ, W4CHL, KG4KSX, KD4ITI. Level II: W3GYK, KD4YTG, KD4ZOE, N1KFC, KG4AWO, N4YMO, W4OH. Level III: W4CC, KB5WY, NC4DT. I'd especially like to thank Dave, NC4DT, for his extensive involvement in the development of these courses. Hamfests: Charlotte March 9-10; Down East/Kinston March 24; Raleigh April 14. Dec. traffic: W4EAT 776 (BPL), K4IWW 364, NC4ML 242, K4RLD 187, KI4YV 156, AA4YW 128, W4IRE 88, KE4JHJ 86, AD4XV 56, WA4SRD 49, N4TAB 42, W3HL 39, W4CC 34, NØSU 34, KG4HDT 28, K4WKT 25, K3AEB 16, WD4LSS 14, KB8VCZ 14, NT4K 10, N4N4O 10 AE4HJ 7, W4EHF 5, AA4TE 5, KB5WY 3, WD4MRD 2. Nov.: W4IRE 55.

SOUTH CAROLINA: SM, Patricia M. Hensley, N4ROS — As of this month, many of you have been to and enjoyed two hamfests in this state. Each was well organized and attendance was good. My hope for the remainder of 2002 is that everyone will make a special effort to attend a hamfest and become a part of a most enjoyable time. The local club has spent long hours planning for the hamfest and all their work comes together when amateurs support the event. Another segment of hamfests are those dealers who continue to support our gatherings. They have costs but enjoy serving you by bringing equipment, parts, and materials to your attention for purchase. Whether you come to the hamfest to look for or purchase used and new equipment, parts, or radio paraphernalia; learn about new technologies; attend seminars or ARRL meetings; maybe, even for the food; or just to renew old friendships and make new ones, we all can find something of interest. A hamfest is loads of fun! Come join us!...and visit with me at the ARRL table. Tfc: AF4QZ 170, KA4LRM 114, KA4UIV 67, K4JIF 38, K3LM 22, WB4BUH 18, N4VVX 15, KG4FQG 14, K8DZH 13, K4BG 11, WB4PCS 3. PSHR: N4VVX 145, KA4UIV 129, KA4LRM 122, AF4QZ 121, K4BG 90, KG4FQG 73. SEC Report 313.

VIRGINIA: SM, Carl Clements, W4CAC—SEC: N4NW. STM: N1SN. PIC: W4PW. ACC: W4IM. OOC: W4NEZ. TC: W4RAH. Several things have happened in the Section since we last met here. I would like to congratulate Tom Gregory (N4NW) for being named the recipient of the 2001 Roanoke Division ARRL Service Award. This award was presented to Tom at Frostfest in Richmond on the 10th of February. Were you at Frostfest? If so, I hope you stopped by and said hello or attended one or more of the forums. Hamfests offer a great opportunity to meet old friends, make new friends, eat (after all, isn't that what hams do?), and shop for that "once in a lifetime" deal. In Portsmouth, on January 12th, the Portsmouth ARC hosted an NTS traffic handling class attended by 17 people. The instructor was Butch Burke, KE4AZL, who did an outstanding job. I look forward to hearing some of these newly trained folks on the local and section level traffic nets. If your club or group is sponsoring a training class, or a hamfest, or anything that the other members in the section would like to hear about, please send it to me and to Pat Wilson (w4pw@arrl.net), and we will put it in the Section News and on our Web page. Remember, you are the ARRL! 73 de Carl, W4CAC. Tfc: W3BBQ 437, N1SN 196, WA4DOX 161, KØIBS 150, K4MTX 85, N4ABM 79, KG4OTL 79, KV4AN 70, K4YVX 62, AA4AT 60, WB4ZNB 44, W4VLL 31, KB4CAU 29, W4YE 24, W4CAC 23, K3SS 19, WB4UHC 17, KU4MF 16, W4JLS 8, W4MWC 7, KE4PAP 4.

WEST VIRGINIA: SM, Hal Turley, KC8FS—www.qsl.net/wvarrl. We are seeing more involvement in our NTS and ARES activity- hope this trend continues! Tnx to everyone participating es checking in; you make our section one of the strongest es most active in the country. The MSEN meets 2nd and 4th Thursday of the month following WVFN on 3.865 MHz at 6 PM. During the Jan.10 MSEN we had 38 check-ins w/ several DECs and ECs onboard. All 9 districts were represented for 1st time in a good while. However, we still have vacancies in our ARES organization that need filled; check Web site or, contact me or Mac, W8XF, if you are interested in serving. Welcome Dirk Burnside, WD8PAD, as new DEC for Zone 5. Dirk is highly qualified for this position and motivated to assist with our ARES organization. Additional appointments: Bert Garcia, N8NN, as O.O. from Moundsville and Hal Tate, N8FXH, as OBS. Congrats to Sharon Spencer, KC8KVF, for successful completion of the ARRL Level 1 Emergency Communications on-line course. Look for everyone at the Charleston Hamfest—March 16th. 73 de Hal. Tfc (Dec): KA8WNO 402, W8YS 118, KC8CON 84, N8NMA 81, W8WWF 72, WW8D 55, WD8DHC 51, N8FXH 7. PSHR: KC8CON 150, W8YS 143, W8WWF 126, KA8WNO 118, WD8DHC 111, N8NMA 104, WW8D 102, W8IVF 93. WVMDN 823/33/469 WW8D; WVN E 119/76/306 N8NMA; WVN L 123/55/261 N8NMA; WVFN 1211/182/923 KC8CON; BDARC (2mtr) 182/0/365, EPTN (2mtr) 121/0/55, PARA (2mtr) 24/1/50.

ROCKY MOUNTAIN DIVISION

COLORADO: SM, Jeff Ryan, NØWPA— ASM: Tim Armagost, WBØTUB. ASM: Jerry VerDuft, ADØA. SEC: Mike Morgan, N5LPZ. STM: Mike Stansberry, KØTER. ACC: Ron Deutsch, NKØP. PIC: Erik Dyce, WØERX. OOC: Karen Schultz, KAØCDN & Glenn Schultz, WØIJR. SGL: Mark Baker, KGØPA. TC: Bob Armstrong, AEØB. BM: Jerry Cassidy, NØMYY. As I write this on January 10th, there's a discussion going on among the Section Manager's about the future of this column. The Division Directors need to take actions to help control costs due to a decline in advertising revenue and reducing the size of *QST* is one of the items on the table. Reducing *QST* by 16 pages will result in annual savings of $100,000. The discussions I have seen indicate that this column (Section News) and contest results would be dropped. This information can instead be made available on the Web— and in a timelier manner. The board of directors meeting is scheduled for January 18th, so by the time you read this, the decision will have been made. Nevertheless, I'm interested in hearing from the membership here in Colorado on this issue. If you haven't already sent me your comments via e-mail and would like to weigh in, please let me know your thoughts. My contact information is on page 12, under Rocky Mountain Division and Colorado Section. Write, phone or e-mail. Speaking of the Web, ARRL has made a Web page available to me for the purpose of posting timely information of interest to ARRL members in Colorado. Surf on over to www.arrl.org/sections and click on Colorado. If you have items you'd like me to post on this page, e-mail them to me. If you have items for this column, let me know that as well. 73, de NØWPA. NTS Traffic: ADØA 231, KØTER 117, WØZZS 9. CAWN: WØWPD 803, K4ARM 538, WØLVI 503, KØHBZ 478, NØNMP 473, WØGGP 418, ABØPG 372, AAØZR 353, WØNCD 295, WDØCKP 262, NØFCR 206, WBØVET 186, KIØND 145, WBØTYT 114.

NEW MEXICO: SM, Joe T. Knight, W5PDY—ASM: K5BIS, N5ART & KM5FT. SEC: K6YEJ. STM: N7IOM. NMs: WA5UNO & W5UW. TC: W8GY. ACC: N5ART. Efforts to get the New Mexico PRB-1 Legislation voted on this session are

still moving forward with AC5ZO leading the way. The Bill is entitled "Emergency Communications Response Act" and is an attempt to get the PRB-1 Bill through the upcoming Legislative session, and to convince Governor Johnson to sign the Bill. At this moment, the Governor has agreed to request that the Bill be on the agenda for this session. That is a major step! We are hoping for the best! If you have not contacted the Governor or your NM State Senator or Representative, please do make contact and help support our efforts. We need to make our voices heard. ARES members from central and northern NM attended a very interesting meeting at the new Bernalillo County Emergency Operations Center. A tour of the Center proved very interesting and a special room for ARES Communications is being readied. Excellent newsletters from the Valencia County ARA, Mesilla Valley RC, QRL from the Gila ARS, S.A.R.A. News from Socorro, W5ES Bulletin, Pecos Valley ARC, ABQ ARC, ABQ ARCC, Deming ARC, URFMSI, Zero Beat, and many others. Very sorry to report the passing of ole timers WB5YBD of Belen, and EX-W5TDB of Carlsbad. They had been active on our Nets for many years. Also, sorry to note the passing of N5HKG & KD5BDV. They, too, will be missed. 73, W5PDY.

UTAH: SM, Mel Parkes, AC7CP— Congratulations to the new officers for Utah ARC: Pres: Mark Richardson, W7HPW; Exec VP: Brett Sutherland, KC7WRR; VP: Gordon Smith, K7HFV; Sec: Gregg Smith, K7APW; Treasurer: Chuck Johnson, WA7JOS; Program Chairs Lauri McCreary, K7LMM and Steve Baxter, K7SRB; and Microvolt Editor: Bruce Bergen, KI7OM. Davis County ARC elected their new Officers: Gary Johnson, N7DND; Mike Youngs, KK7VZ; Treasurer: Alia Zundell, KD7JGA and Sec: Garrie McLaws, KA7LFG. Good luck during your tenure as club officials. Note for other Utah clubs, if you have changes to your officers let me know so I can give them the recognition they deserve. The VHF annual swap meet will be held on 02 Mar at the Utah State Fair Park at 0800 in the Zion Building. Join us for great deal on new and used gear. You will also be able to pre register for the Utah Hamfest there. 73 de Mel - AC7CP.

WYOMING: SM, Bob Williams, N7LKH—There is a proposal to be considered at the January Board meeting (Jan.18-19), to eliminate the Section reports, and "some" contest results from *QST*, posting them instead on the ARRL Web site. In theory, this will remove 16 pages from the magazine, thus reducing mailing costs. Since *QST* is already more that half advertisements, I wonder how many will renew their memberships for the privilege of needing a computer to look up a Web site to see the only things that distinguish *QST* from *CQ* or *WorldRadio*? Would you regularly visit a Web site to check these things? Do you read them now? What I like about *QST* is that I can take it with me to the dentist's office, or on a weekend trip. So, if you have any views on the subject, send a message to our Division Director, Walt Stinson, W0CP@arrl.org, and Vice Director, Rev Morton, WS7W@arrl.org, with copy to me. Their mailing addresses and phone numbers are in *QST*, or send a message via the Cowboy Net or the Columbine Net. Tfc: NN7H 424.

SOUTHEASTERN DIVISION

ALABAMA: SM, Bill Cleveland, KR4TZ – ASMs: W4XI KB4KOY. SEC: W4NTI. SGL: KU4PY. ACC: KV4CX. TC: W4OZK. Spring storm season is upon us, so please support your local SKYWARN Net and the Alabama Emergency Net. The Alabama Emergency Net (AEN) has a session every Tuesday night immediately after the Alabama Traffic Net Mike (ATNM) on 3.965 MHz (The ATNM operates every night at 6:30 PM CST/CDT and Sunday mornings at 8:00 AM (CST/CDT). The purpose of the AEN is to provide section wide communications during an emergency. In order to meet this goal, I need Net Control Operators who can pitch in during an emergency. If you would like to help, feel free to contact me at KR4TZ@ARRL.ORG or (251) 661-3892. Attention all Club Officers! There is a new email reflector just for you. The idea behind this service is to provide a way for your club to become intimate with what is going on in the section. Don't worry if you don't have e-mail access, there will be other ways to get you involved. This service is open to elected club officers only. To join the list server, send me an e-mail at KR4TZ@ARRL.ORG giving your call sign, club name, and your position in the club. There is an e-mail reflector open to all hams in Alabama. With this service, you will be able to share your ideas with other hams in our section as well as receive periodic news bulletins via e-mail. For information on how to join, please go our section Web page at www.kr4tz.org/al-arrl. God bless & 73, Bill Cleveland KR4TZ. Tfc (Dec): AC4CS 403, W4ZJY 256, KD4CQJ 101, W4CKS 98, WB4GM 81, WB4BHH 28, W4DGH 14, W4NTI 6.

GEORGIA: SM, Susan Swiderski, AF4FO— ASM/South GA: Marshall Thigpen, W4IS. ASM/Legal: Jim Altman, W4UCK. ASM/Web: Mike Boatright, KO4WX. SEC: Robert Tyler, KF4VBR. STM: Jim Hanna, AF4NS. SGL: Charles Griffin, WB4UVW. BM: Eddie Kosobucki, K4JNL. ACC: Mary Ahls, W4NZJ. OOC: Mike Swiderski, K4HBI. TC: Fred Runkle, K4KAZ. PIC: Matt Cook, KG4CAA. State Web site: www.qsl.net/arrl-ga. Sincere thanks and good wishes to outgoing SM Sandy Donahue, W4RU, and SEC Lowry Rouse, KM4Z, and a warm welcome aboard to new SEC Robert Tyler, KF4VBR, and ACC Mary Ahls, W4NZJ. GA is very fortunate to count all of them as our own. Congratulations to a very special lady, Maryann Flack, KE4AXE, who was warmly roasted and rightly named Amateur Operator of the Year by the Alford Memorial Radio Club. Upcoming events: March 16 will be the Kennehoochee ARC hamfest at Jim Miller Park in Marietta, and GARS will be holding their 5th annual techfest at Central Baptist Church in Lawrenceville on March 23. Sadly, 2 SKs to report: John Peterson, W4OYT, of Telfair county, a Korean war vet and avid Amateur Radio operator and long-time instructor, and Steve Allen, WB4PFE, a member of Pine Log Mountain Repeater Group and Air Force MARS. Thanks for all of your support so far, and please keep those e-mails coming. Take care of yourselves. And each other. 73, Susan. Dec. Tfc: W4WXA 256, K4BEH 141, AF4NS 128, KG4FXG 126, K1FP 84, WB4GGS 79, K4WKT 68, KE4R 63, WB4BIK 34, AF4PX 23, K4ZC 23, K4JNL 10.

NORTHERN FLORIDA: SM: Rudy Hubbard, WA4PUP—Senior Staff Officials not included. At time of writing this, (Jan) the V-Dir ask for input concerning reducing *QST* magazine. The Board of Directors were to discuss this at the next meeting (Dallas) to reducing the cost of publishing the magazine. ARRL members in NFL Section were sent e-mail suggesting they write Frank and Sandy their views. Some like different parts of the magazine while some do not. Some suggest the *QST* be discontinued, and reduce the dues. Some say the only part they read is the Section column, some say send the column via e-mail and magazines to only those not having Web page capability. As you can see, this is of major concern to the Board. You had an opportunity to send your comments to the Director before the meeting, and I trust you did. NOFARS has elected the following officers for 2002: President, Billy N4UF; VP, Ben N4EL; Sec, Mark, WU4Z; Treas, Chris, KF4AAF. W4IZ was ranked 11th nationwide in the competitive transmitter, emergency power 3A category. 4IZ logged 3184 contact, scoring 8626 points as the top scoring effort in Florida and Southeast US. Menard Norton, KE4IOR, organized a Mall Watch for shoppers between Thanksgiving and Christmas, receiving appreciation from mall officials. Miller Norton, N4RYX, selected Greater Jax Amateur Radio Operator of the Year 2001. Amateurs are now required to supply a ten digit FCC Registration Number (FRN) to FCC. Look at http://wireless.fcc.gov/uls/ for information. Orange Park club elected new president- Hank Fitz, WB4URU. GARS elected pres- Ray Forrester, W4YTC, V-P Curtis Franklin, KG4GWR, Sec. Gary Hunt, KF4QEX, Treas. Roger Cappe, WA4PEA. December *QST* contained commentary that recognized Tom Nolan, KD4MWO, for his effort pertaining to SEDAN. Unfortunately, an update on this subject appearing in January Section News was incorrect. I have subsequently learned that Tom has continued to expand SEDAN, and I'm pleased to report it. Sorry for the confusion. The Staff is not included this time is an effort to conserve space. HQ limits the space, but the reason for being included is to provide to the members a source to seek information pertaining to any ARRL programs at a local level. Each District has an appointed ASM, which is for the purpose of handling info at that level. The program Staff has people at each level to perform their duties and responsibilities. 73, Rudy. Tfc: WX4H 1308, KE4DNO 359, NR2F 212, KF4WIJ 154, AG4DL 148, K1JPG 140, K8KV 139, N9MN 117, WD4GDB 83, WB8NER 46, WD4ILF 42, AF4PU 34, KC4FL 31, WA1VOP 27, KB4DCR 22, W8IM 22, KJ4HS 19, WX4J 17, AB4PG 7, WA4EYU 3.

PUERTO RICO: SM, Víctor Madera, KP4PQ — Felicitamos a los compañeros que han dedicado tiempo a servir como instructores para nuevos candidatos a radioaficionados. Carlos Padró, WP4MJP; y Joseph Renta, WP3HM recibieron premios reconociendo su labor durante la Asamblea Anual del PRARL. José E. Díaz, KP3J también recibió un reconocimiento por su labor de ayuda a personas accidentadas. José es un oficial de la Guardia Costanera de los Estados Unidos. Héctor Ríos, WP3LV está trabajando arduamente en desarrollar un grupo de nuevos operadores de CW. Interesados en telegrafía a baja velocidad deben comunicarse con él. Recibimos confirmación del Secretario de la Gobernación indicándonos que oficiales de la Agencia para el Manejo de Emergencias atenderán nuestra solicitud para organizar ARES próximamente. Felicitaciones a KP4AOC por haber sido electo presidente del PRARL para el 2002-2003. El Puerto Rico DX club sigue reuniéndose los segundos lunes de mes en la UPR a las 7:30PM. Los interesados, comuníquense con Luis de la Vega, KP4WI quien también es nuestro QSL Manager. Clases para principiantes comenzaron en la UPR, Humacao y San Germán. La Universidad Interamericana de Puerto Rico autorizo un nuevo ciclo de exámenes auspiciados por el ARRL/VEC PR VE Team en todos sus recintos alrededor de la isla. Visite http://prarl.org/exámenes para detalles. Todos los clubes de radio comenzarán talleres técnicos y seminarios próximamente celebrando "El Año 2002—Año de la Educación". Para detalles comuníquense con el Section Manager vía email a kp4pq@arrl.org

SOUTHERN FLORIDA: SM, Phyllisan West, KA4FZI. SEC: W4SS. STM: WA2YL. ACC: WA4AW. PIC: W4STB. OOC: K4GP. BM: KC4ZHF. SGL: KC4N. DEC/ASM: N4LEM, K9SHT, AA4BN, KD4GR. Web Page: http://www.sflarrl.org. Dave, N4QPM, received an e-mail from a couple in Australia who were interested in upgrading their ham licenses and seeking a test session in SE FL during a 3-day window when they would be in the US. I got the info from Dave and sent it to our SFL appointees who responded with several choices and the Broward VE team even the offered to set up a special session to accommodate them. The couple was very grateful for the special treatment. Just another example of SFL ham hospitality and service. If you or someone you know is planning to take a test for a ham license or upgrade, check out http://www.aa9pw.com/ for practice tests. Thanks to N4QPM for the info. Around the Section: Brevard's new club officers: Pres KD4JP, VP WA2UQG, Sec W4JBL, Tres KG4DSD. Broward County's holiday public service challenge was the Winterfest Boat Parade featuring 100 boats and calling for the assistance of 45 hams. Collier's highlight was having the Red Cross set them up with a radio room in the building and installing a tower. Julio, WD4JR, of the National Hurricane Center in Miami reports 170 contacts made on NWS SKYWARN Recognition Day. This includes stations in 41 states, Barbados, St. Croix, Puerto Rico, Dominica, Canada, Europe, Africa, South America, Czechoslovakia, Argentina, Brazil, Rwanda and Wake Island. Congratulations W4EHW! Indian River operated a special Kid's Day Event using the Vero Beach club call W4OT. They set up in a park after the City Council and County Comm. issued proclamations declaring Jan 5, 2002 as Amateur Radio Kid's Day. One child's mom said, "I teach 6th grade and often combine my class with the science class… this would be great in the classroom. I could be the sponsor of an after school club…." Way to go Indian River! Good luck to Martin County ARC's hamfest in Stuart on March 16, 2002. Okeechobee officers elected for 2002: Pres KF4FSU, VP KE4EUW, Sec N2BXH, Tres AD4PW. N4QPM reports Palm Beach's latest public service event was the Junior Orange Bowl Parade. December Traffic by STM WA2YL: K4FQU 761, WA9VND 520, KA4FZI 242, KD4GR 128, KC4ZHF 111, KE4UOF 102, KD4HGU 99, WA2YL 80, KD4QIP 72, AA4BN 54, KG4MLD 51, WB4PAM 50, K4VMC (club) 49, KG4MLC 33, W6VIF 33, KE4WBI 31, WA4EIC 31, KG4ILJ 26, WA4CSQ 23, KG4CHW 19, AF4NR 13, KF4OMB 11, K9GZT 9, A4GUK 8. Thank you for sharing your activities with the section. Please send the info to me by the 5th of the month if at all possible. 73, Phyllisan West, KA4FZI, SM SFL.

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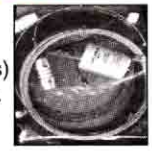

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HAM-IV, $529.95. *The heavy duty Ham-IV is the most popular rotator in the world!* It is designed for medium size antenna arrays up to 15 square feet wind load area when mounted in-tower, or 7.5 square feet when mast mounted with an optional lower 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 $13^{1}/_{2}$Hx8D 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 $14^{1}/_{16}$Hx$9^{3}/_{16}$D 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 $17^{3}/_{8}$Hx8 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 $17^{3}/_{8}$Hx8D inches.

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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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VIRGIN ISLANDS: SM, John Ellis, NP2B, St. Croix—ASM: Ron, KP2N, St. Thomas. ASM: Mal, NP2L, St. John. Section Internet Mgr, SIM: Jeanette, NP2C, St. Croix. SEC: Duane, NP2CY, St Thomas. PIC: Lou, KV4JC, St. Croix. ACC: Debbie, NP2DJ, St. Thomas. NM: Bob, VP2VI/WØDX, Tortola. Some bad news this month. Regret to inform membership of the passing of Drew Johnson, NP2E. He and his XYL, Christina, had just moved back to Pennsylvania. Drew was QSL manager here in the VI for some time. Band was wide open for the ARRL 10 M contest, John, KØIP (longtime friend hadn't seen in 37 years), came down w/XYL Pat and we worked 2001 valid QSOs in 2001! Next year, 2002 QSOs! Attn: all St. Croix hams, please contact Bernie, NP2W, at 771-2501 or NP2W@arrl.net for QSL handling instructions. He can forward them to me, and I can distribute or you can send him an envelope. Call Bernie and let him know or get in touch with me. Mal, NP2L, having equipment problems for his satellite work. Hope you get it fixed, Mal! Caribbean weather provided every morning except Sundays by KP2G, George, on 7241 at 1115Z. Section Web site www.viaccess.net/~jellis. Send section news to me at np2b@arrl.org. 73 and good luck in the contest!

WEST CENTRAL FLORIDA: SM, Dave Armbrust, AE4MR ae4mr@arrl.org http://www.wcfarrl.org—ASM: NA4AR. ASM-Web: N4PK. ASM-Legal: K4LAW. SEC: KD4E. TC: KT4WX. BM: KE4WU. STM: AB4XK. OOC: W4ABC. SGL: KC4N. ACC: AC4MK. PIC: WX1JAD. Please welcome Gary Sessums, KC5QCN, as the new EC for Hillsborough county. WCF Group, Inc. and Section Cabinet had very productive meetings Jan 12 in Sarasota. West Central Florida Section is two years old January 15th, congratulations to all. It has been a very productive two years. SGL KC4N reports work is proceeding on the antenna bill with Rep. Doug Wiles, but there is little hope in getting it introduced in this session. Hamfests: Sebring Feb 16, Zephyrhills Feb 24, New Port Richey Mar 2, Port Charlotte Mar 9. SEC KD4E reports little change in ARES membership total of 446. In Dec, there were 28 ARES Nets. 2 public service events, 16 drills and 0 emergency for a total of 18 ops. The total man hours reported is 531.4 hours. ECs reporting: KBØEVM, KN4YT, KT4WX, K4ZVO, AC4MK, AI4ET and WD4AHZ. TC KT4WX reports an busy Dec with the following TS reporting: - N4BSA, KJ9N, W4AUN, K4KSA, WA4ISB, W4DG, AB4EZ, WB4OMG, AB2M, WA9NLA. STM AB4XK reports Dec Net Report:

Net/NM	*QNI*	*QTC*	*Bulls*	*QND*	*Sess*
AIN/WA4ATF	45	1	3	77	3
PIN ARES/WB2LEZ	74	1	1	122	6
POK ARES/KD4EFM	34	0	0	48	2
SPARC/KF4FCW	474	43	0	912	31
TURTLE/KT4TD	387	58	0	334	31
EAGLE/KT4PM	352	106	0	722	31

Dec PSHR: K4RBR 192, K4SCL 154, W4AUN 142, KF4KSN 124, WB2LEZ 115, AB4XK 113, KF4OPT 102, AE4MR 97, KT4PM 91, KD4EFM 71. SAR: AB4XK 306, K4SCL 275, K4RBR 46, KF4OPT 45, W4AUN 36, AE4MR 34, KT4PM 24, KT4TD 23, KF4KSN 18, KD4EFM 14, WB2LEZ 12. 73, Dave AE4MR.

SOUTHWESTERN DIVISION

ARIZONA: SM, Clifford Hauser, KD6XH— This is the month for the Spring Hamfest at Scottsdale Community College, 9 March 2002. This event is one of the big ones for this state, so please make plans to attend. Our new Division Director, Art Goddard, W6XD, and the new Vice Director, Tuck Miller, NZ6T, both plan to attend. They would like your input as to what we can do to help Amateur Radio and what changes you would like to see. So stop by the ARRL booth (my truck) and talk with these two (2) ARRL officials. We have over 50 different Amateur Radio clubs here in Arizona: From Bullhead City to Sierra Vista, to Yuma, to Holbrook. In Kingman, they have the Hualapai ARC. This club has been around for many years and the current president is Robert Kimbrell, AC7BN. They meet on the first Wednesday of every month in the Kingman Library, 3269 Burbank Street. "www.qsl.net/harc-az". They conduct classes from beginner to extra class throughout the year. If your ever in the area and need assistance just use the 2-meter repeater, 146.76 (-) with a PL of 131.8 or the 440 repeater of 448.250 (-) with a PL of 131.8. These repeaters are monitored, and they will be happy to answer any questions or give directions. The ARCA Web site has been changed to "www.arca-az.org/arca". Take time to visit their Web site and get to know this organization and the officers. ARCA is an organization that represents or 25 of the state's clubs here in Arizona. They do a lot more than just put on the Fort Tuthill Hamfest. Don't forget to checkout our state Web site at www.qsl.net/arrlaz. This site has all the latest information and links to the many clubs here in Arizona, throughout the country, and has a listing for the entire state ARRL volunteer's. We have several state and local nets that are used to sharpen our skills so in the event of an emergency we are prepared. Now is the time for the many public service events that take place in this state. Are you a participant in these events? Do you use your radio skills to give back to your community? Participation in these events will sharpen your radio skills so that when we have an emergency you will be ready. If you are interested in becoming a community volunteer, contact me by telephone or e-mail and I will provide you with a person to contact so you can also be a good community leader. The Arizona Amateur Radio Association will hold its yearly hamfest on April 13 at the DeVry College parking lot. Then, in May, CARA will have its hamfest on May 6 in Sierra Vista. 73. ATEN: 1119 QNI, 40 QTC, 31 sess. Tfc: W7EP 64, K7POF 28.

LOS ANGELES: SM, Phineas J. Icenbice, Jr., W6BF— Congratulations to K6KH, Spud, our most honorable Secretary of our Los Angeles Area Council of Amateur Radio Clubs. Spud has accomplished the almost impossible. He has confirmed that the Local Red Cross will furnish a free meeting room for our troops. Bits of wisdom arrive at this location occasionally. I remember the "random walk theory" (from Collins Radio Kineplex theory) is related to understanding the characteristics of pseudo random noise. That story is where ten thousand birds were walking across a small bridge and eventually all of their feet touched the deck at the same time - and, the bridge collapsed. You might say what is the point? The point is that ten random sine waves of one volt each can add together (to be 10 volts) when they are all in phase and overload the system— especially when the system is only designed to handle 3.17 volts before distortion starts. The percentage of time that this peak value exceeds the RMS value is important in cross talk and intermodulation distortion, evaluation of system performance. The key is that the ratio, of the peak voltage to the square root of the number of tones is the point at which distortion starts. So, an electrical system is loaded, in a ratio, just like the bridge is loaded by many birds. The probability of fracture or distortion is predictable. - Our ASM, Al Hart, W6UBM, has been busy with Paul, W6BZH, our skilled Dept. of Water & Interference Inspector (213) 367 8292. Pin pointing interference caused by cracked insulators and broken or loose hardware has been Paul's specialty in the San Fernando Valley. Paul is doing a great job, and he really appreciates his new DF-ing search equipment for locating power line noise generators. - We now have several groups of so called hi-fi hams on the 20 meter band with elaborate noise gates, peak compressors and multi, audio band network profilers just like the big commercial network stations. The comments and adjustments by those for and those against are worth listening to. Low frequency audio boosting does provide a greater audio bandwidth for intermodulation distortion in the pass band. This extension of the low frequency cutoff, is a very pleasing sound to some hi fidelity fans. However distortion, may be, in some cases, the reason for the pleasing tones. Listen to both sides of the discussions and maybe you will find a new "niche" in Ham Radio. It is seldom dull conversation on 20 meters. Vy 73, Phineas, W6BF.

ORANGE: SM, Joe Brown, W6UBQ—Summary of the Orange Section Staff meeting, held January 5, 2002, in Riverside. SW Division Director Art Goddard spoke on the elimination of the Novice sub bands and the incorporation of Novice/Technician classes into the existing band structure. One of the main aims is to free up those portions of the bands for use by all. Art announced that in the interest of cost savings, the Section News, normally found in *QST,* are being put on the Web and if reception of this is favorable, it can/will save about $100,000 per year in the publishing of *QST*. Art also reported that he is working on a plan to get more participation in the DX convention from Northern California Hams. Joe Brown noted that one of the subjects of the meeting of the Staff at the Convention was that we all need to be salesmen for ARRL and for Amateur Radio. Sandy Heyn spoke on Club ARRL affiliation renewals and how they have to be renewed every two years and that renewal depends on a 51% of membership in ARRL in clubs for affiliation. This info is available on the web at arrl.org/field/club/biglist/html. Special service info is available on the Orange Section Web site. Rich Thompson, WA6NOL, spoke on the 440 links to the Super System on Orange County and the Speaker Bureau on the OCARO Web Page. Ted Shultz, N6RPG, Orange Section EC, spoke on the involvement in the 2001 SW convention and how well it turned out. The convention was a success and it was due to a lot of dedication and hard work by many. Ed Slaughter, WU6I, spoke on involvement with RACES and State OES. The SW Div Convention for 2002 which will be held in Escondido in August. Minutes were taken by Ted Hudson, KQ6U, DEC, Riverside County.

SAN DIEGO: SM, Kent Tiburski, K6FQ, 619-575-1964—It has been a pleasure to serve with Tuck, NZ6T. He will be an excellent Vice Director and is still active with us. For those that don't know me, I've been licensed since 1972 at age 15, a novice then, enjoy all aspects of Amateur Radio. Satellite, DX, VHF/UHF weak signal, MS, EME and public service, that's where you'll find me! I'm here to serve the dedicated hams in my section. When I took over, my first order of business, don't fix anything unless it's broke! Well there isn't anything broke in my section—San Diego Section is alive and well. This is through the leadership of Tuck and the many folks that have given of their time and effort to make things happen. I was one of those so I know what you do and it's greatly appreciated! You know what I like about ham radio? Everything! There is so much that you can learn about. I enjoy so many aspects of the hobby and would like to do more. Do you have a special interest? Sure you do, and I'd like to know more about it so we can share it. Let's get out and recruit new hams, RACES and ARES members. I want to say a special thanks to Bill Taylor, K6TQ, an Elmer to many reading this column. He's the person that inspired me and others to love the hobby of Amateur Radio and instilled the virtues and disciplines of the service. He's been there at the critical points in my life. I thank you for that Bill! It will be an honor to serve all of you. 73, Kent, K6FQ.

SANTA BARBARA: SM, Robert Griffin, K6YR—k6yr@arrl.org or k6yr@arrl.net—SEC: Jack Hunter, KD6HHG (kd6hhg@arrl.net). STM, Ed Shaw, KF6SHU (kf6shu@arrl.net). SGL: Paul Lonnquist, NS6V (paul@dock. net). ACC: Michael Atmore, KE6DKU (ke6dku@aol.com). OOC: Howard Coleman, N6VDV (N6VDV@arrl.net). PIC: Jeff Reinhardt, AA6JR (jreinh@ix.netcom.com). TC (vacancy in this position). ASMs: Ventura, Don Milbury, W6YN (w6yn@arrl.net); Santa Barbara, Marvin Johnston, KE6HTS (ke6hts@sbarc.org); San Luis Obisipo, Bill Palmerston, K6BWJ, (bpalmers@fix.net) & for Internet, Jack Bankson, AD6AD (ad6ad@arrl.net); & DECs: Santa Barb-Dave Lamb, WA6BRW (wa6brw@arrl.net); SLO-Bill Peirce, KE6FKS (ke6fks@arrl.net) & Ven-Dave Gilmore, AA6VH (aa6vh@arrl. net). It is with regret that I report the loss of our Technical Coordinator, Warren Glenn, KM6RZ. A strong and faithful mentor to many of us in the Section. A wonderful and generous gentleman. Congratulations to the new club officers and board of directors! Please contact me if needed. FREE instant Section news updates? Join the SB Reflector! E-mail majordomo@qth.net the message subscribe arrlsb. SB Sec Web: www.qsl.net/arrlsb/. SCN slow speed NTS Net, M-F, at 1915 local on 3598 kHz & SCN/SB at 2100 local on 147.000+(131.8), 224.90-(131.8) & 449.300-(131.8). That's 30—Rob, K6YR

WEST GULF DIVISION

NORTH TEXAS: SM, Larry Melby, KA5TXL—STM: Carolyn, KC5OZT. SEC: Bill, K5MWC. ACC/OOC: John, WN5PFI. SGL: Tom, N5GAR. Congratulations to Frank Krizan, KR1ZAN, and the group at Boy Scout Venture Crew 73 for their recent affiliation with the ARRL. I would also like to re-

mind all the affiliated clubs out in the North Texas Section those if you have not updated your club's information with the League, please do so. If you have any question how to do so the drop my ACC John Fullingim, WN5PFI, an e-mail at wn5pfi@arrl.net. Just a few weeks ago, we had Kid's Day. To listen to the H.F. bands, it was a big success in its goal to expose kids to Amateur Radio. The Arlington ARC club, under Mark Pritchard, K4GVN, and crew set up two stations at the Highpointe Day Care Center. The kids had quite a good time there operating the radios and talking to other kids across the US. Planning is now underway for HAMCOM 2002. If your club would like to be included in the planning of this annual event please drop a note to chairman@hamcom.org. It is also the beginning of the next round of Skywarn season. Be sure to keep an eye to the weather forecast and the severe wx outlook that the NWS puts out daily. 73 de KA5TXL. Tfc: KA4KLU 745, W5KLV 209, AC5XK 186, W5GKH 151, N5SIG 128, KØYNW 126, W5ZX 104, W5ZIN 65, N5OUJ 63, KD5GM 33, N5NAV 25.

OKLAHOMA: SM, Charlie Calhoun, K5TTT—ASMs: N6CL, W6CL. SEC: KA7GLA. ACC: KB5BOB. PIC: N7XYO. OOC: WB9VMY. SGL: W5NZS. STM: K5KXL. Lots to report this month. Don't forget the Greencountry hamfest is in a new location this year. The new Claremore Expo Center just west of Claremore on Highway 20. The ARRL Oklahoma Section Web page is back online! http://members.home.net/arrl-ok there you'll find information on upcoming events, announcements, VE sessions, Nets, links to Oklahoma Clubs and organizations and information about our section cabinet and your section manager. We also are getting more activity on the ARRL-OK email reflector. There is information on the Web site that guides you through the subscription process. Raymond H. McCaffrey "Mac" W5VEJ passed away. Mac was from Muskogee. The big news this month is the Oklahoma QSO Party Begins: 2300 UTC - 22 MARCH 2002 Ends: 2300 UTC - 24 MARCH 2002. This is the first time in a long time that Oklahoma has held a state QSO party. Thanks to OKDXA for sponsoring the event. Stations outside of Oklahoma work as many Oklahoma stations in as many Oklahoma counties as possible. Stations in Oklahoma work anyone. Oklahoma stations send signal report and county. Stations outside of Oklahoma send signal report and State, Canadian Province, or DXCC Country. SUGGESTED HF on or around FREQUENCIES: CW - 3.545 3.745 7.045, 7.140, 14.045, 21.045, 21.145, 28.045, 28.145 PHONE - 3.860, 7.260, 14.260, 21.360, 28.360. For complete rules see the Web site. 73, Charlie. Tfc: KF5A 1469, N5IKN 688, WA5OUV 367, WB5NKD 335, KM5VA 269, WB5NKC 229, K5KXL 140, WA5IMO 108, KI5LQ 98, W5VBD 44.

SOUTH TEXAS: SM, Ray Taylor, N5NAV—ASMs: KS5V, N5WSW, W5GKH, K5DG, N5LYG, WA5UZB, KK5CA, K5EJL, W5ZX, WA5TUM, KB5AWM, WA5JYK, K5PFE, K5PNV, W5JAM. STM: W5GKH. SEC: W5ZX. ACC: N5WSW. TC: KJ5YN. BM: W5KLV. OOC: W5JAM. SGL: K5PNV. PIC: KD5HOP. March winds are upon us by the time you read this. I'm writing this in early January and if the winds get any stronger in March we won't have any Pecan limbs left. The real advantage is that I've gotten more burning wood for the fire place this year than at any other time. I want to congratulate Bob, W5ZX, for a job well done as the Section Emergency Coordinator for South Texas. Bob is a retired Col., and may be moving to Arkansas so that he and his wife will be close to the rest of their family after they sell their home. Bob will maintain his position until everything is final. My first response was I hope they can't sell, but that's being selfish on my part. Bob will stay in contact by ham radio and help when he can. It hurts when you loose a good man and hard worker. Bob, we will miss you and Nono. We do hope you the very best of everything. Now for the subject that has caused the concern of nearly all ARRL members. Drop the contest and Section Manager's news in *QST* and put them on the ARRL Web page. Advantage is that we won't be limited to the amount of lines for the SM news as it is now. However, there are too many of my constituents that don't have a computer and don't plan on getting one. So what is gained if everyone drops their membership with ARRL over this and other issues? At present, there is about one fifth of the hams in the U.S. that are members. Think before you jump. What other organization is doing anything to save our frequencies, work for better antenna laws in each state to help the amateur, create a working relationship with the FCC and license procedures, and fighting for our rights in Congress. This is just a few things that your membership money goes for to better Amateur Radio. Instead of dropping your membership, let's get one half or more to join. Then these things would not have to be dropped. It has not been voted on as yet, but will be by the time you read this. Through the Section Managers' reflector, the Board of Directors have found out the feelings of the members in general, so I don't know how the vote will go. To increase membership, the clubs and all the present members can start a campaign to save the parts of *QST* that they enjoy most. Each member will have to get involved. We're going to need all the operators we can with the Homeland Defense System coming up and the part that Amateur Radio will play in the overall picture for the emergency communications part. We will have a place for all that will give of their time. I hope all of you have a great March. God Bless America. TFc: KA5KLU 745, W5KLV 209, AC5XK 186, W5GKH 151, N5SIG 128, KØYNW 126, W5ZX 104, W5ZIN 65, N5OUJ 63, KD5GM 33, N5NAV 25.

WEST TEXAS: SM, Lee Kitchens, N5YBW— Had a great meeting with the Abilene ARC. If you are in West Texas, don't miss their Hamfest May 4-5. The club is dealing with a typical problem many clubs have with tower sites becoming unavailable. However, it looks like they have found an alternative. This seems to be a problem all over West Texas as commercial interests are buying up towers and kicking hams off or asking for rent much too high for most ham budgets. A visit to the Alpine ARC is scheduled as we continue to meet the objective of visiting with every club in the section. A note to all Texas hams. If you qualify for disabled license plates or the blue handicapped hanger, and you would like to have your call sign on your license plates, you can now have both. You can have your call sign and the handicapped symbol on your license plates. All you have to do is make a special note on the application. The cost is $ 2.00.

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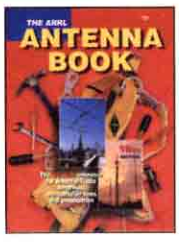

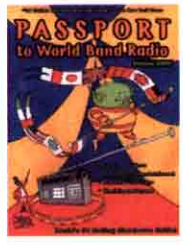

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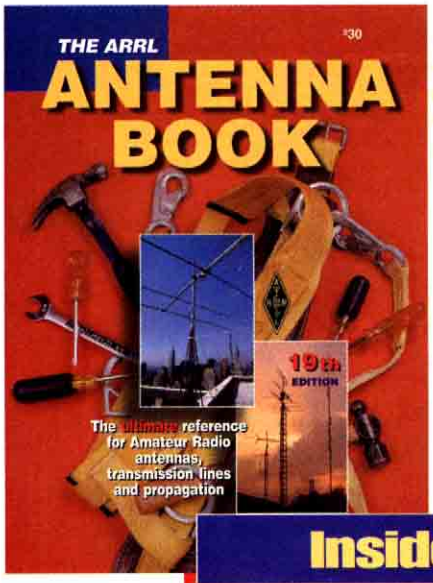

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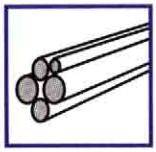
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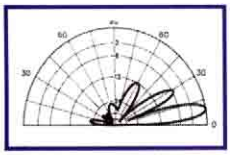
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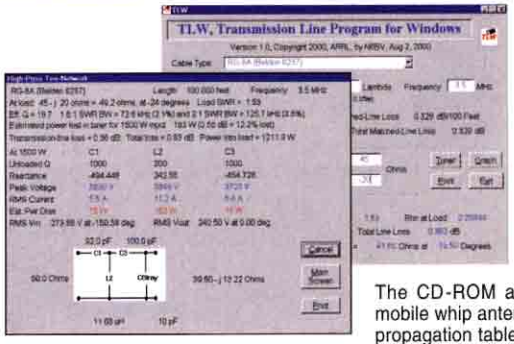

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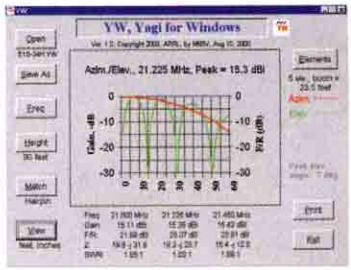

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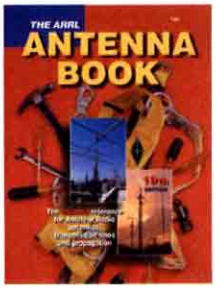

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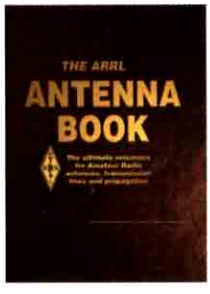

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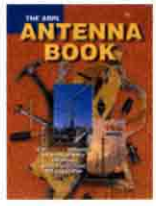

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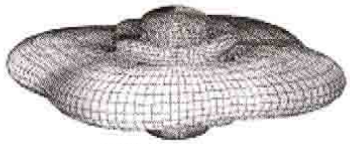

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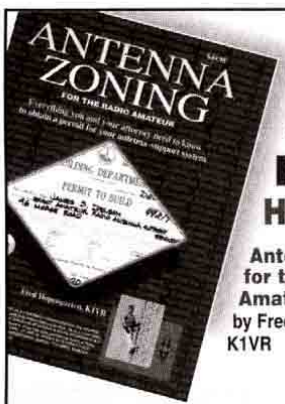

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STRII, Roof Radial Kit	$125
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More Diamond antennas in stock

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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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- Bar antenna for receiving AM broadcasts
- Special weather channel RX mode
- 435 memory channels, multiple scan functions
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- 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
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- 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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KENWOOD
COMMUNICATIONS CORPORATION

AMATEUR RADIO PRODUCTS GROUP
3975 Johns Creek Court, Suwanee, GA 30024
P.O. Box 22745, Long Beach, CA 90801-5745, U.S.A.
Customer Support: (310) 639-4200 Fax: (310) 537-8235

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ISO 9001
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