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All the results of the 1991 CQ WW CW DX Contest ...

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All-Time WW Contest Records

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On the cover: Dale Martin, KG5U, Houston, TX

AMATEUR'S JOURNAL

PEAK PERFORMANCE



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TH-28A/48A

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John Dorr, K1AR, Contest Calendar
 Chod Harris, VP2ML, DX
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 George Jacobs, W3ASK, Propagation
 Dorothy H. Johnson, WB9RCY, Awards & USA-CA
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**The Radio
 Amateur's Journal**



ON THE COVER: Houston-based Dale Martin, KG5U, enjoys bat-
 tling it out during the CQ WW DX CW Contest from this neat, compact station. (Photo
 by Larry Mulvehill, WB2ZPI)

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EDITORIAL

Who says CW is dead? If you want to see how dead it really is, check out the CQ World-Wide DX CW Contest November 28th and 29th. This month you can check out the activity during last year's contest and see what you missed. An interesting phenomenon that has surfaced since no-code is the proliferation of ads for keys and keyers. This summer at the Huntsville Hamfest our booth was next to the Kent Keys booth. That's the English company that makes some nifty brass keys and an assortment of keyers. Over the weekend I watched as a huge pile of goodies dwindled down to a precious few as amateurs carried off their purchases. While there is a growing number of amateurs who simply collect keys, there is also a large number who do actually use them on the air.

I have to admit that I'm one of those who simply collect keys, most of them contemporary. I especially like machined brass keys, and to me they are more like works of art akin to statuary. Part of what I admire is the actual handiwork of the craftsman who made it. As with CW, craftsmanship is slowly losing ground to technology.

If you are in amateur radio's classic "median age" group or older, it's fairly easy to conjure up the days when about half of the average station was homebrew. Amateurs not only built a great deal of their gear, they also took great pride in the way it looked. Described in the amateur radio publications were classic rigs that we all wanted to not only emulate but somehow improve upon. Oh sure, there were the one-, two-, and three-tube rigs built, but there were also some very sophisticated transmitters being constructed with all sorts of features. This month Dave Ingram presents some of the rigs many of us built in the '50s and '60s. Give nostalgia a shot this winter and build one of them.

There's something about keys that transcends nostalgia, though, as people of all ages collect and use them. Perhaps it's simply part of our fantasy life as amateurs, either rekindling a memory from long past or establishing some link or place within our short history. Whatever it really is, it is certainly beyond the "reliable means of communication" explanation.

CW as a reliable means of communication is still a very viable expression, as our CQ World-Wide DX CW Contest results bear out. Whether key or keyboard, these results point out the number of amateurs around the world who actively compete on CW. Check out the volume as well as the DX, and you should be tempted to give this year's contest a shot.

Hurricane Andrew

Hurricane Andrew in a matter of hours created such havoc and monumental devastation to both Florida and Louisiana that it was hard to comprehend the magnitude of the destruction. In the midst of the storm as well as in the aftermath, almost every local TV channel had as part of their news coverage a reporter stationed at an amateur's home. The amateurs I saw did an outstanding job of handling health and welfare messages and keeping lines of communication open. It's too bad, though, that we only become interesting to the general public during tragic times. However, the fact that TV stations can immediately report from an amateur's station attests to our reliability in providing emergency communications.

I would imagine that in the next few weeks (early September) amateur radio will still be a vital link in sorting out where everybody is, and the Herculean task of food, water, and shelter for that number of people.

Hamfests 1992

The 1992 hamfest season has been exceptionally good, with attendances up over last year. We've criss-crossed the country this year, meeting lots of you face to face. As this is being written, we still have two more to do, but I expect the trend to continue. At every hamfest we've attended, people came up and asked about the food, so it would seem that I've been a bit remiss in my food reviews. Well, there's a lot to be said for consistency, and most hamfest food is consistently bad. However, as far as exhibitors go, hamfest committees have taken to preparing a light lunch and delivering it to the booths. There are more and more committees doing this, and it does make life a lot easier, especially when the exhibitor is there alone and can't leave the booth. On the other hand, you'll probably find me on the grease-dog line with everyone else at most events. I know that a piece of fruit and a granola bar are much better for me, but somehow it doesn't capture the hamfest atmosphere or satisfy the taste buds as well.

I have noticed that my suitcase is not weighted down as much with fleamarket goodies this year. It's either that I'm getting more selective, or there's more stuff out there that I haven't the slightest idea why anybody would want it. As the year progresses toward the holiday season, I find that I've begun to pick up more sales brochures and catalogs at shows looking for some

wonderful addition to my shack. There's a lot out there to choose from, and I expect I'll know it when I see it. However, considering the condition of my shack, something is definitely going to have to leave in order for something new to fit in.

At the office the other day we were talking about a brand-new amateur who had this small, pristine area for his shack. The shack consisted of a small TV snack table large enough to hold an HT, a very small note pad, and a cold drink. The joy of simplicity. Something happens, as well all know, to change this bucolic scene into one of REAL RADIO. Cables, wires, boxes, papers, books, magazines, parts slowly appear and multiply. It's one of the joys of amateur radio and part of the lure that attracts thousands upon thousands of us to hamfests and fleamarkets each year. There is this energy and this urgent quest that isn't even mentioned in any license manual that somehow binds us together as amateurs.

Almost Time

It's almost time for traditional antenna work. Within a month or so it should be cold enough in most parts of the country to think in terms of serious antenna work. Real amateurs love ice and snow (except for a few wimps out there) and gladly accept the challenge of digging a tower foundation hole in frozen earth. I guess there's something invigorating about it that makes the thought of it attractive.

Next Month

Besides the CQ WW DX CW Contest and Thanksgiving, this November will also mark the Presidential election. While I know it's hard for the average amateur to leave the confines of his shack, you should make every effort to get out and vote. If you feel insecure about the experience, pack your HT, cellular phone, canteen of water, and a few MREs and trek on out to vote. Besides, it's good practice to find your way around town so you're prepared to locate the next hamfest. Seriously, it is important that you do vote and take part in the system. Your vote does count, and it's a shame to waste it by not voting.

Next month we'll have a bunch of product reviews to get us in the holiday spirit, plus a lot of other interesting articles. So when you come in from your antenna work, you can relax and warm up while reading CQ.

73, Alan, K2EEK

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ANNOUNCEMENTS

• The following special events will take place during October:

N2GVB, from Columbus's discovery of America special event, Columbus, New York; Chenango Valley ARA; 10AM-4 PM Oct. 10 and 1-6 PM Oct. 11; 10-80 meters, 25-30 kHz plus or minus QRM up from edge of General and Novice subbands. For certificate send QSL and 9 1/2 x 12 SASE to Tony Masi, N2GVB, RD 1 Box 39B, Bainbridge, NY 13733.

WB2JKJ, from 12th anniversary of "22 Crew," RC of JHS 22 and EDUCOM, New York, NY; Oct. 21-23, on 7.238 MHz from 1200-1330Z and then on 21.395 until 2000Z. For QSL and surprise package send to RC of JHS 22, P.O. Box 1052, New York, NY 10002, or FAX to 516-674-9600.

W2DQ, from Fire Prevention Week, Farmingville, New York Fire Dept.; Suffolk County RC and Suffolk ARES/RACES; 1300-1800Z Oct. 19; in General 80, 40, 20, 15 meters and Novice 10 meters. For certificate send QSL to Bob Ciappa, WB2NFL, 431 Blue Point Rd., Farmingville, NY 11738.

W3YA, from Columbus Family Chapel historical museum, Boalsburg, Pennsylvania; Nittany ARC; 1500-0100Z Oct. 10, and 1400-2200Z Oct. 11; SSB lower 25 kHz of General 15, 20, 40, 80 meters and Novice 10 meters; CW lower 25 kHz of General 15, 20, 40 meters and Novice 10 and 80 meters; talk-in on 146.76- and 146.85-. Send QSL and SASE for QSL card, or \$1.00 for card and flat certificate to CC500 Committee, Nittany ARC, P.O. Box 614, State College, PA 16804-0614.

W3XX, anniversary of Carnegie Science Center, U.S.S. *Requin SS481*; Breezeshooters ARC of Pittsburgh, Pennsylvania; 1400-2100Z Oct. 3 and 4; phone 28.450, 21.350, 14.250, 7.250, 146.52; CW 28.150, 21.050, 14.050, 7.050. For QSL and certificate send 8 1/2 x 11 SASE to Ron Berry, WB3LHD, 326 Sunset Dr., Bethel Park, PA 15102.

NU3D, from 500th anniversary of Christopher Columbus's landing in New World, McGivney Point Knights of Columbus, Glen Burnie, Maryland; 1200-2000Z Oct. 10-12; on 7.240, 14.240, 21.340 MHz (even hours) and 7.040, 14.040, 21.040 MHz (odd hours). For 8 x 12 certificate send SASE to Gerald R. Gavin, NU3D, 7801 Overhill Rd., Glen Burnie, MD 21060.

K4CO, from Salt Festival and Kentucky Bicentennial, Big Bone Lick State Park, Union Kentucky; Northern Kentucky ARC; 1400-2100Z Oct. 23, 24, 25; phone 40, 20, 10 meters, 147.375+ repeater. For certificate send business-size SASE and contact number to NKARC, P.O. Box 1062, Covington, KY 41012-1062.

K4AIF, from Halloween celebration, Devil's Courthouse, Transylvania County, North Carolina; Transylvania County ARC; 2100Z Oct. 31 to 0200Z Nov. 1; 3.860, 7.243, 14.295, 21.365, 28.335, 144.25, all SSB and 146.52 FM simplex. For certificate send 9 x 12 SASE to Dick Gustafson, K4AIF, 302 Wilson Dr., Brevard, NC 28712.

WA4UCE, from Tennessee Technological University 47th Homecoming celebration, Cookeville, Tennessee; ARS of Tennessee Tech. University; Oct. 24-25 (no times given); General portions of 80, 40, 20, 15, 10 meters and Novice 10 meters. For certificate send 9 x 12 SASE to TTARS, Tennessee Technological University, Box 5262, Cookeville, TN 38505.

WA5IPS, from International Space Hall of Fame Inductions, Alamogordo, New Mexico; Alamogordo ARC; 1500-2300Z Oct. 3; 10 meters Novice (around 28.480/490 MHz) from 1500-1600Z, and 15 and 20 meter General phone bands from 1600-2300Z. For QSL send to (no SASE required) International Space Hall of Fame, Route 2001, P.O. Box 533, Alamogordo, NM 88311-0533.

N5CAF, from Border Air Fiesta II, Brownsville, Texas; South Texas Amateur Repeater Society; 1500-2200Z Oct. 24-25; SSB on HF on 213300 or 28425 MHz, depending on band conditions, and contacts via a UHF remote link attempted with CAF pilots in flying aircraft—CAF B-17, B-25, P-51, C-47, etc. For QSL send SASE and QSL to Dr. David Woolweaver, K5RAV, 2210 S. 77 Sunshine Strip, Harlingen, TX 78550.

WM5R, from Columbus Day celebration, WW II submarine *USS Batfish*, Muskogee, Oklahoma; Eastern Oklahoma area hams; 1400-2200Z Oct. 10-11; Gen-

eral 40-10 meters. For QSL send SASE and QSL to W5UYH, Russ Hutchinson, 12103 E. 79th Court N., Owasso, OK 74055.

KI5UA, from East Texas Yamboree, Gilmer, Texas; East Texas area hams; Oct. 16-17 (no times given); General 40, 20, 15 meters phone subbands, Novice 10 meter phone subband, 147.32 repeater. For certificate send QSL and 8 x 12 SASE to KI5UA, Rt. 2 Box 113, Diana, TX 75640.

W5EHY, from Third Annual Grapes of Wrath Festival '92, Sallisaw, Oklahoma; 1400-2200Z Oct. 10; lower 25 kHz of General 20-15 meters and Novice 10 meters. For QSL send QSL and SASE to John Hawkins, W5EHY, 115 North Cedar, Sallisaw, OK 74955.

W5MS, from AbbeyFest II, Corpus Christi Abbey, Lagarto, Texas; Corpus Christi ARC and Civil Emergency Radio League; 1700Z Oct. 24 to 2359Z Oct. 25; lower 25 kHz of General phone subbands 40, 20, 15, 10 meters, 146.98- and 147.08+ talk-in.

W5OK, from Year of the Indian 1992, Tulsa, Oklahoma; Tulsa ARC; 1700Z Oct. 10 to 1700Z Oct. 11; phone lower 50 kHz of General 15, 20, 40, 80 meter subbands and Novice 10 meters, plus 2 meter SSB station; CW lower 25 kHz of General 20, 40, 80 meter subbands and Novice 15 meters. For certificate send QSL and 9 x 12 SASE to Tulsa ARC, P.O. Box 4283, Tulsa, OK 74159.

KK5W, from Children's Christmas Card Parade, Texas Medical Center, Houston, Texas; M.D. Anderson Hospital AR Volunteers; 1630-1830Z Oct. 1; on 7292.9, 18129.9, 21392.9, 28392.9. For certificate send QSL and 9 x 12 SASE to KK5W, M.D. Anderson Hospital, Amateur Radio Volunteers, 1515 Holcombe Blvd., Houston, TX 77030-4095.

K6MF, from SETI inauguration, NASA Ames Research Center, Moffett Field, California; Ames ARC; 1700-2400 Oct. 11 and 12; approximate freqs. 7280, 14280, 21380, 28480, 145.585 simplex. Also possible operation by W6VIO and from ops at Ariceibo, Puerto Rico. For QSL from K6MF only, send #10 SASE to Ames Amateur Radio Club, P.O. Box 73, Moffett Field, CA 94035.

W7AW, from Second Annual Quilcene Slug & Oyster DX Festival, Quilcene, Washington; West Seattle ARC; Oct. 10 from 1600-2400Z on 21125 MHz (CW) and 14228-14325 MHz (SSB), and from 0200-0500Z on 7225 MHz (SSB) and 3532 MHz (CW); Oct. 11 from 1600-1900Z on 21125 MHz (CW) and 14228-14325 MHz (SSB). Send QSL and large SASE to W7AW Callbook address for QSL certificate.

8-land, from 1992 Tall Stacks Celebration, Cincinnati, Ohio; Greater Cincinnati ARA and OH-KY-IN ARS, participating stations will identify using callsign suffixes "Tall Stacks" or "T/S," **K8SCH** from Oct. 15-18; month of October; (no frequencies or contact for return QSL given).

W8TO, from Columbus Day celebration, Columbus, Ohio; Columbus ARA; 1600-0300Z Oct. 10 and 1600-0100Z Oct. 11; General and Advanced portions of 10, 15, 20, 40, 80 meters beginning with 10 meters and moving to the next band every two hours each day; contacts with W8TO count 6 points per band per day, contacts with any other central Ohio station (0500Z Friday to 0500Z Sunday) on any HF band count 1 point per station per day. For certificate send copy of log which shows contact worth at least 10 points and 9 x 12 SASE to Thomas Camm, 1634 Dundee Court, Columbus, OH 43227-2421.

W8BAP, from Farmers Fall Festival, Chillicothe, Ohio; Scioto Valley ARC; 1400-0200Z Oct. 9, 10, 11; lower portions of 40, 20, 15 General SSB subbands and lower 25 kHz 10 meters Novice. For certificate send 9 x 12 SASE to Peter Scott, N8JVL, 93 Wright St., Chillicothe, OH 45601.

KA9RWP, from Raintree Jamboree, New Castle, Indiana; Henry County ARC; 10 AM until ? Oct. 10 & 11; General portion of 80, 40, 20 meters and 21.385-28.385. QSL via Callbook or P.O. Box 607, New Castle, IN 47362.

W9AWE, from Quincentenary of European Discovery of America, Columbus, Illinois; Western Illinois ARC; 1400Z Oct. 10 to 2400Z Oct. 11; General SSB and

(continued on p. 8)

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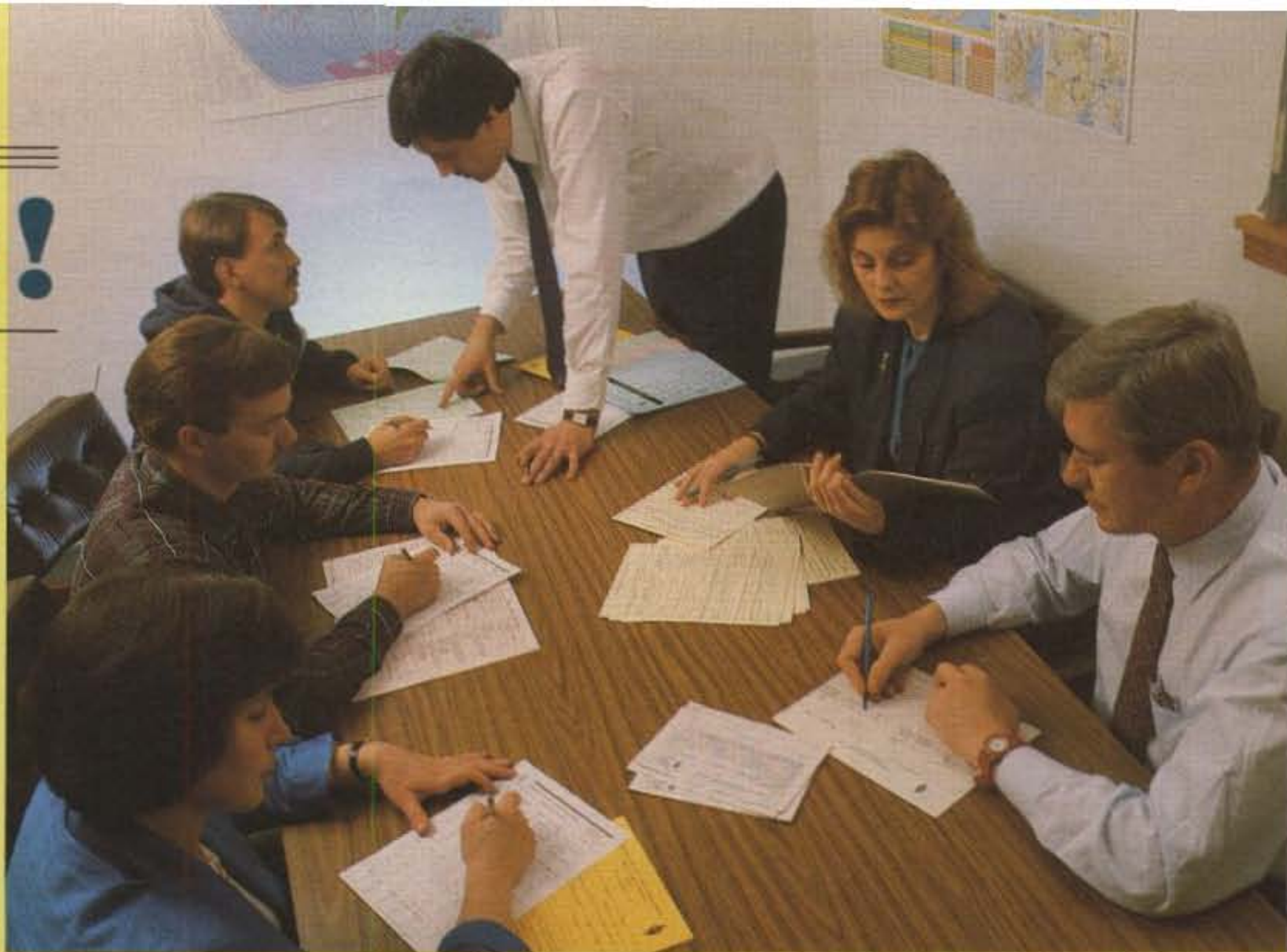


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CERTIFICATION

By signing this Application Form, I certify that to the best of my knowledge the above information AND the following statements are true:

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- 2) I agree to comply with the FCC Rules (see especially Subpart F—Section 97.515 (b)).
- 3) I agree to comply with the examination procedures established by the ARRL as Volunteer Examiner Coordinator.
- 4) I understand that violation of the FCC Rules or willful noncompliance with the VEC will result in the loss of my VE accreditation, and could result in loss of my Amateur Radio operator and/or station licenses, or both.
- 5) I understand that even though I may be accredited as a VE, if I am not able or competent to perform certain VE functions required for any particular examination, I should not administer that examination (Section 97.525[a] [3]).

_____ (signature) _____ (call sign) _____ (date)

[Please attach a photocopy of your Amateur Radio license, and if applicable a photocopy of any other VEC accreditation held, to this application.]

Announcements (from p. 6)

CW subbands, packet, and 147.03 W9AWE repeater. For certificate send QSL and SASE to WIARC, P.O. Box 3132, Quincy, IL 62305.

W9TE, first annual Fort Wayne RC On The Air Contest; 1400Z Oct. 3 through 2300Z Oct. 4; around 3.940, 7.290, 14.290, 21.360, 28.350. DX stations work 5 club members; Statesiders work 10 club members. For certificate send list of contacts with date, time (GMT), and band to: Fort Wayne Radio Club, P.O. Box 15127, Fort Wayne, IN 46885.

W0AA, from Hamfest Minnesota & Computer Expo, St. Paul Civic Center, St. Paul, Minnesota; SMARTS Radio Club; 7:30 AM to 3 PM CST Oct. 31; lower 25 kHz of 20 and 40 meters and Novice and Tech portion of 10 meters. For QSL send SASE to W0AA, Hamfest Minnesota & Computer Expo, P.O. Box 5598, Hopkins, MN 55343.

0-land, from Quincentennial of Columbus's Discov-

ery of America, St. Louis, Missouri; Knights of Columbus amateurs, Missouri; Oct. 10-11; General bands and 10 meter Novice. For certificate send 9 x 12 SASE (45¢ postage) to Henry G. Schaper, Sr., 241 Tapestry Dr., St. Louis, MO 63129.

C6A500, from 500th anniversary of Columbus's discovery of the New World; Bahamas ARS; 0001-2359Z Oct. 12, and intermittent throughout Oct.; 3590, 3740, 7030, 7090, 7290, 14,070, 14,135, 14,290, 18,150, 21,140, 21,204, 21,390, 24,950, 28,190, 28,350, 28,990, 146640D-600. All authorized BARS members may operate in Oct. with /500 suffix. Awards: (1) 3 different /500 contacts, (2) 10 different /500 contacts, one of which must be C6A500. For QSL send SAE and 3 IRCs to BARS, Box SS.6004, Nassau, Bahamas, or Bahamas Bureau. For award send copy of log and 3 IRCs.

• **The following hamfests, etc., are slated for October:**
Sept. 26, **Sonoma County Radio Amateurs Ham**

Radio Fleamarket, Holy Ghost Hall, north of Sebastopol, California. Contact SCRA, Box 116, Santa Rosa, CA 95402.

Oct. 3, **Indiana Tri-County Hamfest**, Miami County Fairgrounds, Peru, Indiana. Contact Indiana Tri-County Hamfest, c/o Cass Co. ARC, P.O. Box 1092, Logansport, IN 46947.

Oct. 3, **York County ARS 41st Rock Hill Hamfest**, Charlotte Knight Baseball Stadium, south of Charlotte, North Carolina. Contact Tom Lempicke, AB4YV, 2129 Squire Rd., Rock Hill, SC 29730 (803-328-3837). (VE exams 10 AM)

Oct. 3, **Pack Rats Mid-Atlantic States Conference & Banquet**, Cherry Hill, New Jersey. Contact VHF Conference, P.O. Box 311, Southampton, PA 18966 (SASE).

Oct. 4, **Pack Rats Hamarama '92**, Garden State Park, Cherry Hill, New Jersey. Contact Hamarama '92, P.O. Box 311, Southampton, PA 18966 (SASE).

Oct. 3-4, **Mississippi Coast ARA Ham/Swapfest**, Mississippi Coast Coliseum & Convention Center, Biloxi, Mississippi. Contact Ernie Orman, W5OXA, 15625 Little Joe Rd., Biloxi, MS 39532 (601-392-2816). (VE exams 1 PM Saturday, advance applications requested, and 11 AM Sunday)

Oct. 4, **Ashland Area ARC Hamfest**, Ashland County Fairgrounds, Ashland, Ohio. Contact Eric, K8FAN, 419-281-4459. (VE exams, preregistration required)

Oct. 4, **Huntington ARS Hamfest**, PAL Club, Huntington, Indiana. Contact Ray Tackett, KC9DZ, 420 Market St., Andrews, IN 46702 (219-786-0057). (VE exams; handicapped accessible)

Oct. 4, **Springfield, Ohio Hamfest and Computer Expo**, Clark County Fairgrounds, Springfield, Ohio. Contact Springfield Independent Radio Assn., P.O. Box 523, Springfield, OH 45501, or call Ralph Pamer, WA8KSS, 513-325-1456.

Oct. 4, **NW Indiana Hamfest & Computer Fair**, Porter County Fairgrounds, Valparaiso, Indiana. Call Kevin, N9IAA, 219-462-4681. (Exams)

Oct. 9-10, **ARC of Augusta, Georgia Hamfest**, Civic Center, Augusta, Georgia. Contact Paul Murray, N4XTD, Burden Lake Rd., Aiken, SC 29803 (SASE). (VE exams 1 PM, preregistration 12 noon)

Oct. 9-11, **AMSAT Annual Conference & Space Symposium**, INTELSAT Headquarters, Washington, DC. Contact AMSAT, 850 Sligo Ave., Silver Spring, MD 20910-4703 (301-589-6062).

Oct. 10, **Bergen ARA Fall Hamfest**, Fairleigh Dickinson University, Teaneck, New Jersey. Contact Jim Joyce, K2ZO, 201-664-6725. (VE exams info Pete Adey, K2MHP, 201-796-6622 before 10 PM)

Oct. 10, **Radio Amateurs of Greater Syracuse Hamfest**, Tricounty Convention Center, Baldwinsville, New York. Call 315-469-0590. (Handicapped accessible; VE exams, preregistration required)

Oct. 10, **Forx ARC Hamfest**, Civic Auditorium, Grand Forks, North Dakota. Contact Gerry Nies, N0NGW, 1815 University Ave., Grand Forks, ND 58203 (701-775-5066). (VE exams)

Oct. 10, **North Kitsap ARC Hamfest & Electronics Swapmeet**, Kitsap County Fairgrounds, President's Hall, north of Bremerton, Washington. Contact Matt Amis, AA7LP, 2196 California Ave. E., Port Orchard, WA 98366 (206-871-7099).

Oct. 10-11, **International Hamfiesta**, Texas National Guard Bldg., El Paso, Texas. Contact Clay Emert, K5TRW, P.O. Box 31628, El Paso, TX 79931 (915-859-5502).

Oct. 10-11, **Greater Memphis Amateur Radio & Computer Show**, Pipkin Bldg., Mid-South Fairgrounds, Memphis, Tennessee. Contact Nita Woodford, N4DON, 2966 Cordell, Memphis, TN 38118 (901-363-1971). (VE exams Sat. and Sun. 9 AM to noon)

Oct. 10-11, **DXPO-92**, Holiday Inn, College Park, Maryland. Call Stuart Meyer, W2GHK, 703-281-3806.

Oct. 11, **Northwest Ohio ARC Hamfest**, Allen County Fairgrounds, Lima, Ohio. Contact W8TY, P.O. Box 211, Lima, OH 45802. (Handicapped accessible; VE exams, preregister by Oct. 3 to W8TY)

Oct. 11, **Maysville Hamfest**, Maysville, North Carolina. Contact Jo Ann Taylor, 919-393-2120. (VE exams 9 AM only, walk-ins only, contact W4ULD, 919-726-5924 or 919-247-0967)

Oct. 11, **Shore Area Ham & Computer Fest**, Allaire

(continued on p. 163)

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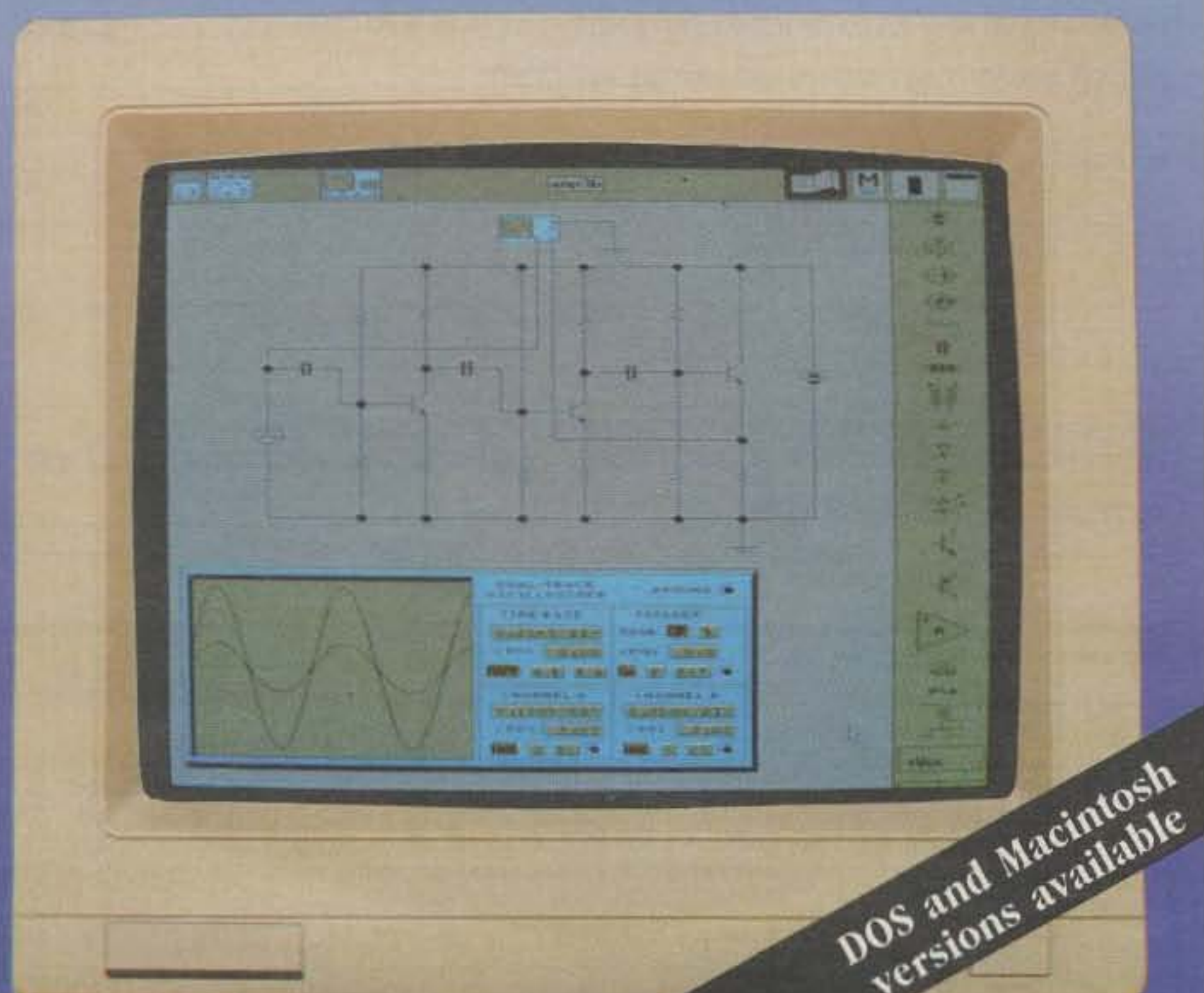
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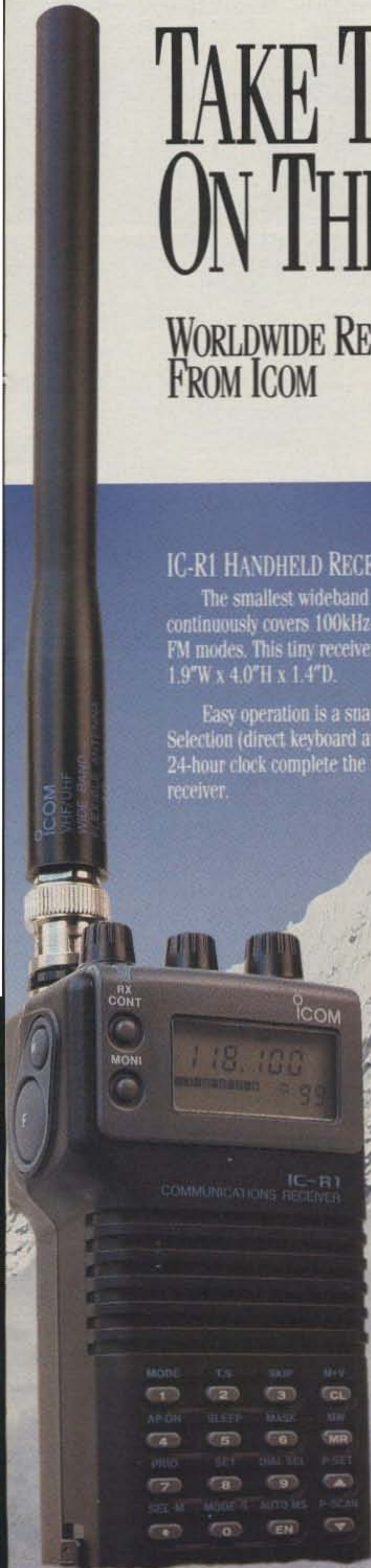
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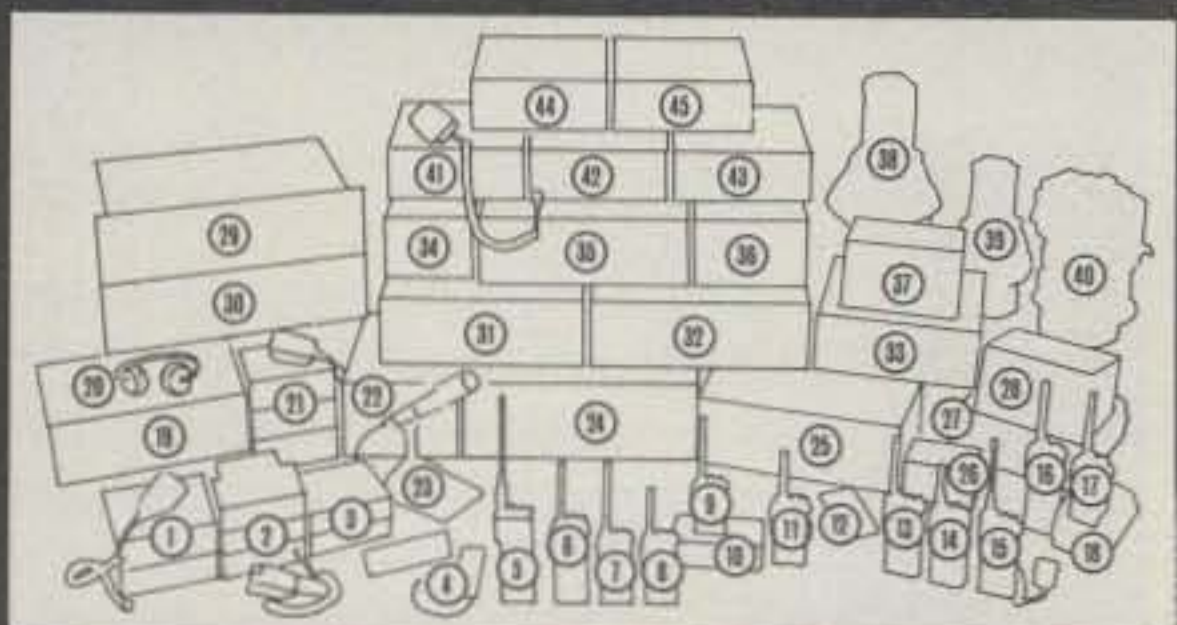


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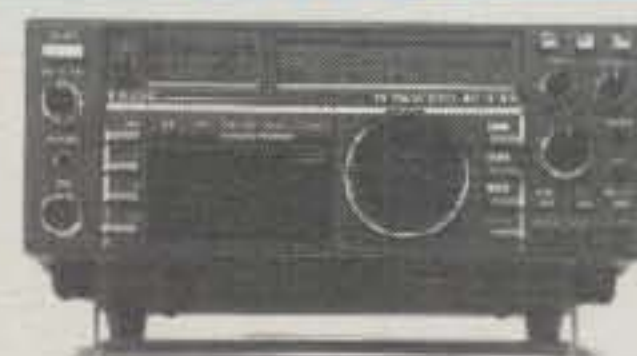
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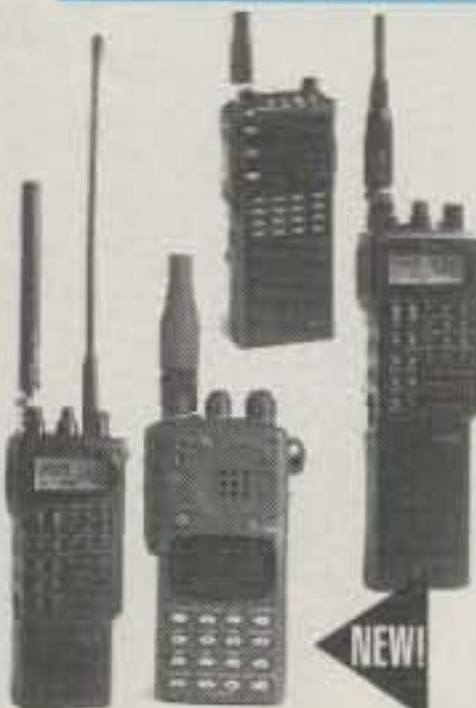
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Results of the 1991 CQ World-Wide DX CW Contest

BY BOB COX*, K3EST/6, AND LARRY BROCKMAN**, N6AR/4

One of the beautiful and exciting features of amateur radio is that radio waves respect no boundaries. The waves pass without passports or guards right into a king's palace, a dipole in India, or the smallest shack in Denver. When anyone enters a CQ WW Contest, he or she makes new friends and meets old ones. It is truly the ultimate fishing trip or shopping spree to search for all the multipliers the CQ WW brings out of the ether. With the world in rapid political change, it is reassuring to know that the ham spirit is alive and well.

Searching for the best location to try to win the prestigious single operator all band category requires months of preparation. In 1991 this location was in EA8. Located in just the right geographical location to take advantage of the most multipliers, EA8EA operated by OH2MM set a new world record. Ville said he operated the full 48 hours! He sure was moving multipliers from band to band. Just look at his band-by-band breakdown. You can also check his QTH in the photographs. Finishing second was John, W2GD, operating with his new call, P40W. The same two operators finished one and two on SSB. Last year's winner, Juha, OH7JT, operating CR3A, finished third.

The top gun in the U.S. was Bob, KQ2M, operating KM1H. Taking advantage of a great opening on 40 meters allowed him to win the trophy. Finishing second was W1KM with a fabulous 80 meter effort. Top honors in Europe go to W6NV, operating CT4A. The top three European scores were U.S. ops looking for better conditions than you would find on the U.S. west coast. Pete, AH3C, keyed IS0QDV to a second-place finish, and EA6/N6RA came in third.

High Bands

Conditions were improved over the SSB weekend, but still you could tell the sun had cleared up its face. The top scores all came from below or near the equator. Taking top world honors on 28 MHz was ZS6BCR. He sure had a good signal. He was in the right place to get Europe and the U.S. In second place was CE3DNP, always a solid contender. The top U.S. 28 MHz winner was W0UN (operated by Steve, N2IC), just edging out K8CX. It is interesting to note the top three U.S. 28 MHz entries were from west of W3-land. In Europe it sure was best to be in the region of the sunny Mediterranean. Operating in the shadow of Mt. Etna was IT9A with IT9VDO pushing the key. Second and third were OH0BA/EA7 and 4N2V. You had to be south to get into the States.

Conditions improved a little when we consider 21MHz. Setting a new world record was Jorge, LU8DQ, operating ZW5B. He also had 40 zones



World high CW winner OH2MM operated from EA8EA. The view is looking to W to left, to EU on right! Wow!

—quite an accomplishment. It was LU8DQ's last contest before becoming a Silent Key in December. He was always easy to work and a skilled code man. ZW5B was followed by P40J operated by WX4G, who beat ZW5B in QSOs but couldn't get into Asia and Europe long enough to beat him in multipliers. Third place went to C56B operated by OH6LK looking to get away from the long nights in OH-land.

The top U.S. finished was K1RM, who averaged about four QSOs more per hour than second-place KR2Q. Third-place K5RM eked out more multipliers than any other U.S. 21 MHz entrant. In Europe first place on 21MHz went to FF0XX operated by F6GCP, who managed to snag 39 zones. Second and third place were LY2WW operated by LY2BIJ and YZ9A operated by YT3AA.

Boy, twenty sure was dead at night from California and from the comments from around the world "When the sun went down, so did 20." This bodes well for 40. Setting a new world record was P40V operated by N7NG. Wayne took advantage of a great geographical location to have more country multipliers than anyone outside the U.S. In second place was TU2MA. He made a lot of people happy with a TU CW QSO. On the other side of the earth, ZL3GQ, always a fantastic signal and operator, took third in the world. The top U.S. score was K4XS. Bill was heard working guys who KC2X second place and K3EST/6 third place could not hear. That Florida location brings more than just sunshine. In Europe top 14 MHz honors went to Sigg, TF3CW, who edged out Ike, OH0BVI. LZ5W operated by LZ1BP finished third.

Low Bands

What was spotty on the high bands was solid copy on the low bands. Forty was very good everywhere in the world. Leaving now war-torn Bosnia and setting a new 7 MHz world record Ivo, YU4OO, operating C42A on Cyprus left the rest of the world in the dust. Several islands in the Mediterranean are similar to the three-point islands of northern South America. ZC4,5B4, and IH9 look right into Europe. World second place went to W0ZV way over in Colorado, and third went to K4JPD. In Europe top honors went to OH5BM, who beat fellow countryman LX/OH2PQ.

Jorma, OH2KI, keyed ZB2X to world-high 3.5 MHz score, a pretty neat trick, where each European QSO was worth one point. Second high was UV9CAF, followed by G3KDB. The struggle for top U.S. 3.5 MHz had a lot of fireworks. After the logs settled, W1FV just edged out K1ZM/2 and W1MK. The latter two almost finished in a dead heat. In a photo finish, Riki, 4X4NJ, was world high on 1.8 MHz. Just beating UL0A, John, ON4UN, was the top European finisher over OK3CQR. By our count there were 109 countries on 160! In the U.S. the top score was N6SS/7 in Arizona. He ended up just one QSO above K5UR, the perennial 160 champion. It's been a long time since anyone that far west won 160 in the U.S.

Low Power

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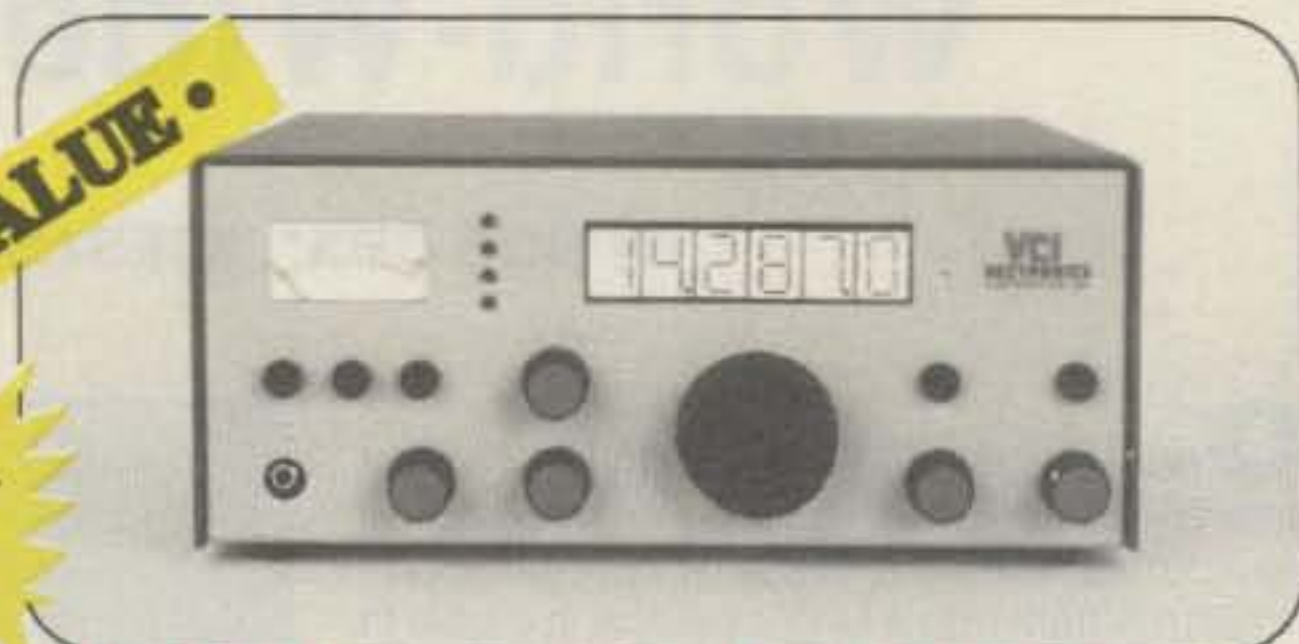
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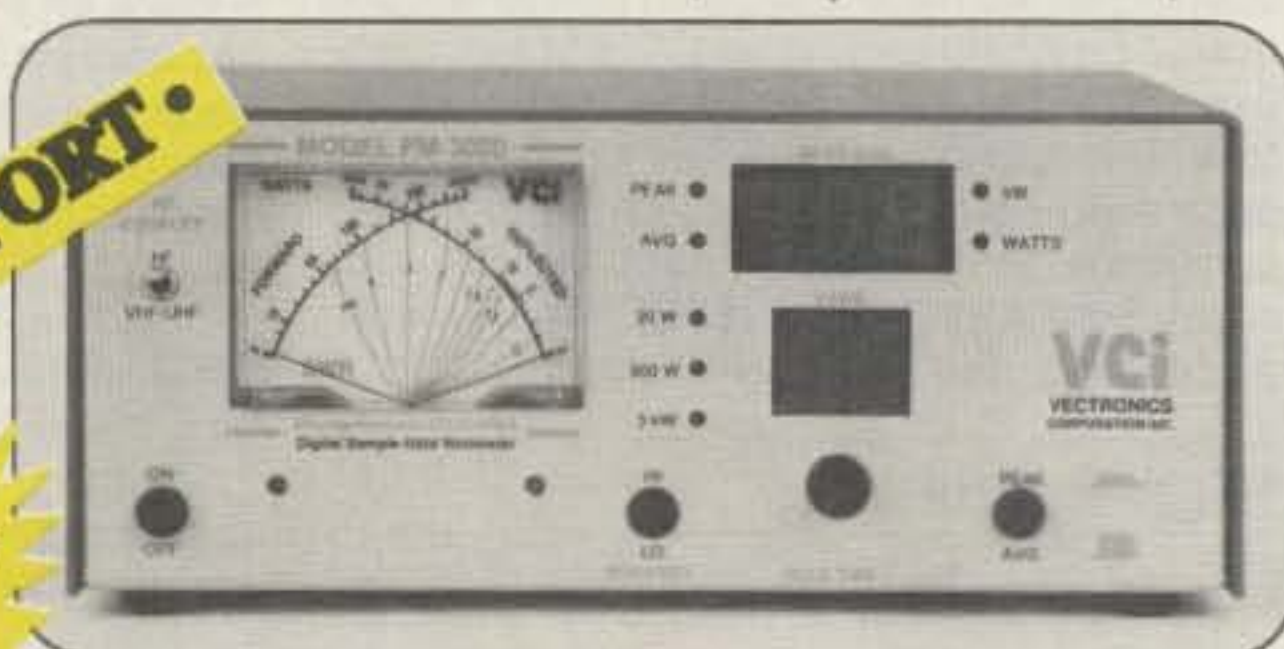
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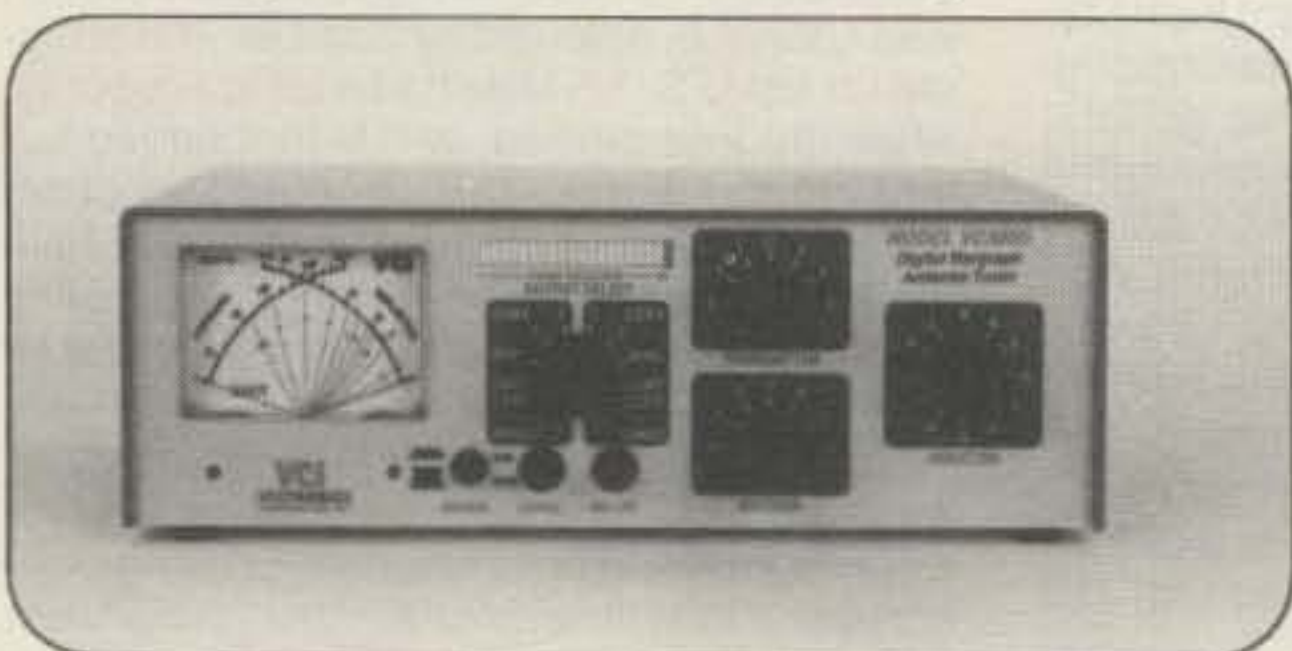
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WA2WYR on his way to passing out AP to happy testers.

at the results. The number one all band score in the world was 9M8DX operated by VK2DXI. He made a lot of people happy handing out eastern Malaysia. Second was RZ9UA located in Zone 18. Both the U.S. top scorer, W2TZ, and the European top scorer, YU3BC, switched over to low power from QRP the previous year. This category offers an opportunity for someone with just an excitor or with RFI problems to complete against others with similar circumstances.

QRP

In the flea-power category, Aki, JA5DQH, pushed HI8A to a new world record. It was interesting to see how being in a good DX QTH adds "dBs" to your signal. He had real pile-ups. He also lost his commercial power but noted "No problem; I just used a car battery!" Second place in the world went to Roland, DK3GI. A seasoned tester, Rol knew how to work as many three pointers as he could. The QRP category

has had 90 to 120 entrants per year since its inception.

Multi-Singles

With both EA8EA and EA9EA on the air at the same time, it is a tribute to all the stations who copied their calls correctly. EA9EA lead all other multi-single entrants to win the world trophy. The EA boys did a fantastic job from their North Africa location. It seemed that if your suffix ended with an "A" then your station received an "A" grade in the contest.

Second in the world and first in Europe was IQ4A from their mountaintop in northern Italy. Following closely on their heels was the crew of RZ1A from St. Petersburg and LZ9A, the Bulgarian beacon station. The top U.S. position went to K5NA/2. Richard and crew (including his wife and son) edged out perennial top-scorer Sig, N3RS. Some of the crew from UZ9AYA teamed up with some UL7 boys to activate RL0L as the top Asian multi-single. I remember that Willy, UW9AR, used to bicycle from UA9A to UL7L. I guess that gets you in shape for the CQ WW. A G and W crew went to that popular African QTH C5 to take sixth high in the world. C5 sure had plenty of activity.

Multi-Multi

In the battle of the giants, Radio Team Finland, PJ9A, enjoyed better conditions than on SSB. Set up Field Day style, they used 19 towers (all made by OH6RM) and lots of antennas (all made by OH6RM), including a full-size 3-element 80 Yagi, to take the world trophy. They used a crane to help put up their antennas. The towers were

rope guyed to Formula 1 racing cement barrier blocks! Second place went to CT3M's fine multinational crew. Their log was superb—two large notebooks with all the detail we could hope to see. Thanks, fellows.

Finishing third, just a few QSOs behind, was the W8 crew of J6DX. They had the second highest QSO total in the whole contest.

On a little island in the northern Pacific, KH0AM set a new Oceania multi-multi record. Operating from a hotel on Saipan, JE1CKA and his all JA crew worked a surprising number of Europeans on most bands. Finishing on top in the U.S. was N2RM. This Frankford Radio Club powerhouse seems to have the skilled operators necessary to prevail. Several of the old K2GL crew have found a home on the New Jersey coast. In second place was W3LPL representing the PVRC. Operating from K1EA's QTH, K1AR rounded out the top three.

Topping the European scores was HG73DX. Their multiplier was truly awesome! Sixty-three and 97 countries on 160 and 80, respectively. HG73DX was a combined effort of operators from HG4P, HA5KDX, HG5A, HG6N, and HG8Q. Second place in Europe went to 4N31A from what is now the new country of Slovenia. Their call was the second most miscopied call in our data bank. The usual mistake was 4N3JA. Who was the most miscopied you ask? HG95T, who many people copied as HG9HT.

Assisted

Boy, this category is growing very fast. From just over 100 entrants a few years ago, it now has well over 200. Multiplier spotting nets (on VHF) have been around for over 30 years, but you had

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to listen to what was said. Now these nets (packet clusters) are visual and that convenience made all the difference. Contest packet systems are now active in Japan, North America, and Europe. It is interesting to note that until the 1991 test it seemed to be difficult to keep up a very good rate with so many multipliers flashing across the computer screen. Bill, KM9P, operating N4RJ found a middle ground to turn in the first assisted score competitive with the regular single ops. He was world high. Taking second, third, and fourth place were K3WW, WR3E, and N3AD, all using the Frankford packet system. The top non-USA score was DF3CB, followed by Paolo, I2UIY, operating IQ2A.

Team Contesting

It looks like this category is finally catching on. Three teams from the Southern California Contest Club fanned out over the world to the delight of the entrants. Finishing number 1 was SCCC #1. You can look at the box to see how many of their calls you worked. Dick, 4S7/N6AA, mentioned that he called himself blue trying to work guys on 160, but to no avail. His antenna was confined to a small lot. The SCCC boys would like to challenge other teams. Remember, the five team members can be from anywhere on earth.

New Records

The following stations are to be congratulated for setting new CQ WW CW Records. **World:** All Band, EA8EA (OH2MM); 21 MHz ZW5B (LU8DQ); 14 MHz, P40V (N7NG). **Continental Records:** **Africa:** All Band, EA8EA (OH2MM); 28 MHz,



Setting a new Oceania MM record was KH0AM. Back (left to right) are JA7RHJ, JR7OMD, JA9SSY, JA1KFX, 7K1PTT, JI1QPU, and JH0LFE. Front (left to right) are JE7BIZ, JE1QPU XYL, JH0KHR, JH7CUO, and AH0K. Taking the picture is JE1CKA, Tack the organizer.

ZS6BCR; 21 MHz, C56B (OH6LK); Multi-Single, EA9EA. **Asia:** All Band, JY8VJ (DL1VJ); 21 MHz, 4Z4T (4Z4UT); 7 MHz, C42A (YU4OO). **Europe:** 3.5 MHz, ZB2X (OH2KI). **Oceania:** 14 MHz, ZL3GQ; Multi-Multi, KH0AM. **South America:** All Band, P40W (W2GD); 21 MHz, ZW5B (LU8DQ); 14 MHz, P40V (N7NG). **North America:** All Band, PJ7A (K1TO); **QRP:** All Band, HI8A (JA5DQH); **Low Power—World:** 9M8DX (VK2DXI).

Comments

The new Low Power category seems to be an

instant success. Those of you who chose to enter this category, please remember that you are allowed no more than **100 watts** output. You are on your honor to comply with the rule. It was difficult for us to decide how to present the low power results in a way which allowed comparison to the high power scores and at the same time did not detract from the high power stations. The asterisk (*) does not look so bad. What do you think?

Please note the list of trophies shown in the rules in September should also include four additional trophies: **World Low Power SSB** and **CW** and **Oceania Multi-Single SSB** and **CW**. The former two will be in honor of K7RA and UA1DZ, both recent Silent Keys, and the Oceania trophies will be sponsored by JH4RHF.

Take some time and look at the rules. You will notice that you are no longer required to sign portable if you are in the same country indicated



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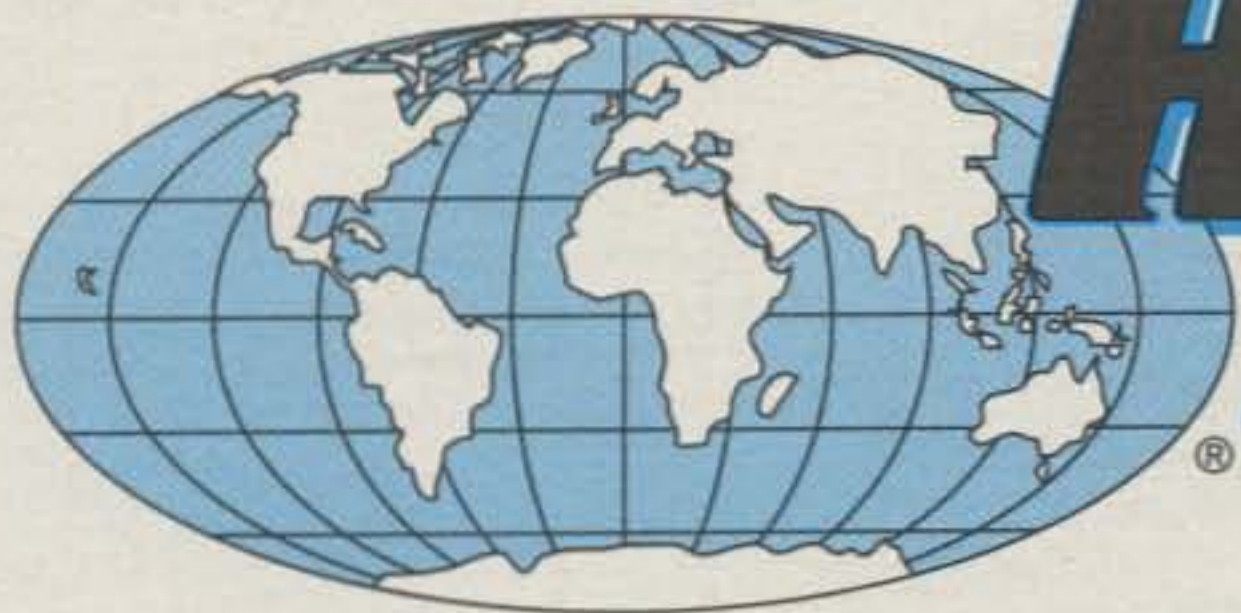
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Donor: Gene Walsh, N2AA

World—Single Operator Assisted

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Donor: Richard Newell, AK1A

U.S.A.

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PJ7A (Opr. Daniel Street, K1TO)
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Oceania

9M6NA (Opr. Saty Nakamura, JE1JKL)
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South America

P40W (Opr. John Crovelli, W2GD)
Donor: Venezuela DX Club

SINGLE OPERATOR, SINGLE BAND

World—28 MHz

Chris R. Burger, ZS6BCR
Donor: Joel Chalmers, KG6DX

World—21 MHz

ZW5B (Opr. Jorge Bozzo, LU8DQ)
Donor: Don Busick, K5AAD
N5JJ Memorial

World—14 MHz

P40V (Opr. Wayne Mills, N7NG)
Donor: North Jersey DX Assn.
W2JT Memorial

World—7 MHz

C42A (Opr. Ivo Pezer, YU4OO)
Donor: Alex M. Kasevich, VP2MM

World—3.5 MHz

ZB2X (Opr. Jorma Saloranta, OH2KI)
Donor: Fred Capossela, K6SSS

World—1.8 MHz

Riki Kline, 4X4NJ
Donor: Kenneth Byers, Jr., K4TEA

USA—28 MHz

W0UN (Opr. Steven London, N2IC)
Donor: Robert Clark, K6JYO

USA—21 MHz

Vincent Sgroi, K1RM
Donor: Wayne Carroll, W4MPY

USA—14 MHz

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XN3EJ (Ops. VE3IY, VE3ICR, VE3EJ, VE3CDX)
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Caribbean/Central America

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VP5P)

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Europe

IQ4A (Ops. I4DKO, I4EAT, I4IKW, I4IND, I4LCK,
I4LEC, I4JEE, I4QJH, I4TJE, I4VEQ, I4YRW,
I1ZEU, I4LZLF, I4DCT, I4EWH, I4EWN,
I4NPD, I4W4ANU)

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MULTI-OPERATOR, MULTI-TRANSMITTER

World

PJ9A

Donor: Hazard Reeves, K2GL Memorial

USA

N2RM (Ops. N2RM, WM2H, KE2PF, N2EA,
KZ2S, KA2AEV, K3UA, KR2J, N4HY, N2AA,
K2TW)

Donor: Jim Rafferty, N6RJ

Europe

HG73DX (Ops. HA4ZZ, HA4WQ, HA4ZD,
HA8LKK, HG4FC, HA5GF, HA5IW, HA6WX,
HA5LN, HA5MK, HA5OM, HA7RY, HA5FA,
HA5ML, HA5UA, HA5RE, HA5FQ, HG5YY,
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P40W	KG6DX	963,815	KH2D	173,712	WB4TDH	185,472	RB3MO	32,311	W3XU	2,817,485			
CR3A	4Z4T	939,900	1.8 MHz			N4EJW	146,064	3.5 MHz					
8R1K			4X4NJ	99,470	JN3TMW	141,570	UT5JAJ	49,150	N2MM	2,170,158			
PJ7A			UL0A	98,344	21 MHz			N4IJ	40,504	MULTI-OPERATOR SINGLE TRANSMITTER			
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8P9Z			OK3CQR	52,785	HA8RH	212,598	OK1DRQ	34,776	IQ4A	9,104,040			
TI1C			LZ1KOZ	37,467	JN1VOC	205,905	IK1OWC	29,884	RZ1A	9,083,938			
9Y4H			IT9T	28,260	JE1VTZ	179,832	LY2BIP	28,413	LZ9A	8,961,206			
ZP0Y			LOW POWER			SP5JTR	178,048	1.8 MHz					
All Band				9M8DX	2,388,719	14 MHz			OY6A	36,352			
28 MHz	C42A	980,490	RZ9UA	1,939,451	JE0UXR	171,788	OK3IQ	22,080	Y21PO	18,088			
ZS6BCR	W0ZV	382,936	YU3BC	1,677,744	VU2PTT	136,100	OK1DRU	17,976	OK3TWJ	12,532			
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4N2V			W2TZ	1,159,128	7 MHz			WR3E	2,997,498	J6DX	26,968,675		
21 MHz				NM2L	1,107,635	HA8QC	45,120	N3AD	2,924,540	KH0AM	21,856,979		
ZW5B	ZB2X	435,456	YB2HAP	1,050,560	KV8Q	45,114	ASSISTED						
P40J	UV9CAF	361,935	28 MHz			RB5QCT	38,610	K3WW	3,330,771	HG73DX	16,057,755		
All Band				C56/G4ODV	902,967	7 MHz			N3AD	2,924,540	N2RM	12,374,331	
USA				3.5 MHz			14 MHz			MULTI-OPERATOR SINGLE TRANSMITTER			
All Band	KR2Q	509,250	W1FV	169,572	W6JTI	912,216	KI6YB	23,680	W3XU	2,817,485			
KM1H	K5MR	414,018	K1ZM/2	167,827	NJ2L	861,568	WD9GGY	17,850	AA2Z/1	2,762,535			
W1KM	WA8DXB	304,869	W1MK	167,162	K9QVB	814,484	WA2ASQ	16,848	K2SX/1	2,267,397			
K1CC	KC0D	275,128	WE3C	72,168	KG1D	768,950	K4NNO	6,210	N2MM	2,170,158			
N2NT	NQ0I	232,974	WB5VZL	45,600	N4YDU	783,090	MULTI-OPERATOR SINGLE TRANSMITTER						
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K3ZO			1.8 MHz			W3RJ	543,749	3.5 MHz					
N2LT			N6SS/7	9,800	WA0RJY/7	423,072	ASSISTED						
W3BGN			K5UR	9,744	28 MHz			MULTI-OPERATOR MULTI-TRANSMITTER					
N6BV/1			WB9Z	8,154	WB4TDH	185,472	KV8Q	45,114	K5NA/2	6,718,160			
WM5G			KV0Q	7,222	N4EJW	146,064	N9XX	16,401	N3RS	6,621,024			
28 MHz				K4TEA	6,223	W5VGX	113,796	7 MHz					
W0UN			AB4RU	6,063	KA4RRU	102,080	3.5 MHz						
K8CX			LOW POWER			KJ4VU	43,700	ASSISTED					
W6QHS			All Band			WA6FGV	29,172	MULTI-OPERATOR MULTI-TRANSMITTER					
K5RX			W2TZ	1,159,128	WT8P	62,008	N4RJ	4,481,038	N2RM	12,374,331			
WS1M			NM2L	1,107,635	NK8Z	53,376	K3WW	3,330,771	W3LPL	11,286,606			
W6AXX/3			3.5 MHz			NA9N	37,410	WR3E	2,997,498	K1AR	10,632,647		
21 MHz				LOW POWER			21 MHz			K1ST	8,249,583		
K1RM			All Band			ASSISTED			K8CC	5,748,535			
EUROPE				1.8 MHz			14 MHz			N6ND	5,748,129		
All Band	EA2IA	420,064	ON4UN	79,458	DJ2HH	102,796	MULTI-OPERATOR SINGLE TRANSMITTER						
CT4A	LZ2KRU	418,035	OK3CQR	52,785	UC2ADX	101,568	7 MHz						
IS0QDV	LZ5N	382,752	LZ1KOZ	37,467	UA6BPJ	95,036	3.5 MHz						
EA6/N6RA			IT9T	28,260	21 MHz			ASSISTED					
HA4XT			LY2BTS	28,224	HA8RH	212,598	UT5JAJ	49,150	MULTI-OPERATOR SINGLE TRANSMITTER				
IS0/K1RX			HA8KX	26,340	SP5JTR	178,048	OK1DRQ	34,776	1.8 MHz				
G3MXJ			LOW POWER			UB5PCU	168,783	IK1OWC	29,884	ASSISTED			
OZ1LO			All Band			YL2GN	149,860	RZ3AW	28,770	MULTI-OPERATOR MULTI-TRANSMITTER			
G4BUO			YU3BC	1,677,744	HA6NW	137,256	LY2BIP	28,413	7 MHz				
OK1ALW			GD4UOL	1,314,405	OK2PLH	134,256	OK3ZBU	26,845	ASSISTED				
F6BEE			DL2OBF	1,001,376	14 MHz			MULTI-OPERATOR SINGLE TRANSMITTER					
28 MHz				OE2VEL	917,896	LY2BRJ	118,472	OY6A	36,352	1.8 MHz			
IT9A			F1JCB	832,136	OH9UW	117,832	OK3IQ	22,080	ASSISTED				
OH0BA/EA7			YL2KO	749,840	YU3PG	95,190	Y21PO	18,088	MULTI-OPERATOR MULTI-TRANSMITTER				
4N2V			UA3DQH	737,622	UA3DJY	86,020	OK1DRU	17,976	7 MHz				
DK5PD			YU3FA	674,172	HA8DT	74,776	OK3TWJ	12,532	ASSISTED				
HA9BVK			SM5AD	619,884	OK3CES	71,875	DF3LP	9,515	MULTI-OPERATOR SINGLE TRANSMITTER				
LY3BI			G3SWH	605,484	21 MHz			ASSISTED					
21 MHz				28 MHz			7 MHz			MULTI-OPERATOR MULTI-TRANSMITTER			
FF0XX			RB5QDP	133,497	HA8QC	45,120	DF3CB	2,142,255	ASSISTED				
LY2WW			I1XPQ	123,806	RB5QCT	38,610	IQ2A	2,044,562	MULTI-OPERATOR SINGLE TRANSMITTER				
YZ9A			OK1XW	111,198	RQ2GIG	37,584	DJ2YA	1,983,190	ASSISTED				
All Band				28 MHz			7 MHz			MULTI-OPERATOR MULTI-TRANSMITTER			
ASSISTED				28 MHz			7 MHz			MULTI-OPERATOR SINGLE TRANSMITTER			
DF3CB	2,142,255	4N31A	9,993,051	HA8QC	45,120	GB5CW	1,913,184	HG73DX	16,057,755	ASSISTED			
IQ2A	2,044,562	R6L	8,074,150	RB5QCT	38,610	YU3EA	1,829,282	4N31A	9,993,051	MULTI-OPERATOR MULTI-TRANSMITTER			
DJ2YA	1,983,190	LY2ZO	6,471,187	RQ2GIG	37,584	ASSISTED				MULTI-OPERATOR SINGLE TRANSMITTER			
GB5CW	1,913,184	PI4COM	5,960,952	UA2EC	35,445	ASSISTED				MULTI-OPERATOR MULTI-TRANSMITTER			
YU3EA	1,829,282	DL0KF	5,299,711	UA2EC	35,445	ASSISTED				MULTI-OPERATOR SINGLE TRANSMITTER			

by your callsign. So K5NA/2 can sign K5NA now in the CQ WW. It would help us if U.S. stations indicated your contest call area on the cover sheet. Also note that we have tightened up the requirements that you must comply with if you need an extension to prepare your log. We had to put our foot down on this issue. If you look at the rule on log requirements, you will see that a separate log must be submitted for each band you operate. Do not submit a log with 80, 20, etc., all mixed together. Submit a separate log for each band.

As was mentioned last month, the CQ WW country multiplier list is composed of both the

DXCC plus the WAE lists. As of this writing, the following *count* as country multipliers in the CQ but are *not* on the DXCC list: 4U1VIC, 9A, GM (Shetland Islands), IT, JW (Bear Island), TA1 (remember that you can also count TA2,3,4,5—Asiatic Turkey), UN, YU3, and YU4.

A Special Thanks

To all the members of the CW WW Committee: W7EJ, N6AW, K6NA, W9RE, WA8YVR, KR0Y, W2RQ, N3ED, K4XS, K1DG, and KR2Q. Thanks to the DX help from OH2MM, OH2BH, I2UIY,

JE1CKA, and YT3AA. Thanks for computer guidance from KB3MM, K1EA, and KD6EJP.

I don't know how to thank a retiring log checker who has been on the committee since 1970. N2AA, Gene, has been someone I have kicked ideas around with for 25 years. He has looked at thousands of logs and still maintained his enthusiasm and fresh outlook. He will still act as a special consultant for the committee. All contesters should tip their antennas to Gene.

Congratulations to all entrants. See you in the 1992 contest!

73, Bob, K3EST/6, and Larry, N6AR/4

DX QRM

If our station was only located on the east coast... VE7ZZZ. Heavy rain hampered my operations on bands as well. I always enjoyed the CW contest and hope to do better in 1992... 9M2FK. Propagation cndx to North America and Europe were just awful. In any event, I had a great time and will be able to operate the contest from here next year as well. Looking forward to it... 9M2NA. The test was a last-minute effort. I was just given permission to operate. What a pile up! Sounded like the inside of a bell and I was hearing ditty-bop in my head for two days after the test... AP/WA2WYR.

Vy QRN in this area... CX4SS. Ten meters was poor but 40 was fantastic; contacted only a few stateside stns... DU3HF. I operated with simple dipole up only 10 feet... JA4CUU. QRQ was very hard to copy... PY2HF. I was keen to give away a few a new zone number to friends. I have not seen CQ magazine in 10 years! Someone told me test started at 1200Z! Finally I found correct starting time. I called many people with no answer until JA1NUT answered me and gave me encouragement. So I made new antenna and worked some more. It was great fun and hope to do better next time... VU2BGS.

Thank you to those who made possible four hours at 200+ QSOs. Great conditions on all bands! Hope 1992 will be as much fun!... P40W (Opr. W2GD). Deep thanks to the St. Maarten power company for scheduling over 3.5 prime hours of power outages! Otherwise, I thoroughly enjoyed my first single-op DXpedition!... PJ7A (Opr. K1TO). Tnx HC5K and Chela... HC5M (Opr. CT1BOH). Biggest thrill: HS0AC on 5 bands, 6V6U on 6 bands in 6 minutes... ZP0Y (Opr. WN4KKN). Klaus, JY9VC, was a superb host!... JY8VJ (Opr. DL1VJ).

I am newcomer in contest, thrilled by seeing lots of sleepless, restless participants... VU2FWW. Chasing as many countries as possible on 7 and 14 MHz... YB0UNC. This is my first CQWW. It is a very interesting and excellent contest... EA2CLU. Quite good cndx on most bands, many interesting stations and some "new ones" have brought another enjoyable weekend... EA3ALV. First time in the test. What a race! Will be back agn next year... EC1DFP. CQWW is vy good contest... F1MOY.

I regard this contest as one of the best in the calendar. There were so many big signals on the band that I would have traded my grandmother for a better dynamic range on the RX. Hi!... G3XMZ. Conditions not as good as last year on 14 and 28... G4ZME. Thanks for Biggie CW test. What an effort it took to decipher some of the pileups for the GI prefix... G10NWG. Quite good cndx on Sunday. But no JA or W6/7 on Saturday or Sunday... GM3CFS. TVI problem. Best DX op = PJ9A... LY1BA.

Using low power reminds of 1950s and 60s when I used Geloso VFO + 6164 in all tests, including CQWW... OH3TY. After 190 QSO rig broke!... OH8LC. Enjoyed contest but can't be a long time in the shack... ON4ZD. Operating from WW II museum in Copenhagen, using old B2 (suitcase radio from 1943) as xmtr, was glad to have 52 QSO during the museums Sunday opening time... OZ5MAY. How come that people who want to operate seriously in a contest with just 100W often get TVI and those who operate with 1 KW cause no TVI?... PA3EZL.

Have participated since 1983; looking forward to joining the 1992 test... SM7LAZ. Poor cndx-hrd nil from North, Central and South America... SP5GH. I was out of Athens and I came back just few hours before the end of the contest. Very quickly made a dipole for the top band and here I am!... SV1NA. I made DXCC award in contest... UB5COM. Every WWDX contest has many DX stations... UO5OLW. Cndx and WX were very bad over here... UW0ST. Best contest of the year... Y21CL. I found a lot of old friends but also new ones... YU3PG.

I wish that cndx had been here for more DX contacts... RC2AZ. It was my first WW. From now on I will take part in every one in future... UA1NAW. Not easy to work DX on 80 meters... UA6LTI. UT0N is special call of Ukrainian Language Radio Amateur Society "Radio-TLUM"... UT0N (Opr. RB5NC). Cndx are really decreasing, but we can still enjoy 10 meters for several years... 7K1NUX. I make it a rule to take part in this contest every year... JA1EMQ. Cndx was so well but antenna was not so well. I lost some other countries. Much regret!... JH1NHY.

Enjoyed and glad to get some new ones... JI1FYC. I enjoyed the test but couldn't contact with 5V7RC and other African stns... JN1WXW. I've forgotten to get JA multiplier on any bands!... JQ3UDL. I took more than 100 multipliers with my small system. I can't believe still now!... JR4PMX/1. Very poor cndx 1st day, moderate on 2nd day on 80 meters... JA1XAF. I enjoyed all of 48 hours but cndx not so good... JA5ONK. Me and my friends (JA6EXO and JA6JVI) built antennas

on 23rd November just the day of CQWW. I enjoyed test thanks to my friends... JA6SHL.

First time to use CT on CW test. It is really easy and enjoyable... JA8RUZ. Hope to work next year from KH2V in Guam... JA8RWU. Enjoyed this contest with ARRL EME competition at same night time. I don't like beam antennas very much. I am member of "Dipole WW DX Contesters Club." Hi!... JA9KHU. I got eight new countries for the DXCC through the contest! A big harvest... JE8MFG. I will try 3.5 band next contest... JG1BPS. As XYL and the boys went to my parents' house, I operated almost full 40 hours this year... JR1IJV.

The WWDX CW test was very entertaining... JR0EQO. My first competition as a single operator—quite an experience!... C56A (Op OH6EI). There is a chance I might be here next fall. If so we'll certainly be looking to do a bigger effort then... KG6UH/DU1. Due to the continuous changes of prefixes I suggest that in same issue of CQ where you announce tests you may give forms required including list of countries... HZ1HZ. Vy happy to work your contest... LU7EE. Vy glad for getting 8 more countries on 80 on my way to 5BDXCC... PP8WHL.

My first test—some day I will reach the top... PY2NN. CQWW is still the most exciting competition. As sunspot cycle 22 held steady, 10 meters proved to be a must... PY5BLG. Emergency LW antenna did not work... VK2BQQ. Great to see the terrific CW activity particularly from Europe, Japan and Russia... VK3ALZ. After the contest I found the grass in the backyard up to my son's knees! I had fun... VK8SD. Cndx vy bad from Indonesia. I heard many 599 but they did not hear me... YB2FEA.

It's great to be back contesting again from YV-land... YV5/K3UOC. After about 10 years the first "Big One" in CW. I really enjoyed it... Z21HQ (Op DF2RQ). Only operate from a suburban lot so not a large antenna farm... ZL1AIZ. First contest—my operating skills improved tremendously!!... ZS6TVB (Op ZS6BUV). QTH: Wa Safwan, Iraq. Buffer zone with UN peace keeping... N6BFM/4U. Please understand that I listened carefully for many hours in the effort to copy the call of the many contest operators. I succeeded in copying 50. So when AB5K gave his nice clear contest call, I responded and made my first successful contest exchange—watch for me next year... 5W1JD.

Murphy strikes! Lost power twice for 5 hours on Sat. and quit... 6D2X. Pointed the beam to check long path first night—it froze for 14 hrs!... AA6DX/KL7. Great fun. I enjoyed the contest. So did my wife, Heather, PJ8CW, who did the phone section... PJ5JP. First time in CW portion of contest, will be back next year... VE3VET. Six hours in volleyball tournament burned my anti-sleep resistor... VE7UF. Getting back into CW after 30 years. I appreciate those who slowed down for me... W8HNI/KP4.

I wish 9M6NA had heard me as well as I heard him... XN2ZP. Very bad opening to the west. Next time I'll prepare new amp "Jack the Ripper" and you will see what will happen to your bulbs!... 4N1A (Op YU1YV). Vy bad cndx; 20 closed at night... DJ0SH. Cndx on 20 terrible, vy noisy in Eu worked most W6 LP... DL1HCM. 5U7M was a new one on 80... DL7MAE. I tried using the abbreviation "E" for the "5" in the report. Only three stations out of the 3629 did not seem to understand... EA6/N6RA.

Unable to operate the keyer and computer so back to the old pencil... EA6GP. Great DX, lots of fun, next year computer no more pencil... EI6FR. Many thanks for great test... ES0NW. I operated the contest without calling CQ, only answering stations... F6GKO. Strong sigs from US east but nothing from west... FD1OQJ. TVI caused me run low power during prime-time TV but still great fun... G3NKS. Was able to run stns only on 80 and 10 other bands a struggle... G4BUO.

Still enjoyable! Forty years of participating!... GW3JI. Hope to win contest for HB for 10th consecutive time... HE7AGA (Wow!—ed.). My stn was field day style with 20 cm of snow... HE7APJ. All wrked with hand-key... HE7CVO. I congratulate you for organizing the very interesting CQ contests. Greetings from Vatican City... I0DUD. Great to have ZA1TAG call me! Tough times on 10 and 15 to west US... IS0QDV (Op AH3C). I had no time, but CQWW is CQWW!... LY3BO.

Nice to be back again!... OZ5DX. T77C on 6 bands! Tks PA3DFJ... PA0CLN. The first time I used "real time" computer logging—I had lots of fun!... PA0LOU. Big plans, hard work, poor propagation, but great satisfaction. It is the WWDX... SP2PMO (Op SP2JKC). Some big guns don't send I.D. for long time, wasting time for real contesters. Thanks again for best contest ever!... SP5DDJ. Special thanks for KH0AM, VS6WO, CT3M, EA9EA, and NP4Z for nice 40 and 80 multipliers... YL2GD.

My all band score was less than the one me and OH2MM worked on 20m from PJ9A last year! This was my first single band effort and will be back for sure



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BR1K	77/12/23	275/17/51	779/23/68	1281/30/78	1417/27/80	1851/24/75
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T11C	59/8/14	382/15/49	1174/31/89	918/35/93	1282/33/97	1676/32/94
9Y4H	84/9/21	223/20/58	664/24/81	1090/32/94	1067/31/89	1396/29/76
ZP0Y	37/11/12	87/20/35	496/31/62	977/33/90	1094/34/92	1938/32/91

USA TOP SINGLE OPERATOR, ALL BAND

Station	160	80	40	20	15	10
KM1H	29/10/25	207/15/60	877/30/92	438/33/87	622/33/94	737/28/85
W1KM	21/13/18	359/22/78	492/29/85	437/31/97	489/27/80	601/26/85
K1CC	30/11/22	136/14/54	342/30/93	348/33/95	756/30/89	677/28/83
N2NT	29/10/21	165/18/63	556/28/88	368/31/83	811/33/91	403/24/82
K3TUP	25/9/17	115/18/56	519/34/96	560/36/101	452/30/92	512/29/87
K3ZO	11/5/9	204/19/65	451/33/103	289/37/93	465/32/97	597/27/90
N2LT	17/8/15	91/20/56	374/31/96	294/33/94	793/35/96	399/27/82
W3BGN	31/9/19	166/15/54	430/31/95	261/30/82	544/29/82	635/29/89
N6BV/1	19/7/14	121/16/55	544/30/80	475/32/92	525/28/85	403/26/70
WM5G	15/8/11	103/18/34	446/32/94	390/33/92	348/31/91	580/31/91

WORLD MULTI-OPERATOR SINGLE TRANSMITTER

Station	160	80	40	20	15	10
EA9EA	61/14/50	526/16/71	1586/32/109	1045/36/123	1349/35/115	1287/37/114
IQ4A	47/7/48	157/19/92	1794/36/124	801/36/121	1093/36/119	1252/38/116
RZ1A	269/12/57	820/33/102	1022/38/121	1727/37/128	1293/37/119	682/36/115
LZ9A	110/17/62	194/22/76	1703/36/125	793/37/124	1118/39/127	1138/37/113
RLBL	125/15/50	550/23/81	957/34/104	1104/36/115	867/34/105	605/32/98
C56N	12/6/11	48/12/45	913/23/79	1385/35/100	928/30/105	1718/27/88

USA MULTI-OPERATOR SINGLE TRANSMITTER

Station	160	80	40	20	15	10
K5NA	27/12/25	111/22/76	932/39/127	652/38/138	555/36/124	683/32/121
N3RS	36/16/35	190/22/79	727/35/120	613/39/143	603/37/132	663/34/124
K1RU	19/11/19	93/17/66	679/34/106	606/36/126	645/34/118	637/31/112
N4WW	29/13/26	106/22/61	685/34/112	544/37/118	666/36/116	618/34/113
K2TR	43/11/32	70/19/66	694/35/116	459/35/126	688/34/112	403/32/110
K1IU	21/8/17	129/19/68	482/34/105	404/32/120	568/33/109	543/32/111

WORLD MULTI-OPERATOR MULTI-TRANSMITTER

Station	160	80	40	20	15	10
PJ9A	443/16/47	1233/26/77	2372/29/105	4036/39/136	3373/36/135	3534/37/128
CT3M	184/12/48	1500/21/81	2289/31/108	3108/36/130	2710/34/121	2411/33/113
J6DX	620/18/62	1304/21/81	2011/29/101	2957/34/124	3951/37/130	2986/32/116
KH0AM	129/5/6	796/25/54	1900/34/112	2790/38/128	2848/37/116	2184/37/101
HG73DX	599/11/63	1305/29/97	2040/37/133	1901/39/128	1897/38/123	1478/36/120
N2RM	70/16/44	394/24/86	1058/36/124	1133/38/138	1397/37/137	1020/36/131

USA MULTI-OPERATOR MULTI-TRANSMITTER

Station	160	80	40	20	15	10
N2RM	70/16/44	394/24/86	1058/36/124	1133/38/138	1397/37/137	1020/36/131
W3LPL	82/15/43	452/23/87	1063/37/131	909/39/138	1119/38/131	968/34/133
K1AR	58/12/37	423/25/88	766/39/128	1051/39/145	1251/37/132	812/33/124
K1ST	124/12/26	267/20/75	766/36/112	873/38/130	1102/37/118	755/32/119
K8CC	47/12/27	150/19/57	644/34/111	739/37/124	819/35/121	541/29/105
N6ND	107/12/17	378/27/54	721/36/115	634/38/117	584/32/107	551/33/99

... OH1MMM (Op OH6LI). Aurora made cndx poor. However, nice test as always ... OH5TS. It was nice to work those fellows from the USA that I met in Curacao during CQ WW SSB test ... OH6YF. Aurora blocked the bands totally sometimes ... OH7BUQ. Very good cndx on 10 meters ... OK1AD. My first real CW entry. You will see me many more times after this one ... ON4AKL.

USA QRM

Running JAs with 100W and holding a frequency in the bottom 10 kHz ... AA7CQ. A real surprise to call CQ on 40 meters and have JT1BG answer ... AA7EL. "Gonna go computer next year" ... AE2N. Those tiny sigs from Europe at 1AM on east coast and getting 7Q7 ... KA1WIF. My second contest. Lots of fun. Wish they had an entry class for people who work on Saturday ... KA4IQD. Was amazed at ability to break through pile-ups with my low-power rig and no gain antennas ... KB1KM.

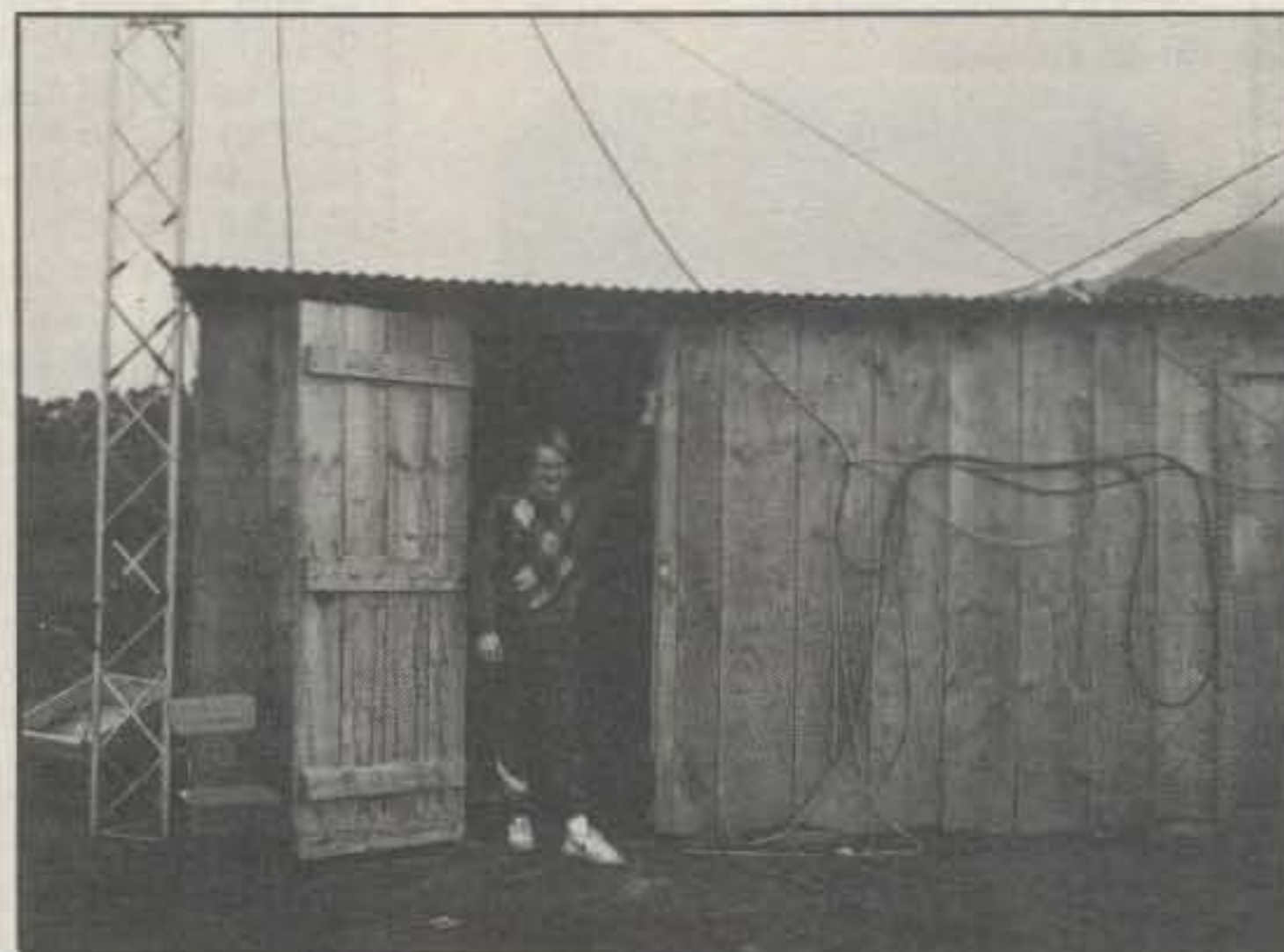
Heard 4S7/N6AA on 20 Saturday, called my head off, no luck ... KF5PE. Mni tks to vast majority of ops who were vy courteous and extremely patient ... KK4SM. Instead of taking down R5 vertical in daytime (no outside antennas allowed) left it up all weekend. Got call Monday to take it down! ... KC3AG. Like low power category ... N2JOH. This completes my first set of WW tests, lots of fun ... N5TCQ. New low power category finally gives the little guys a chance ... N9XX. Biggest thrill was wrking BY1PK ... N19C.

Working VK0ML for my 290th country ... W6JTI. Wrking KH0AM on 20 at 2:15 EST ... W8YGR. CT is wonderful ... W9HE. Hit the button on memory keyer. Out came a language that I could not decipher! Forgot to reprogram! ... WA6KUI/4. Low power class is a great idea ... WA0RJY/7. I never thought I would miss the East Coast. A vertical is the pits for WW from Colorado ... AA0CY. Thirty-eight zones—closest I've ever come to WAZ in a weekend ... K1TN. Outstanding contest, outstanding operators, marginal cndx ... K4XG.

High-speed ops should slow down to 25 wpm so everybody could work them. They lose lots of QSOs ... K9IKP. How about an optional participation pin similar to Sweepstakes or CQ-M? ... K0BJ. Cracked zone 33 pile-up on 80 with 80W and 67 foot LW ... KA5VOZ. The first time I've entered results for. Ever! I was really impressed by the polite operating of the JAs ... KG6I. I enjoyed the test vy much and hope the stns wrked are as good at QSLing as they are at contesting! ... KM3D. Remarkable what can be wrked during a solar flare ... KS7T.

I think that anyone who makes 10-15 QSOs before IDing should be flogged ... KU0C. Seemed tougher but beat last year's score ... N2MR. I hope you get my call right this year. N2WK not N2WM ... N2WK (Sri—ed.). Been a ham for 30 years! Tired of pulling antenna around with rope! Next year I'm buying an antenna rotor ... N7JXS. Borrowed keyer, borrowed rig—no filter. Too much wrk! ... NA2Q. Did not think I would make it. Had triple by-pass in July, had double pneumonia; 87 days in hospital ... W1CNU.

Who is this station QRZ? I kept hearing him all over the bands. TU QRZ ... W100. Eighty-seven years old and still going strong in CQ and ARRL DX contests! ... W2AWF (Congratulations, Elmer—eds). Everyone comes out of the woodwork and causes a mess ... W2YY. QSK failed after 13 minutes so used old bug and foot switch ... W3GM. First hour on 14 wrked 9M6, A3, V8, and HS ... W3OV. Propagation was about the worst I can recall since the CQWW started in 1948—and I haven't missed many ... W3VT/4.



Operating from a true shack, OH1JT put CR3A on the map.

Knocking off for supper and martinis! ... W4OO. I never heard Australia or much of the western Pacific. Congrats on a nice contest. I'm already looking forward to next year's event ... W4ZYT. This year I tried all bands again to celebrate my 80th birthday ... W6BIP (Many more, Bip!—ed.). Working JW8 on 40 ... W6JTA. First CQWW as K2DGT single op 40 CW 1959—still super fun ... W6PU. After noting a drop in QSO rate, I found I had made three QSOs on dummy load! ... W0RXL. Those with computers should give a rpt if called "again," rather than refusing QSO ... WA2VYA.

Finally getting to H18A through his pile-up ... WK3P (QRP champ with pile-up, the callsign sure adds dBs!—ed.). After first hour had to take 24 hrs off to retrieve family and repair the car ... AA5B. Had fun on 7 with new 2-element beam—62 countries ... K7ABV. No JA opening, few VEs, a 60 dB local—160 is sure fun! ... K0CS. First CQWW—Wow! What fun! ... KG5YA. Come on November 1992! ... NO8C. Tough cndx east & west; okay north and south ... W1LQQ.

Station Operators Multi-Operator Single Transmitter

4U1TU: VE5ZX, G4FNL. 4U1VIC: DF7RX, DK6WL, DK20Y, DL6RAJ, DL6RDR, LX1II. A35MX: K1XM, KQ1F, K2WR. AA50R & NA50, N5XIE. AA6TT/8 & N8XX. AB2E & WT3Q. AG6D & AE0M, N6IP, N6YK, W6LVY. BY1PK: BZ1AA, BZ1AB, BZ1HAM, BZ1AG, BZ1AL. BY4AA: BZ4AA, Nizhuo-qing, Xu. BY4SZ: BZ4AAA.

USA CLUB SCORES

Frankford Radio Club	232,530,605
Yankee Clipper Contest Club	201,487,931
Southern California Contest Club	76,315,042
Potomac Valley Radio Club	62,931,880
Northern California Contest Club	59,371,303
Southwest Ohio DX Association	44,388,991
Southeast DX Club	35,183,327
North Coast Contesters	30,836,727
Mad River Contest Club	24,340,512
Society Midwest Contesters	19,330,774
Texas DX Society	17,736,829
Dixie Dxers	17,208,576
North Alabama DX Association	15,617,772
North Texas Contest Club	14,659,935
Mile Hi DX Association	13,209,440
Minnesota Wireless	11,664,799
Left Coast Contest Club	10,477,788
Central Florida DX Association	7,757,717
N Ohio DX Association	7,155,227
Oklahoma DX Association	7,011,698
Mississippi Valley DX & Contest Club	6,356,154
Order Boiled Owls NY	6,029,784
Carolina DX Association	5,676,194
Grand Mesa	5,460,449
Southern California DX Club	5,093,012
West Coast DX Ring	4,879,552
Rochester DX Association	4,834,716
Falmouth Amateur Radio Association	4,430,146
Long Island DX Association	3,840,376
Kansas City DX Club	3,666,302
Western Washington DX Club	3,494,033
Hossier	3,230,431
San Diego DX Club	2,853,931
Albany Amateur Radio Association	2,781,081
Woodbridge Wireless	2,710,832
North Florida DX Association	2,637,034
Kentucky Contest Group	2,536,385
Western NY DX Association	2,462,721
Salt City DX Association	2,308,033
Eastern Iowa DX Association	2,266,205
Lone Star DX Association	1,828,520
No Dot Dxers	1,389,841
Great Dismal Swamp	1,188,485
South Florida DX Association	1,163,728
Amarillo DX Society	1,131,185

North Texas DX Club	924,051
Central Arizona DX Association	790,012
New Jersey DX Association	715,977
Middle Tennessee DX Club	690,020
Redwood Empire DX Association	681,406
Willamette Valley DX Club	633,396
Overlook Mtn Amateur Radio Club	592,391
Northern California DX Club	568,093
West Park Radio Ops	449,974
Naked Chicken Contest Club	365,886
Dauberville	340,731
Tri-city Amateur Radio Club	288,303
Sterling Park Amateur Radio Club	237,075
Delta DX Association	196,933
Metro DX Club	99,794
Thurston Amateur Radio Club	77,553

DX CLUB SCORES

Rhein-Ruhr DX Association	94,138,183
Bavarian Contest Club	46,138,149
OH DX Ring	39,496,098
Ukrainian Contest Club	21,656,761
Kaunas Polytechnical University	20,712,140
French DX Foundation	17,849,437
Kiev ICAE Radio Club	14,197,524
Araucaria DX Group (PY)	13,799,121
Grupo DX Panamericano	13,065,944
Les Nouvelles DX	12,792,873
Chiltern DXC(G)	11,103,513
Alaska Dx Association	9,265,023
Udmurtian Contest Club (UA4)	6,046,859
Southern Germany DX Group	5,099,312
Fraser Valley	3,201,084
Taganrog Radio Club (UA6)	2,689,284
YV DXperts	2,177,810
Radio Club Cordoba	1,705,993
Teuva Radio Club (OH)	1,682,889
Tupy DXG (PY)	1,282,693
GACW (LU)	1,204,753
Prie Neries (LY)	1,190,003
Rostov Radio Club	1,138,550
Top European Contesters (SM)	885,327
North Lithuania DX Group	470,831
East-Bavarian DX Association	419,356
Kremala Contest Group (LY)	314,549
ARI Perugia (I)	109,491

BZ4SBA, BZ4SBG. **C56N:** G3SXW, GM3YTS, K5VT, K7GE, N27E. **DA2UK:** DA2OJ, DA2QX, DL/F1MJX. **DF0DF:** DJ8SW, DL5ZBD, DL2ZAE. **DF0DX:** DF8AE, DL1YAW, DL1YDI, DL4YBM.

DF0LE: DJ0MCH, DL2SDD. **DF0OD:** DL1BJL, DL1BJN, DL2BCC. **DF0RR:** Club. **DF3QG & DJ1FC,** DK2YI. **DJ4AX:** Club. **DK0MM:** DJ9CB, DJ8WL, DJ7IK, DL4FJ. **DK0TZ:** DJ5AI, DF3SV, DL1S8F, DF5EN. **DK0UU:** DL2MEH, DL1GRG, DL1GGT. **DL0LR:** DJ7PT, DJ3ZX, DL3WL, DF9RR, DF1LX, DL8RE, DF4PM. **DL8SSB:** DL1EFO, DL1EFD, DK7FP, DL9XY, DL4JO. **DL8WH:** DF4ZK, DF6IH, DF3IAC, DF7IT, DL2IAK. **DL8WU:** DL1HX, DJ8UV, DF1EJ. **DL1SBR & DL4AA:** EA3KU & EA3AIR, EA3AVV, EA3DU, EA3DWW, EA3FER, EA3LL. **EA9EA & others:** E17M: E13DP, E14DQ, E16BT.

FF3RM: F6DTU, F6GNL, F1HBF, F1NLO, FB1RTK, FB1SBY, FD1SFG, F11NRI, Van Cortenbochs. **FQ2M:** F5IN, F5QF, F6ARC, F1LGE. **G3VGG:** Club. **G4CNY & W3MA.** **GW8GT:** GW3KYA, GW3NWS, G3DAY, GW5NF, GW4TTU, GW4JBO, GW4LXQ, G4VXE, GW6ZUQ, GW8NAW, G4IFB, G4SRX, G4BKJ, G4FAM. **HA0KLL:** Ferenczy, Racz, Kristof, Kiss. **HA5KTT:** HA5BWW, HA7JAI, HA5OI. **HA6Z:** HA6VV, HA6GQ. **HA8KCK:** HA8FW, HA8EK, HA8FT, HA8DZ, HA8KH. **HA8KWE:** Pluhar, Beregszaszi, Burda, Murvai, Wolf. **HG1S:** HA1TJ, HA1TD, HA1AH, HA1SV, HA1DAE, HA1DAC, HA1TW. **HG95T:** Farago, Barcsay, Czizrok, Szilagyi, Osztas, Kiss. **HZ1AB:** N4KT, SM0CXU, W7SE.

IK0LZR & IK0PHU, IK0IXI, IK0SYD, I0MYQ, I0MMI. **IL3VE:** IK3HAQ, IK3HZS, IK3DBH, IK3OAR. **IQ4A:** I4DKO, I4EAT, I4IKW, I4IND, I4LCK, I4LEC, I4JEE, I4QJH, I4TJE, I4VEQ, I4YRW, I1ZEU, IK4LZF, IK4DCT, IK4EWH, IK4EWK, IK4NPD, I4W4NU. **J37YL:** NM7N, N4DDK, VE7YL. **JA3ZK:** JH4PUL, JM3ILK, JG3SXR. **JA3ZOH:** JE3MAS, JG3KIV, JG3ODG, JN3QCB. **JA7YAB:** JJ1NNJ, JH0MGJ, JQ1XGV, JJ3FFZ, JA1-36363, JG3ENB, JN3IQJ, JG7MAX. **JA8YBY:** JO1DFG, JF8TMI, JG8NFE, JH8PNE, JR8DHA, JR8WJS. **JA9YAV:** JH9ETC, JR9FNN, JA9-3017. **JE6ZIH:** JR6GKT, JF6DEA, JG6GNN, JI6BRB, JG4KEZ, Narumi, Ryoki, Maki. **JG2YIV/2:** JF2WEQ, JE2PCY.

JH5ZCP: JA5AUC, JA5IGX, JH5PHC, JR5JAO, JE5IVW, JA5AQC. **JH8YCT:** JR8XWU, JR8QMO, JE8URM, JE8JZX, JF7LGH, JM3GZO. **K1IU & KD2SX,** KS1J, W1GL, NS1I. **K1RU & K2SS,** K1YR. **K2SG & WA2SRQ.** **K2TR & WA2SPL,** WA4VKD, N2DU, N1CC, K2XA. **K3ANS & K3YD,** N3ED, NU3L, WA2MKM. **K3DI & WD4IEH,** K3NL & K3JG. **K4FW & W9VW,** K4LTA & N8UM, N1CWR, W4TYU, KN4NQ, KR4C. **K5HKX & NV5L,** K5IU & ND0P. **K5NA/2 & KU2Q,** WB2Q, KY2J, NG2X, NA2N, K2UR, K2ONP. **K8DD & AC8W,** KJ8A, N8CQA. **K9MK & KC9IW,** KA5W & KS1G. **KB1H & AK1N,** K1GX, K1YRP, KC1Q, N4XR, WA1HYN. **KF8QE & KF8DF,** KI6X & N4EA. **KK9I & NZ9R,** KG9J.

KL7AF & NL7UT, NL7WA, NL7IY. **KS3F & NE3F,** NK3Z. **KU4J & WA4DPU.** **LA1H:** LA4KQ, LA8UL, LA9OI. **LA2AB:** LA4DCA, LA9EEA. **LZ1KDP:** Myanev, LZ1N151. **LZ1KWT:** LZ1DZ, LZ1JH, LZ1MC, LZ1DQ, LZ1DP, LZ1RT. **LZ9A:** LZ2CC, LZ2PD, LZ2DF, LZ2HE, LZ2UU, LZ2BE, LZ2WF, LZ2XA, LZ2ZM, LZ2TT, LZ2PS, LZ2II, LZ2NA, LZ2WM. **N0KFE & AA0A,** N0PKX. **N3RS & NW3B,** WA3LRO, N3RD. **N4WW & K8LUZ,** NX4N, K4SAV, WA6DGX. **N5EA & W5ASP,** NV6O. **N0ZA & AL7H,** KR0U, W1XE, W0KEA. **NK7U & KY7M,** N17T. **NN3Q & K3ATO,** K3NW. **NS2K & W82AOH.** **OE1XTU:** OE4BKU, OE1OPW, OE1TKW, OE1JNB, OE1MCU. **OE3XCW:** OE1GAS, OE3CHC, OE3PUW. **OH2AG:** OH2LU, OH2OF, OH2GI, OH2SS. **OH3ES & OH3MEP,**

OH3XR. **OH7AAC:** OH7MS, OH7MCA, OH7MHL, OH7LNI, OH7WV, OH4MJ. **OK1KQJ:** OK1AYP, OK1BY, OK1ICM, OK1IMR, OK1JKX. **OK1OPT:** Club. **OK2KDS:** OK2VWB, OK2-22266, OK2-32906. **OK2KOD:** OK2BDI, OK2BGR, OK2BNX, OK2PID. **OK2KVI:** Club. **OK3KAG:** OK3CGN, OK3CIR, OK3DX, OK3TRU, OK3TZI, OK3WDX, OK3ZFM. **OK3KUN:** Club. **OK3KXR:** OK3YDP, OK3CVB, OK3CGN. **OK3ROS:** OK3CHH, OK3-28015. **OK5W:** OK1AEZ, OK1JJB, OK1CF, OK1JKT, OK1WT, OK1AII. **OM5KTU:** Club. **ON6AH & ON4GO,** ON6MH, ON6DR, ON7ZV, ON7PC, ON9CMB, ON5PV.

ON7LR: ON1ARZ, ON1AVZ, ON4ABW, ON4AEU, ON4ALW, ON4AMI, ON4APA, ON4ASB, ON4AWU, ON4DB, ON4EX, ON4WD, ON4WW, ON5DH, ON5FF, ON5OT, ON5SH, ON6BY, ON6EV, ON6FX, ON6LK, ON6MR, ON6VK, ON7CS, ON7SF. **OZ10XZ:** OZ5DL, OZ8AE. **OZ5EDR:** OZ1BBM, OZ1BOQ, OZ5AAM, OZ5ABD, OZ5ABN, OZ8SW. **P4/N6BT:** N6BT, W0ZZ, N6TV. **PABKHS & PA3ENJ.** **PA6DX:** PA6COR, PA6ERA, PA3AAV, PA3BFM, PA3CTM, PA3DUA, PA3DWD. **PA4SHB:** PA8SHY, PA3FCD, PA3FPF, PA3FXU. **PA4ZLD:** PA3EOB, NL-8884, NL-10895. **RB4IWE:** UB4IRI, UB5-073-4328, UT5SI. **RL0L:** RA9AD, RA9AM, UL7LEB, UL7LER, UL7LEZ, UL7LT, UW3AA, UW9AR. **RW0CWA:** UW0CN, UW0CA, UW0CR, RW0CA, UA0CDX, UA0CZ, UA0CCD, UW0CW.

RX3ARM: UA3-151-670, UA3-157-210, UA3RMK, UA3RFC, RA3RFH. **RY0N:** Pavlik, Rudenko. **RY0Q:** RB5QNA, RB5QNV, RB5QRQ, RB5QRW, 5B5QW, UB4QW, UB5WU, UB5QN, UY5ZM. **RY5L:** UB4LNC, UB4LUF. **RZ1A:** UV1AA, RV1AW, UW1AE, UA1BX, UA1ALZ, UA1ARL, UA1AKC, UA1ABR, UA1ATD, UA1-169-132, UA1-169-2475, KA1WPO. **RZ6AXO:** UV6AOE, UV6AEW, UA6YHF, RA6AX, UV6AOW. **RZ6AZZ:** RV6AGG, UA6BGL, UA6-101-355. **SK0WA:** SM0KWS, SM0SNI. **SK1PW:** SM1ALH, SM5GLC, SM4HAK, SM10II, SM1PCC, SM1TDE. **SK6TW:** SM0CXM, SM6AOU, SM6CPY, SM6DOI, SM6DER. **SL0CB:** SM0DRD, SM3LGO, SM3NSJ, SM5NZY, SM0RVV. **SN3A:** SP3GEM, SP2FWC, SP3ASN, SP3HLM, SP3HRM, SP3RBI, SP3RBR, SP5INQ, DJ0IF.

SN3N: SP3FHV, SP3FLR, SP3FPF. **SP3KPN:** Club. **SV4AAQ & SV4AFY.** **T77C:** IK4HLO, PA3DFT, PA0GAM. **TK6C:** F6BBJ, F6HSV, TK5EP. **TV6MMN:** F6AXX, F6BQY, F6IIE, F6HBR, F1HEW, FD1OYC, FD1OTZ. **UB3IWA:** UB5IOK, RB5II, UB5IKF, UB3IBZ. **UB4EYT:** UB4-060-90, UB4-060-175. **UB4MWU:** UB5MBM, UB5MRE, RB5MRE, Reva. **UB4WZA:** UB5WCX, UB5-068-996, UB5WBY. **UB4ZWK:** RB5ZC, UB5ZM2, UB5ZIZ. **UC1CWB:** UC2-009-130, UC2CEI, UC2CEO. **U00Z:** RB5FF, UB5FBV, U05OB, UB4FA, RB5FT, RB5ZM, U05WU, RB5FA.

UT4UXW: UT5ULY, UA0CIT. **UW2F:** UA2FF, UA2FJ, UA2FM, UA2FZ, RA2FA, RC2AB, RC2AX. **UX9C:** UV9CP, RW9CW, UA0CBM, UA9COB, UV9CCY. **UZ0CWV:** UA0CHW, UA0-110-530, UA0CF. **UZ0CXD:** UA0CR, UA0CID, UA0CKA. **UZ1AWD:** UA1-169-2391, UA1-169-900. **UZ1NWW:** UA1NAW, UA1NDX, UA1NDY. **UZ1OWZ:** UA1OZ, UA1OMS, UA1-113-244, UA1OIZ, UA1-113-630. **UZ1TWC:** UA1TFG, UA1TAN, UA1-144-1068. **UZ1TWW:** UA1TGA, UA1TAL, UA1TBD. **UZ3AWR:** Isakow, Bojchenko. **UZ3WWA:** UV3WU, RW3WR, UV3WT. **UZ3XWB:** Vic Kabakov, Barsky, Mararov, Murashkin, Safonov, Val Kabakov, Haritonov. **UZ4PWW:** RA4PO, UA4-094-976, UA4-094-973, UA4PBZ.

UZ4WWA: UA4WA, RW4WA, UA4WAZ, UA4WAN. **UZ4WWB:** UA4WHW, UA4WGU, Kosarev, Klepanov.

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Model AC 1.8-30

- SWR Max 2:1, 1.4:1 average from 1.8 to 30 MHz
- Can be installed in approximately 80 ft. space
- Ideal for commercial services for multi frequency operation without the need for antenna tuners or additional antennas
- Handles 1 KW, 2 KW PEP ICAS
- Higher power models available on special order. Contact your dealer or factory

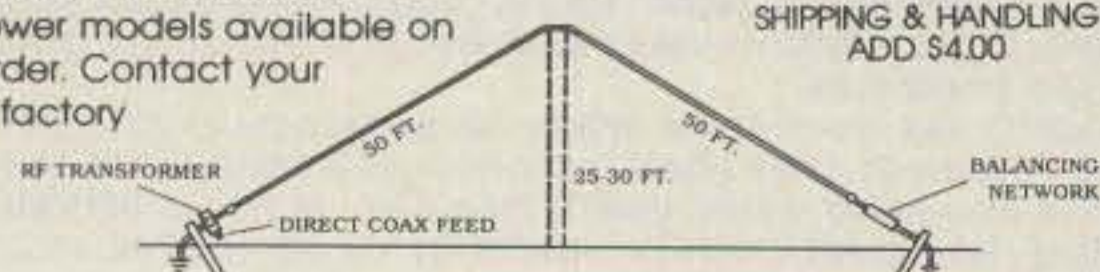
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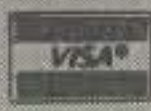
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The crew at VP5P: (left to right) K4MF, VP5P, N2MG, NQ2D, WS4E, and WM2C.

Karataev. **UZ6AYN:** UH8HAI/UA6A, UA6AH, UA6-101-465, UA6ASG, UV6AIU. **UZ6HWA:** UA6HSV, UV6HTV, UV6HSI. **UZ9AWD:** RA9AL, UA9AMG. **UZ9CZ0:** UV9CAZ, UA9-154-2454, RV9CDA, UA9-154-2007. **UZ9QWA:** UA9QA, UA9RQ, UA9QGX. **UZ9XWT:** UA9XFW, UA9XCI, UA9XLV. **V31DX:** WA9L, N6YRU, VE3SUN. **VE7SV** & **VE7AHA,** VE7CT, VE7CC, VE7VR. **V85HG:** J01BMV, JR0JFM. **VK6LW** & **VK6BB.** **VP5P** & **NQ2D,** N2MG, WS4E, K4MF, WM2C. **VS6W0:** AA9AK, AG9A, NA9D. **W8CP** & **W0PSY,** K9AY, WA8SWM, NR5K, ND0V, **W1BK** & **WA1UAR,** K1TXH. **W1FJ** & **K1JKS.** **W2UI** & **N3KR.** **W3GG** & **WD3I.** **W4AOL:** K0DI, WD4DWN, WD4ELG, N7FYT, N9HZQ. **W4PRO** & **WB8HDD,** WY7U, AA4NG, AC4HB, K4IX, W4DHZ, W8RNL, WA4OHH, **W6GO** & **AA6LB,** AA6WJ, NB6G, NV6O. **W8SH:** KT8X, W8JRK. **W8WEJ** & **AA4VV,** W8VVE. **WA6IET** & **KJ6BK,** W2KVA, W6KFV. **WA6NKQ/7** & **K7PVT,** N7PLP, N6HR. **WA7EGA** & **K7GS,** W7TJ, NQ7M. **WA80SE** & **N8JEC,** WB8LGL, NZ8O. **WA8TOB** & **KK8J.** **WB3FIZ** & **KA3GIK.** **WE1B** & **WA1LNP,** KI2L, WY1A, WF1L. **WD8LLD** & **AF8A,** KU8E, N8FLS, WB8WTS, WD8AUB. **WS1F** & **WA1PMA.** **XN3EJ:** VE3IY, VE3ICR, VE3EJ, VE3CDX, **Y3AK:** DL3OI, Y24UK, Y42LK, Y42MK. **Y35L:** DL6DQB, DL8WAA, Y33TL, Y33UL, Y33VL. **Y57UD** & **DL1RNE,** DL1RNN, DL1RMT. **Y04KCC:** Y04BGZ, Y04BBH. **YZ4Z:** 4N4CX, 4N4RX, 4N4TF, YU4AX, YU4GG, YU4JK, YU4NW, YU4RW, YU4TB, YU4UK, Amela, Boris, Dave, Hajro, Jasmin, Kameni, Samir, Slavo.

Station Operators Multi-Operator Multi-Transmitter

4N31A: YU3MM, YU3AI, YU3IX, YU3QJ, YU3EW, YT3AW, YU3KD, YT3ZW, 4N3AM, YU3ZO, YU3AY, YU3ZV, YU3PV, YU3EO, YU3RJ, YU3DB, YT3HM, YT3OP, YU3EF, YT3EZ, YU3XI, YU3WN, YU3RS, 4N3CQ, Renato, Simon. **CT3M:** CT1DI, CT3BX, CT3EE, CT3EF, DB8XP, DF4SA, DF5TS, DF5UL, DJ2YE, DJ8VC, DK8WF, DL1EFT, DL1EJS, DL1EK, DL1HBT, DL2BAY, DL3BQM, DL3HAH, DL4ZBI, DL5XX, EA4KA, F6IMS, HB9CEY, HB9CRV, HB9CUI, LA2YGA, LA7DFA, PA3CEF. **DL0KF:** DJ3UL, DJ4FZ, DJ7SW, DF4PA, DJ9MT, DJ6TK, DF6LI, DL8LBM, DH1LAO, DL2ZT, DF3LZ, DL8KUA. **ED5TX:** EA5BM, EA5TX. **FF1POI:** F6ANW, F6ERZ. **HG7DX:** HA4ZZ, HA4WQ, HA4ZD, HA8LKK, HG4FC, HA5GF, HA5IW, HA6WX, HA5LN, HA5MK, HA5OM, HA7RY, HA5FA, HA5ML, HA5UA, HA5RE, HA5FQ, HG5YY, HA5FM, HA5AWH, HA6NF, HA6OQ, HA6NY, HA6ON, HA6ND, HA6PX, HA8IE, HA8LKE, HA8LLK, HA8-806, HA8JV, HA5TI, Szabadfi. **HS0AC:** HS1AAM, HS1ABU, HS1CDX, HS1EHY, HS1EZB, HS0ZAA, G3NOM, SM3DYU. **J6DX:** W8ILC, K0IYF, W8QID, N8BJQ, AC0S, W8FN, W8OK, K9BQL, WD8IXE, N9AG, WA2USA, W8PR, KB6ZBI, WB8ENR. **JA1YXP:** JS1INN, JQ1UXN, JG1TNX, JG2QH, JL1SXX, JI2KRK, JI7QPV, JK7EUC, JJ1WYS, 7N1IAP, 7M1DVT, JE1BHI, JF1QOW, JS1XEX, JJ1QJG, 7K1HUK. **JA3YBF:** JA3RDH, JE3OPD, JF3HXJ, JH3NFZ, JH3LQV, JR3RIY, JF4FUF, JG4CLV, JH4DXX, JH4IFF, JA6WST, JA9TOZ. **JA3YK:** JF3VXV, JG3MRT, JG3WDN, JL3HEY, JL3MCM, JM3CMG, JM3FVL, J03UGI, JP3AIK, JE3PMN, JF5DTS, 7K1CDS, JK3HZH, Ken. **JABYAK:** JK2PVL, JR0FQM, JG7JMO. **JE2YRD:** JA2KVD, JF2XJE, JF2E0C, JR2SQU, JK3GAD, JI3ERV, JH4RHF, KC6CW, JA9-10148. **K1AR** & **K1EA,** K1GQ, K1JX, W1RM, K1DG, KM3T. **K1ST** & **K1XX,** K1FWE, NW1U, NX1G, NX1H, NK1F, K1BG, K1MNS, K1TR. **K2TD** & **WB2YOF,** WB2R, WG3T. **K3II** & **K3IE,** NA3K. **K8CC** & **AA8AV,** K5GO, K8JM, KR8V, N8CC, W8LU, WA8RRR. **KH0AM:** AH0K, 7K1PTT, JA1KFX, JI1QPU, JA7RHJ, JH7CUO, JE7BIZ, JA9SSY, JR7OMD, JH0KHR, JH0LFE. **KY1H** & **NU1P,** WB1AUV, KD1FE, NZ1W, N1FJ, KY1K, KB1W, K010. **LY2Z0:** LY1BC, LY1DI, LY2NK, LY2BDW, LY2BFN, LY2BMX, LY2BOA, LY2BSS, LY3BAB, LYR-346, LYR-728, LYR-1751. **N2RM** & **WM2H,** KE2PF, N2EA, KZ2S, KA2AEV, K3UA, KR2J, N4HY, N2AA, K2TW. **N6DX** & **AD6C,** AA6AA, N6VR, K0RF, WA7ZTN, KC7V, N7BG, N6HC, K1TKL, KH6WZ, N6IC, NY6Y, K6ZT, WB6SHD, W7CB, W6OUL, W6MSG, Randy. **N6ND** & **W6UQF,** W6YA, K6ZH, K9VV, N7CW, N6W, KT6V, N6NI, K6XT. **NL7G** & **KL7HF,** KL7HFA, KL7PJ, KL7Y, NL7GP, NL7VJ, WL7E. **OH3AT:** OH3FS, OH3DC, OH3LB, OH3NB. **PI4COM:** PA3ALP, PA3BBP, PA3BUD, PA3BWD, PA3CAL, PA3DKX, PA3ELX, PA3ERC, PA3DHR, PA3EWP, PA3FVW, PA3EPD, PB0AIU, NL-10373. **PJ9A:** Radio Team Finland. **R6L:** UA6LO, UA6LV, UB5ITW, UB5IBG, UA6-150-1103, UV6LPL, UA9OC, UA6-150-1403. **VE7ZZZ:** VE7AV, VE7ARQ, VE7BUX, VE7DP, VE7DRS, VE7EME, VE7NNN, VE7RBL, VE7SK, VE7XYL. **W3LPL** & **K1DQV,** KA1GD, WB2EKK, ND3A, W3EKT, N3GB, K3NA, KF3P, K3RA, K3SO, KT3Y, WR3Z, N8II, WA8MAZ, KE9A, KD9J. **W6BA** & **N6AW,** N6AV, N6FH, N6NU, N7QQ, K7JYE. **W8AIH** & **K3WT,** KS0T, K0FVF, NB9C, WE0B, KS9O, KA9FOX, N9KAU, AA9D, WA0RBW, W0W0J, KM00. **ZL2K:** ZL2IN, ZL2IR, ZL2AGY, ZL2AJI, ZL2BKM, ZL2BSJ, ZL2CWL, ZL2UDF, ZL40Y.

Please send all reader inquiries directly.



IC-W2A



IC-24AT

ICOM



IC-2410



IC-3220H



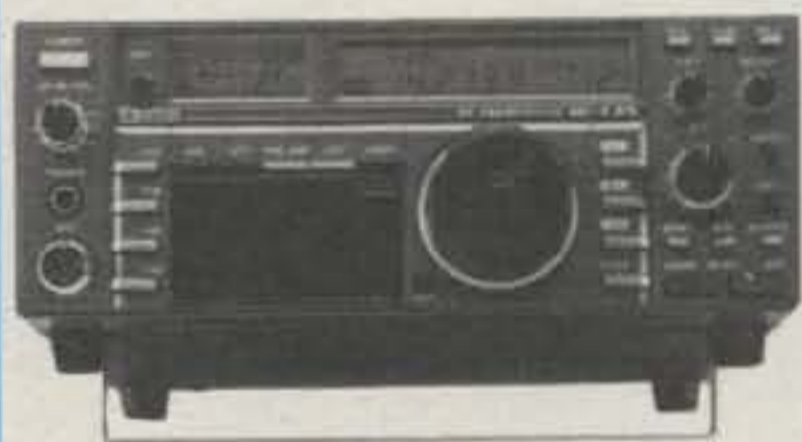
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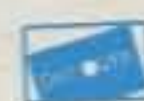
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**WORLD TOP 10 QRPp
All Band**

1. HI8A	3,316,768	6. N4KG	536,157
2. DK3GI	1,359,280	7. DA1SJ	531,300
3. 4A2MX	724,785	8. IK8EJN	463,143
4. AA2U	719,136	9. OK3CUG	314,839
5. G4BUE	702,117	10. N7IR	286,456

**TOP 10 SINGLE OPERATOR ASSISTED
All Band**

1. N4RJ	4,481,038	6. W1RR	2,879,104
2. K3WW	3,330,771	7. W3XU	2,817,485
3. WR3E	2,997,498	8. AA2Z/1	2,762,535
4. N3AD	2,924,540	9. K2SX/1	2,267,397
5. AD1C	2,897,988	10. N2MM	2,170,158

TEAM CONTESTING

- Southern California Contest Club Team #3—32,187,067.** By IR8A (N6TJ), TI1C (N6TR), 9Y4H (K6NA), ZP0Y (WN4KKN), and KP2A (N6CW).
- Southern California Contest Club Team #1—23,285,093.** By 4S7/N6AA, 7Q7TT (N6ZZ), CT4A (W6NV), HC1OT (W6XD), and IS0QDV (AH3C).
- Frankford Radio Club—23,198,810.** By P40W (W2GD), 6V6U (K3IPK), V47KP (K2DOX), N2NT, and K300.
- Southern California Contest Club Team #2—9,048,140.** By 6D5X (K5TSQ) and HC5M (CT1BOH).
- Russian Bear-Babies—3,340,946.** By UA3DPX, UV3HD, RZ9UA, and UA3DQH.

Number groups after call letters denote following: Band (A = all), Final Score, Number of QSOs, Zones, and Countries. An asterisk before a call indicates low power. Certificate winners are listed in boldface. (Also note that the use of the term "USSR" in these results reflects the DXCC list at the time of the 1991 contest. The 1992 contest and results will reflect the political changes since that time.)

**CW RESULTS
SINGLE OPERATOR
NORTH AMERICA**

United States

KM1H	A	4,969,248	2910	149	443	
			(Opr. K02M)			
W1KM	"	4,133,454	2399	148	443	
K1CC	"	3,875,538	2289	146	436	
N6BV/1	"	3,211,070	2087	139	396	
W1PH	"	2,644,608	1570	141	441	
K5MA/1	"	2,506,350	1652	138	387	
W1WEF	"	1,868,730	1320	131	370	
W1NG	"	1,828,096	1104	147	445	
KC1SJ	"	1,448,450	1047	127	364	
W100	"	1,410,808	1037	122	350	
K1TN	"	1,214,124	867	119	379	
N4XR/1	"	969,650	729	118	355	
W1BR	"	931,816	754	119	314	
W2AX/1	"	856,329	759	106	291	
K1EBY	"	633,640	618	97	268	
KA1DWH	"	516,736	515	102	265	
W1WAI	"	470,112	483	102	252	
KS1L	"	234,910	312	79	199	
W1BYH	"	114,234	188	77	164	
AI3E/1	"	112,487	204	56	141	
WE6G/1	"	105,462	208	65	121	
KA1WVH	"	104,430	219	57	120	
W1PL	"	92,000	189	63	121	
K1MD	"	77,598	172	51	111	
KA5G1S/1	"	66,768	160	52	104	
K1MBO	"	27,455	102	34	61	
W1CNU	"	18,761	122	50	161	
KA1UKR	"	16,065	70	32	53	
NT1Q	"	10,362	61	23	43	
			(Opr. W1XG)			
WQ1I	"	3,645	30	18	27	
WS1M	28	163,609	528	25	84	
NZ1D	"	1,815	23	12	21	
K1RM	21	562,624	1289	35	114	

WW1C	"	58,844	222	26	68	
K1VWL	"	51,243	197	24	69	
W1YN	14	150,852	339	38	118	
K1EFJ	"	115,973	284	35	108	
K1JB	"	58,315	195	28	79	
W1LOO	"	56,499	186	27	84	
K1MM	7	258,579	602	37	120	
W1BWS	"	54,282	240	27	82	
W1GIH	"	47,912	148	29	84	
W1FV	3.5	169,572	548	27	89	
W1MK	"	167,162	564	24	82	
W1XN	"	10,285	72	15	40	
K1UO	"	3,780	43	6	24	
*K61D	A	768,950	769	95	255	
*WA1FCN	"	765,438	705	105	281	
*WS1E	"	583,128	580	99	265	
*WA1GUV	"	118,503	209	64	125	
*KA1WIF	"	95,206	208	57	124	
*KZ1M	"	40,660	131	34	73	
*KA1OX	"	38,600	134	27	73	
*KB1KM	"	29,618	103	40	78	
*K1VSJ	"	5,985	47	14	31	
N2NT	A	3,813,524	2333	144	428	
N2LT	"	3,399,076	1968	154	439	
W2SC	"	2,426,490	1720	126	369	
N2DT	"	1,634,236	1127	133	375	
K2SIG	"	1,238,983	1047	112	307	
WF2W	"	1,013,220	916	110	280	
WA2VYA	"	747,544	685	102	290	
N2GC	"	582,796	530	102	295	
WA2ASM	"	379,962	459	91	212	
W2FXA	"	366,424	410	89	237	
N2MR	"	343,449	438	82	197	
K2KIR	"	335,376	403	93	213	
W2WD	"	332,050	410	84	206	
NA2M	"	329,588	399	85	213	
WA2UDT	"	280,644	369	87	186	
K2PF	"	280,320	350	82	210	
WA2ORX	"	274,010	377	76	189	
WA2TVU	"	229,116	345	67	177	
WB2DVU	"	178,340	277	69	172	
W2GW	"	103,878	186	64	135	
W2AWF	"	100,367	208	56	111	
WB2CJL	"	92,576	189	61	115	
N02T	"	82,151	511	68	45	
NA2Q	"	81,624	176	69	110	
WB2JFP	"	33,465	106	41	74	
N2WK	"	31,784	100	40	76	
W2GKZ	"	16,632	71	32	52	
KB2SE	"	15,312	66	33	54	
NG2P	"	8,400	53	17	39	
W2YY	"	8,286	86	36	68	

W2A0Y	"	6,930	46	21	34	
KF2BH	"	6,216	42	22	34	
KR2Q	21	509,250	1178	35	115	
KA2HML	"	214,272	603	30	94	
WB2YQH	"	125,874	345	32	94	
WA2UZI	14	62,130	202	28	81	
K1ZM/2	3.5	167,827	506	27	94	
W2FR	"	19,462	101	18	56	
W2FCR	1.8	3,640	41	11	29	
*W2TZ	A	1,159,128	1029	101	307	
*NM2L	"	1,107,635	939	109	306	
*NJ2L	"	861,568	737	110	314	
*WT2F	"	234,403	366	59	188	
*W2KHO	"	133,084	240	53	141	
*W20MV	"	123,120	240	62	128	
*N2JOH	"	99,918	208	57	125	
*K2UFT	"	83,215	168	62	125	
*K2SWZ	"	78,765	179	54	123	
*W2HCA	"	53,048	134	52	100	
*K2JF	"	50,370	125	48	98	
*K2MN	"	40,828	124	37	81	
*W2XL	"	28,462	95	34	73	
*AA2Y	"	27,027	100	36	63	
*AE2N	"	18,942	100	27	50	
*N2INN	"	15,840	72	36	52	
*K2LP	"	14,668	193	19	57	
*KA2IRO	"	1,350	36	9	18	
*K2GETY	"					
/2	28	2,952	44	6	18	
*WA2ASQ	14	16,848	87	21	51	
K3TUP	A	3,813,315	2183	156	449	
			(Opr. K5ZD)			
K3ZD	"	3,495,300	2017	153	457	
W3BGN	"	3,393,024	2080	143	421	
W8FJ/3	"	1,938,176	1272	133	403	
W3UM	"	1,434,348	977	136	377	
K3TEJ	"	1,359,616	1068	113	339	
AK3Z	"	1,204,008	970	115	327	
K2PS	"	1,000,178	889	107	284	
W3AZ	"	616,737	603	99	264	
K3VW	"	680,108	637	110	267	
W3UJ	"	601,965	617	73	250	
KB3MM	"	568,278	527	106	287	
W3GK	"	513,968	507	99	265	
K4JLD/3	"	513,851	493	115	262	
KL7HIR/3	"	511,500	636	89	221	
KY3N	"	482,355	432	119	286	
W3OV	"	462,475	514	98	227	
W3GRF	"	416,070	459	99	236	
W3GM	"	395,744	480	86	212	
K07V/3	"	277,760	387	77	179	
W3GU	"	218,500	358	65	166	

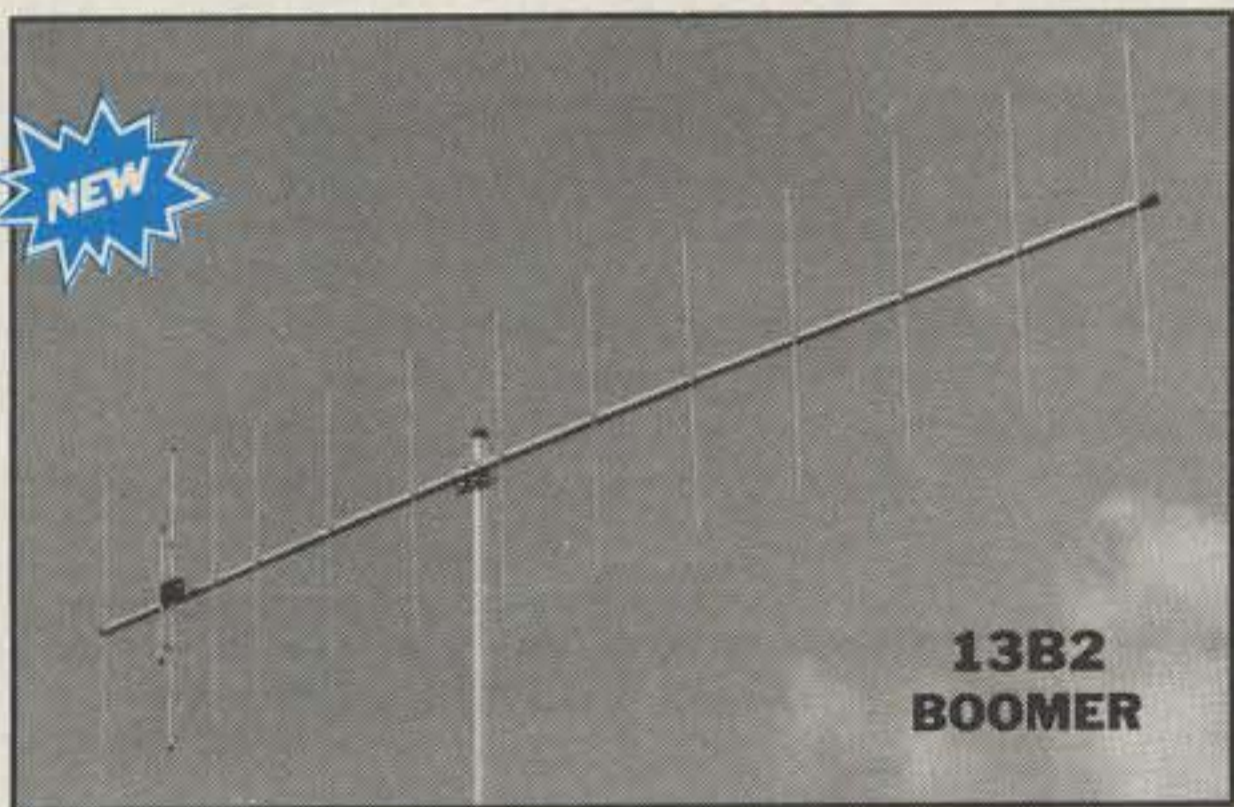
K3ZA	"	160,650	293	52	137	
W3EVW	"	146,880	245	73	167	
W3FTG	"	129,639	210	80	157	
KE3Q	"	115,364	218	57	134	
K3NZ	"	102,382	339	25	78	
KM3D	"	89,425	180	61	114	
K3OX	"	76,639	165	54	119	
WK3V	"	56,090	148	51	91	
N8NA/3	"	44,022	128	51	87	
WK3P	"	31,302	118	33	61	
K3GYS	"	21,888	83	33	63	
W6AXX/3	28	148,561	440	31	102	
KN5H/3	"	77,165	226	27	88	
W9XR/3	21	211,582	585	29	98	
K3EI	"	80,031	271	26	77	
W3EAN	14	3,489	72	21	45	
W2UP/3	7	148,480	427	30	98	
WE3C	3.5	72,168	296	24	73	
*W3RJ	A	543,749	565	92	255	
*AD8J/3	"	386,904	468	79	215	
*WA3NKO	"	167,420	273	68	152	
*N3KAQ	"	163,795	271	64	171	
*W3DAD	"	151,110	259	59	148	
*KC3AG	"	147,576	229	95	163	
*KB3TS	"	105,280	213	58	130	

*JR7ZMP A	330,220	621	75	115	*UA9XAC	239,076	388	60	169	Czechoslovakia		*OZ5WQ	235,913	505	67	202	*OH2YL	14,885	92	22	43	
*JA7CPW	128,488	372	84	133	*UA9AKS	183,464	427	33	119	OK1ALW	2,650,158	2097	146	421	*OH2BSQ	10,890	80	20	46			
*JA7ASD	79,180	189	64	84	*UA9WNF	75,089	230	36	83	OK3PA	1,920,304	1820	134	380	*OH1MKT	123,879	569	31	88			
*JE7GRW	27,819	123	43	56	*UA9XLX	3,572	34	13	25	OK3CND	646,170	1162	86	276	*OH3NXW	112,926	502	31	87			
*JA7AMK	2,162	32	10	13	*UA9LE	37,800	212	19	51	OK1ARN	602,096	1010	77	234	(Opr. OH3MMF)							
*JH7CJM	44,109	170	31	56	*UABJAD	97,955	462	65	78	OK2EC	493,620	875	79	206	*OH8NLC	69,229	334	28	79			
*JA7MSQ	14,174	113	24	30	*UW0ST	10,004	104	25	36	OK1KT	342,048	524	94	336	*OH1RZ	45,732	168	31	80			
*JA7AXP	6,624	55	18	28	*UA0ZDK	19,824	240	20	36	OK3PQ	288,420	500	81	204	*OH6MUE	36,769	269	22	61			
*JR7COL	56,028	233	25	62	Azerbaijan					OK2PAY	207,144	943	33	104	*OH8LC	32,936	190	24	68			
*JA7VEI	26,791	139	26	47	*UD6DF	69,560	300	28	66	OK1MNV	194,480	410	62	198	*OH7NVU	25,550	241	21	52			
*JA7EC	13,806	86	23	36	*UD6DFT	65,200	289	22	58	OK2BPO	186,296	384	161	232	*OH8LEQ	8,250	68	18	48			
*JE7JRD	1,343	34	7	10	Georgia					OK3IA	185,969	452	54	163	*OH2BRH	7,590	89	16	39			
JABRWU	201,520	334	86	134	RF6FM	3.5	30,360	236	11	35	OK1MKU	165,816	343	68	184	*OH9VU	117,832	695	27	77		
JEBMFG	74,074	193	61	93	Kirghizia					OK2BND	129,748	496	52	147	*OH6MM	23,725	202	19	54			
JH8WBR	71,589	178	60	87	Kazakhstan					OK2ABU	122,474	356	58	151	*OH6VLS	22,050	214	17	46			
JABSW	32,109	236	61	91	UL7BN	A	602,241	743	82	227	OK3FON	119,952	231	77	161	(Opr. OH6CD)						
JABRUZ	162,624	610	30	66	RL7LW	2.1	358,402	1134	30	91	OK2PVO	24,464	128	33	55	*OH50Y	7	24,012	182	22	65	
JABRII	588	12	9	11	RL7AC	3.5	27,756	223	13	41	OK2BCI	13,892	56	38	54	*OH8TU	**	10,557	147	11	40	
*JABAJE	158,240	337	76	96	UL8A	1.8	98,344	477	14	62	OK20N	78,645	292	31	74	*OH9PH	**	6,360	61	12	48	
*JA8HBO	70,623	200	57	76	*UL7RDZ	28	68,400	354	24	51	OK1AD	67,362	239	29	74	France						
*JAGCJY	48,875	210	28	57	*UL7GG	21	111,072	467	26	78	OK2BHQ	33,856	177	25	39	F6BEE	A	2,658,796	1955	142	411	
*JG8PBE	4,096	50	13	19	Tajikistan					OK1MNW	25,718	135	25	52	F5IG	**	458,415	814	85	220		
JAGCWJ	374,752	586	84	140	UJ8JA	21	186,912	550	30	102	OK1BMW	5,184	42	19	35	F6GKQ	**	420,162	663	79	214	
JA9KHU	54,320	152	45	67	UJ8JI	7	189,516	770	29	73	OK1VD	256,668	881	35	111	F6EQV	**	215,758	480	63	170	
JA9YE	30,634	109	37	69	Turkmenistan					OK1MSP	25,024	112	26	66	FD10JL	**	186,940	392	63	197		
JA9BOH	13,294	125	19	27	RH0E	A	5,856,136	4304	123	358	OK3COU	14,931	145	19	44	FF1IPA	**	186,816	404	68	156	
JA9DOF	1,088	33	9	7	(Opr. JH8BDD)						OK2BQU	7,701	79	17	34	(Opr. F6CXJ)						
*JA9XBW	192,960	406	68	124	OH0BVI	14	673,056	2513	34	110	OK1DWU	16,650	139	16	58	F6DZD	**	77,778	284	50	124	
*JA9CDE	735	15	9	12	OH0AM	3.5	195,151	1414	27	86	OK2PSZ	43,200	524	14	58	F6ERZ	**	67,298	219	45	109	
*JH9KVF	73,568	295	30	58	OH0BCI	**	87,444	907	15	69	OK3TRJ	31,672	340	15	59	F9BB	**	57,196	200	42	116	
*JA9TSI	64,504	273	30	58	Uzbekistan					OK3CQR	52,785	500	17	68	F9QE	**	40,166	142	45	88		
JA0HC	111,414	242	78	108	UI8BAA	A	46,610	180	47	71	OK1JDX	15,950	290	7	43	F3VV	**	40,092	110	57	99	
JA0GZ	6,431	47	30	29	RI8AD	28	315,372	1088	32	91	OK2BQU	1,682	54	7	18	FD10JQ	**	31,992	119	46	83	
JABZRY	188,598	645	33	69	EUROPE					OK2BUL	1,040	38	5	21	FD1NXL	**	31,700	225	29	71		
JABZRY	370,388	1072	35	89	Aaland Islands						*OK2TBC	479,520	660	95	229	F8TM	**	30,420	150	33	84	
JH0EPI	55,872	328	22	42	OE9SLH	A	168,975	400	67	158	*OK1EP	386,334	491	90	248	FD1OTY	**	14,160	90	28	52	
JR0EQJ	18,720	95	23	49	OE3DSA	2.1	205,128	760	34	98	*OK3YCA	357,245	637	78	217	FD1RVL	**	10,395	114	8	25	
JE0WJS	4,228	59	12	16	OE3GSA	3.5	69,046	700	17	62	*OK2HI	296,970	674	66	219	FD10QJ	28	44,822	292	23	50	
JABQNJ	111,550	408	31	66	OE6IMD	1.8	20,976	290	8	49	*K2PCF	260,148	631	65	191	FF0XX	21	528,160	1564	39	121	
JA0THQ	2,304	26	14	18	*OE2VEL	A	917,896	1072	117	326	*OK3DT	245,700	559	68	205	(Opr. F6GCP)						
JABUMV	55,242	219	28	65	Austria					*OK1FPS	239,031	638	59	168	F6KOB	**	6,798	106	10	23		
JH0ZHQ	1,760	31	12	10	OE9SLH	A	168,975	400	67	158	*OK1KZ	195,509	528	50	143	F6DKV	14	281,698	1335	29	93	
					OE3DSA	2.1	205,128	760	34	98	*OK1MKI	194,192	640	46	166	F6EZV	7	329,875	1233	33	112	
*JH0DNX	349,652	533	95	149	OE3GSA	3.5	69,046	700	17	62	*OK1PG	183,954	387	76	182	F6HWU	3.5	20,286	189	16	53	
*JF0MOX	24,940	119	35	51	OE6IMD	1.8	20,976	290	8	49	*OK3COZ	175,440	607	50	154	F6AML	1.8	21,952	343	10	46	
*JH0BLI	15,616	90	21	43	*OE2VEL	A	917,896	1072	117	326	*OK3CEL	173,052	500	57	171	*F1JCB	A	832,136	1562	81	263	
*JE0UXR	171,788	458	36	98	OH0BVI	14	673,056	2513	34	110	*OK1FSM	163,000	511	52	148	*F1SX	**	569,052	1031	80	217	
*JE0IUZ	1,254	21	11	11	OH0AM	3.5	195,151	1414	27	86	*OK1ZY	160,527	335	54	165	(Opr. FB1MUX)						
					OH0BCI	**	87,444	907	15	69	*OK2BBO	138,368	497	41	147	*FD1PGP	**	524,226	1111	68	178	
Jordan					Bulgaria					*OK1DXW	128,740	327	62	143	*FD1NLY	**	451,110	618	81	249		
JY0VJ	A	5,927,480	3948	124	396	OE9SLH	A	168,975	400	67	158	*OK1AXB	123,984	416	53	136	*FD10IE	**	397,320	720	73	207
						OE3DSA	2.1	205,128	760	34	98	*OK3CWF	78,905	378	31	102	*F1MOY	**	198,660	513	54	166
Korea					Azores					*OK1AXW	128,740	327	62	143	*FDINOL	**	167,238	493	54	117		
HL9HH	A	152,958	273	89	133	OE3GSA	3.5	69,046	700	17	62	*OK3CVD	72,504	361	34	118	*F1MHP	**	119,325	350	58	71
						OE6IMD	1.8	20,976	290	8	49	*OK3CWF	60,635	257	41	140	*F1NKK	**	109,816	251	67	145
Kuwait					Balearic Islands					*OK3CWF	78,905	378	31	102	*F1JLV	**	84,612	305	33	99		
9K2ZZ	A	342,930	569	64	146	EA6/N6RA	A	3,837,915	3611	129	392	*OK2BZC	72,504	361	34	118	*FE1LVB	**	81,420	260	50	127
						EA6ZS	**	70,035	270	40	105	*OK1MZO	60,635	257	41	140	*F6BSU	**	48,564	187	40	74
Mongolia					Belgium					*OK1MZO	60,635	257	41	140	*F6FKL	**	17,760	100	29	51		
JT7AB	A	138,800	609	33	67	EA6AAK	**	23,577	139	24	63	*OK1DSZ	44,280	313	31	92	*F6ABI	**	6,532	73	10	36
JT1CS	14	112,918	612	27	59	EA6GP	7	51,389	373	15	52	*OK1DJJ	37,539	197	36	93	*HWSR	28	39,150	394	20	30
Pakistan					Bulgaria					*OK1DJJ	37,539	197	36	93	(Opr. F1NRG)							
*AP						*EC6QZ	21	10,206	181	10	32	*OK3CLL	32,344	233	28	76	*F1MAA	**	1,533	31	8	13
/WA2WYR	14	13,608	115	27	45	ON4AKL	A	180,306	484	50	109	*OK2POT	30,873	189	34	89	*F9DK	21	46,308	343	20	48
Saudi Arabia					Denmark					*OK3CDN	20,056	195	19	73	QZ1LO	A	2,764,025	2630	129	400		
HZ1HZ	A	2,432,730	1978	104	311	ON4PX	21	21,167	171	18	43	*OK1FHI	64,315	307	24	71	QZ5DX	**	410,060	786	73	217
Sri Lanka					Denmark					*OK1FHI	64,315	307	24	71	QZ5MJ	**	403,872	630	80	256		
4S7/N6AA	A	3,567,320	2805	143	362	ON4UN	1.8	79,458	784	15	67	*OK1FKW	45,408	252	24	64	DZ1FTE	7	165,908	491	35	113
West Malaysia					Denmark					*OK1FKW	45,408	252	24	64	*OZ1BIZ	A	600,568	989	79	249		
9M2AX	1.8	56	5	3																		

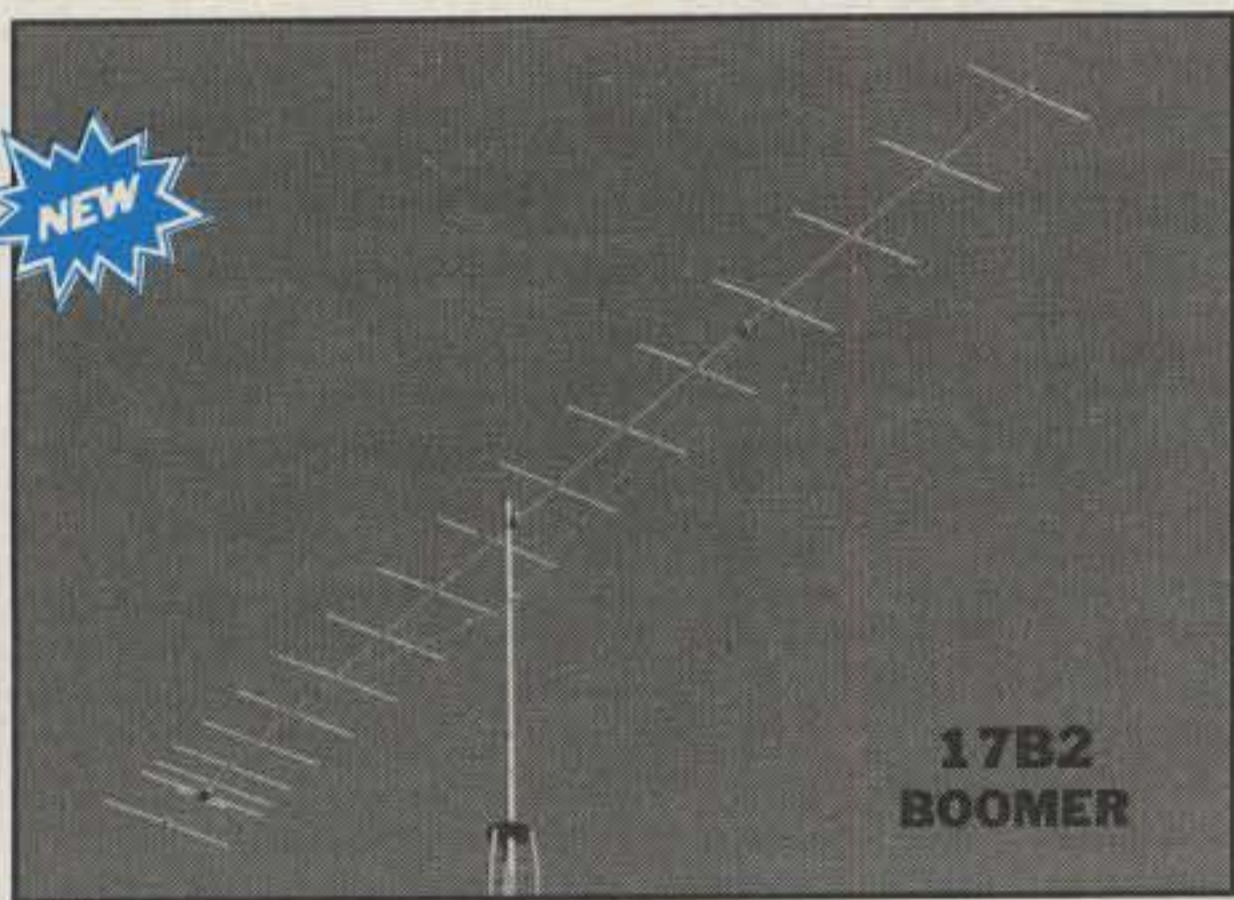
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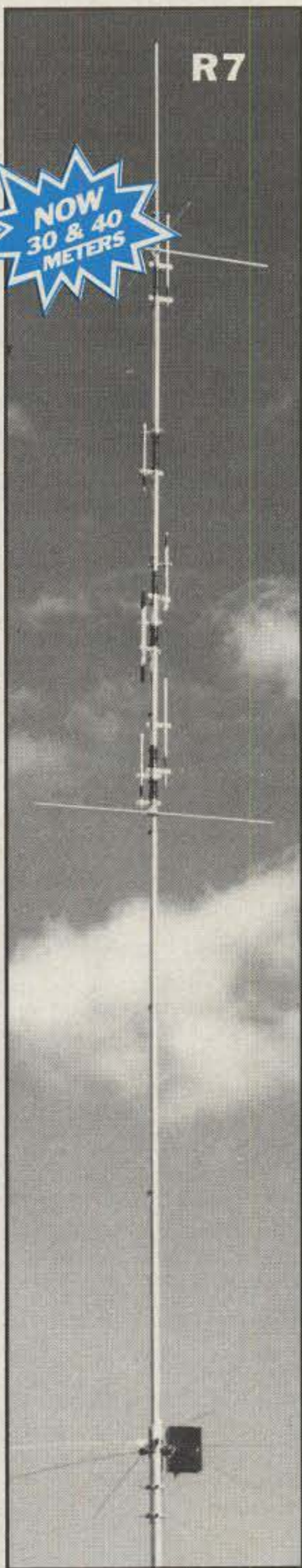
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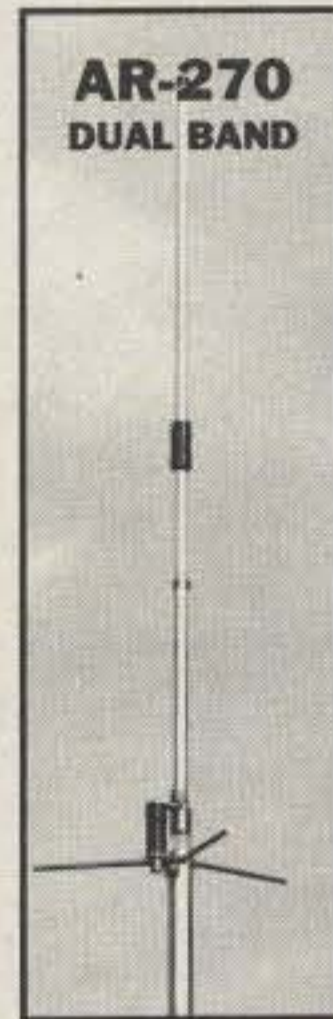
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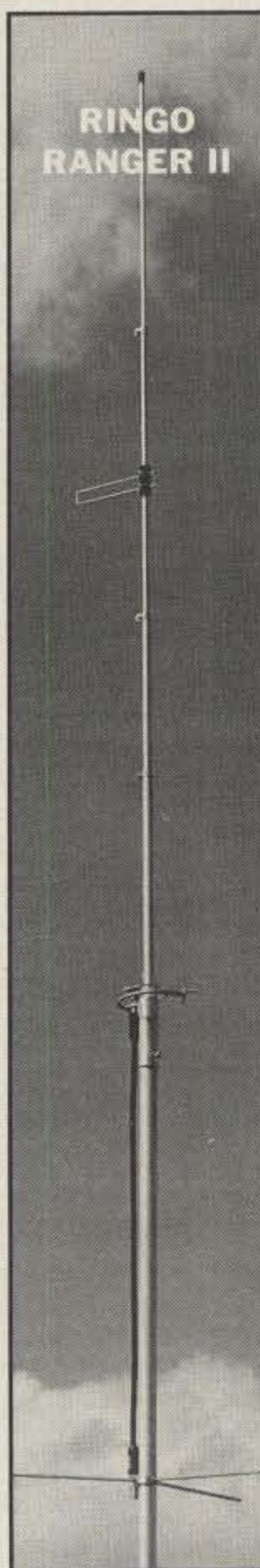
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DL1HCM	14	246,784	1098	31	97
DF9LJ	3.5	116,885	747	21	76
DK3QJ	"	58,806	516	15	66
Y24AM	"	16,224	189	13	39
*DL2DBF	A	1,001,376	1254	99	333
*DA1DC	"	602,667	894	83	268
*Y88VO	"	552,610	811	96	269
*Y21XC	"	421,890	620	85	258
*DL1NCT	"	409,475	826	79	196
*DJ8IP	"	366,850	636	78	241
(Opr. WB3AYM)					
*DJ8WD	"	311,741	571	74	183
*Y27WI	"	303,841	533	72	221
*DL1TH	"	274,320	610	66	188
*DF4ZL	"	254,597	520	73	186
*DF3QL	"	219,042	467	71	212
*DK8FS	"	211,400	413	72	208
*Y23RJ	"	193,024	514	61	195
*DL1ZQ	"	173,201	450	57	170
*Y42DA	"	169,371	377	63	180
*DK7ZH	"	108,356	247	63	143
*DK8FD	"	101,178	255	56	142
*Y26FI	"	98,490	227	63	182
*DF7TU	"	86,100	321	45	119
*Y23HJ	"	75,969	198	59	148
*DL4FJ	"	63,448	300	47	107
*Y22JA	"	47,124	112	55	99
*DL8IH	"	39,849	140	40	71
*Y41PN	"	34,917	194	40	63
*DF3QN	"	33,669	190	34	95
*DL1XAS	"	33,480	164	36	72
*Y38YE	"	26,166	151	28	70
*DL1VBN	"	17,479	89	33	44
*DL2S8Y	"	17,292	100	24	64
*DL2VLA	"	"	"	"	"
/P	"	15,879	126	23	44
*Y55VJ	"	12,150	62	34	47
*DL5LRA	"	10,721	95	25	46
*DL3HWX	"	8,687	80	23	50
*DL3YDY	"	6,862	88	19	53
*Y25UJ	"	1,290	19	13	17
*DL4NBV	"	960	27	7	13
*Y24ON	"	396	20	6	12
*DJ2HH	28	102,796	326	33	91
*DL6RDE	"	68,200	300	26	62
*Y25OH	"	53,578	283	27	62
*DJ3GE	"	35,105	162	26	59
*DL4XU	"	32,406	212	21	45
*DL2GBB	"	25,920	130	23	49
*DL3VBN	"	25,092	130	26	56
*DL7YS	"	8,532	65	23	31
*Y21CL	"	6,264	42	20	38
*Y25GH	"	1,225	34	9	16
*DL3HRA	"	1,150	20	11	12
*DL4RU	21	54,815	260	24	71
*DL2AXM	"	13,908	105	15	46
*Y35WF	"	782	22	8	15
*Y48MN	14	62,944	356	32	80
*Y57TO	"	9,009	103	14	49
*DL1EFW	"	7,777	62	18	59
*Y23BF	"	2,405	25	15	22
*Y21EF	7	26,180	210	21	64
*Y34RG	3.5	5,421	121	8	39
*Y21PO	1.8	18,088	322	8	48
*DF3LP	"	9,515	153	9	46
Gibraltar					
ZB2X	3.5	435,456	1989	29	97
(Opr. OH2KI)					
Greece					
SV1RP	14	297,307	1479	31	96
*SV1NA	1.8	2,190	64	6	24
Guernsey					
GU4WRP	A	1,240,635	2179	76	233
Hungary					
HA4XT	A	3,714,316	3196	133	385
HA5AGS	"	1,322,754	1612	105	344
HA8HW	"	1,176,933	1368	115	346
HA9BVK	28	364,080	994	36	112
(Opr. HA9AX)					
HA7TM	28	199,920	773	29	76
HASMY	7	58,590	409	20	73
HAGNL	3.5	101,990	850	20	74
HABXX	1.8	26,340	414	9	51
*HABXX	A	245,673	584	69	174
*HABDD	"	77,349	268	52	125
*HABIR	"	54,054	185	46	71
*HA1ZU	"	31,752	219	33	75
*HABEN	28	37,908	209	26	55
*HABRR	21	212,598	817	30	97
*HAGNW	"	137,256	480	32	97
*HABDT	14	74,776	525	25	79
*HASLZ	"	44,625	253	28	76
*HA3LD	"	5,360	119	8	32
*HABDC	7	45,120	256	22	74
Iceland					
TF3UA	A	73,575	300	42	93
TF3CW	14	740,250	2442	35	106
Ireland					
EI6FR	21	110,220	530	26	84

Isle of Man

*GD4UOL	A	1,314,405	2045	89	324
Italy					
IR8A	A	2,507,760	2767	123	363
(Opr. N6TJ)					
IK1GPG	"	467,418	630	97	262
IK2A8B	"	308,914	606	73	184
IF3FZ	"	255,429	477	86	217
IK3HHY	"	155,428	420	51	131
IK8ADY	"	138,580	343	58	147
IK2BLA	"	84,252	179	75	129
I8OFK	"	78,765	209	61	116
IK3HUG	"	60,928	240	35	76
IK68OB	"	25,179	81	43	66
I2HWE	28	234,234	718	37	106
IK10ML	21	21,168	153	24	60
I3JSS	14	539,232	1685	38	126
IRIA	"	164,118	1054	28	74
IK8FWI	"	9,168	140	12	36
I8FSP	"	7,452	141	12	34
I3VHO	3.5	86,663	768	18	61
I7ALE	"	53,541	501	15	66
I8ZUT	"	25,568	320	12	56
*IK2AIT	A	111,456	325	47	125
*IK1PMR	"	67,375	167	61	114
*IK2PZC	"	48,764	150	51	95
*IK8IFV	"	21,576	156	29	58
*IK1NPN	"	18,642	116	34	44
*IK8CHL	"	540	18	7	11
I1XPG	28	123,806	477	30	73
I1LGR	"	21,682	126	26	48
*IK8HGX	"	16,748	128	18	35
*IK8CNA	21	42,928	307	19	50
*IK10WC	3.5	29,884	360	10	52
*IK5ORT	"	16,720	281	9	46
*IK2ILG	1.8	720	38	4	16

Latvia

YL2G0	A	2,221,290	2194	124	389
YL2SM	"	709,240	1137	94	246
YL2PJ	28	63,329	251	27	82
YL2IP	"	22,512	120	26	58
YL3IZ	3.5	51,075	609	13	62
YL2GVW	1.8	19,500	356	8	42
*YL2K0	A	749,840	1118	93	271
*YL2HB	"	124,848	476	49	155
*YL2SW	"	107,900	530	39	127
*YL2FD	"	58,938	338	37	104
*YL2EC	"	33,012	191	27	57
*YL2CR	"	21,663	537	42	152
*YL2OD	"	9,405	171	16	39
*YL2GN	21	149,860	656	31	96
*YL2JV	14	48,861	329	23	66
*RQ2GIG	7	37,584	264	19	68
*YL2GVL	3.5	7,252	203	5	32

Liechtenstein

*HBB	/DJ1FH	A	53,128	320	32	84
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Lithuania

LY3BA	A	2,343,974	2086	133	421
LY3BU	"	888,470	1302	95	299
LY2PAQ	"	369,056	728	76	228
LY2BNC	"	333,828	753	72	225
LY3BY	"	324,288	806	66	222
LY2BIC	"	260,944	414	61	167
LY1CN	"	211,839	620	57	184
LY380	"	130,464	326	74	214
LY3BI	28	339,590	1023	36	109
LY2OU	"	81,812	306	29	84
LY2WW	21	474,166	1370	36	118
(Opr. LY2B1J)					
LY2BOC	"	150,075	674	29	86
LY2DT	"	134,550	630	29	86
LY2BN	14	193,024	855	32	96
LY1CF	"	167,152	790	32	92
LY3BX	"	148,108	837	31	91
LY1CJ	"	42,884	399	16	55
LY2PCF	7	17,220	127	20	50
LY1BY	3.5	102,432	768	21	75
LY2BCO	"	94,080	727	20	76
LY3BS	"	65,819	668	16	67
LY2BTS	1.8	28,224	404	10	53
*LY1CY	A	107,062	329	52	147
*LY2PBM	"	79,094	403	30	112
*LY1DM	"	76,630	362	39	119
*LY2BEW	"	70,905	403	33	112
*LY2BRE	"	70,119	309	37	110
*LY1DR	"	63,837	389	41	82
*LY2BKM	"	48,666	196	34	84
*LY1BA	"	16,470	140	26	64
*LY2BUU	21	27,540	217	18	42
*LY2BRJ	14	118,472	610	30	88
*LY1CO	"	47,616	343	23	70
*LY2BIP	3.5	28,413	300	13	64
*LY1CX	"	208	13	3	13

Luxembourg

LX/OH2PQ	7	354,340	1690	32	108
*LX2AA	14	43,016	459	16	60

Netherlands

PABLOU	A	1,180,185	1333	120	385
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ZONE LEADERS SINGLE OPERATOR

Zone	Call	Score	Zone	Call	Score
1	AL7CQ	551,608	21	HZ1HZ	2,432,730
2	No entry		22	4S7/N6AA	3,567,320
3	CK7C	2,984,204	23	JT7AB	138,800
4	WM5G	3,010,554	24	VS6BG	632,170
5	KM1H	4,969,248	25	JH7WKQ	2,014,268
6	6D2X	890,900	26	No entry	
7	TI1C	7,789,180	27	KG6DX	963,815
8	PJ7A	8,357,236	28	9M6NA	4,682,496
9	P40W	10,586,808	29	VK8SD	143,895
10	HC5M	8,157,240	30	VK2KS	260,731
11	ZP0Y	7,406,520	31	AH6JF	208,040
12	CE3DNP	1,082,304	32	ZL3GQ	1,148,418
13	LU7EE	652,912	33	EA8EA	13,225,295
14	CT4A	4,718,880	34	No entry	
15	IS0QDV	4,519,248	35	6V6U	7,134,225
16	UT4UX	1,994,481	36	ZD8LI	3,951,490
17	RH0E	5,856,136	37	7Q7TT	5,704,443
18	RZ9UA	1,939,451	38	Z21HQ	3,069,297
19	RA0FU	221,502	39	VQ9RB	59,774
20	JY8VJ	5,927,480	40	TF3CW	740,250

PABCLN	"	979,050	1270	105	312
PABHOR	"	100,033	307	52	115
PA3FNE	"	92,320	348	46	144
PA8UV	"	64,758	217	43	86
PA38TH	"	44,289	171	44	89
PA3BNH	"	4,410	78	14	35
PA2REH	7	25,900	246	15	55
PA8CYW	3.5	5,551	49	13	48
PA3BU0	"	714	12	10	11
PA8VUV	1.8	7,774	166	6	40
*PA3EZL	A	101,875	275	44	81
*PA3DKX	14	11,400	80	23	53
*PABPLN	"	9,500	145	13	



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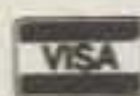


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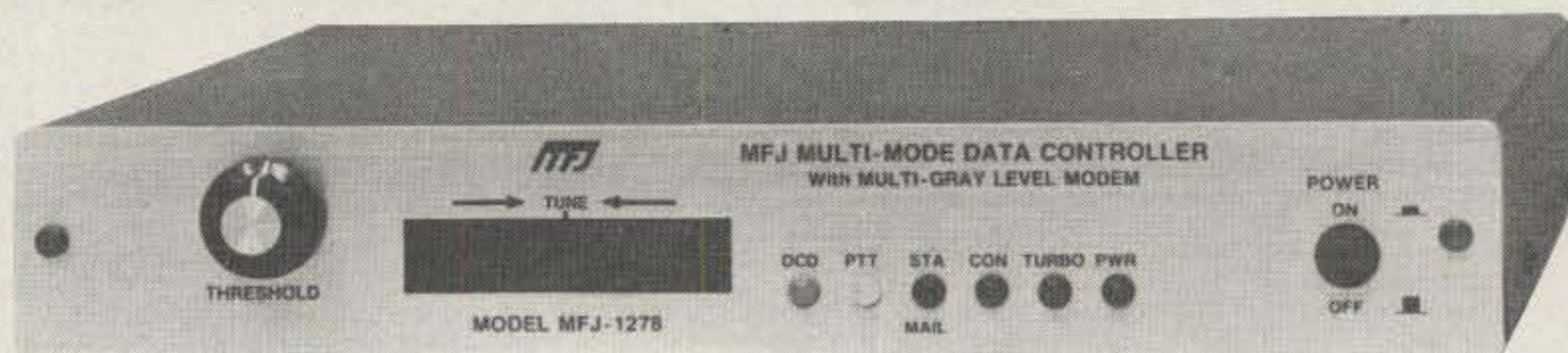
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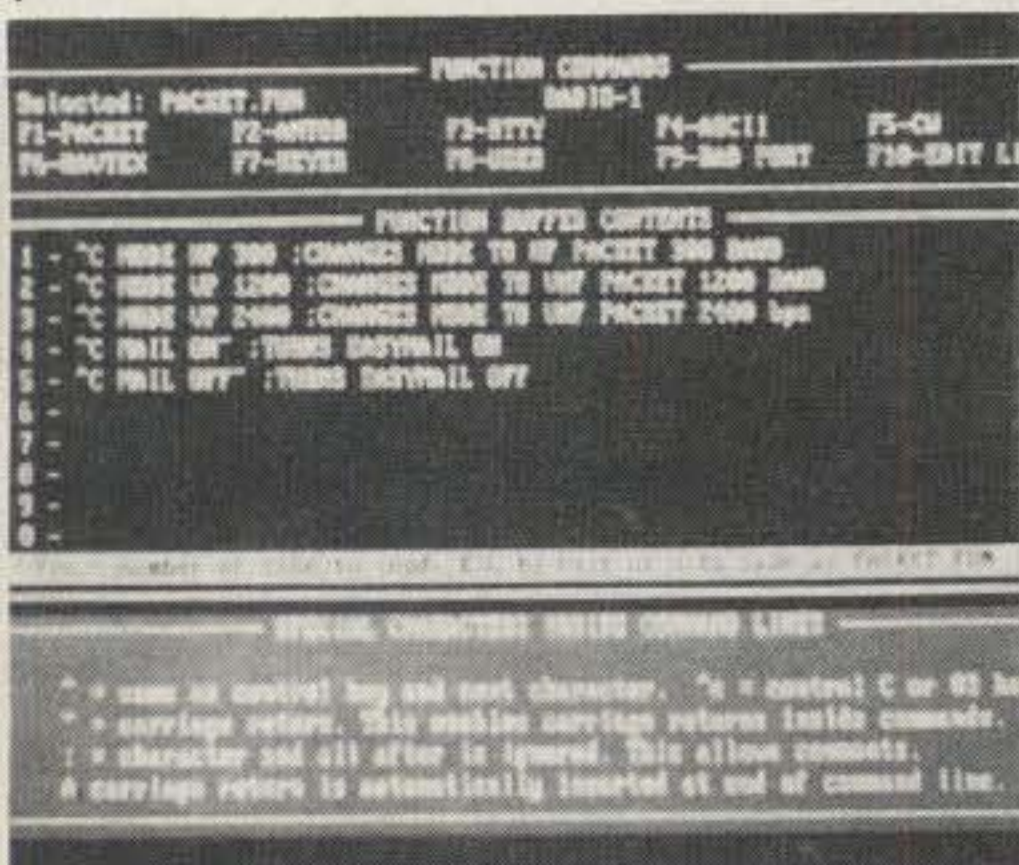
Full Color SSTV picture actually received on 14.230 MHz, using Robot 72 second format. Transmit and receive color and black and white SSTV pictures.



16 Gray Levels WeFAX map actually received on 16.410 MHz. Only MFJ-1278 and MultiCom™ gives you a 16 gray level modem for transmitting and receiving WEFAX, FAX and Color SSTV.



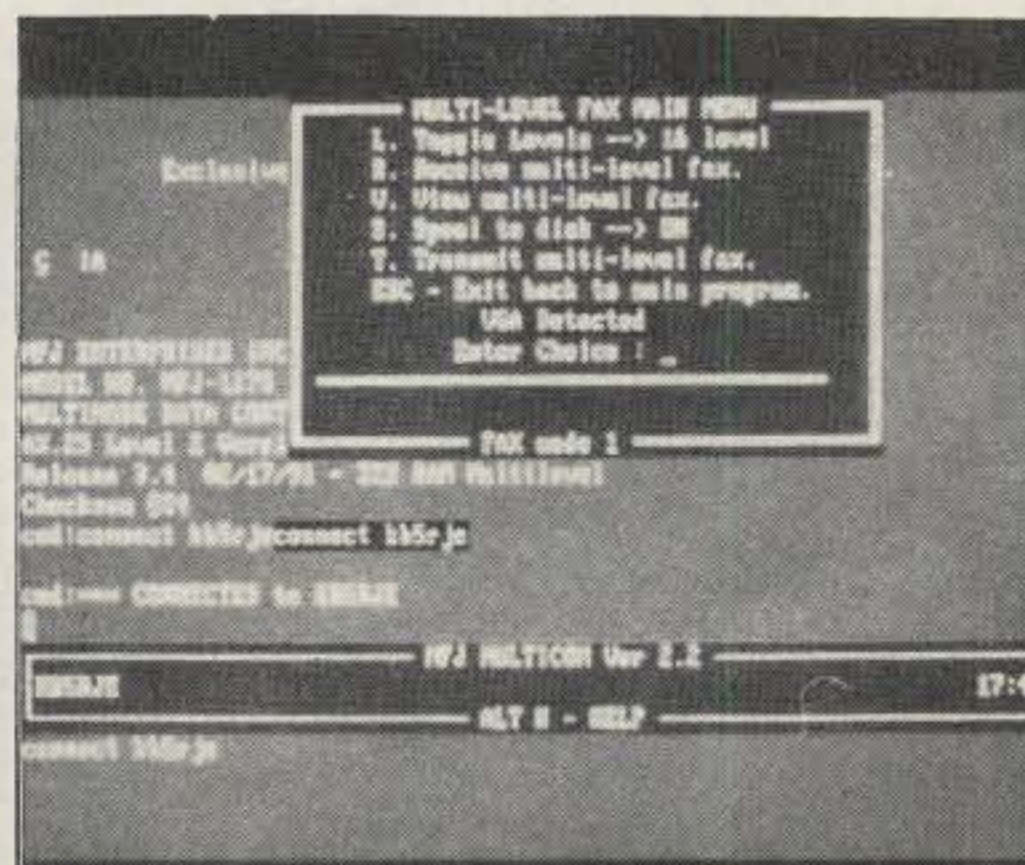
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16 Gray Levels AP Wire Photo FAX actually received on 20.738 MHz. See tomorrow's news today before it appear in your newspaper.



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KV1V	2,250	32	11	19	K3SA	116,725	202	63	140	Czechoslovakia	WA6IET	987,900	958	125	245	Belgium	ON7LR	2,016,054	1829	128	430	
J17GBI	1,062	22	9	9	N3UN	104,796	176	75	138	DK2FD	A	555,979	513	128	401	ON6AH	2,007,141	2364	109	328		
JH2NYZ	224	10	4	4	NY3B	60,348	153	42	99	England	GB5CW	A	1,913,184	2302	108	360	Bulgaria	LZ9A	8,961,206	5056	188	628
SP4GFG	3.5	20,574	362	8	46	WR3L	39,800	141	25	75	GB8WP	225,680	367	99	211	LZ1KWT	1,716,768	2040	118	314		
OK3THV	11,300	226	9	41	N4RJ	A	4,481,038	2163	171	547	GB8LMX	210,176	443	70	186	LZ1KNP	22,140	193	24	66		
OK2BQZ	9,744	230	6	36	AA4NC	1,680,252	1186	140	358	Finland	OH28VM	A	507,276	698	110	317	Corsica	TK5C	5,818,923	4817	137	445
OK1FKD	8,730	197	5	40	K4PI	1,629,422	900	166	475	OH1MOR	488,310	696	101	296	Czechoslovakia	OK5W	5,439,142	3377	166	570		
OK1MYA	6,006	174	5	34	NA4K	1,027,000	730	135	365	OH4RH	449,200	617	104	296	OK3KAG	3,110,184	2302	149	467			
OK2PHH	3,922	109	4	33	NA4A	782,469	706	105	278	Germany	DF3CB	A	2,142,255	1865	132	395	OK1KQJ	1,940,941	2183	124	369	
RA4PC	2,700	64	7	23	K4CEF	712,071	593	123	324	DF8WS	1,545,356	1380	121	371	OK2KOD	952,512	1088	123	328			
UC2WAF	1.8	17,686	239	6	31	KR4F	611,653	521	118	295	DL4MCF	1,060,290	1181	109	353	OK2KDS	729,488	1143	87	272		
RB5QUM	7,520	184	9	31	K4PB	530,442	462	123	295	DJ5BV	775,529	787	116	341	OM5KTU	378,591	765	83	208			
RB4INR	5,809	126	8	29	K4UEE	424,490	419	115	259	DJ9MH	634,728	807	104	320	OK10PT	247,000	700	60	187			
UB5NBJ	3,300	95	7	26	WR4K	410,640	413	101	253	DJ3WE	378,015	565	87	232	OK3KUN	177,408	563	45	147			
OK3TLI	2,842	103	4	25	N8AXY	309,177	326	96	251	DJ1DJ	361,995	581	83	202	OK3KXR	74,253	309	45	114			
RA9CTK	2,244	26	9	24	WB4VKW	249,591	292	90	217	DL8FBD	203,280	402	76	166	OK3R0S	2,016	63	5	26			
OK2PAW	2,088	71	5	24	KN4UB	233,961	311	83	190	DL8AAM	130,615	422	49	124	OK2KVI	1,278	35	7	11			
RB500S	1,219	61	6	17	KX3O	203,200	282	80	174	Alaska	DL4MFM	120,666	300	51	131	Denmark	OZ10XZ	1,249,820	1730	107	330	
IBKHP	782	36	4	19	KB8DB	197,886	279	80	178	DL2HBX	119,739	262	68	171	OZ5EDR	3,942	55	19	35			
OK3TLB	322	24	3	10	KJ4VH	169,646	239	88	183	DF2RG	106,465	260	64	135	England	G4CNY	1,882,359	1882	114	345		
DK5RY	150	22	2	8	NU4Y	153,846	290	59	130	DJ5AV	101,871	306	54	135	G3VGG	367,821	893	61	178			
					K4PR	122,661	230	65	124	DL3ZBA	5,330	46	26	39	Finland	OH3ES	2,235,208	1995	139	403		
					WD4JNS	99,424	191	80	128	DJ8FR	155,485	534	32	89	OH7AAC	1,545,658	1783	124	378			
					W4FDA	54,405	123	36	119	DF1SD	140,650	537	34	111	OH2AG	461,598	900	80	241			
					W4LVM	35,378	97	51	82	Italy	IQ2A	A	2,044,562	1915	128	398	France	FQ2M	6,578,184	4604	166	535
					AD4Y	27,260	96	50	66	I2SVA	130,400	299	67	133	TV6MN	2,549,745	3076	105	354			
					W4BXI	9,230	51	27	44	I2FUM	38,704	120	52	112	FF3RM	572,732	1291	71	191			
					W4MGX	50,963	158	29	84	IN3NJB	266,328	799	36	101	Germany	Y34K	4,797,235	3190	163	534		
					WA4CUG	32,900	118	27	73	Norway	LA1K	A	173,893	632	49	144	DJ4AX	3,506,390	2925	132	403	
					K5LP	A	546,156	503	123	266	Sweden	SM5IMO	A	1,101,762	1135	121	365	Y35L	3,481,464	2826	149	487
					N5FA	422,792	468	111	217	SK3LH	1,068,264	1451	104	297	DK0UU	2,210,274	2013	133	416			
					NU1V/5	139,071	331	56	95	SM6LPF	312,137	545	87	214	DK0MM	2,192,544	1891	130	422			
					KI3L/5	81,466	182	55	106	Switzerland	HB98GV	A	1,028,100	1132	113	347	DF0DF	1,974,969	1652	143	436	
					WSNBI	55,572	150	45	87	Ukraine	UT2L	A	1,516,110	1603	132	389	DF0DX	1,954,452	1705	135	407	
					NSUD	39,500	143	24	76	Yugoslavia	YU3EA	A	1,829,282	1528	138	460	DF0RR	1,623,858	1791	126	356	
					KC5CP	27,968	110	26	66	MULTI-OPERATOR						DF3OG	1,483,751	1651	123	400		
					K5WE	36,668	130	31	72	SINGLE TRANSMITTER						DL0SSB	1,211,070	1513	99	296		
					N16T	223,800	239	110	190	NORTH AMERICA						DL1SBR	1,124,390	1068	123	368		
					WK6V	202,464	325	89	139	United States						DL0WH	1,121,462	1347	113	318		
					AA6JJ	41,026	102	60	86	K1RU	5,489,078	2679	162	547	DL0LR	1,108,940	1308	102	343			
					WX6M	24,309	85	52	59	K1IU	4,220,192	2147	158	530	DK0TZ	548,230	766	86	279			
					WABLLY/6	7,410	42	30	35	KB1H	2,124,759	1331	133	426	DF0OD	510,130	1218	75	203			
					W6ISQ	61,380	229	28	65	W1FJ	1,261,386	901	123	374	DA2UK	354,530	926	64	178			
					N6OU	14,578	73	27	47	WE1B	814,359	713	104	295	DF0LE	120,175	275	59	150			
					W6AUE	217,952	559	32	107	W1BK	226,259	264	92	215	Y57UD	95,765	381	46	133			
					KI3V/7	1,929,624	1409	141	351	WS1F	124,640	238	63	142	DL0WU	50,085	248	36	69			
					N7KZN	238,392	342	98	154	ASIA						Greece	SV4AAQ	995,507	1820	90	269	
					KF7YP	104,961	230	74	103	Hong Kong						Hungary	HG1S	7,057,087	5363	155	494	
					W7ZR	13,330	82	28	34	VS6WO	6,027,468	4615	157	407	HABKCK	2,205,657	2240	123	418			
					WJ7R	98,600	409	26	59	Peoples Rep. of China						HG95T	337,680	874	64	204		
					W8CG/8	1,870,323	1316	127	380	BY1PK	2,744,280	3098	118	260	HA6Z	152,200	410	61	139			
					WR3G/8	1,722,600	1032	147	453	BY4SZ	1,102,884	1977	110	182	HA5KTT	136,224	562	45	131			
					K8MR	1,352,340	959	132	363	BY4AA	885,372	1343	152	204	HABKWE	87,721	824	69	150			
					K8OQL	1,162,392	861	132	344	Saudi Arabia	HZ1AB	4,485,285	3694	116	319	HA0KLL	72,344	311	47	94		
					K8ERM	371,604	397	97	249	U.S.S.R.						Ireland	EI7M	3,584,106	3436	116	382	
					K8PYD	226,044	301	86	187	Asiatic Russia						Italy	IQ4A	9,104,040	5144	172	620	
					N8JQX	191,526	259	84	190	UX9C	3,350,677	2524	130	387	IL3VE	1,123,930	1899	86	269			
					K8BL	104,416	200	68	140	UZ9QWA	1,869,240	1500	125	319	IK0LZR	698,938	999	84	253			
					AB8Y	75,075	157	57	118	UZ9CZO	1,387,204	1372	105	259	Netherlands	PA6DX	2,963,950	2598	154	480		
					N8AA	29,574	100	37	69	UZ9AWD	916,188	1205	78	195	PI4ZLD	297,176	567	76	231			
					K4ZLE	6,490	41	25	34	UZ9XWT	87,162	175	46	100	PI4SHB	213,743	495	66	145			
					WB0VZ	174,482	406	37	117	RWB0WA	2,018,720	2055	129	278	PA8KHS	64,848	262	40	128			
					W8XD	66,906	205	29	89	UZ0CXD	810,060	1496	100	176	Norway	LA1H	1,826,520	1781	117	348		
					N4CC/9	1,352,989	935	144	373	UZ0CWV	680,264	1612	94	154	Poland	LA2AB	1,682,136	1916	117	371		
					NE9U	428,571	480	107	226	Kazakhstan	RLBL	8,684,742	4208	174	553	SN3A	6,539,084	4198	178	604		
					KD9HT	124,424	224	66	140	EUROPE						SN3N	674,310	1032	102	297		
					NGAKE	104,976	180	74	142	4U-Geneva						SP3KPN	3,621	61	18	33		
					KW9E	18,018	71	38	61	4U-Vienna						Romania	YO4KCC	204,832	570	39	257	
					W9XT	116,160	349	28	92	4U-IXT												
					N4RR/9	224,140	559	33	107	OE3XCW	1,814,904	1948	125	379								
					N9AU	65,090	208	27	88													
					WB9TIY	50,850	163	27	86													
					NS0W	403,535	453	100	219													
					WY0J	388,680	463															

New MFJ CW Transceivers

... throw this *tiny* CW rig in a corner of your briefcase and enjoy DXing and ragchewing wherever you go ... you get a high performance superhet receiver, crystal filter, RIT, AGC, vernier tuning, sidetone, speaker, up to 5 watts output, semi/full-break-in ...

MFJ-9040, MFJ-9030, MFJ-9020,
MFJ-9017, MFJ-9015

\$179⁹⁵ each

- NEW! 5 Bands ... Models for 40, 30, 20, 17, 15 Meters
- Write for Free manual

Throw a tiny MFJ CW Transceiver in a corner of your briefcase and enjoy DXing and ragchewing wherever you go.

You'll turn lonely nights into exciting adventures as you contact fellow amateurs around the world.

With 5 watts you'll have plenty of power to work the world even with a makeshift antenna.

At home with a good dipole, vertical or beam, you'll be able to work almost anyone you hear — can you imagine earning DXCC with 5 watts?

Big gun DX'ers: Try a new DX challenge for the price of a simple station accessory.

It's good enough to be your only rig — you get a high performance superhet receiver, razor sharp 8-pole crystal filter, RIT, AGC, vernier tuning, sinewave sidetone, built-in speaker, headphone jack, adjustable semi and full QSK break-in, up to 5 watts output plus much more.

Tiny 6x6½x2½ inches. Weighs 1-3/4 lb. Uses 12-15 VDC. Optional matching antenna tuner, power pack, antenna, plug-in Curtis chip keyer and plug-in narrow audio filter.

Now 5 Bands ...

MFJ-9040 covers 40 Meters: 7.000-7.150 MHz. **MFJ-9030** covers 30 Meters: 10.100-10.150 MHz. **MFJ-9020** covers 20 Meters: 14.000-14.075 MHz. **MFJ-9017** covers 17 Meters: 18.068-18.110 MHz. **MFJ-9015** covers 15 Meters: 21.000-21.200 MHz. \$179.95 each.

40 and 15 Meter Models include Novice and Technician Band. Your perfect first radio.

High Performance Superhet Receiver

You get a high performance superhet receiver with a selective double tuned front end and double-balance mixer. It's sensitive enough to copy weak DX signals down to the noise floor yet resist overload when a strong local comes on.

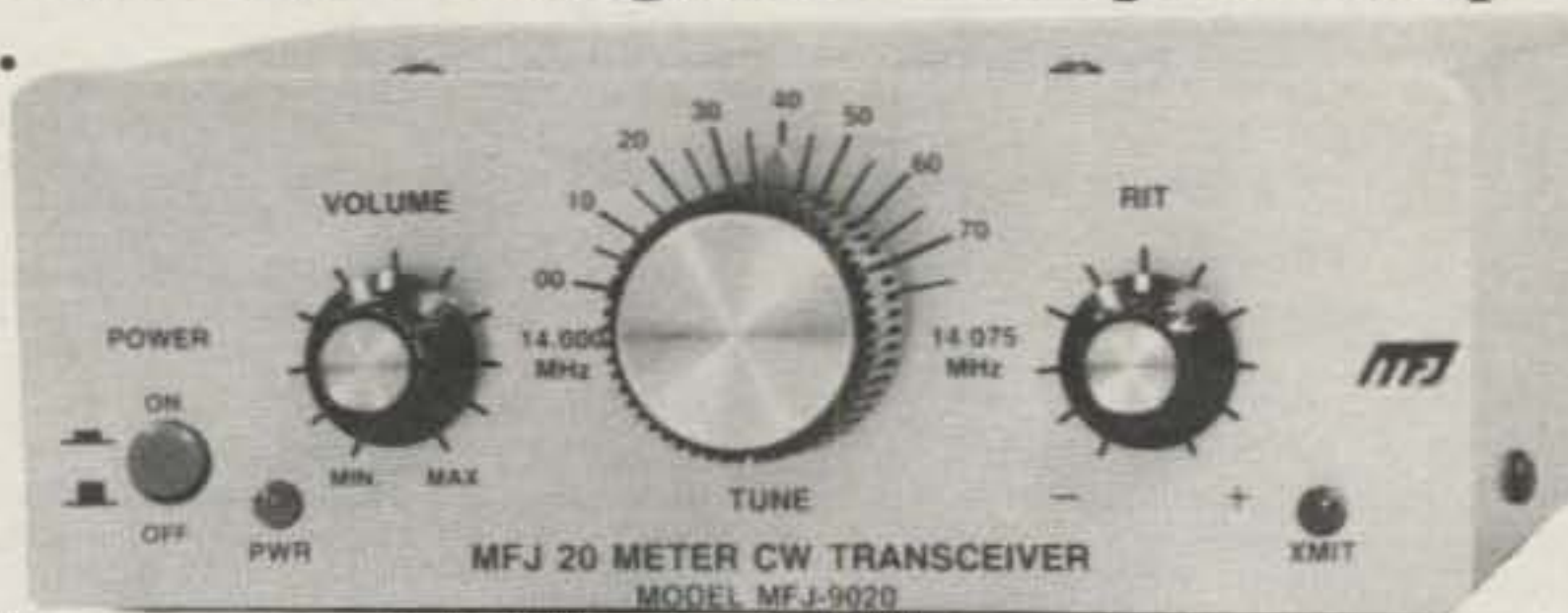
What you hear is what you get — images and birdies are eliminated with this single conversion design and a high IF.

A ball bearing reduction drive and linear frequency readout gives you smooth precise tuning.

Half watt of audio gives you plenty of volume from headphones and built-in speaker.

Razor Sharp Selectivity

You'll slice through QRM and pull weak ones out of the mud with an 8-pole crystal filter that gives you razor sharp selectivity with steep sided skirts.



attractive matte-black aluminum enclosure with a deluxe brushed-aluminum front panel and matched knob set. Machine screws and pressed-in PEM nuts are used — not sheet metal screws.

Has power-on LED, transmit LED and SO-239 coax connector for antenna.

Designed by Rick Littlefield, K1BQT

Instant Recovery AGC™

Weak DX signals are just as loud as strong local ones because a graceful Automatic Gain Control (AGC) keeps your audio level constant.

You get smooth break-in operation because MFJ's exclusive *Instant Recovery AGC™* gives you instantaneous transmit recovery.

True Receiver Incremental Tuning (RIT)

True Receiver Incremental Tuning (RIT) lets you dodge QRM and compensate for other's drift without moving your transmit frequency.

MFJ Integrated CW Station

Transceiver, tuner, power pack fastens together to form tiny 6x6½x8½ inch integrated CW station.

SAVE \$45

\$329⁸⁰

Save \$45! \$329⁸⁰ buys complete MFJ CW Station. Includes MFJ CW Transceiver, MFJ-971 tuner, MFJ-4114 power pack, portable antenna ... order MFJ-9140B, 40M; MFJ-9130B, 30M; MFJ-9120B, 20M; MFJ-9117B, 17M; MFJ-9115B, 15M. \$374.80 each if purchased separately (keyer and filter not included.) MFJ-27, \$4.95. Handle for CW Station. Add \$3.00 s/h if order separately.



Enough Power to Work the World

With 5 watts you'll have plenty of power to work the world even with a makeshift antenna.

You can use any antenna with an SWR up to 3:1. These MFJ CW Transceivers are rugged enough to withstand momentary antenna opens or shorts without damage.

If you're really into QRP you can reduce your power down to milliwatts.

A pleasing sinewave sidetone lets you monitor your sending.

You also get adjustable semi and full QSK break-in plus adjustable automatic transmit offset.

You'll get hours of battery operation — draws only 50 ma. receive, 1 amp transmit.

Looks Great!

Each MFJ CW Transceiver is housed in an

The MFJ CW Transceivers were designed by Rick Littlefield, K1BQT. He's known worldwide for his reliable high-performance transceiver designs and countless articles.

K1BQT has given careful attention to board layout, heatsinking, mechanical rigidity, voltage regulation and component selection to ensure stable operation and long-term reliability.

It meets or exceeds all FCC requirements.

Comes fully assembled, tested and guaranteed to work

Your factory built MFJ CW Transceiver is ready to work DX right out of the box. It's not a kit of parts you have to put together and hope you can get to work.

Free MFJ CW Transceiver Manual

Manual includes operating instructions, setting up your station, DX techniques, antenna suggestions, trouble shooting guide, theory of operation, alignment procedures, parts placement, schematic, parts list and more.

For a free manual write or call MFJ.

Plug-in Keyer and Narrow Filter (Optional)

MFJ-412 Curtis chip iambic keyer, \$39.95.

MFJ-726 narrow audio filter, \$29.95. Has In/Out switch.

Each plugs into an MFJ CW Transceiver. Controls on rear panel. No soldering or modifications needed.

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You get MFJ's famous one year *No Matter What™* unconditional guarantee. That means we will repair or replace your MFJ CW Transceiver (at our option) *no matter what* for a full year.

Continuing Service

MFJ Customer Service Technicians will help you keep your MFJ CW Transceiver performing flawlessly — no matter how long you own it. Just call our toll-free help line 800-647-TECH(8324) — an MFJ exclusive.

Made in USA

MFJ CW Transceivers are made in the USA. Help our fellow Americans by keeping our money here — buy Made in USA.

Call Your Favorite Dealer Today

Enjoy DXing and ragchewing wherever you go. Call your favorite dealer today and get your MFJ CW Transceivers. Don't leave home without it!

MFJ Portable Operating Accessories

MFJ Portable Antenna Tuner



MFJ-971 Tunes coax, balanced lines, random wire 1.8-30 MHz. Cross-Needle SWR/Wattmeter has two switchable ranges: 30, 300 or user selectable 6 watt ranges. Tiny 6x6½x2½ inches matches MFJ CW Transceivers. Fastens to MFJ CW Transceivers and/or MFJ-4114 Power Pack to form single unit.

Prices and specifications subject to change © 1992 MFJ Enterprises, Inc.

MFJ Portable Power Pack



MFJ-4114 Matching portable Battery/AC Power Pack for MFJ CW Transceivers or other low power rig. Provides power from Ni-cad D cells, regular or alkaline D cells or 110 VAC. Has charging circuit for Ni-cad D cells. 6x6½x3½ inches. Fastens to MFJ CW Transceivers and/or MFJ-971. Batteries not included.

MFJ Portable Antennas

\$34⁹⁵ Efficient low SWR folded dipole. Lightweight, easy to carry, easy to put up. Perfect for MFJ CW Transceivers. Order MFJ-1774, 40 Meters; MFJ-1773, 30 Meters; MFJ-1772, 20 Meters; MFJ-1771, 17 Meters; MFJ-1770, 15 Meters.

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Technical Help: 800-647-TECH(8324)

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San Marino T77C 4,426,793 4493 130 381	RY5L 674,500 1363 96 259 UB4ZWK 635,180 1005 98 266 RB4IWE 199,796 472 74 177 UB4MWU 130,611 388 56 141 UB4EYT 31,725 155 40 95 UT4UXW 494 18 7 12	Canada K2TD 2,719,868 1564 146 482 K3II 1,622,852 1192 125 359	Lithuania LY2ZD 6,471,187 4996 160 546	OCEANIA New Zealand ZL2K 3,658,408 3296 111 266
Spain EA3KU 5,888,334 4319 152 493	Wales GW8GT 6,786,675 4699 158 537	Alaska NL7G 7,474,278 6278 146 356	Netherlands PI4COM 5,960,952 4986 152 493	Northern Marianas KH8AM 21,856,979 10647 176 517
Sweden SK1PW 2,587,115 2562 130 415 SK6TW 2,202,412 2246 133 415 SL8CB 1,688,576 1790 131 381 SK8WA 311,227 600 75 182	Yugoslavia YZ4Z 4,385,040 3743 150 455	St. Lucia J6DX 26,968,675 13829 171 614	Spain ED5TX 2,862,714 2792 126 375	SOUTH AMERICA Netherland Antilles PJ9A 35,327,160 14991 183 628
U.S.S.R. Belorus UC1CW8 924,704 1717 90 262	OCEANIA Australia VK6LW 3,649,950 3017 125 289	AFRICA Madeira Islands CT3M 27,961,992 12202 167 601		
European Russia RZ1A 9,083,938 5613 193 642 UZ4WWB 2,525,625 2122 149 476 RZ6AZZ 2,427,030 2612 133 401 UZ4WWA 2,195,550 2148 140 434 UZ4PWW 1,745,456 2162 131 341 UZ3XWB 1,387,602 1330 134 385 RZ6AXO 1,386,164 1878 116 321 UZ10WZ 1,019,872 2198 128 336 RX3ARM 1,009,282 1708 92 246 UZ1TWC 717,868 1065 105 289 UZ3WWA 635,460 1112 93 263 UZ1AWO 332,756 962 61 193 UZ6HWA 198,000 580 85 170 UZ1TWW 115,440 569 44 156 UZ6AYN 107,761 876 71 215 UZ3AWR 75,880 368 42 98	Brunei V85HG 4,068,025 3096 134 314	ASIA Japan JE2YRD 7,678,320 4471 170 428 JA1YXP 4,779,594 3153 160 389 JA3YKC 4,349,800 3002 161 359 JA3YBF 2,890,810 2165 147 334 JA8YAK 14,475 78 33 42		
Ukraine RY80 3,567,890 3608 146 464 UB4WZA 2,334,500 2076 138 437 UB3IWA 2,198,930 2019 145 445 RY8N 748,880 1368 94 274	Tonga A35MX 4,498,628 3721 142 270	Thailand HS8AC 952,476 1251 110 247		
Kaliningrad UW2F 7,598,605 4870 179 570	SOUTH AMERICA Aruba P4/N6BT 1,492,764 1863 75 198	EUROPE European Russia R6L 8,074,150 5389 176 606		
Karelia UZ1NWY 1,566 42 7 27	MULTI-OPERATOR MULTI-TRANSMITTER NORTH AMERICA United States N2RM 12,374,331 5072 187 660 W3LPL 11,286,606 4593 186 663 K1AR 10,632,647 4361 185 654 K1ST 8,249,583 3887 175 580 K8CC 5,748,535 2940 166 545 N6ND 5,748,129 2975 178 509 N6DX 5,620,486 3170 181 493 KY1H 5,293,080 2878 159 517 WB4IH/9 5,140,188 2928 169 512 W6BA 3,693,404 2252 166 406	Finland OH3AT 172,224 503 58 150		
Moldova U08Z 5,058,690 4669 153 510		France FF1POI 17,538 105 21 53		
		Germany DL8KF 5,299,711 4286 161 521		
		Hungary HG73DX 16,057,755 9220 191 664		

*These logs were received after the deadline and a reasonable extension grace period. They are included in the results for completeness, but are not eligible for awards.

CHECK LOGS

Our thanks to the following stations who sent in check logs: CE3/KL7RA, CT1A0Z, CX6RE, DJ5FD, DK5OS, DK9EA, DL4LVM, DL7UED, DL8UED, DL8WCM, EA1AUI, EA1EDS, EA1EVM, EA1FAE, EA3GCV, EA4EBE, EA5AIK, EA5GGV, EA5OI, EA6BD, EA6EJ, EA7CDT, EA8BIE, EC1CYH, I1ZQD, IK3GER, K3APM, K6FM, KL7UR, LA1FW, LA1IE, LA2KD, LA2QM, LA2UA, LA3GI, LA3MHA, LA4IAA, LA4KF, LA4NE, LA4OGA, LA5ZEA, LA6ZH, LA7AFA, LA7IJ, LA7SI, LA8CE, LA8LA, LA8NHA, LA9DAA, LA9HF, LZ1IA, LZ1IU, LZ1KAZ, LZ1UH, LZ3AB, N1HKK, OH1MEB, OH1XX, OH2EJ, OH2IQ, OH3WR, OH4MCV, OH5FA, OH5OT, OH6MIL, OH8LAE, OK1AD, OK1DRQ, OK1DZI, OK1FAI, OK2ON, OK2PO, OK2SG, OK3TOX, OK4DWJ/MM, OZ1CAR, OZ1JLX, OZ1JSZ, OZ2JI, OZ5PA, OZ5UR, OZ8XO, RA1AI, RA1OA, RA3ATM, RA3DEV, RA3DGP, RA3NB, RA3RGG, RA3ZM, RA4HKS, RA4LAH, RA6AU, RB4MYC, RB5GI, RB5VY, RL7YA, RV1AO, RW3RO, SM0BFJ, SM0BXT, SM0CSX, SM3CBB, SM5CVC, SM5LI, SM5MLE, SM5OL, SM5WC, SM6BWQ, SM6CMR, SM6CZU, SM6DUR, SM6FPZ, SM6NJK, SM6OLL, SM6TOL, SM7AFI, SM7CZC, SP1BNS, SP1DPA, SP2EFU, SP2ERZ, SP2GUC, SP2HHX, SP2IU, SP3JIA, SP3XR, SP4AVG, SP4EHC, SP4GDC, SP4GFG, SP4JSR, SP4LDT, SP4LVG, SP5ATO, SP5ENA, SP5FS, SP5GDX, SP5NOG, SP6CPF, SP6CTC, SP6EY, SP8HXN, SP8JMA, SP9AGS, SP9DEE, SP9NLI, SP9ODY, U3DI, UA0BFU, UA0QBO, UA0SZ, UA0UAG, UA0UBX, UA0ZAL, UA1AKT, UA1CDX, UA1CUQ, UA3AGW, UA3DFV, UA3DNV, UA3ICK, UA3ICX, UA3IDT, UA3MIF, UA3PTW, UA3RAG, UA3SDN, UA4HRZ, UA4NCI, UA4ZA, UA6AGE, UA6AUT, UA6ED, UA6LDF, UA6PAX, UA6YCI, UA9AKW, UA9XK, UA9XS, UA9YC, UB4DWW, UB4JN, UB4MYQ, UB4UFT, UB5FDL, UB5WDD, UB5XAN, UB5ZBG, UB5ZC, UC2LB, UL7CU, UL7TJ, UL8CWC, UL8GAK, UT5UCY, UT5UJY, UV3DAV, UV3DBF, UV3DUF, UV3NG, UW3DG, UW3PK, UW9CZ, UZ6HWE, UZ9MXX, VE1RJ, VE2EM, VE3ZD, VE7IN, VU2PTT, W4ZCT, W8LYT, W8RV, W9YCV, WB4RUA, Y24OA, Y25KL, Y27KO, Y28WG, Y28YN, Y31ON, Y38ZM, Y41QM, Y53YN, Y54WM, Y54ZA, Y75YL, YL2GRO, YL2RP, YD2ALK, YD3CDN, YD4SI, YD7CFD, YD7DO, ZS6BMN, ZZ1AA.

Disqualifications: 4Z2DX (for excessive duplicates and unverifiable contacts).



Rob, WA3QLS



Gail, KA3ITN



Paul, WA3QPX

HF

FT-1000D
FT-1000
FT-990
FT-990DC
FT-890
FT-747GX



Base Stations

FT-650 6m, 10m, 12m
FT-736R V/UHF



YAESU

Mobiles

FT-2400, 2m
FT-212RH, 2m
FT-712RH, 70cm
FT-912R, 1.2 GHz
FT-5200, 2M/440
FT-6200, 2M/440



Receiver

FRG-8800
HF Amplifier
FL-7000



Hand Helds

FT-23R, 2m
FT-33R, 220 MHz
FT-411, 2m
FT-811, 70cm
FT-911, 1.2 GHz
FT-470 2m/70cm
FT-26, 2m
FT-76, 70cm
FT-415, 2m
FT-815, 70cm



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W4UW presents us with a project that we could probably put together over a weekend and could have us on the WARC bands by Monday. A little time, a little money, and a little bit of wire can go a long way.

40 Plus WARC A Multi-Band Dipole Antenna

BY RICHARD A. GENAILLE*, W4UW

A few years ago I decided to trade in my old transceiver for one of those "new-fangled" jobs with all the bells and whistles, including the WARC bands.

*719 Quarterstaff Rd., Winston-Salem, NC 27104

I spent quite a lot of time becoming acquainted with the various controls and their functions, figuring out various features on the analog side of my new toy's front panel and learning something about the digital side of the control panel. Figuring out how to store my favorite frequencies into memory and setting the digital clock, calendar,

and display also kept me busy for quite awhile. I also learned quickly that the newer transceivers with transistor amplifiers don't take too kindly to SWR excursions much greater than 2 to 1. Solving that problem without an antenna tuner wasn't too big a chore, but it did keep me busy for awhile.¹ Finally, one day I decided it was

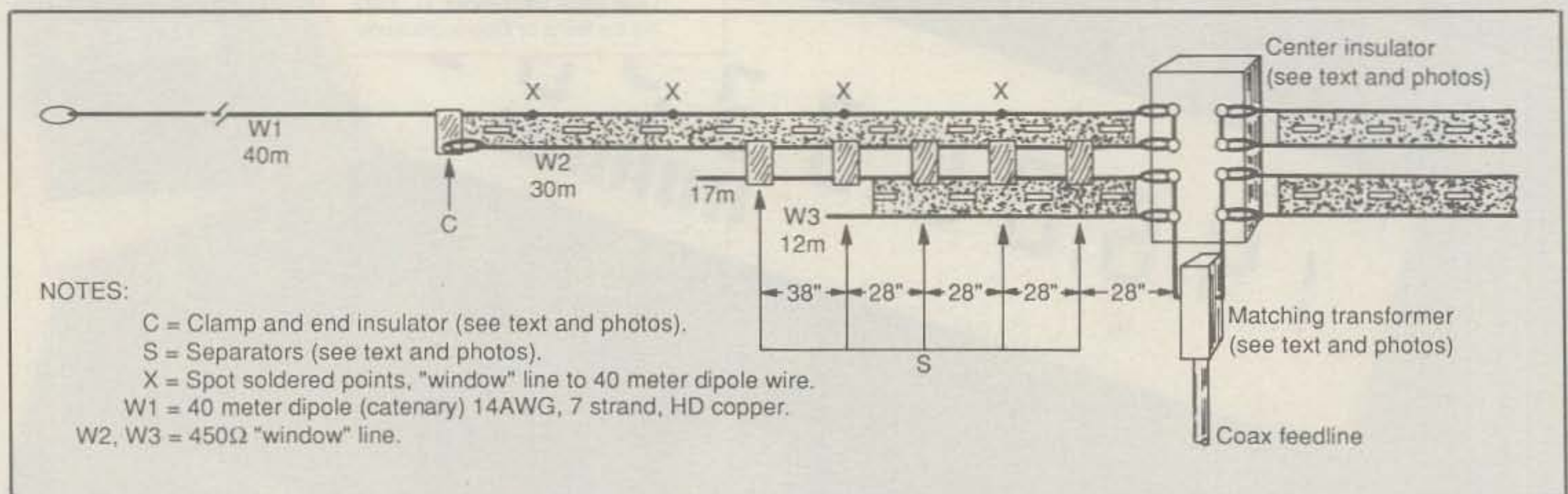


Fig. 1—A multi-band dipole antenna using 450 ohm "window line" for 40 meters plus the WARC bands.

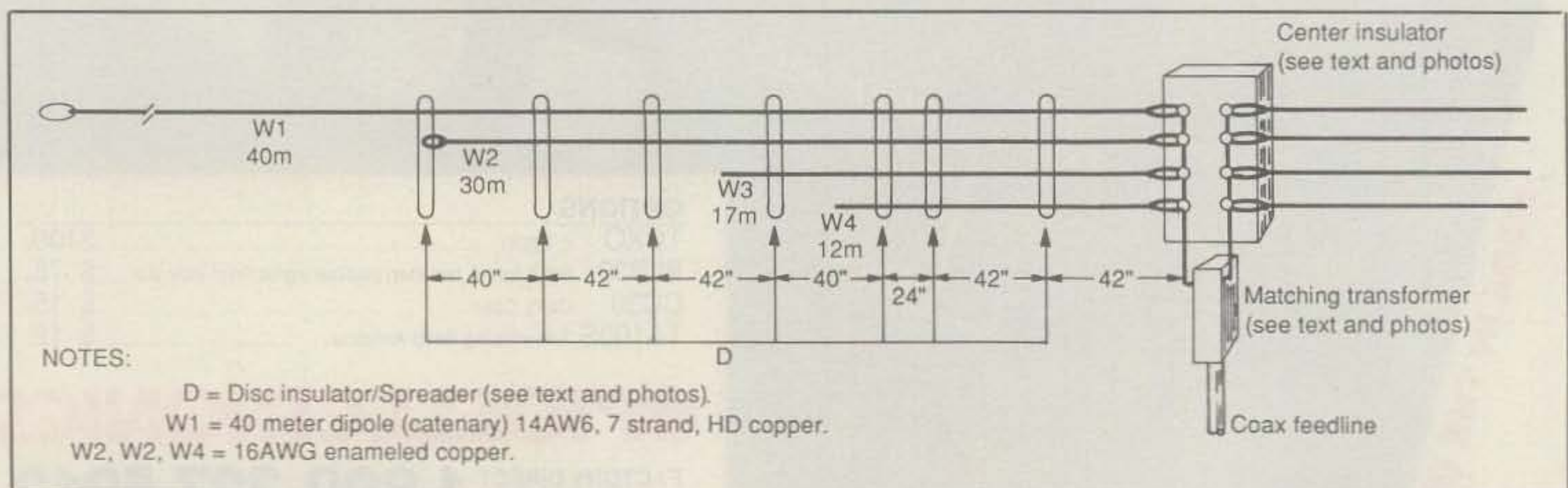


Fig. 2—Similar antenna to the one in fig. 1, but utilizing individual wires for each band.

YAESU



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200 watt HF XCVR, dual RX, with auto-antenna tuner and more! Deluxe and standard models available. An excellent performer Call!



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100 watt HF XCVR with automatic antenna tuner. DC model comes without the power supply and CW filter. A great performer Call!



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100 watt HF XCVR, the AT model includes an automatic antenna tuner. Many other features make it an excellent mobile performer Call!



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100 watt HF XCVR, with automatic antenna tuner. Two optional band slots, for 6m, 2m, or 70cm Call!



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100 watt HF XCVR. Optional external automatic antenna tuner unit. A very popular HF mobile radio Call!



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Mobile 2m/70cm, 45 watt. Optional remote mounting kit. A great dual band mobile radio Call!



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100 watt HF XCVR. The AT model includes an automatic antenna tuner. Optional Digital Signal Processor. A great mobile performer Call!



TM-741A
50 watt 2m/70cm FM XCVR. One optional band unit can be added, (10m, 6m, 220MHz, or 1.2GHz) Call!



TM-241A
45 watt FM XCVR. Extended receive (118-174MHz), super compact size. A great 2m performer Call!

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TH-78 2m/70cm tiny HT Call
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TS-140S HF mobile Call
TS-690S HF - 6m mobile Call
TS-790 2m/70cm base Call
Ham Windows software Call

ICOM



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IC728 HF mobile Call
IC729 HF & 6m mobile Call
IC-P2AT 2m tiny HT Call
IC-W2A 2m/70cm HT Call

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RS20M	16	20	112.00
RS35A	27	35	144.00
RS35M	27	35	162.00
VS-35M	27	35	179.00
RS50A	35	50	219.00
RS50M	35	50	239.00
VS50M	35	50	249.00

M=dual meters V=variable voltage.

MFJ

1278/1270 TNCs 249/119
1284/1289 TNC software 25/59
989C/986 tuners 299/25
949D/948 tuners 139/119
941E/945D tuners 99/89
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407/401 CW keyers 69/49
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Yaesu G500A (elevation) Call
Yaesu G800SDX (21 Sq.) Call
Yaesu G1000SDX (23 Sq.) Call
Yaesu G2700SDX (34 Sq.) Call
Yaesu G5400 (azimuth/elevation) .. Call

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TX-472	23'8"	72 FT	18 SQ. FT	2279
TX-489	24'4"	89 FT	18 SQ. FT	3959
HDX-538	22'6"	38 FT	30 SQ. FT	1179
HDX-555	22'0"	55 FT	30 SQ. FT	2079
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HDX-589M	24'8"	89 FT	30 SQ. FT	7119

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1.125"	.058"	1.009"	.80
1.250"	.058"	1.134"	.90
1.375"	.058"	1.259"	1.05
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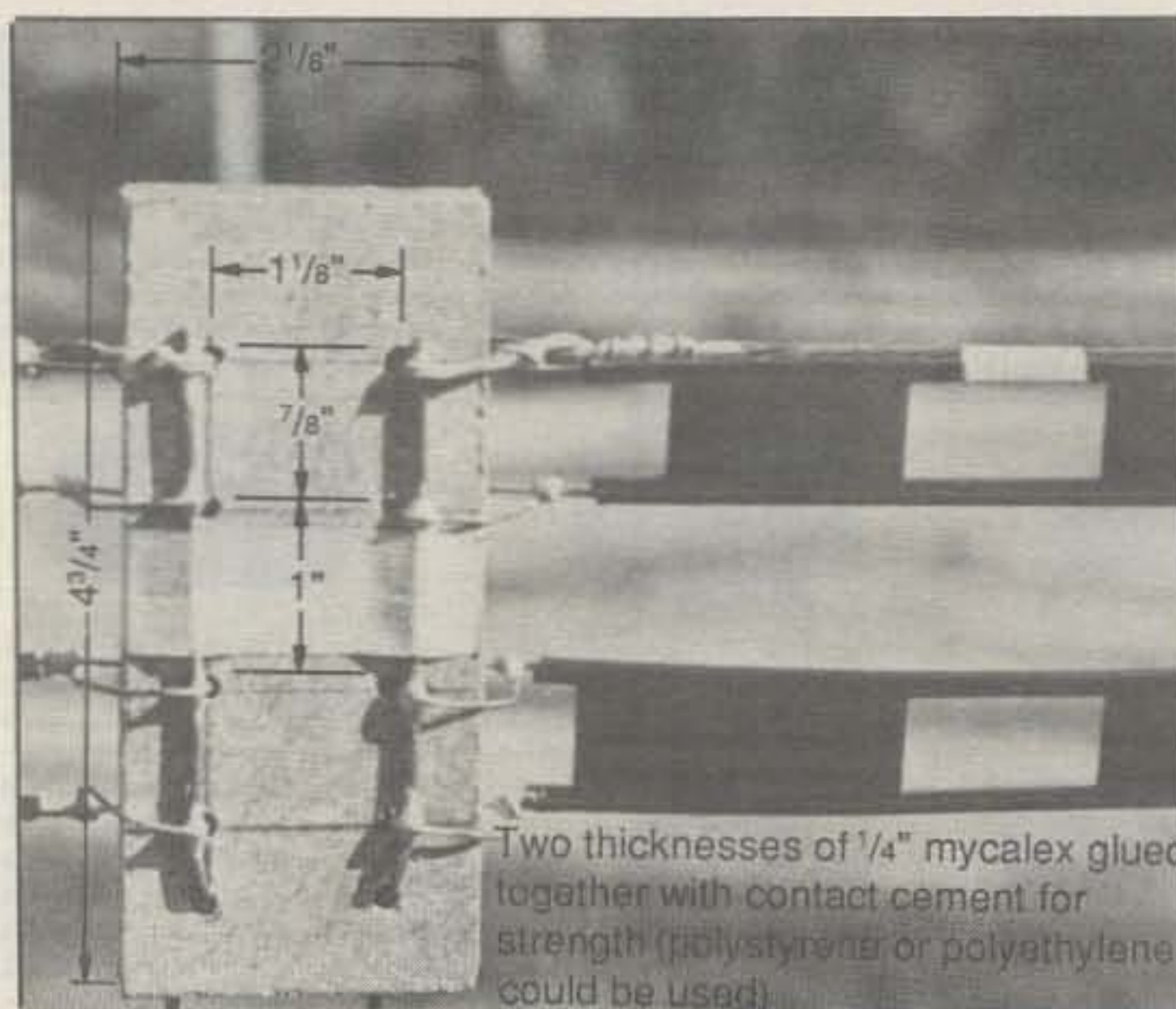
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Photo 1 - The center insulator showing the 40 meter dipole (catenary) wire and the window line connections.

about time to find out what the WARC bands were all about. After all, they were one of the reasons why I purchased my new toy!

I have only one good location in my backyard where I can erect simple wire antennas. Some years back, in my more agile days, I climbed part way up the two 60 foot oak trees that are on either side of my property and installed some large screw eyes and pulleys with ample footage of 3/8 inch Samson Stable Braid at about the 45 foot level. I did this in order to hoist up a variety of wire antennas from time to time, mostly for 40 meters. To the existing 40 meter folded dipole I added a 12 meter folded dipole in tandem. I also had to add another coax feedline and provide another opening in my cable entry box to the shack. Everything had worked out fine, so far!

When we were given permission to operate the 17 meter band, I hastily threw up a 17 meter dipole between two smaller trees and had a ball trying to work all states

as fast as I could. The WARC bands seemed to be pretty good ones. Of course, I had to play games with another transmission line and the subsequent switching arrangements in the shack. Then I got curious about 30 meters, but the backyard was getting to look like a power sub-station with all the wires strung between the trees and feedlines hanging down. The more I looked at what I had and the more I thought about it, the more I came to the conclusion "enough already."

The concept of multiple-dipole antennas has been around for quite some time. The one I have constructed to solve my particular problems of too many separate antennas and too many feedlines came from an antenna book circa 1964.² In those days WARC bands did not exist, and the multiple-dipole antenna design was primarily for 40, 20, 15, and 10 meters. The antenna I have constructed, and am using quite successfully, has been designed for 40 and WARC. The beauty of it is that only one

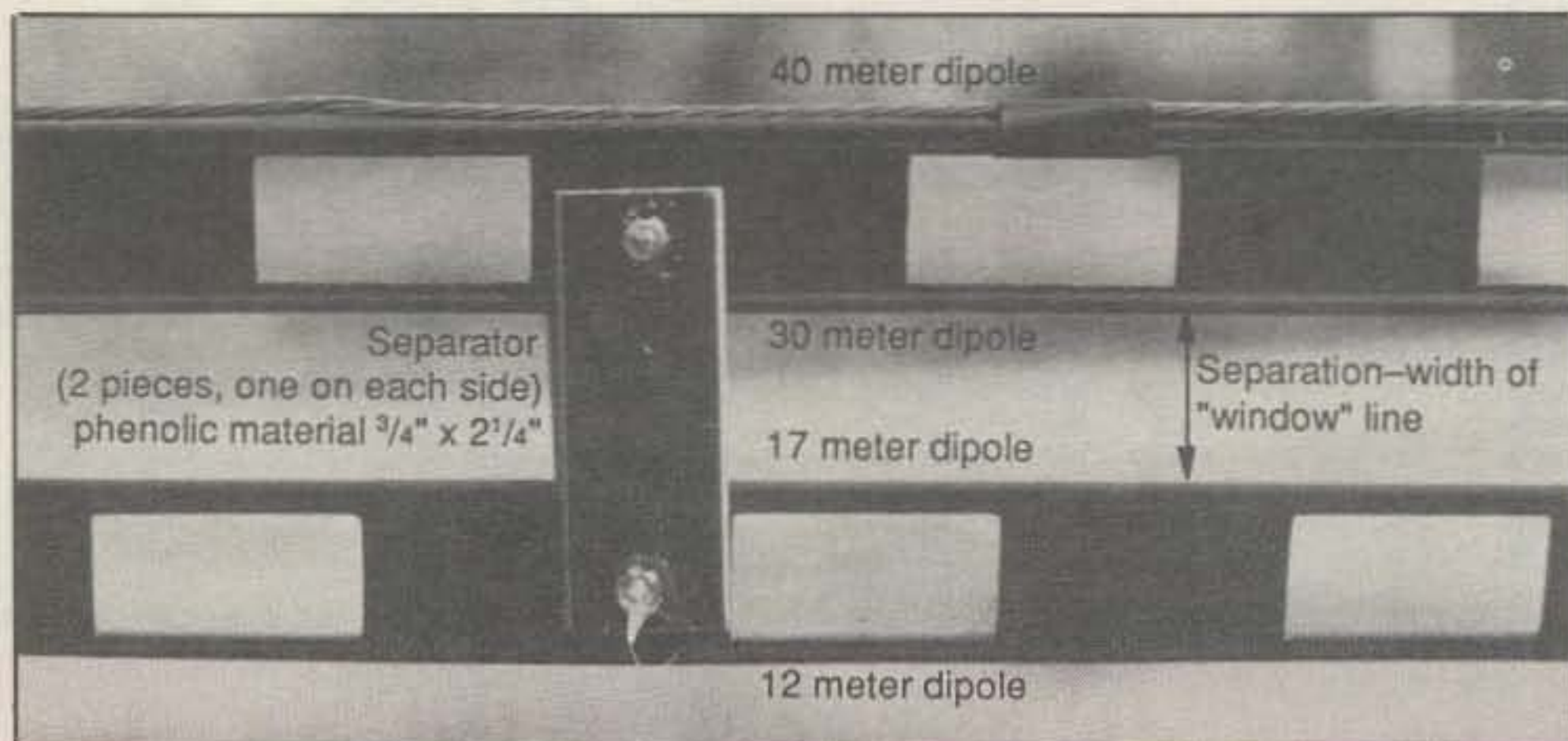


Photo 2 - A section of the multi-band dipole antenna showing a separator.

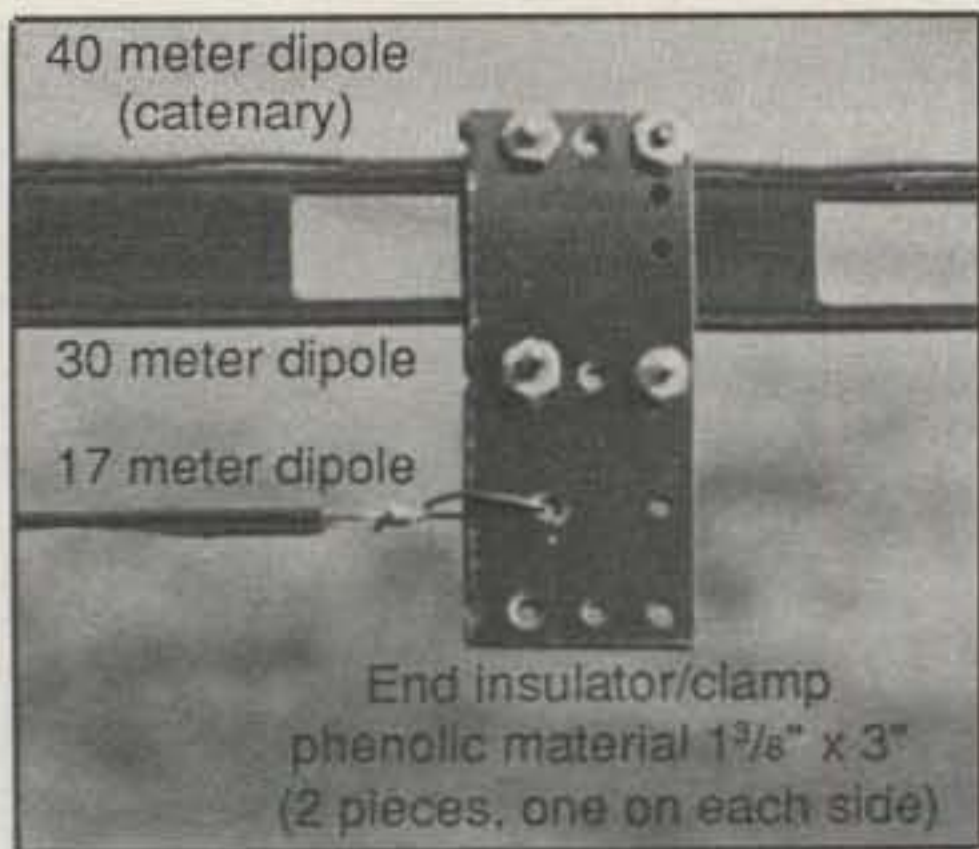


Photo 3- Detailed shot of the end insulator/clamp for the 17 meter dipole.

feedline is required, and consequently you have four bands at your disposal in the shack without having to switch anything except your transceiver's band switch, if it has one! If you can have a 20, 15, and 10 meter beam using only one feedline, why not another system serving four bands or more with one feedline?

The materials required for the 40 plus WARC multiple-dipole are quite inexpensive. Most of the material, with the possible exception of the wire, can be found in the average junk box.

I constructed several types of multiple-dipoles for 40, 30, 17, and 12 meters to learn something about the characteristics of this type of antenna, and some of what I learned was quite surprising. First of all, there is interaction between the dipoles, but the effect of the other dipoles on the feedpoint impedance of the particular dipole being used is minimal.

Two different types of construction are shown in figs. 1 and 2. Either type will perform satisfactorily, although physical dimensions are somewhat different. Both construction techniques make use of a main 40 meter catenary for supporting the dipoles for 30, 17, and 12 meters. The positioning of separators or insulators/spreaders is shown in figs. 1 and 2. Photos 1 through 4 should provide sufficient details for the prospective constructor to do a reasonable job of duplicating either of the two antennas.

Photos 1 through 3 show constructional details for the multiple-dipole antenna using 450 ohm window line. The center anchor block was made of 2 blocks of 1/4 inch thick mycalex glued together with contact cement to provide sufficient strengths for the pull exerted when the antenna is stretched out. Polystyrene, polyethylene, or other low-loss material could be used, but bear in mind that certain materials can be adversely affected by sunlight. The piece of masking tape shown across the block is not required! I used it to hold the wire assembly still for soldering and then I forgot to remove it before the photo was taken. The separators shown help to keep

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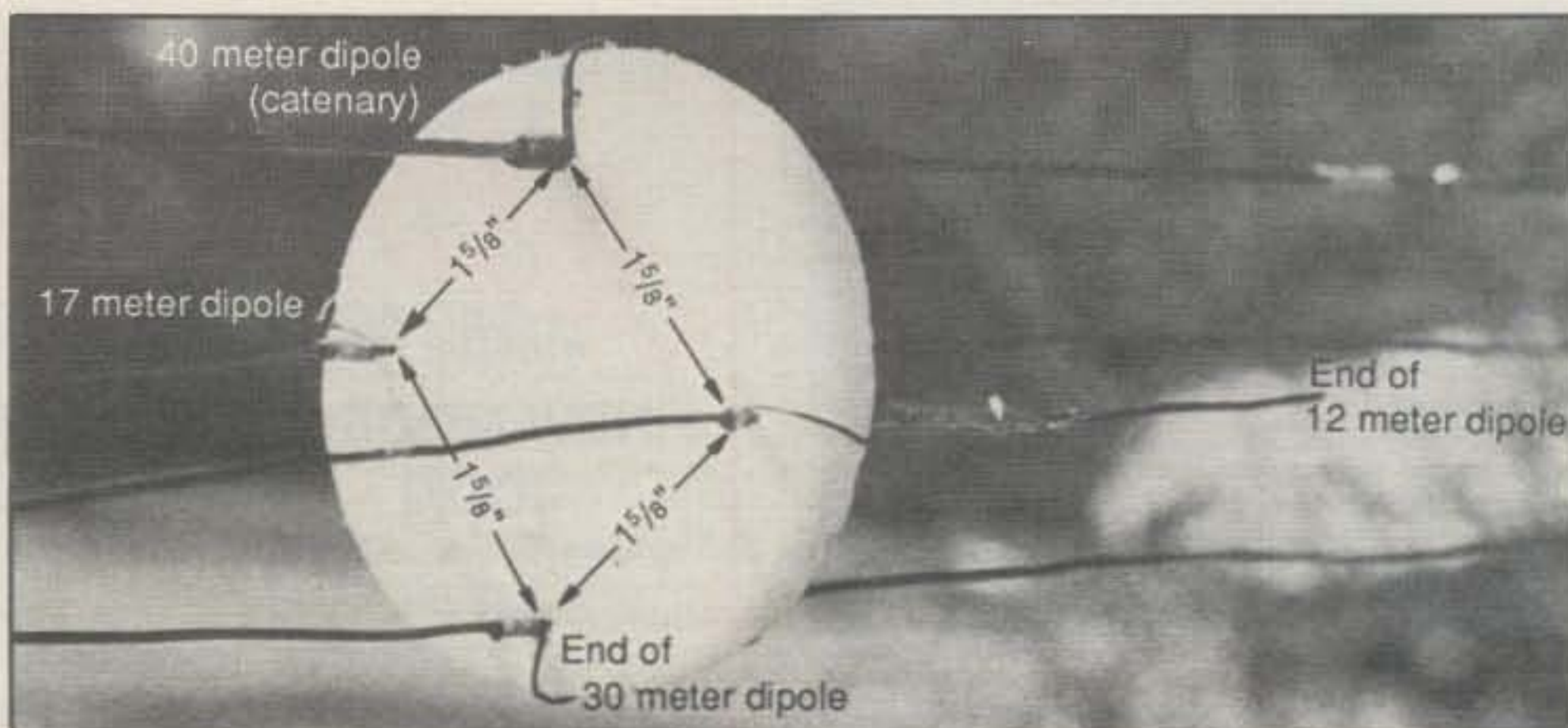


Photo 4- In the all-wire version a polystyrene disc insulator/spreader is used.

Freq. (MHz)	450 ohm "Window Line"		
	Length of Each Half		
	Meters	Feet	Inches
7.15	9.98	32	9
10.125	6.725	22	3/4
18.108	3.79	12	5 1/4
24.940	2.86	9	4 3/4

Freq. (MHz)	Individual Wire Dipoles		
	Length of Each Half		
	Meters	Feet	Inches
7.15	9.98	32	9
10.125	7.29	23	11 1/8
18.108	4.07	13	4 1/2
24.940	2.94	9	7 3/4

Table 1- Dimensions for multi-band dipole antennas.

the two sections of window line separated by the width of the window line. The material is phenolic, about 1/8 inch thick, held together with small screws. One such separator is shown in photo 2. Photo 3 shows an end insulator/clamp supporting the end of the 17 meter dipole. The separators and end insulator/clamps should be made from low-loss material.

A partial view of the all-wire multiple-dipole with a disc insulator/spreader is shown in photo 4. The disc wafer was cut from 3 inch diameter polyethylene stock obtained from a local plastics outfit. It is 3/8 inch thick; however, the thickness is not a magical value. Solid plastic coasters, used under drinking glasses, could probably be used, but the thicker material provides greater rigidity for separating the individual wires. Note that small tie wires were used to hold the dipole wires in place.

Initially, the dipole lengths were determined by the usual formula of $468/f$ MHz. However, except perhaps for the 40 meter dipole, some pruning may be required after the multiple-dipole antenna is raised into operating position and tested. The lengths

shown in Table 1 are my final lengths, but yours may be slightly different, depending on height above ground, surrounding objects, and other factors. I was fully expecting that the final lengths of the three higher frequency dipoles would be shorter than what was determined from the formula due to the dielectric of the window line. The dimensions for 30 and 17 meters were somewhat shorter than formula length, but the 12 meter length was just about the same. Different spacing between the two sections of window lines would more than likely affect the final lengths of the various dipoles. I was surprised to find that all of the lengths of the higher frequency dipoles of the all-wire multiple-dipole antenna were somewhat longer than the calculated value.

If you find that some pruning of dipole lengths is necessary, work from the lowest frequency to the highest, since lengthening or shortening the lower frequency elements has more of an effect on the higher frequency elements than vice-versa. Lengthening or shortening the dipoles is easy to do, but remember to change each

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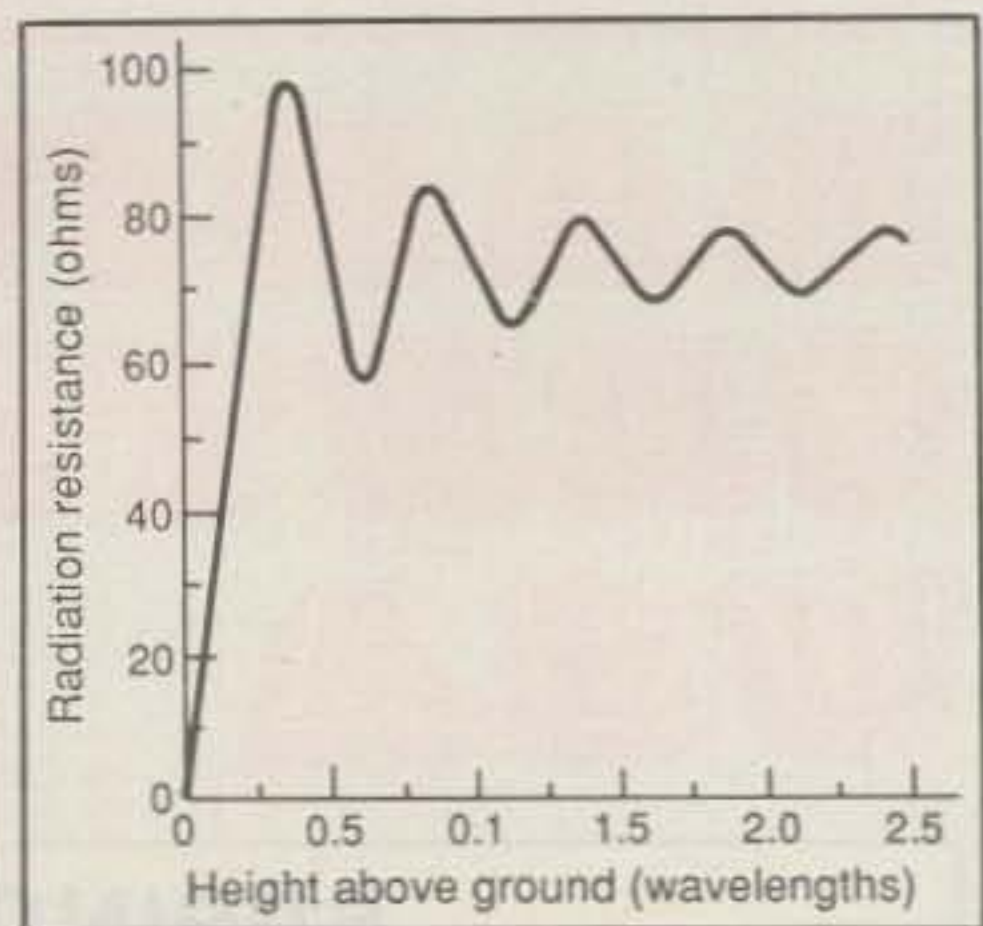
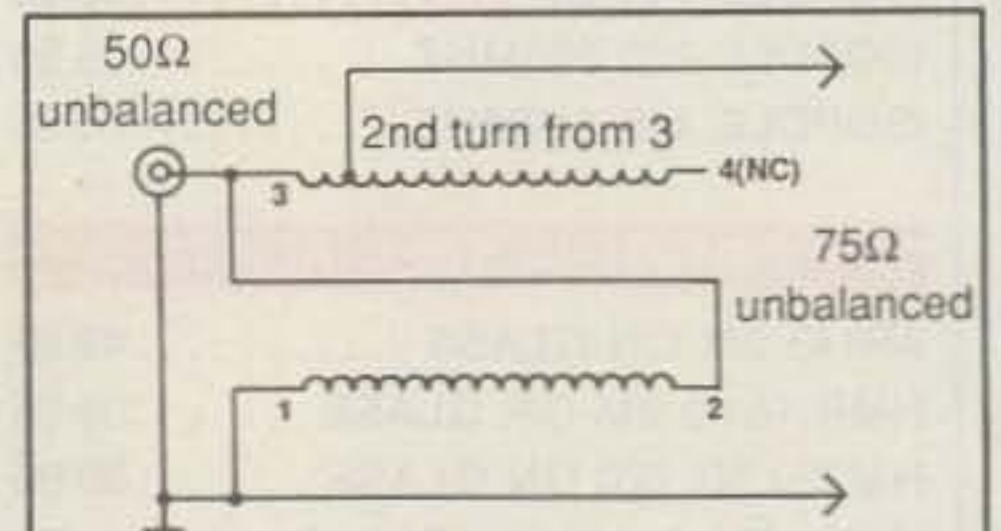
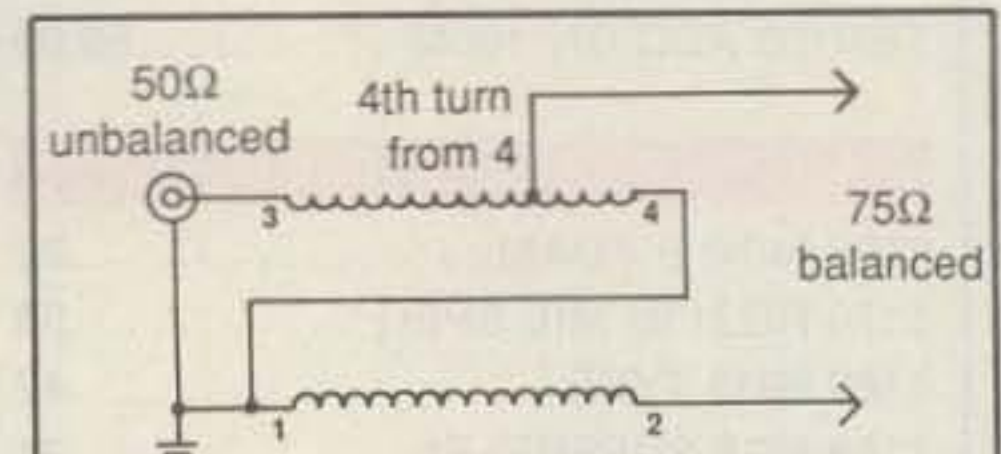


Fig. 3—Plot of radiation resistance of a half-wave dipole at various heights above ground.



NOTE:
 15 bifilar turns, 14AWG, enameled wire, spread out 2", wound on 1/2" dia ferrite rod, u125 4" long rod.

Fig. 4—A 1:1.5 unbalanced-to-unbalanced (unun) transformer.



NOTE:
 14 bifilar turns, 14AWG, teflon coated wire close wound on 1/2" dia ferrite rod, u125 4" long rod.

Fig. 5—A 1:1.5 balun.

half of the dipole by the same amount. Fig. 3 shows what variations in radiation resistance you can expect when using a half-wave horizontal antenna at different heights above perfectly conducting ground. It might appear that with four dipoles all connected together at the center, a big matching problem could be encountered. However, such was not the case in my installation. My system is 45 feet above the ground level with a house full of wiring and plumbing underneath it. I found that the feedpoint impedance ran between 50 and 85 ohms for the four bands of operation. You could use a 75 ohm coax feed line or 70 ohm twin lead to feed the

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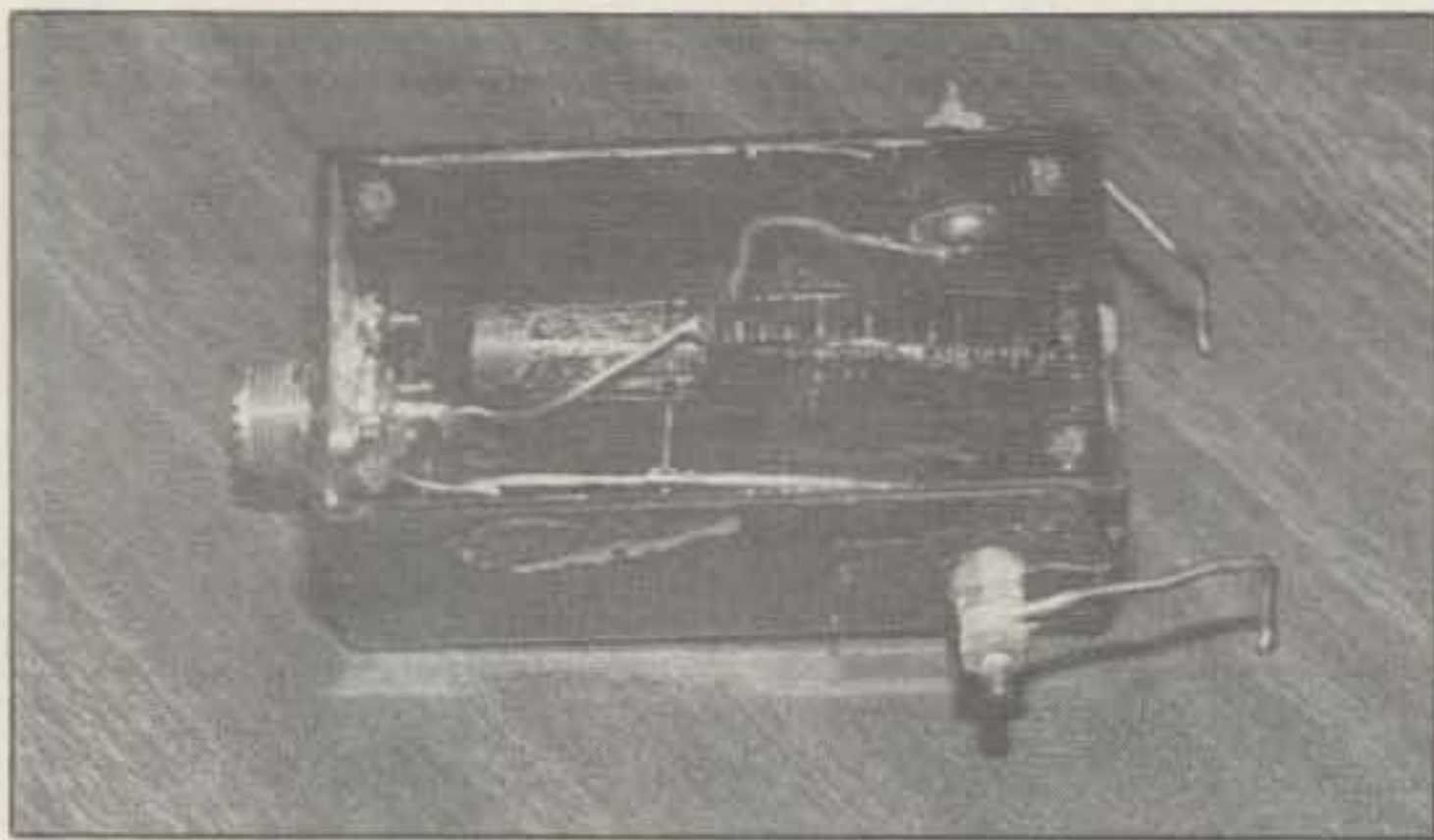


Photo 5—The unbalanced 50 ohm to unbalanced 75 ohm matching transformer.

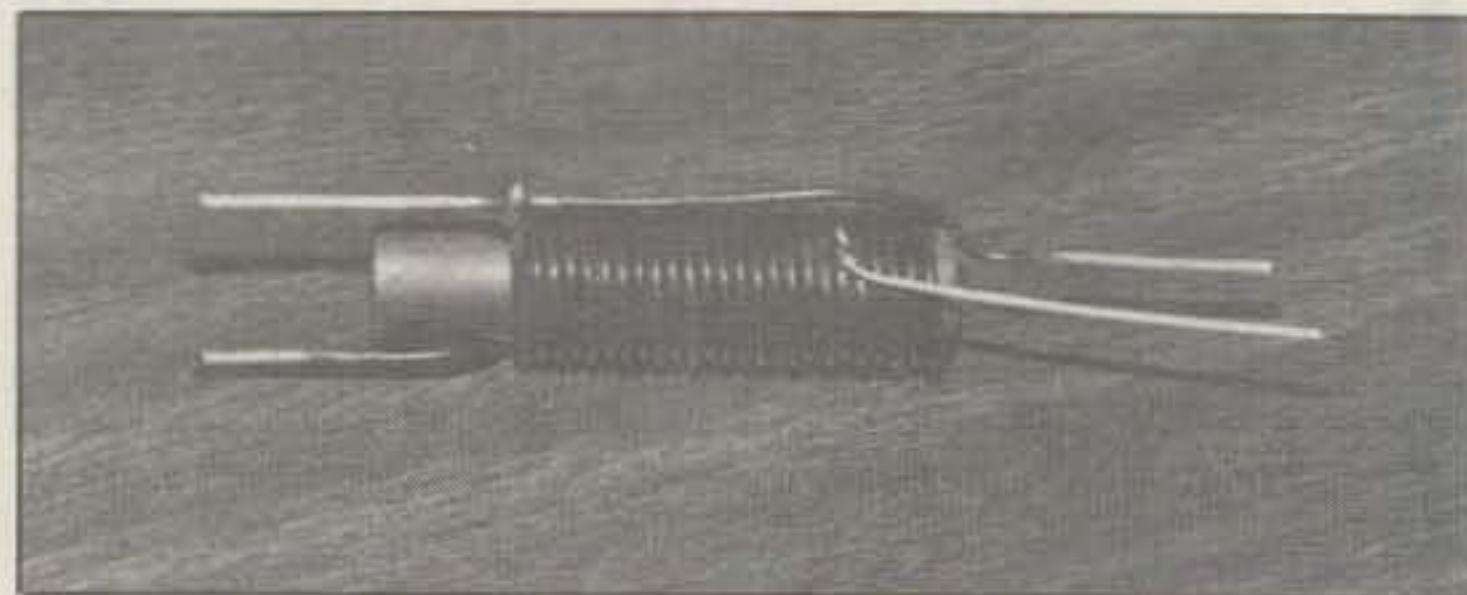


Photo 6—The unbalanced 50 ohm to balanced 75 ohm matching transformer.

antenna, but if you do not want different varieties of feedlines with different impedances around the shack, then use a simple 1:1.5 balun and 50 ohm coax and that should work just fine.

To determine the feedpoint impedances of the multiple-dipole antenna at the various frequencies shown in Table I, I used a modified SWR bridge remotely controlled and connected at the feedpoint of the multiple-dipole.³ By using this arrangement I was also able to determine the resonant frequency of each dipole without resorting to the use of sections of transmission line as suggested by numerous exper-

imenters. Grid dipping an antenna in mid-air to check resonance can be a problem, and doing it at waist level, near the ground, is a waste of time!

The matching arrangements can be accomplished through the use of either an unbalanced-to-unbalanced transformer or balun as shown in figs. 4 and 5.⁴ Photo 5 shows the transformer of fig. 4, which while looking a bit messy from experimenting, worked well and provided the 1:1.5 transformation covering 7 through 25 MHz. Photo 6 shows the balun of fig. 5 which is currently in use, and hopefully proves that I can wind a neat coil if needed! Photo 7 shows the balun enclosure and the method of connecting the balun to the feedpoint of the multiple-dipole antenna.

While I might be accused of having "low-SWR mania"⁵, I feel that time spent in impedance matching at the feedpoint of the dipoles is well worth it. It means not having to have an antenna tuner in the shack to have to adjust and switch simply because I didn't know how to determine the feedpoint impedance of my antenna or because I was too lazy to do the job.

As constructed, the 40 plus WARC multiple-dipole antenna presents a very desirable load to my transceiver on 40, 30, 17, and 12 meters from one end of the band to the other. It has resulted in my spending more time on the WARC bands, and I hope that it will do the same for you and help to keep these bands populated. As for 40 meters, there aren't too many antennas that can perform much better than a good old dipole considering the price and ease of construction!

Good luck with your 40 plus WARC multiple-dipole!

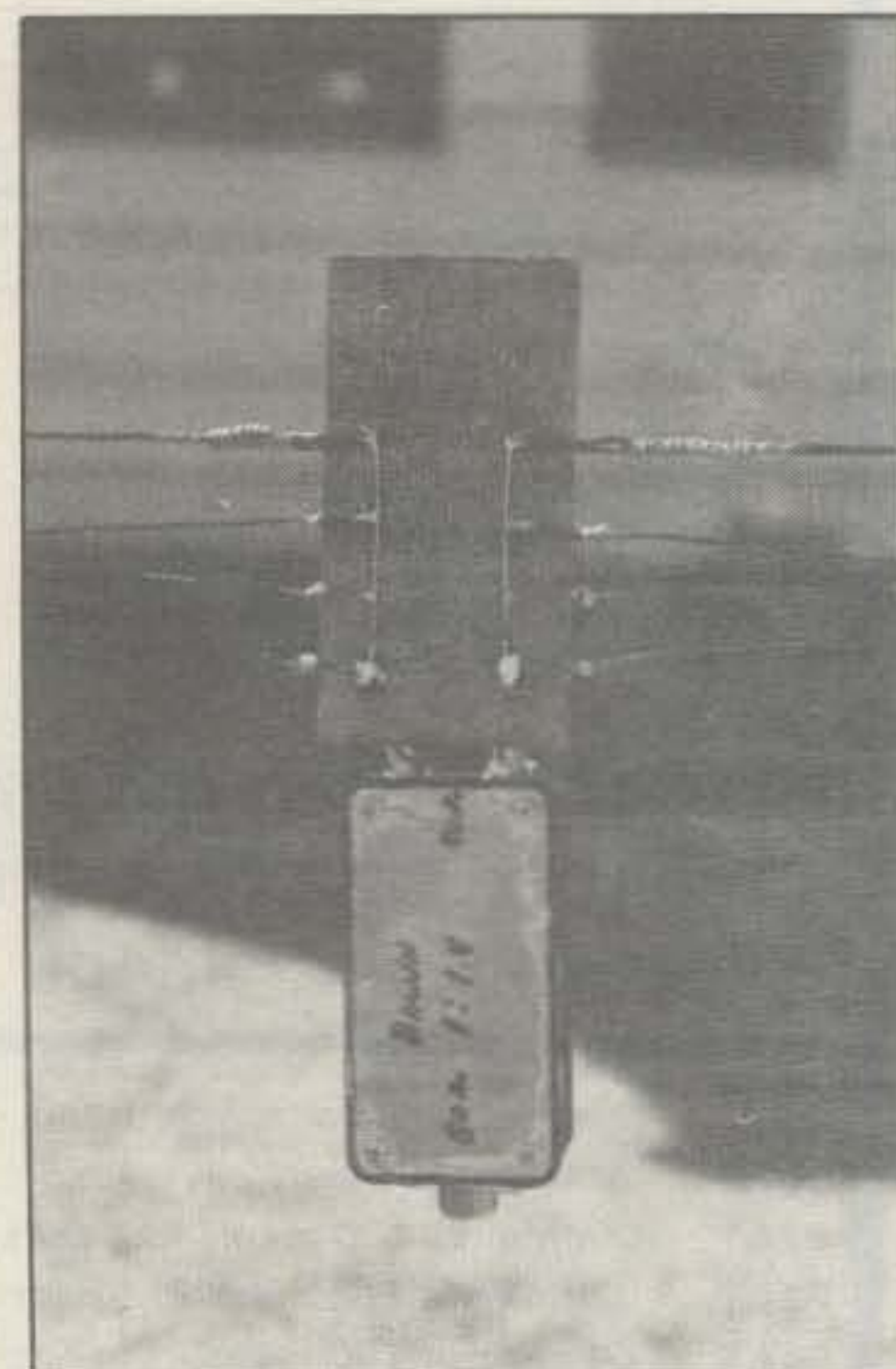



Photo 7—The center insulator for the all-wire version of the 40 plus WARC antenna. This view shows the matching transformer connections. The transformer is housed in a 1 1/8" x 2 1/8" x 4" project box (Radio Shack 270-231).

4. Sevick, Jerry, *Transmission Line Transformers*, ARRL, 1990.

5. Maxwell, M. Walter, *Reflections, Transmission Lines and Antennas*, ARRL, 1990.

Suggested Sources For Material

Wire: Certified Communications, "The Wire," Landrum, South Carolina. CQ51 450 ohm 18 AWG Cu-Clad, Poly-Clad "Window Line." 541-CQ 14 AWG HDS, 7 Strand Hard Drawn Copper. See your local motor rewinding shop for 16 AWG copper wire.

Miscellaneous: Yours or someone else's "Junque Box." 

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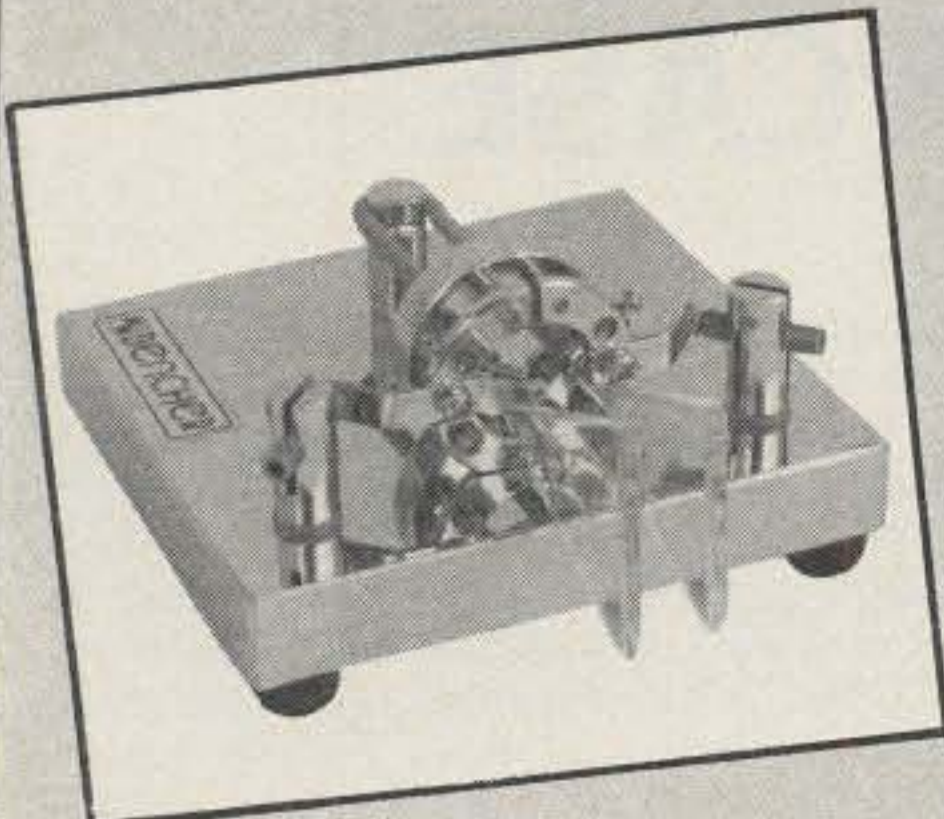
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Footnotes

1. Genaille, Richard A., "The Coax Line Stretcher," *CQ*, April 1989.

2. *The ARRL Antenna Book*, Tenth Edition, ARRL.

3. Genaille, Richard A., "A Remotely Controlled Bridge For Impedance Matching," *CQ*, August 1991.



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keying up. The built-in switching power supply has a rated power consumption of approximately 2.4 kVA at 2 kW DC input—a power factor of close to 100%.

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H144-5	2m	9.10	1.05	1.39	\$ 69
H144-15	2m	13.73	1.02	1.68	\$145
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HF & VHF Remote Base & Repeater *Autopatch *Rotor Control
*Voice Meters*Paging*Logging*Polite ID's*Voice Packet B.B.S.



Model CS64S
REV 8...\$379.95

Includes: C64 interface, disk, cables, Manual Add \$5.00 S/H U.S.A. CA. address add 7.75% *Ask for free catalog!

Here are just a few of the Ultra's advanced Features:

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- *Disk & Printer logging of telephone numbers dialed, usage time, functions *18 Rotating Polite ID's* 16 External relay controls *CTCSS Tone Paging* CW Practice with voice *Security mode, T.tone mute* Voice announced user call sign when logging on *Voltage proportional courtesy beep indicates signal strength* 18 rotating Polite ID tails* Safety timers & overrides **Ultra Link* provides T. tone control from remote audio monitored *User programmed multi-tone courtesy beeps each mode* Modem or Packet control* 9 T.Tone Macros store 26 digit command strings *2 Talking Meter inputs * Packet* Modem input* Simplex Repeater Mode Optional with DVR * WX1 & PK8 speaks temperature and humidity with polite ID *
- Autopatch & Rev *Store 1000 (18 digit) tel. #'s *Quick dial & quick answer * Directed & general page *50 tel #'s restricted patch *Telephone control input* Regenerated touchtones *Autopatch auto off, detects calling party hangup*Pulse or touchtone dial *Call waiting & last number redial*
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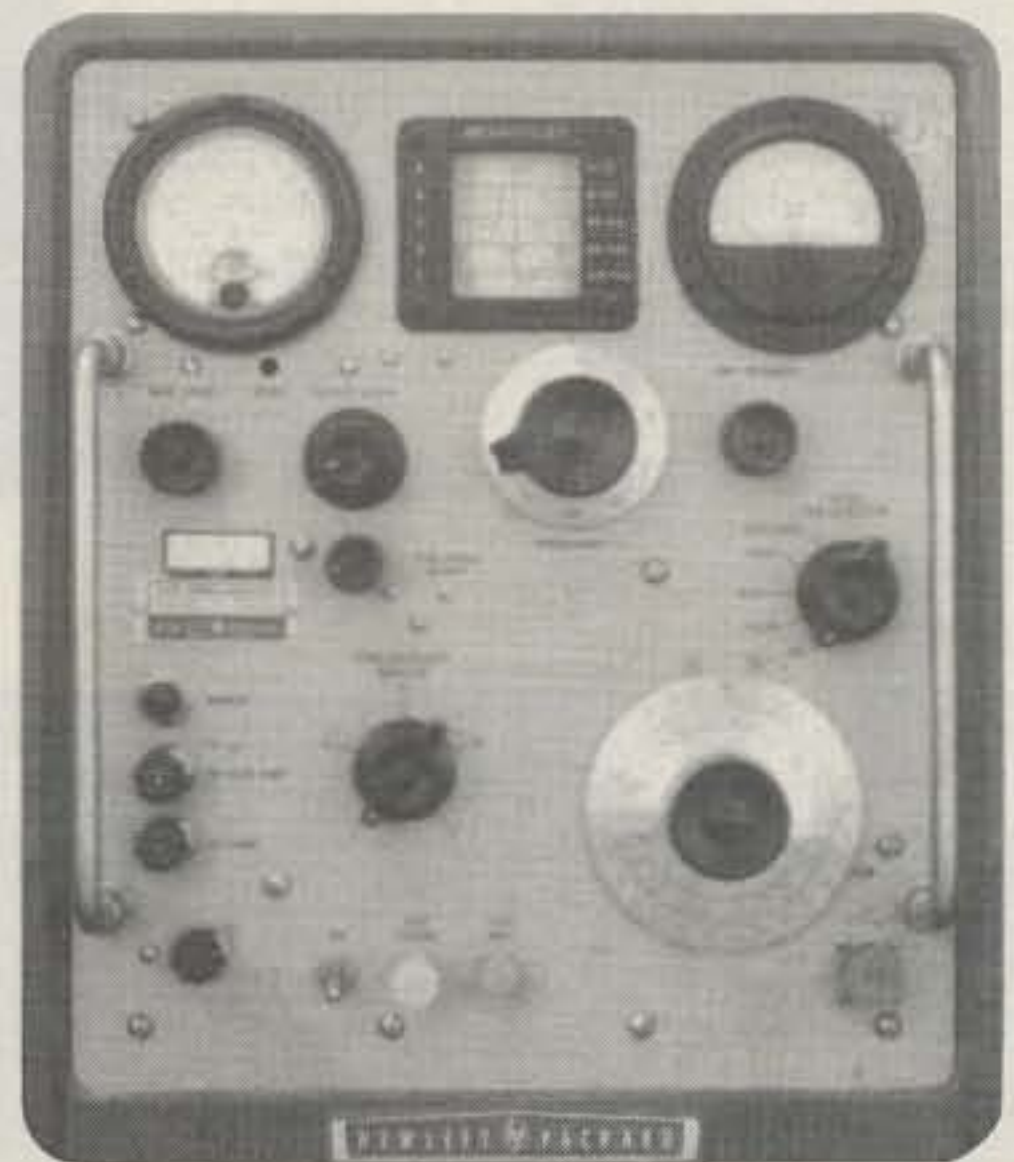
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Specifications:

- Frequency Range: 10 to 480 MHz in 5 bands
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- Voltage Accuracy: ± 1 dB full range into 50 Ω load
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- External Modulation: 0 to 95% at output levels of 0 dBm and below at modulation frequencies of 20 Hz to 20 kHz
- Incidental FM: Less than 1 kHz at 50% AM for RF output frequencies above 100 MHz; Less than 0.001% at 30% AM for RF output below 100 MHz
- Leakage: Negligible-permits sensitivity measurements to at least 0.1 μV
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- Weight: Cabinet 73 lbs

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HP 608C



Tucker Bargain Price
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A built-in 140 dB output attenuator allows metered output set levels from +23 to -120 dBm or 0.1 μV to 3 V into 50 Ω. Front panel metering of output modulation is also provided. A highly refined internal 400 Hz or 1 kHz amplitude modulation system provides AM up to 90% with low distortion and incidental FM. This feature allows precision distortion checks of receivers from antenna to output. The 606A will even accept external modulation with complex waveforms, square waves or DC voltages for the test and evaluation of filters, networks, amplifiers, and receivers.

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Tucker Bargain Price
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**MILITARY HP AN/USM-338
Ruggedized Oscilloscope**

(Same as HP-1707B Opt 300)

The USM-338 oscilloscope is a dual trace delayed sweep model with 75 MHz bandwidth. It provides laboratory quality measurements under the most adverse conditions. It has been designed to meet several of the military's rigid environmental tests such as MIL-STD-108. You may even operate this unit in damp and spray areas since all switches and knobs are sealed. The unit is encased in a sealed case that is designed to withstand 14 drops from 30 inches onto a concrete floor and then be **submerged in 3 feet of water** with no violation of its water tight integrity.

Operator convenience: Front panel controls are grouped according to function for fast operation. A large 6x10 cm CRT provides easy viewing and a sharp trace allows high resolution for accurate measurements. Main and delayed sweep speed are selected by separate controls.

Performance: Bandwidth is specified over the full 6 divisions of vertical display and the most sensitive deflection factors are usable over the entire bandwidth. Sweep linearity is specified over the full 10 divisions of horizontal display. **The majority of the internal components are designed to operate at only 10 to 20% of their maximum rated power which assures a long reliable life.**

Power Sources: AC and DC line. Operating flexibility starts with the low voltage supply which allows operation from AC or DC line. In either 115 V or 230 VAC operation, line frequency can vary from 48 to 440 Hz and the voltage can vary 20%. DC operation can vary from 11.5 VDC to 38 VDC. **You may even add internal batteries for up to 4 hours operation.**

Specifications:

Vertical Section:

- The military specified that this unit only have 50 MHz BW, but it normally meets the specs of the HP 1707B which is a 75 MHz scope.
- Bandwidth DC to 50 MHz with or without probe
- Risetime < 7 nsec
- Ranges 5 mV/div. to 20 V/div. in 12 ranges in a 1, 2, 5 sequence
- Polarity Norm or Invt selectable on Chan B
- Max. Input 350 V
- Channel A Output 1 div. displayed = 50 mV output

Time Base:

- Range 0.1 μ sec/div. to 2 sec/div. in 23 ranges in a 1, 2, 5 sequence
- Magnifier Expands all sweeps by 10
- Sweep modes Automatic, single, line, normal
- Triggering \pm slope, internal and external, AC or DC
- Delayed Sweep 0.1 μ sec/div. to 0.2 sec/div. in 20 ranges with a 1, 2, 5 sequence
- All other features are same as main time base

General:

- CRT 15 kV post accelerated P31 phosphor
- Graticule 6x10 cm
- Calibrator 1 kHz at 1 v p-p
- Weight 27 pounds
- Dimensions 17-1/4" L x 9-1/8" H x 13" W



Military Paid \$3360
Tucker Bargain Price
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CQ World-Wide DX Contest All-Time Phone Records

BY FREDERICK CAPOSSELA, K6SSS

Number groups after calls are: year of operation, total score, contacts, zones, and countries. All-band and Multi-Operator records include a band-by-band breakdown of the world leader in each category.

Single Operator/Single Band WORLD RECORD HOLDERS

1.8	UG7GWO('87)	255,852	1,327	12	57
3.5	P40R('87)	552,786	1,628	23	91
	(Opr. K4UEE)				
7.0	ZF2JR('90)	870,480	2,253	33	123
	(Opr. N6RJ)				
14	VP2KAA('81)	2,011,185	4,186	37	150
21	P40R('90)	2,719,336	4,972	37	147
28	ZV5A('91)	2,984,166	5,154	37	156

AFRICA

1.8	IH9/IV3PRK('89)	81,344	447	9	53
3.5	CT3BZ('79)	235,113	772	22	87
7.0	EA8RCT('87)	859,362	1,959	32	115
	(Opr. OH2MM)				
14	EA9LZ('90)	1,244,340	2,685	32	123
21	EL2CX('89)	2,242,968	4,445	34	135
28	ZD8Z('91)	2,341,866	4,521	33	141
	(Opr. N6TJ)				

ASIA

1.8	UG7GWO('87)	255,852	1,327	12	57
3.5	UW9AF('83)	222,192	554	19	53
7.0	JA8IXM('90)	469,012	1,304	38	110
14	RF0FWW('87)	1,447,128	2,894	40	147
	(Opr. UF6FFF)				
21	7L1GVE('91)	1,210,140	2,365	39	141
28	JH1AJT('88)	1,421,070	2,409	38	163

EUROPE

1.8	LZ2CJ('84)	107,818	1,319	13	61
3.5	HA8IE('90)	361,343	1,455	35	116
7.0	IK5BAF('90)	687,040	1,809	37	123
14	TF3CW('88)	1,791,840	4,107	34	126
21	CQ4A('90)	1,757,780	3,912	38	141
	(Opr. CT1BOP)				
28	YU3ZV('88)	1,541,603	3,219	39	134

NORTH AMERICA

1.8	VE3BMV('86)	52,240	662	14	26
3.5	VE3BMV('85)	383,040	1,629	25	89
7.0	ZF2JR('90)	870,480	2,253	33	123
	(Opr. N6RJ)				
14	VP2KAA('81)	2,011,185	4,186	37	150
21	FM6A('91)	1,934,659	4,535	36	137
	(Opr. F6HMQ)				
28	VP2ET('88)	2,423,880	5,137	37	143
	(Opr. K5RX)				

OCEANIA

1.8	KH6CC('85)	45,984	484	13	19
3.5	T32AF('85)	222,768	1,064	23	49
7.0	T32AF('84)	677,844	2,045	34	80
	(Opr. KH6UR)				
14	ZM1BIL('83)	1,334,232	2,635	38	136
21	AH0AB('82)	1,923,840	4,509	36	108
	(Opr. JA3DOC)				
28	KD7P/NH2('88)	2,309,304	4,885	38	123

SOUTH AMERICA

1.8	YV2IF('84)	18,291	172	14	25
3.5	P40R('87)	552,786	1,628	23	91
	(Opr. K4UEE)				
7.0	9Y4VU('84)	700,488	1,718	28	110
14	P40SS('87)	1,792,056	3,570	35	133
	(Opr. K2SS)				
21	P40R('90)	2,719,336	4,972	37	147
	(Opr. K4UEE)				
28	ZV5A('91)	2,984,166	5,154	37	156

Single Operator/All Band

AF	CT3BH('90)	14,892,102	7,177	166	531
	(Opr. OH2BH)				
AS	EX6F('84)	6,362,000	4,648	113	387
EU	ZB2X('91)	7,128,646	5,056	137	510
NA	FG5R('90)	12,192,368	7,006	154	510
	(Opr. W7EJ)				
O	YJ1A('90)	9,516,731	6,429	160	381
	(Opr. OH1RY)				
SA	9Y4TT('88)	12,340,132	7,150	151	436
	(Opr. NQ4I)				
QRP	PJ2FR('87)	3,171,166	3,212	100	234
	(Opr. K7SS)				
Asst.	YT3AA('89)	5,756,932	3,580	154	482

Multi-Operator/Single Xmtr.

AF	EA8AGD('88)	17,172,672	8,203	157	547
AS	YM5KA('90)	15,056,664	7,609	164	548
EU	IQ4A('90)	17,255,700	7,253	183	717
NA	8P9Z('91)	15,929,221	8,712	149	582
O	KH2S('91)	11,095,392	7,086	145	387
SA	PJ1B('91)	21,214,809	9,418	162	596

Multi-Operator/Multi-Xmtr.

AF	EA8CR('77)	21,351,898	10,290	153	544
AS	EW6V('82)	18,746,136	10,100	142	544
EU	LX7A('89)	26,578,978	14,947	175	751
NA	VP2KC('79)	37,770,012	17,767	175	677
O	KH0AM('90)	35,730,600	16,309	179	565
SA	PJ1B('90)	57,610,400	19,655	189	803

WORLD RECORD

Station	Band	QSOs	Zones	Countries
CT3BH (1990)	1.8	136	11	43
	3.5	371	20	64
	7.0	686	29	82
	14.0	1,877	38	115
	21.0	2,212	35	118
	28.0	1,895	33	109
Total		7,177	166	531

WORLD RECORD

Station	Band	QSOs	Zones	Countries
PJ1B (1991)	1.8	20	8	18
	3.5	144	15	50
	7.0	740	27	92
	14.0	2,020	39	149
	21.0	2,796	37	148
21,214,809	28.0	3,698	36	139
	Total		9,418	162

WORLD RECORD

Station	Band	QSOs	Zones	Countries
PJ1B (1990)	1.8	531	19	50
	3.5	1,335	24	99
	7.0	2,104	31	117
	14.0	4,860	38	179
	21.0	5,395	38	176
57,610,400	28.0	5,430	39	182
	Total		19,655	189

CQ World-Wide DX Contest All-Time CW Records

Single Operator/Single Band WORLD RECORD HOLDERS

1.8	UG6GAW('90)	164,430	851	15	55
3.5	NP4A('88) (Opr. K1ZM)	808,640	2,243	31	102
7.0	P40J('90) (Opr. WX4G)	1,022,076	2,598	32	100
14	P40V('91) (Opr. N7NG)	1,883,700	3,521	38	142
21	ZW5B('91) (Opr. LU8DQ)	1,864,372	3,525	40	138
28	CX0CW('90) (Opr. CX8BBH)	1,890,607	3,795	39	128

AFRICA

1.8	EA8AK('82)	75,768	385	15	51
3.5	EA8XS('88) (Opr. OH5XT)	516,390	1,649	24	81
7.0	OH7JT/CT9('88)	904,038	2,195	35	103
14	ED9ED('90)	1,444,436	3,063	37	121
21	C56B('91) (Opr. OH6LK)	1,405,728	3,269	33	111
28	ZS6BCR('91)	1,214,499	2,849	34	109

ASIA

1.8	UG6GAW('90)	164,430	851	15	55
3.5	ZC4DX('87) (Opr. 4Z4DX)	430,560	1,318	29	88
7.0	C42A('91) (Opr. YU4OO)	980,490	2,577	33	105
14	4Z8DX('89) (Opr. 4Z4DX)	1,156,148	2,621	38	119
21	4Z4T('91) (Opr. 4Z4UT)	939,900	2,240	36	120
28	4Z5DX('90)	826,759	2,003	39	120

EUROPE

1.8	ON4UN('90)	118,776	936	16	68
3.5	ZB2X('91) (Opr. OH2KI)	435,456	1,989	29	97
7.0	Y42MK('90)	716,976	2,051	36	108
14	OH2BH('90) (Opr. OH6UM)	915,136	2,454	36	122
21	OH6MCW('89)	775,620	2,208	37	102
28	LZ5Z('90) (Opr. LZ1AX)	785,178	1,726	39	142

NORTH AMERICA

1.8	K5UR('85)	47,005	219	25	60
3.5	NP4A('88) (Opr. K1ZM)	808,640	2,243	31	102
7.0	K1ZM('90)	839,520	1,783	34	125
14	VP2KAA('80) (Opr. N4PN)	1,244,782	3,111	37	117
21	V29W('90) (Opr. KD6WW)	1,110,512	2,829	37	115
28	J79DX('89) (Opr. AA5DX)	859,360	2,661	33	98

OCEANIA

1.8	KH6CC('90)	60,352	494	17	24
3.5	VR3AH('76)	178,560	956	24	40
7.0	KH6XX('84)	427,230	1,424	33	68
14	ZL3GQ('91)	1,148,418	2,396	36	126
21	N7DF/NH2('89)	1,205,776	2,977	37	99
28	KD7P/NH2('88)	1,037,608	2,456	38	105

SOUTH AMERICA

1.8	YV3AGT('85)	147,588	591	21	63
3.5	P40R('86) (Opr. K4UEE)	576,725	1,682	25	90
7.0	P40J('90) (Opr. WX4G)	1,022,076	2,598	32	100
14	P40V('91) (Opr. N7NG)	1,883,700	3,521	38	142
21	ZW5B('91) (Opr. LU5DQ)	1,864,372	3,525	40	138
28	CX0CW('90) (Opr. CX8BBH)	1,890,607	3,795	39	128

Single Operator/All Band

AF	EA8EA('91) (Opr. OH2MM)	13,225,295	6,490	171	514
AS	JY8VJ('91) (Opr. DL1VJ)	5,927,480	3,948	124	396
EU	ZB2X('89) (Opr. OH2KI)	5,450,761	4,402	146	429
NA	PJ7A('91) (Opr. K1TO)	8,357,236	5,799	135	421
O	AH3C('90)	6,798,363	4,539	172	335
SA	P40W('91) (Opr. W2GD)	10,586,808	5,742	149	472
QRP	HI8A('91) (Opr. JA5DQH)	3,316,768	3,320	117	325
Asst.	K1DG('89)	5,048,802	2,904	155	438

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	254	14	57
EA8EA	3.5	567	21	64
(1991)	7.0	1,114	30	90
13,225,295	14.0	1,405	37	108
	21.0	1,374	36	100
	28.0	1,776	33	95
	Total	6,490	171	514

Multi-Operator/Single Xmtr.

AF	EA9EA('91)	13,096,080	5,854	170	582
AS	TA5KA('90)	13,915,044	7,201	175	527
EU	LZ9A('89)	9,962,386	5,342	200	626
NA	NP4A('82)	11,648,565	6,881	168	515
O	KC6AA('89)	5,002,664	3,917	136	300
SA	PJ2X('88)	8,948,660	5,257	152	422

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	181	10	49
TA5KA	3.5	962	23	69
(1990)	7.0	2,037	31	84
13,915,044	14.0	1,231	38	96
	21.0	1,518	36	112
	28.0	1,272	37	112
	Total	7,201	175	527

Multi-Operator/Multi-Xmtr.

AF	CN5N('90)	33,659,256	14,179	178	644
AS	EW6V('82)	14,702,688	8,001	159	504
EU	LX7A('89)	20,497,632	12,735	189	705
NA	KP2A('88)	32,325,150	15,198	191	631
O	KH0AM('91)	21,856,979	10,647	176	517
SA	PJ1B('88)	38,415,760	14,921	194	672

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	717	17	65
PJ1B	3.5	1,447	24	83
(1988)	7.0	3,119	37	133
38,415,760	14.0	3,791	40	140
	21.0	2,997	39	134
	28.0	2,850	37	117
	Total	14,921	194	672

CQ World-Wide DX Contest All-Time U.S.A. Records

BY FREDERICK CAPOSSELA, K6SSS

Tabulated below are the record-high scores achieved by U.S. Contesters in the CQ World-Wide DX Contest. Number groups following calls and bands are: year of operation, total score, contacts, zones, and countries.

PHONE				
Single Operator/Single Band				
1.8	WB9HAD('87)	27,181	157	23 54
3.5	K7SS('86)	217,038	828	31 91
7.0	KC7EM('91)	263,048	688	33 98
14	K1OX('85)	1,131,328	2,176	36 140
	(Opr. KC1F)			
21	K3RV/4('88)	1,270,478	2,298	39 148
28	W0ZV('88)	1,145,368	2,158	39 142

Single Operator/All Band				
Station	Band	QSOs	Zones	Countries
	1.8	16	7	10
KC1F	3.5	225	18	58
(1988)	7.0	102	18	58
6,429,808	14.0	968	36	125
	21.0	723	33	102
	28.0	1,527	34	117
	Total	3,561	146	470

QRP				
KR2Q('90)		1,246,974	1,069	106 305
Assisted				
K1ZM/2('90)		4,405,350	2,246	165 518

Multi-Operator/Single Xmtr.				
Station	Band	QSOs	Zones	Countries
	1.8	32	12	30
K1AR	3.5	197	18	76
(1990)	7.0	154	26	95
11,193,606	14.0	1,370	39	167
	21.0	1,167	38	165
	28.0	1,517	37	170
	Total	4,437	170	703

Multi-Operator/Multi-Xmtr.				
Station	Band	QSOs	Zones	Countries
	1.8	80	13	26
N2RM	3.5	531	19	82
(1990)	7.0	466	24	95
18,146,246	14.0	2,216	40	170
	21.0	2,082	39	172
	28.0	1,946	36	171
	Total	7,321	171	716

CW				
Single Operator/Single Band				
1.8	K5UR('85)	47,005	219	25 60
3.5	W1FV('87)	270,692	790	28 90
7.0	K1ZM/2('90)	839,520	1,783	34 125
14	K2EK('89)	903,200	1,902	38 112
21	W7WA('89)	772,146	1,647	39 119
28	K1ZM('89)	732,564	1,447	37 134

Single Operator/All Band				
Station	Band	QSOs	Zones	Countries
	1.8	14	5	9
K3TUP	3.5	61	15	46
(Op. K5ZD)	7.0	622	31	85
(1989)	14.0	759	36	98
5,575,913	21.0	864	35	99
	28.0	894	33	95
	Total	3,214	155	432

QRP				
AA2U('90)		1,039,678	894	112 297
Assisted				
K1DG('89)		5,048,802	2,904	155 438

Multi-Operator/Single Xmtr.				
Station	Band	QSOs	Zones	Countries
	1.8	36	16	33
K1AR	3.5	313	26	75
(1989)	7.0	920	35	100
9,383,459	14.0	1,139	37	128
	21.0	773	39	123
	28.0	920	37	129
	Total	4,101	150	588

Multi-Operator/Multi-Xmtr.				
Station	Band	QSOs	Zones	Countries
	1.8	96	17	51
N2RM	3.5	622	24	88
(1990)	7.0	1,511	34	120
17,282,262	14.0	2,085	39	149
	21.0	1,495	38	130
	28.0	1,209	37	130
	Total	7,018	189	668

Club record: Frankford Radio Club ('90) 352,816,404

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	Fits UG-21 D/U & UG-21 B/UN's	1.50
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UG-21B/9913	N Male for RG-8 with 9913 Pin	5.75
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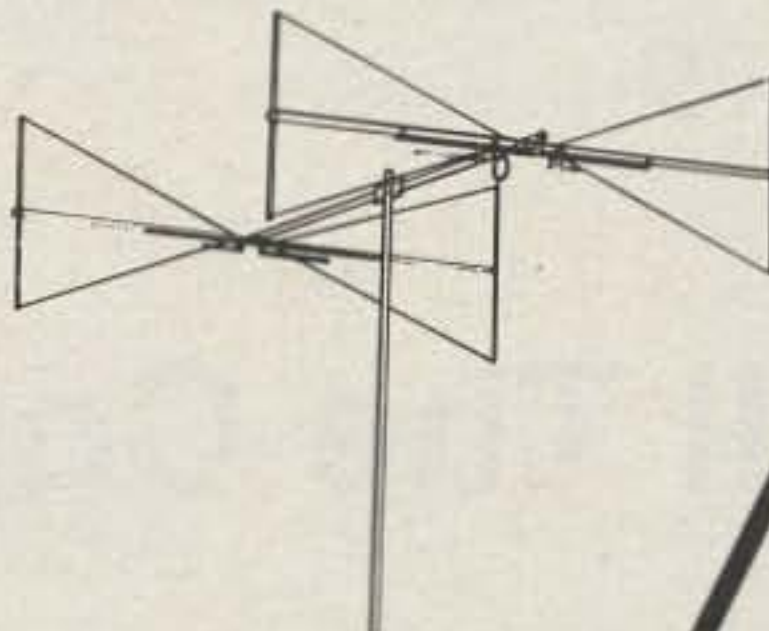
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“Call The Cops!”

BY BILL CROWLEY*, K1NIT

It can happen anytime. You hear the screech of tires against the pavement and the dull, sickening thud as a car collides with another solid object. The car in front of you has just had an accident.

Luckily for everyone involved, you are an amateur radio operator with access to the autopatch. You grab your mic, punch up the nearest police department, and tell them to get out there fast! In the meantime you've done just about everything wrong except to notify someone about the accident.

I work as a Police Communications Op-

*RFD 7 Box 1589, Farmingdale, ME 04344

erator (bureaucratic talk for a “dispatcher”) at Maine State Police Headquarters. During an average snowstorm, we get dozens of calls about accidents, some of which come via one of the area repeater autopatches. While the amateur radio autopatch is head and shoulders above Citizens Band for calling in emergencies, there are still some definite “shoulds” and “should nots” involved. Let's take a minute to look over the situation.

The first thing you should do when you encounter an emergency on the road is to **drive past the problem** and pull over to the side. Too many times a second accident occurs because an amateur radio operator reporting the first accident was try-

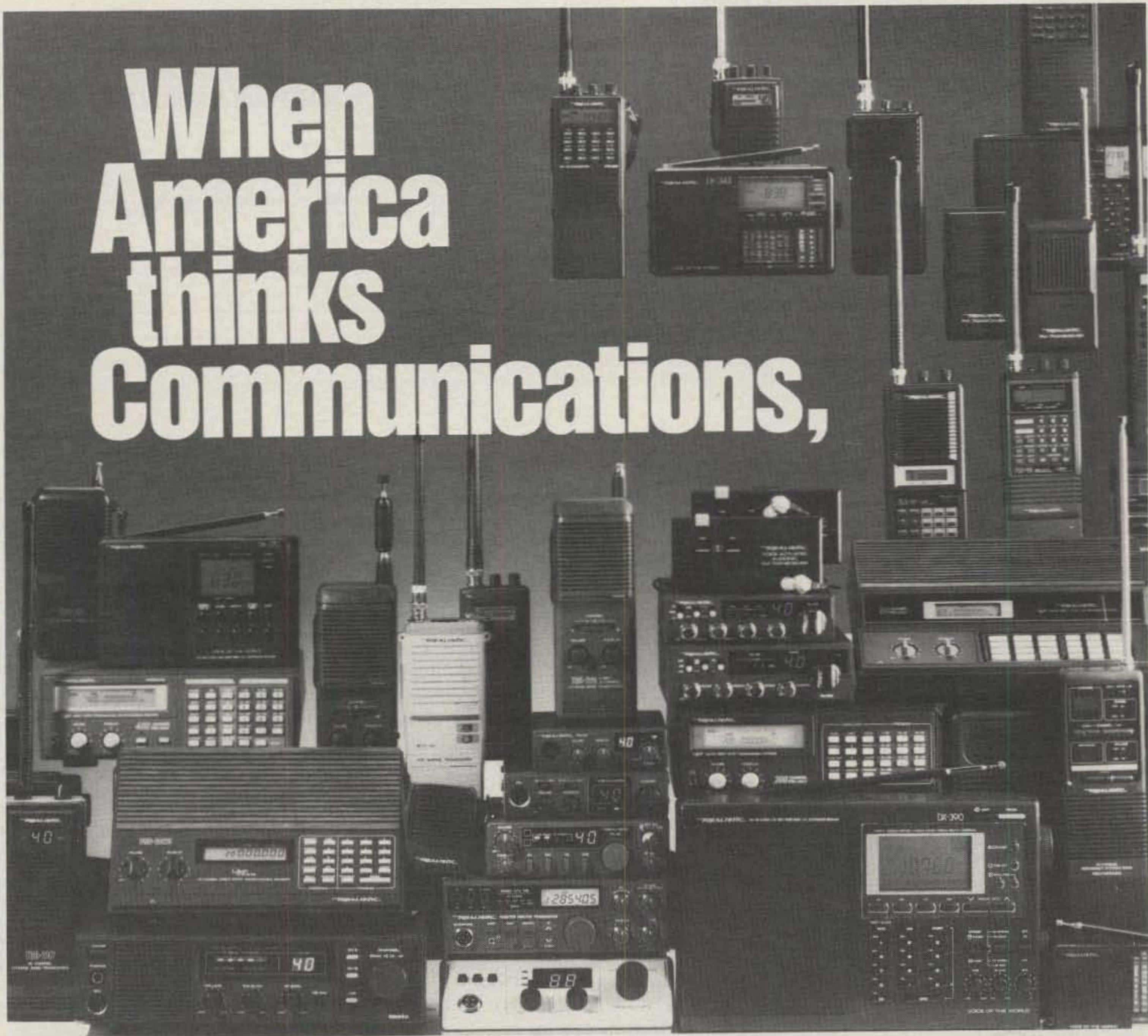
ing to punch up the autopatch and drive at the same time. While you have your eyes off the road to operate the patch, other drivers are rubbernecking to check out the accident scene, and that's how collisions occur in the first place.

It's also important to not stop behind the accident in most situations. If you do, your sudden stop can cause more accidents behind you. On the other hand, if the accident is just over the crest of a hill or the vehicles involved are somehow obscured from the view of oncoming traffic and causing an additional hazard, and you can safely stop before the scene, do it. Turn on your four-way flashers to warn the cars behind you, but keep in mind you are running the risk

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FIRE	POLICE	RED CROSS
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
	COAST GUARD	RESCUE
	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>
		POISON CONTROL CTR.
		<input type="text"/>
		<input type="text"/>
		N.O.A.A. <input type="text"/>
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Fig. 1—Here's a card that you can affix to your car's sun visor or keep in your glove compartment to outline how to report an accident and the phone numbers of whom to call.

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CIRCLE 133 ON READER SERVICE CARD

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MY CALL IS MY NAME IS

YOU ARE INVITED TO ATTEND ONE OF OUR
 MEETINGS ON THE 3RD THURSDAY AT 7:30 P.M.
 AT THE BONANZA RESTAURANT IN AUGUSTA, MAINE

SAFE MOTORING

Fig. 2—This inexpensive business card lets people know who helped them and that the help was via amateur radio. You can use the back to put down other information in the event that you were an actual witness to what happened.

of a rear-end collision when you stop on the highway.

Before you call up the autopatch, take a moment to organize your thoughts. Determine what the situation is. What sort of help is actually needed? Whom are you going to call? What are you going to tell them?

The Augusta Amateur Radio Association (back when it was the Augusta Amateur Radio Emergency Unit, and back when I had a different job!) produced a card to help amateurs get it all together before they dialed up the autopatch (see fig. 1). It's a good idea to have something like this on your sunvisor or in the glove compartment, and with the current generation of form generator programs and laserjet printers, it should be a snap to have one customized for your hometown repeater, complete with the telephone numbers for local emergency services.

In many areas now you don't have to make separate calls for police, fire, and ambulance. To the credit of local governments and telephone companies, all you have to call is 911, and a dispatcher will take care of the rest for you. But if you are in an area that does not yet have 911, calling the ambulance when you need the fire department can add unnecessary delays. When in doubt, call the police, and once you have called them, let them handle the rest of the dispatch. Don't call the sheriff, too, unless the police ask you to, and the same goes for the ambulance, fire department, wrecker, and so forth. If you call one on your own, you may be duplicating services of the ones that the police dispatcher is probably already calling for. At best you are calling the same ones, creating another phone call to answer—and a subsequent delay—for the service needed.

Once again, don't guess at or assume anything. In most situations it's better to say you don't know than to take a stab at it. Remember that you may be dealing with someone's life here, not just at the accident scene, but also with the units responding to your call. Unless you are a trained professional, don't give medical opinions.

If you are not calling 911, bear in mind that the first voice you hear may be a receptionist or telephone switchboard operator, not a dispatcher. It doesn't do any good to tell that person all the details of the accident, because usually you will just have to do it all over again when you are transferred to the dispatch center. When the center answers, simply say, "I would like to report a **property damage** (or **personal injury**, as the case may be) **accident**." The receptionist will then give you to the right person for the rest of the report.

Note the words **property damage**. If no one is hurt, *be sure* you include those words. While any accident is serious, property damage accidents have less priority than any life-threatening situations. While you are trying to call in the accident you've witnessed, someone else may be reporting a more serious one. If you state "property damage" or "minor personal injury," the dispatcher can instantly make a decision as to which call will get handled first. But if you are not sure, don't guess. Just say, "I don't know if anyone is hurt."

Tell the dispatcher you are calling by way of amateur radio, but don't try to explain the autopatch. Most of us who work in emergency services communications have at least a rudimentary knowledge of what an autopatch is and how it works, and your explanation is really unnecessary and could be a waste of time in a critical situation. When you have finished speaking and are ready for the dispatcher to talk, say "over." This serves as a reminder that the conversation is by radio, and makes it clear that you are ready to listen.

Even though you have stated that you are calling by way of amateur radio, the dispatcher may still ask you for a "callback" number; that is, a telephone where you can be called back for further information. Don't get upset if you are asked for this. Just state that you are calling by radio and can't be called back. You can offer your home phone as an alternative.

After you have told the dispatcher you want to report an accident, let him ask the

questions. Don't try to give all the information in one transmission; for one thing, the dispatcher probably can't write that fast, and for another, he's probably working with a form that calls for the information in an order different from what you are telling him. Keep your transmissions short. In addition to everything else, remember that there can be interference on the repeater as well as static on the telephone line (contrary to what some telephone companies would lead you to believe!).

When in doubt, say, "I don't know for sure, but it looks like . . ." and let the dispatcher decide.

Don't try to sound official. While "10-signals" are pretty much the same across the country for some situations, there are wide discrepancies with others. Therefore, just state in plain English what it is you are trying to report. A local amateur called me recently at the dispatch center to report a "DMV." He had me stumped. I couldn't figure out why he wanted to report the Department of Motor Vehicles, and he couldn't understand why I wasn't ready to take the information on a disabled motor vehicle.

If you can, stay at the scene until someone in authority arrives. Situations can change at a moment's notice. A seemingly uninjured person can discover they are indeed hurt; another car can collide with the original accident; a vehicle can catch fire. All these things need to be reported to the dispatch center, but if you are on your way down the road, the people at the scene will have to hope that another amateur—or more likely, a CBer or someone with a cellular phone—comes along.

While you are waiting for the emergency services to arrive, stay in your car unless you are actually contributing to the rescue effort. In most states, for example, it is illegal to be a pedestrian on an interstate highway, and when you are standing around at an accident scene doing all the heavy looking-on, you are really just a pedestrian, no matter how well-intentioned you are.

Our local club has a business card for members to hand out after they have assisted someone via the autopatch (see fig. 2). It's a good promotion for the club and amateur radio in general, and in case you are a witness, it gives you something on which to write your name, address, and phone number. Ask the investigating officer to give one to the other parties involved. In these days of competition for radio spectrum, it's good to have the general public associate amateur radio with something positive.

Finally, remember that nothing is too minor to report. If it caught your attention, then there must be a reason. It's better to report something than to shrug it off; next time it could be someone calling in a situation that involves you. When in doubt, call it in; we're always there.



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ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

BY KARL T. THURBER, JR., W8FX

Antenna Update—Part II

This month we continue with more antenna products of interest, plus some software for the amateur radio/computer enthusiast, so let's dive right in.

Livewire Antenna System. This is a novel, centered, halfwave dipole system that features individual pre-cut monoband wire sets. The Livewire is available for 80 through 10 meters and does not require the use of tools. Power-handling capability is 2000 watts RF and SWR is typically lower than 2:1. The system is well suited for limited space applications, where multiple dipoles would not be practical, and for portable use.

The system is designed to provide good half-wave dipole performance without relinquishing the convenience of easy bandswitching. Each wire set is color coded for easy identification and is pre-cut to resonate on that band; switching to another band requires only unscrewing one set and screwing in a different color coded set. For example, if you have a 20 meter antenna up and would like to work on 40 meters, all you need do is drop the antenna, unscrew the 20 meter wire set, screw in the 40 meter wire set, and pull the antenna back up. Changing bands takes about five minutes.

Each Livewire system comes with a special PVC center connector, pre-cut wire set with end insulators installed, and instructions. The antenna flattop is made of No. 12 AWG copper wire with nylon jacket; the 40 and 75 meter wire sets also are available in heavy-duty versions that use No. 10 AWG wire.

Antenna system prices run from \$25 for a 10 meter system to \$70 for a heavy-duty 75/80 meter system; wire sets, additional center connec-

tors, and 900 lb. test Dacron™ rope are available separately. For more information on the Livewire Antenna System, contact Horizon Engineering & Design, P.O. Box 30161, Savannah, GA 31410-0161.

Sinclabs Products. Bob Morton of Sinclabs sent his new 23-page catalog displaying a wide variety of accessories. These include VHF transverters, filters, coaxial power dividers and jumper cables, asynchronous RF transformers, VHF and UHF base and mobile antennas and mounts, lightning protectors, load terminators, and other adjuncts.

Some of the more interesting products in the catalog are the line of VHF/UHF 50-to-75 ohm asynchronous transformers. These are used to convert one coax cable impedance to another impedance, such as when using inexpensive surplus 75 ohm coax from the cable TV market. An example of this application is the use of a 50 ohm transceiver and a 50 ohm antenna connected with 75 ohm coax. In this application, one of the transformers would be required at the antenna and another at the transceiver. Ten different models covering six different frequency ranges are available.

Another unique offering is the 2m/70cm dual-band mobile antenna and diplexer; the combo covers both 144-148 MHz and 440-450 MHz. The diplexer claims to provide 50 dB isolation between the VHF and UHF ports.

For a catalog of the firm's offerings, contact Sinclabs, Inc., 85 Mary St., Aurora, Ontario, Canada L4G 3G9.

Electron Processing Signal Scoops. On several occasions we've noted the many signal enhancement devices and accessories offered by Electron Processing. The firm recently added to its product line with the Signal Scoop mobile receiving antennas. These boast wide

frequency coverage and mount conveniently with suction cups. Three models cover 0.53 to 1200 MHz in various frequency ranges for applications such as AM and SW broadcast listening, FM and TV broadcast reception, and scanner monitoring. All have a 12 inch antenna element and come with 15 feet of coax.

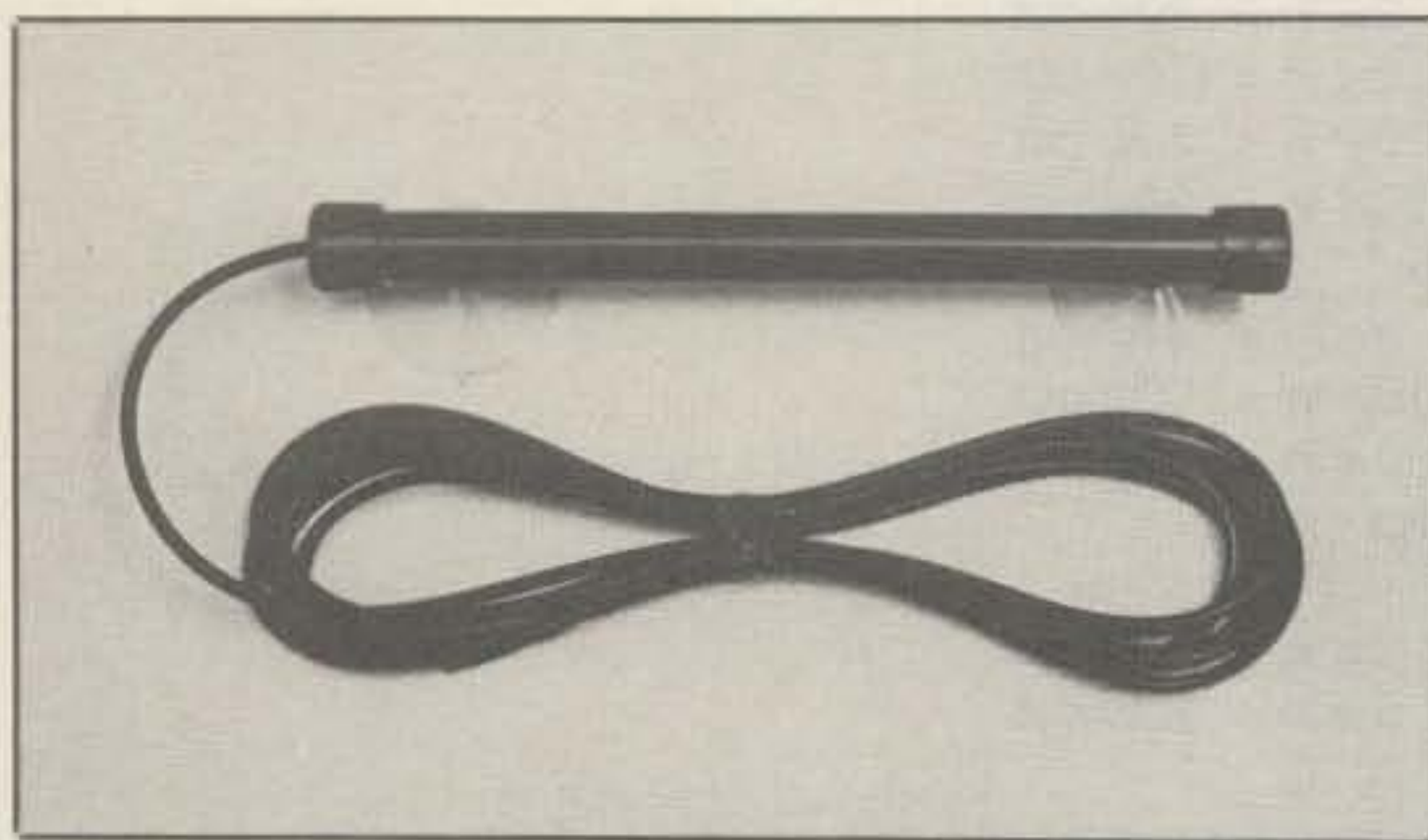
The antennas also are available in three Super Signal Scoop versions that include internal preamplifiers; these boast 15 dB gain and are powered by 10-15 VDC. The amplified models cover the same frequency bands as the unamplified models. A total of six different models (amplified and nonamplified versions covering three discrete frequency ranges) are available.

For more information, contact Electron Processing, Inc., P.O. Box 68, Cedar, MI 49621.

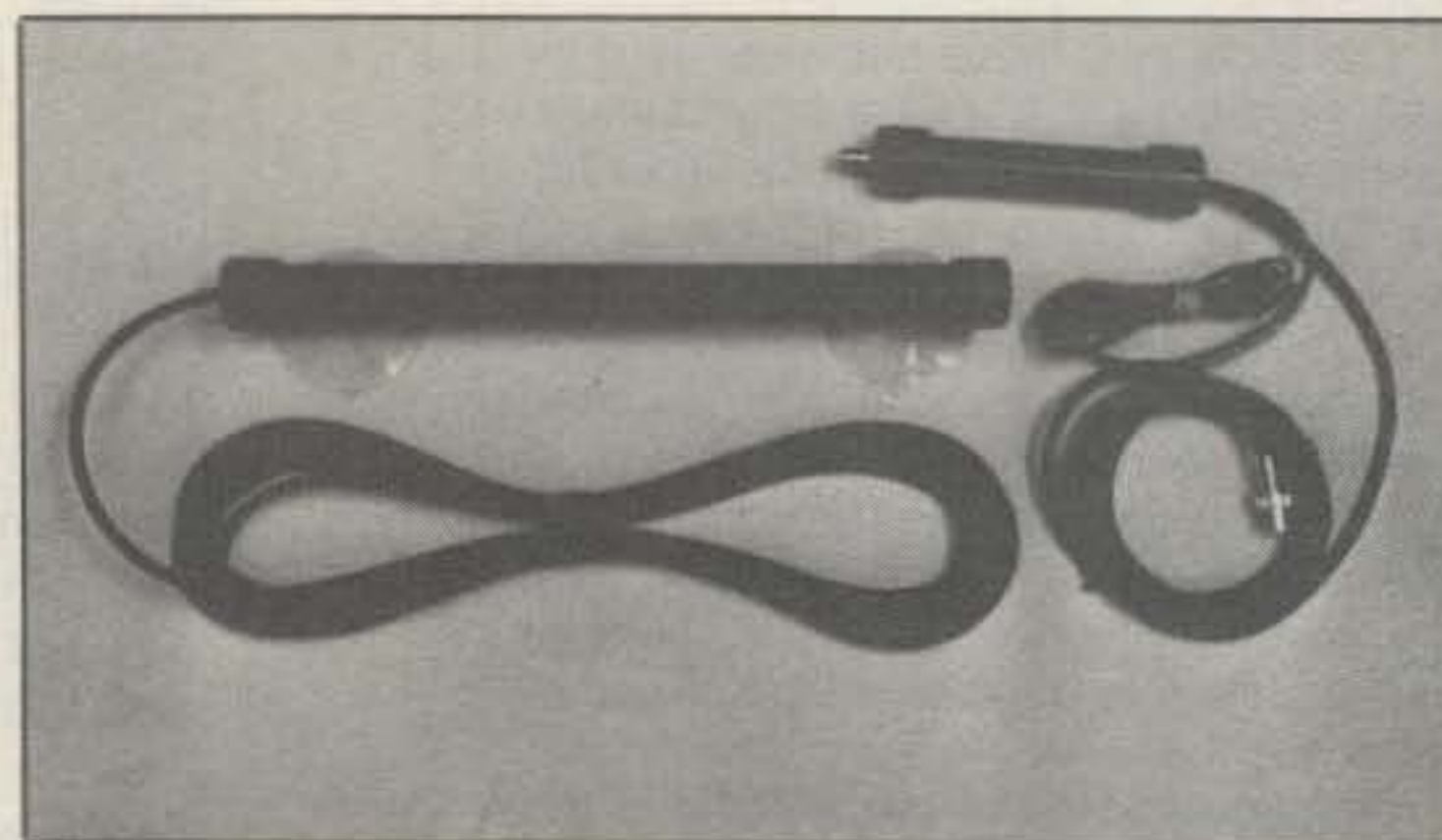
SGC Antennas Update. In the July 1989 issue we profiled the SG-230 Smartuner™. This is SGC's microprocessor-controlled "intelligent" (frequency memorizing) automatic HF antenna coupler designed for marine, aviation, paramilitary, and amateur operation. The coupler automatically tunes any length antenna from 8 to 80 feet over the range 1.8 to 30 MHz. Following that, in the October 1990 column we described the SG-303, a 9 foot vertical HF antenna for 2-30 MHz marine and mobile use; it is designed for use with the SGC-230 Smartuner or similar coupler.

SGC has expanded its product line considerably, to become a leading supplier of a variety of communications products, including commercial and military quality SSB mobile and base-station transceivers. The firm also offers the coax-fed SG-103 broadband dipole antenna. The \$195 antenna is a 90 foot long, center-loaded antenna that covers the range 1.8 to 30 MHz continuously. It boasts a typical SWR of 2:1

317 Poplar Drive, Millbrook, AL 36054



Electron Processing Signal Scoop antennas are mobile receiving antennas that have wide frequency coverage and mount conveniently with suction cups. Three models cover 0.53 to 1200 MHz in various frequency combinations; all have a 12 inch antenna element and come with 15 feet of coax. (Photo via Electron Processing)



The Signal Scoops also are available in three models that include an internal preamplifier; the preamp models boasts 15 dB gain and are powered by 10-15 VDC. The three amplified models cover the same frequency combinations as the unamplified models. (Photo courtesy Electron Processing, Inc.)

SAGANT. ANTENNA

Arrow Line

series of base and mobile antennas are compact and easy to use. You will be amazed how your signal radiates from an Arrow Line antenna. Special radiation characteristics* of the Arrow Line result in copying "Q5" even though the signals may not even move the "S" meter. We have reports from users that after switching from a high gain antenna to the Arrow Line that they experienced DX QSO's that were not possible before.

*Ask for fact sheet "Why the High Gain Antenna May Not be Your Best Choice"

ARROW LINE SERIES

	Model	Freq.	Type	Power	Length	Weight
Base	AL-144F	2M	1/2λ	100W	43.3"	.6 lb.
	AL-432F	70CM	1/2λ	100W	23.6	.55
	AL-432FII	70CM	5/8λ × 2	100W	51.1	.64
	AL-207FH	2M/70CM	1/2λ + 5/8λ × 2	100W	51.1	.77
Mobile	AL-144FL	2M	1/2λ	100W	55.9	1.1
	AL-432FL	70CM	5/8λ × 2	100W	62.9	1.1
	AL-207FL	2M/70CM	1/2λ + 5/8λ × 2	100W	53.1	1.2



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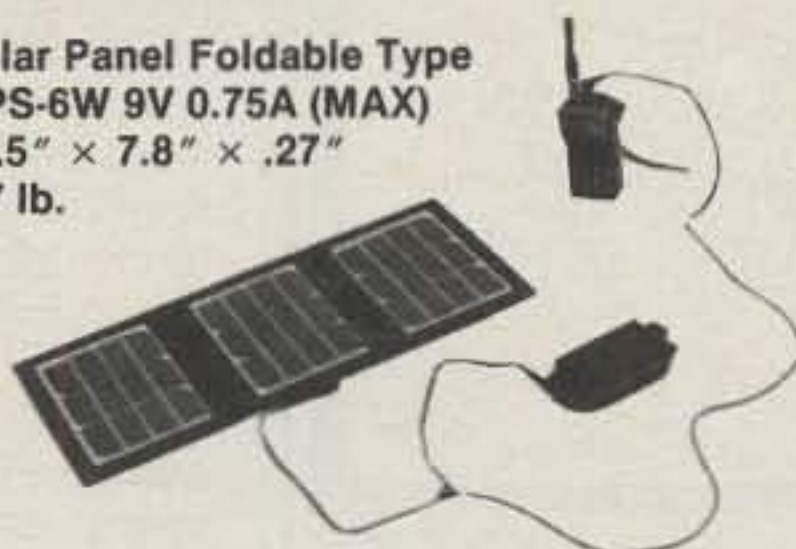


2.8" × 2.4" × 4.7"
excluding the handle
1.2 lb.

Solar Panel Foldable Type
HPS-6W 9V 0.75A (MAX)
17.5" × 7.8" × .27"
1.7 lb.



HPS-55X



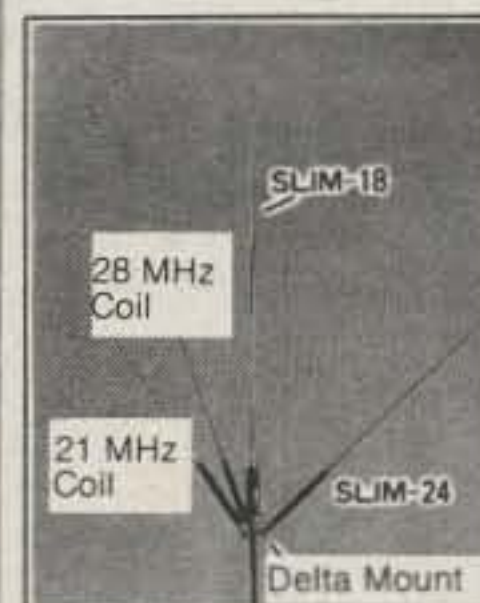
Four Band CM-144W

59" 50/144MHz GLASS ROD

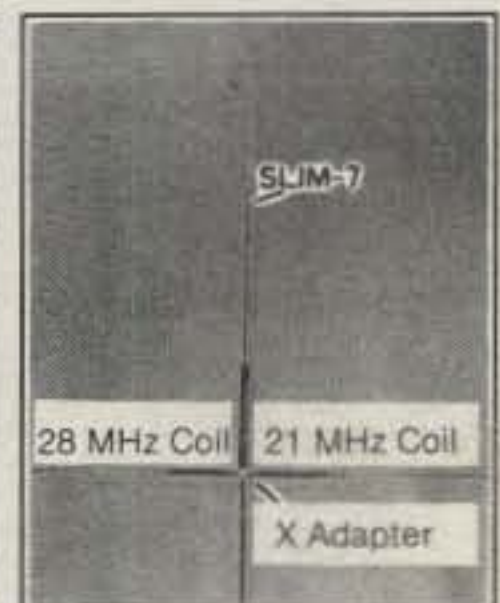
21MHz
28MHz

CM-144W

HF mobile antenna for 21, 28, 50, and 144 MHz is one of our most popular products. Optional coils allow operation on 3.5, 7, 10, 18, and 24 MHz. Power rating is 200W SSB.



Delta mount
7-14-21-28 MHz



Fleming adaptor
7-14-21 MHz

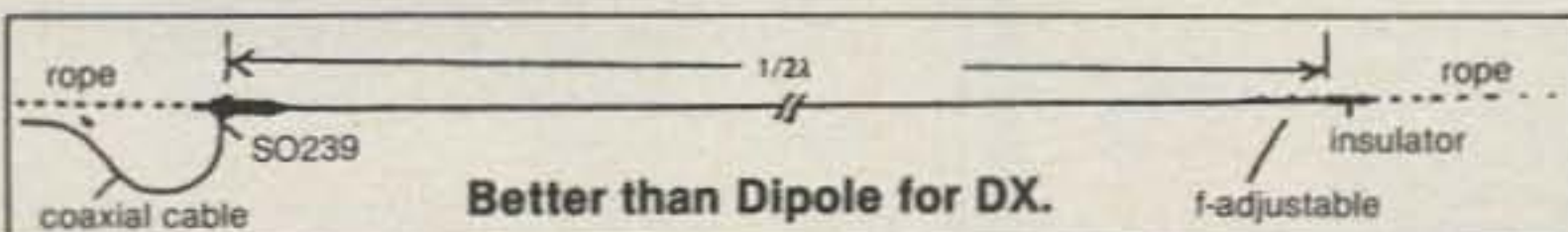
ZEPP WIRE ANTENNAS



Model	Band	Length
ZA-3.5K	3.5 MHz	131'
ZA-7K	7 MHz	65'
ZA-14K	14 MHz	32'
ZA-21K	21 MHz	21'
ZA-50K	50 MHz	9'

(Power 1KW SSB)

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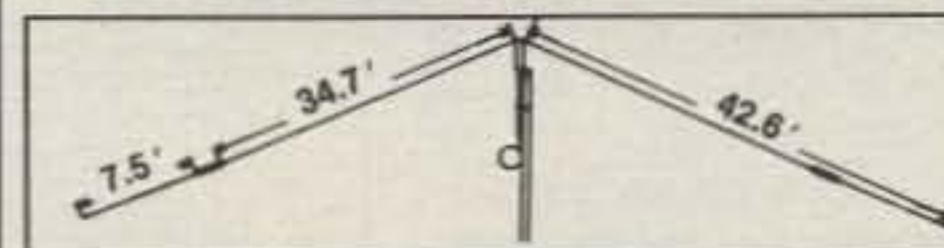


MT-240XK
3.5-7-14-21-28 MHz
Max. Length 72 Ft.

MT-40XEK
3.5-7-21-28
Max. Length 72 Ft.

EL-40XK
3.5-7 MHz
Length 85 Ft.

EL-140XK
7-21 MHz
Length 42 Ft.
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WARNING

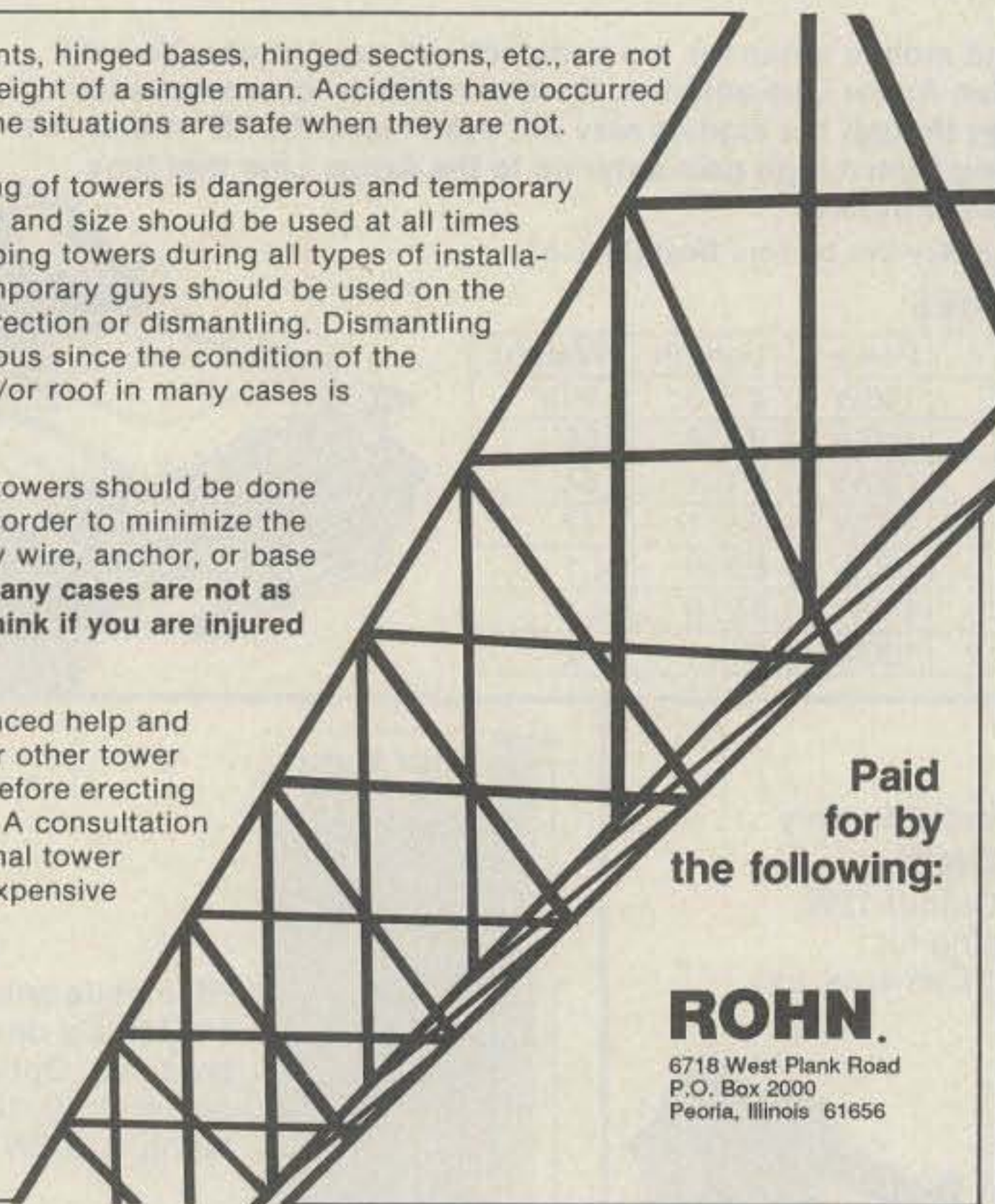
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The dismantling of some towers should be done with the use of a crane in order to minimize the possibility of member, guy wire, anchor, or base failures. **Used towers in many cases are not as inexpensive as you may think if you are injured or killed.**

Get professional, experienced help and read your Rohn catalog or other tower manufacturers' catalogs before erecting or dismantling any tower. A consultation with your local, professional tower erector would be very inexpensive insurance.



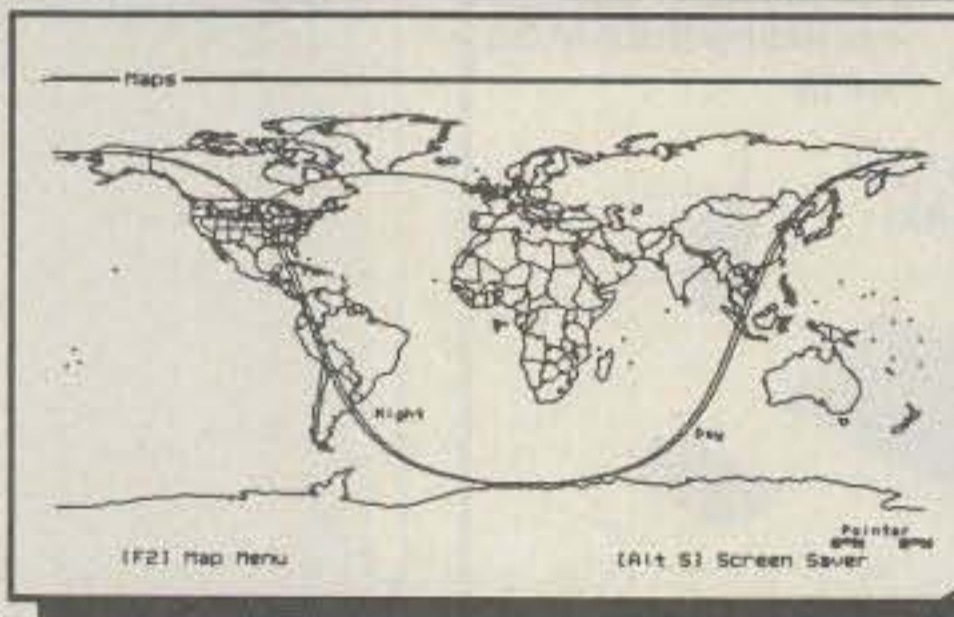
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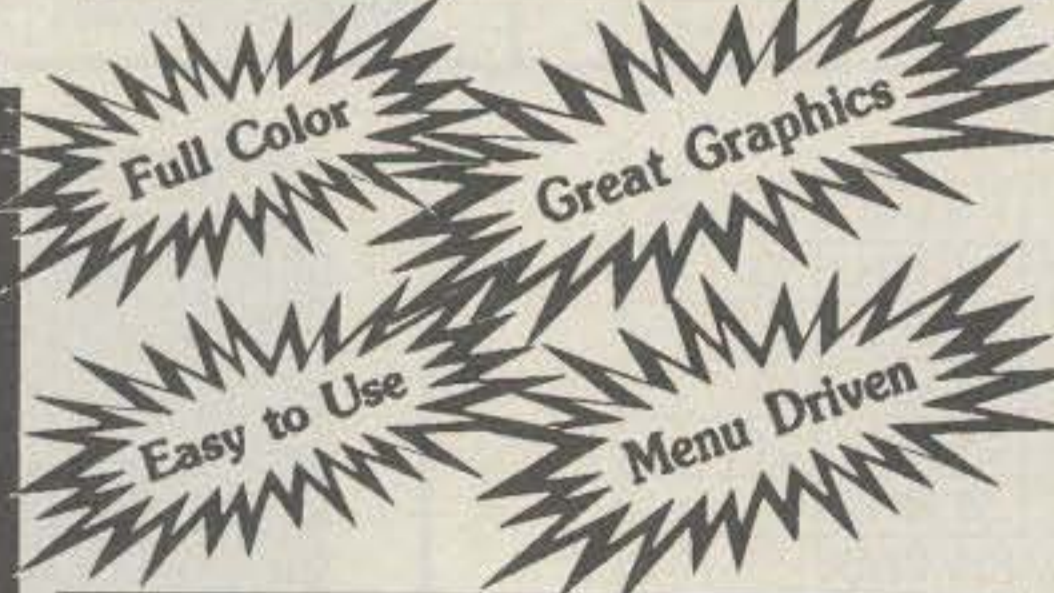
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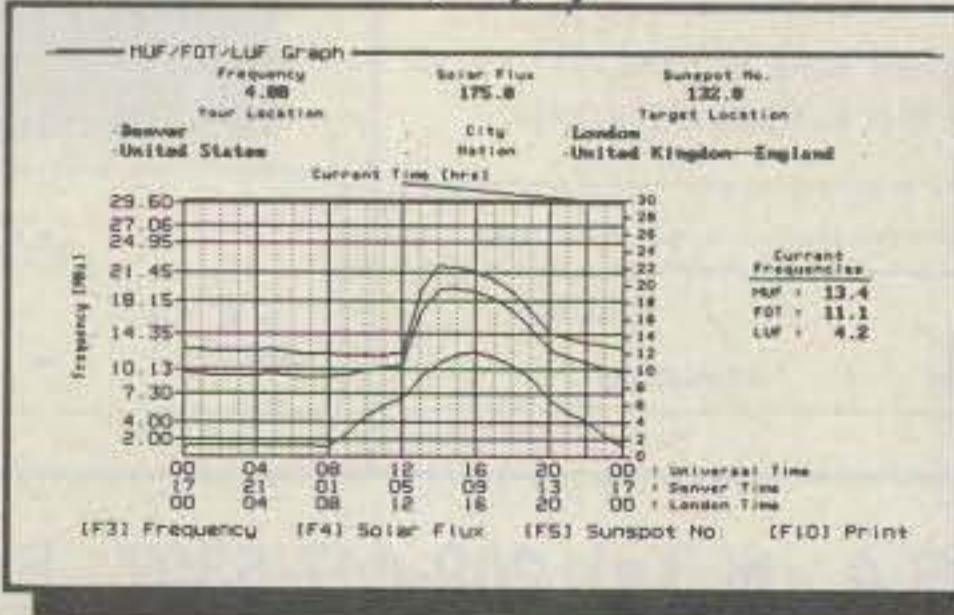
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County Seat & St. Capital					
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United States	39°45'N	105°00'W	Lat./Long.	United Kingdom—England	51°38'N
					000°05'W
Nov/05Jan02/1127	8721/ 25°-200°	1058/151°-231°	Day/Date/Time Sunrise/Sunset/Grayline	Nov/05Jan02/1027	8084/ 37°-217° 1087/143°-223°
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7,570 Kilometers	12.5	11.9	9.4	Nov/05Jan02/1027	
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(3:1 maximum); an antenna tuner or coupler is not required. The antenna handles 150 watts PEP, and a similar design, the SGC-104, has a power-handling capability of 1 KW PEP.

For pricing, specs, and product data sheets, contact SGC, Inc., Box 3526, Bellevue, WA 98009.

Ham-Pro Antennas Update. Peter K. Onnigian, W6QEU, of Ham-Pro, sent us an impressive pile of information on his line of rugged Yagi monobanders for 20 meters through 70 cm. We discussed many of the Ham-Pro antennas in last February's Antennas and Accessories column.

The big news: Ham-Pro has been granted a patent for an improved Yagi feed method, which it calls the "Balanced Double Gamma Feed System." This feed method is said to eliminate the need for stepladder or tower tuning as well as random feedline radiation and signal pickup that distorts the antenna pattern. The feed system, which is claimed to provide an extremely broad SWR bandwidth, is incorporated in the Ham-Pro monobanders.

As Ham-Pro points out in its technical literature describing the new feed system, conventional balanced feed and matching schemes can be traced back to the late 1930s when steel conduit "plumber's delight" designs became popular. These methods of feeding an all-grounded dipole or beam driven element provided a workable direct connection to both sides of the dipole element with balanced line.

Then came coaxial cable and the need for a new feed system; the unbalanced "gamma match" was introduced shortly after World War II. It was used to feed one side of the driven element with coax and was popularized by Washburn in the September 1949 QST. The popular and easy-to-adjust gamma match and its variations have served their purpose well for more than 40 years, but have drawbacks. These include characteristically narrow VSWR bandwidth, random signal radiation that can fill in desired pattern nulls, and the potential for RF current to flow on the outside of the coax. The new system addresses these problems.

The Balanced Double Gamma Feed System, patent No. 5,068,672, applies power to both sides of a grounded driven element through a non-frequency sensitive balun, which is part of a new feed loop. The loop functions as a so-called inherent "infinity balun" in series with the antenna's driven element. Its reactance is opposite that of the dipole; this results in more than twice the usual VSWR bandwidth found in conventional feeds.

The newly patented feed method is claimed to have other advantages not found in gamma, Tee, balun transformer, hairpin, or delta matches. Because the new feed system is balanced with respect to both the element and ground, there is no significant transmission line radiation. This helps reduce harmonic radiation and RFI. The wide VSWR bandwidth characteristic of the Balanced Double Gamma allows Ham-Pro to factory tune, test, weatherproof, and seal the feed elements on its line of Yagi monobanders.

For specs on the firm's Yagi antennas and a very interesting technical paper that describes the new feed system, contact Ham-Pro Antennas, 6199-B Warehouse Way, Sacramento, CA 95826.

Software Topix

SWISSLOG. Several years ago we received an early version of SWISSLOG directly from its Eur-

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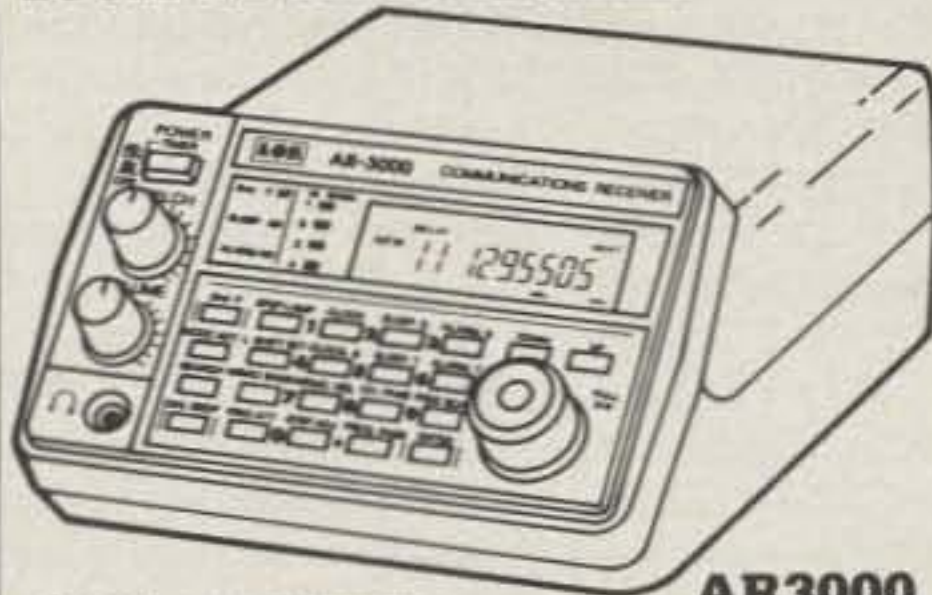
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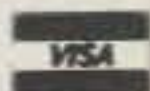
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Top dualband performance begins with a good antenna, and PRO•AM's new PM-144-440 and 77BNC give you that special big signal edge. They look good, work great, and last for years.

PRO•AMs PM144-440 Mobile Antenna has a center loaded (3/8) wave radiating element with unit gain for 2 meters and stacked (1/4) wave radiators for 2.1 dB gain on 70 cm. It is 19 inches tall, has low SWR, handles up to 150 watts, and is available with stainless steel or stylish black chrome whip. Fully assembled with 3-inch base, super strong titanium magnet, 12' RG-58 coax and PL-259. An excellent mobile antenna indeed!



PRO•AMs 77BNC Flexible Handheld Antenna has a helically wound (3/8) wave radiator for 2 meters and phased 1/4 wave helical radiators for 70 cm. Performance is significantly better than standard stubby dualband antennas. Smooth black coating.

Mobiling with two monoband rigs or a transceiver without a duplexer? Combine PRO•AM's D270 duplexer and PM144-440 for a neat one antenna setup. It handles up to 100 watts on both bands, has only .3dB insertion loss, PL-259 connectors, and is enclosed in a rugged 3 x 2.25 x 1" case. The D270 can also be used "in reverse" to connect a dualband rig with one output to separate VHF/UHF antennas.

Miss Vickie Says: Hamfesting or vacationing? Snap the flexible 77BNC into PRO•AM's BNC-SC suction cup mount, stick it on your motel room window, and connect the cable to your handheld for a quick and clever in-room station. Neat!

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CIRCLE 52 ON READER SERVICE CARD

68 • CQ • October 1992

SCANCAT

Version 4.50

- < R > Set for "Demo Without Radio"
- < 1 > Input Single Frequency
- < 2 > Between Frequencies
- < 3 > Disk File Scan Setups
- < 5 > Scan Diskfile "TOP20" 20 Records
- < 6 > Set Time / Zone
- < 7 > Interface Comm. Parameters = COM1:4800,N,8,2
- < C > Quick Term Communication Program
- < ALT-C > Color Setups
- < D > Demo Without Radio - < F-1 >=ORDER INFORMATION
- < E > Exit

Press < U > for UTC/STD 00:11:04 UTC

F-1 Help - Your Scan Cat has 11 Lives Remaining

Fig. 1— Shown here is the main menu of SCANCAT Demo Version 4.5. The multifunction program controls any of a large number of receivers and transceivers. SCANCAT allows complete control of all radio functions that are addressed to the radio's microprocessor, enabling you to perform many radio functions that are not available manually.

open author, Walter Baur, HB9BJS. Over the years the program has been upgraded and improved, and a new U.S. distributor, Frank Greenhalgh, KD2LL, now is on board.

Intended for use with the IBM PC and compatible computers, SWISSLOG's hallmarks are flexibility and personal customization. More than just a "logger," the program is a complete QSO tracking system. It includes a worldwide prefix/callsign library, beam heading and distance calculator, grid locator, reports generator and formatter, DX statistics generator and tracker, awards tracking component, graphical propagation prediction program with Grayline capability, contest duping, QSL card and label printing, and many other features. The program can be made memory resident and conveniently popped up from within other application programs. SWISSLOG also has the ability to import data from the popular K1EA and DXLOG loggers and the commercial database program, dBASE™.

With SWISSLOG, when you enter a station's callsign, the program informs you immediately if you worked the country, on what bands, whether the contact was confirmed, and if so, on what bands. Another keystroke shows the stations worked in that country. Another keypress produces information on the number of countries worked and confirmed, data that is updated as you input QSL cards received. SWISSLOG also is adept at contesting: it has a "fast input" mode that allows you to input fields in any sequence. The program is \$75 plus \$3 shipping.

For more details, contact Frank Greenhalgh, KD2LL, 10 Robbins Ave., Amityville, NY 11701.

CW Simulator. CW Simulator for the IBM PC and compatibles was developed as a training tool to help one learn Morse code. The menu-driven software was designed to provide novice and experienced CW operators with skill-build-

ing options to increase CW comprehension. Many of the current features in the CW Simulator package are the result of feedback from those who early-on tested the software.

Some of the program's features include an editor to create, save, and run custom QSOs from user configurable text files; a lesson menu; the ability to hide text from the screen but display it after code is sent; an "air simulation" that imitates on-the-air experience with built-in QRM (interference) and poor operator keying; a compressed code option that varies character spacing; an option to specify how characters are displayed and what types of characters are sent; and much more. The program also can be run in the Microsoft Windows environment.

For more information, contact Owens/Browning Software, 954 Church St., Hutchinson, MN 55350.

CT by K1EA. One of the "standards" against which IBM PC contesting programs are judged is CT by K1EA. With a reputation as a very comprehensive, sophisticated, and high-quality realtime contest program, CT is used by many top-scoring contenders.

Release 7 handles more than 4000 QSOs with 640K memory, or up to 64,000 QSOs with the addition of expanded memory on your PC. The program produces complete duped and scored logs for three CQ contests (WW DX, WPX, and 160 Meter) and many ARRL and other major operating events. Some of the program's many features include identification of countries, zones, and prefixes from callsigns; checking of partial callsigns against stations already worked; finding all bands on which a station has been worked; sending of Morse code concurrently with all other functions; display of QSO rates per hour; and creation of diskettes for paperless log submissions in both ARRL and CQ formats.

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clude program interfacing to a packet radio TNC or to the DRSI PC-Packet Adapter; automatic checking of DX announcements from Pavillion Software PacketCluster™ bulletin boards; control of various ICOM and Kenwood radios for point-and-shoot QSY to announced frequencies found in PacketCluster™ spots; and support of voice keys, such as K1EA's own Digital Voice Processor™.

For more information, contact Bill McGowan, KC1EO, at K1EA Software, 33 Truell Road, Hollis, NH 03049.

SCANCAT V4.5. John Shidler, NX5Z, and James Springer, N5JMZ, have introduced a very flexible transceiver/receiver control and frequency database program to manage a wide variety of computer-based radios from an IBM PC or compatible. Their objective in designing SCANCAT was to create an easy to use program that will let you run *all* supported radios from a single program, instead of having to purchase a separate program for each radio used.

SCANCAT currently supports most microprocessor-based ICOM Kenwood, Yaesu, Drake, and Japan Radio receivers and transceivers. The many radios supported encompass most ICOMs including the R-71 and R-7000; Japan Radio NRD-525 and NRD-535; AOR-2500 and AOR-3000; most Kenwoods including the TS-440, TS-950, and R-5000; the Yaesu FT-757GX, FT-757GXII, FRG-8800, and FRG-9600; and the Drake R-8. A nice plus is that virtually any frequency file created by one radio can be used by another, as long as the modes are compatible.

SCANCAT allows complete, sophisticated control of all radio functions that are addressed to the radio's microprocessor. This means that you can perform many functions that are not available through manual control of the radio. The user-friendly program includes online help and implements keystroke accessed pop-up windows. The software permits you to create 30 personal scanning frequency bands, including increment and mode. SCANCAT also allows unlimited frequency files of up to 400 frequencies each. These files can be sorted by any field, such as description or frequency. Two files are included for immediate use with the program, and additional preprogrammed files are available from the firm. Also included is an integrated communications program for TNC access, with split windows for receiving and sending. The program comes with a 30-page manual.

The program is priced at \$49.95 postpaid, and a fully functional demo is \$5. For more information and specifications, contact J & J Enterprises, 4001 Parkway Drive, Bossier City, LA 71112. Fig. 1 shows the SCANCAT V4.5 Demo main menu.

PXDB Update. We initially profiled PXDB in the April '92 column. Offered by John H. Boston, WB4RUA, PXDB is a specialized database for the amateur radio prefix chaser, designed to keep a running record of prefixes worked and confirmed for the CQ WPX Award. The program prints out calls and prefixes to mail to the WPX award manager for initial application and endorsements.

John reports his program as being well received, and he sent us a new version 1B that fixes a few "bugs" found in the original program. The new version looks like an especially good bet for accomplishing its stated purpose. As shareware, it's found on several amateur radio bulletin boards and also is available directly from the author. Contact John H. Boston, WB4RUA,

NEW MULTIBAND ANTENNAS FROM DIAMOND

SUPER GAINER BY DIAMOND

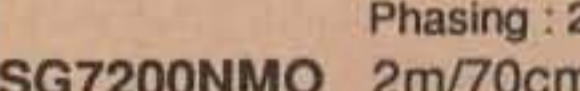



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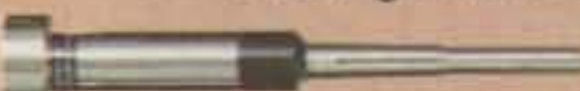
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SG7500NMO 2m/70cm Dual Band Antenna. **NEW** NMO
Phasing : 2m $1/2\lambda$, 70cm 2-5/8 λ . Rating : 150W. Length : 40.6". Connector : NMO.
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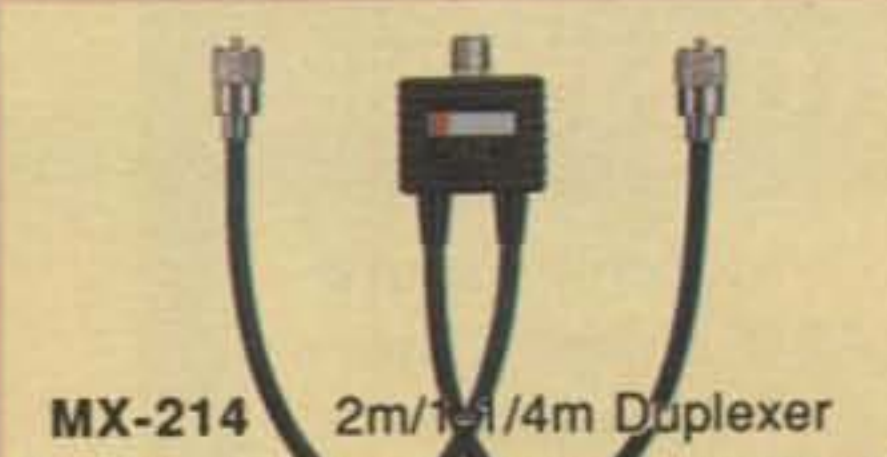
SG7200NMO 2m/70cm Dual Band Antenna. **NEW** NMO
Phasing : 2m $1/2\lambda$, 70cm 2-5/8 λ . Rating : 150W. Length : 37.8". Connector : NMO.
- 

SG7500 2m/70cm Dual Band Antenna.
Phasing : 2m $1/2\lambda$, 70cm 2-5/8 λ . Rating : 150W. Length : 41.7". Connector : UHF.
- 

NR2000NA 2m/70cm/23cm Tri-Band Antenna. **NEW**
Phasing : 2m $1/2\lambda$, 70cm 2-5/8 λ , 23cm 5-5/8 λ . Rating : 100W (2m & 70cm), 50W (23cm). Length : 39.0". Connector : N.
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CR214S 2m/1-1/4m Dual Band Antenna. **NEW** NMO
Phasing : 2m $1/2\lambda$, 1-1/4m 5/8 λ . Rating : 120W. Length : 37.0". Connector : NMO.
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NR770HNMO 2m/70cm Dual Band Antenna. **NEW** NMO
Phasing : 2m $1/2\lambda$, 70cm 2-5/8. Rating : 200W. Length : 38.2". Connector : NMO.

MX-214 2m/1-1/4m Duplexer
(2m/70cm Duplexers also available.)



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Note: The Prices shown here are List  Call for Discount Prices



YAESU FT-1000 • 200W - 9-band, all-mode HF transceiver with 100kHz-30MHz receive, 99 memories & built-in antenna tuner with memories. Knob or direct keyboard entry. Simultaneous dual receive with two tuning knobs, balance and dual displays; optional crossband dual receive. Digital Voice Storage option. Antenna selector, electronic keyer, Cascaded filter selections, width control, IF shift, notch, squelch, blanker, CW audio peak filter. Built-in AC ps. 6"h x 16"w x 15"d, 58 lbs. .. \$3399.00

- BPF-1 Dual bandpass filter; crossband rx.. 159.00
- TXCO-1 Temperature controlled xtal osc..... 229.00
- XF-C 2.4 KHz SSB filter (455kHz) 149.00
- XF-D 2 KHz SSB xtal filter (455kHz)..... 149.00
- XF-E 500Hz CW xtal filter (455kHz) 149.00
- YAESU FT-1000D** • Deluxe version with dual bandpass filter for crossband receive, temperature compensated crystal oscillator, 2.4kHz/2KHz SSB filters and 500Hz CW xtal filter..... \$4399.00
- DVS-2 Digital voice recording module 299.00
- MD-1C8 Desk microphone 115.00
- SP-5 External speaker/audio filter..... 149.00
- LL-5 Phone patch unit for SP-5 139.00
- XF-455MC 600Hz CW filter (455kHz); subrx 159.00
- XF-F 250 Hz CW xtal filter (455 KHz) 159.00
- YH-77ST Open-air type stereo headphones .52.00



YAESU FT-990 • 100W - all mode 160-10M HF transceiver with 100kHz-30MHz receiver, 99 tunable/scannable memories & built-in antenna tuner w/memory. Dual VFOs, digital IF shift/notch filters, speech processor. Special provisions for CW, RTTY, Packet. Digital Voice Contest option. Built-in AC ps. 12 1/2"w x 4 1/2"h x 11 1/2"d, 30 lbs..... \$2399.00

- DVS-2 Digital voice recording module 299.00
- MD-1C8 Desk microphone 115.00
- SP-6 External spkr/audio filter 149.00
- LL-5 Phone patch unit for SP-6 139.00
- TXCO-2 Temp compensated xtal oscillator ...199.00
- XF-10.9M-202-01 2nd IF 2KHz SSB filter.... 129.00
- XF-455K-251-01 2nd IF 250HZ CW Filter.... 159.00
- YH-77ST Open-air type stereo headphones 52.00
- FT-990DC** • No AC power supply or CW filter ..1999.00
- FP-800 20A Heavy duty ps for FT-990DC 299.00
- H-1102193 500Hz CW filter for FT-990DC... 127.00



YAESU FT-767GX • All-mode, 160-10M transceiver with 100kHz-30MHz receiver. Optional plug-in modules for 6M, 2M & 70cm. 100W out to 30MHz, 10W above. Dual VFOs, 10 mode/frequency memories, memory/sub-band scanning. Speech processor, CW keyer. QSK or semi break-in, IF shift. RF preamplifier and attenuator, squelch, noise blanker. Multi-function meter, and digital SWR/power meter. Data jacks for packet, CAT System bus for computer control, built-in AC ps. 5 1/2"h x 14 1/2"w x 11 1/2"d, 30 lbs..... \$2068.00

- 2M/767 (FEX-767-2M) 2m module 239.00
- 6M/767 (FEX-767-6M) 6m module 196.00
- 430/767 (FEX-767-70B) 430-440MHz mod. 296.00
- 440/767 (FEX-767-70A) 440-450MHz mod.. 296.00
- FIF-232C Interface for RS-232 95.00
- FTS-8 Encoder/decoder 55.00



YAESU FT-890 • 100W 160-10m all mode transceiver with 100kHz-30MHz receiver. Two independent A/B VFOs for each band (20 total) hold freq/modes, clarifier offsets and repeater shifts. 32 memories store all data for both VFOs, Blanker, all-mode squelch, RF speech processor, built-in iambic keyer. Optional internal auto antenna tuner. 13.5VDC @ 20A. 9 1/2"w x 3 3/4" x 9 1/2"d, 12.3 lbs..... \$1339.00

- ATU-2 Internal antenna tuner 209.00
- FT-890/AT** • as above w/auto antenna tuner..1529.00
- FP-800 20A heavy duty power supply 299.00
- DVS-2 Digital voice recording module 299.00
- FC-800 External auto antenna tuner 469.00
- FIF-232C Interface for RS-232 95.00
- FRB-757 External relay box 14.00
- MD-1C8 Desk microphone 115.00
- MMB-20 Mobile mount 26.00
- SP-6 External speaker w/filter 149.00
- LL-5 Phone patch unit for SP-6 139.00
- SP-7 Mobile Speaker 34.00
- TCXO-3 TCXO unit 99.00
- XF-455K-251-01 2nd IF 250HZ CW Filter.... 159.00
- YF-100 2nd IF 500Hz CW filter.....159.00
- YF-101 2nd IF 2.6 KHz SSB filter159.00



YAESU FT-747GX • 100W, 160-10M SSB/CW base or mobile transceiver with 100kHz-30MHz receiver, and opt. FM transmit/receive. Dual VFOs, 20 multi-function memories. Scanning with lockout. Main tuning knob or scanning mic up/down frequency entry. RIT, narrow CW filter, AM filter, attenuator, blanker, squelch, CAT System bus for PC control. 12V DC @ 20A. 3 1/2"h x 9 1/2"w x 9 1/2"d, 7 lbs..... \$899.00

- FP-757HD Heavy duty power supply w/fan . 309.00
- FP-700 Power supply..... 244.00
- FC-757 AT Auto antenna tuner w/ memory... 429.00
- E-767 Cable for FC-757 w/FT-747GX 11.00
- FM-747 FM unit 47.00
- MD-1C8 Desk microphone 115.00
- MMB-38 Mobile bracket 14.00
- SP-767 Speaker w/audio filters..... 99.00
- TCXO-747 Increased freq. stability unit 42.00



YAESU FT-650 • 100W - 6, 10 and 12M all mode transceiver with 24.5-56.0 MHz receiver. 105 memories: 99 for channels, 4 programmable scan memories and 2 priority channels. 1.2db NF receive preamp with switched 5 MHz bandwidth varactor tuned BPF, Direct Digital Synthesis and auto seeking notch filter. Built-in AC supply or 12V DC @ 18A operation. 5 1/2"h x 11 1/2"w x 11 1/2"d, 18 lbs..... \$1599.00

- DVS-2 Digital Voice recording module..... 299.00
- MD-1C8 Desk Microphone 115.00
- SP-5 External Spkr w/audio filter149.00
- LL-5 Phone patch for SP-5139.00



YAESU FL-7000 • Covers 160-12M. Solid-state, "no tune" with built-in automatic antenna tuner and power supply. 70W drive for 600W output. Full break-in for CW, HF Packet and AMTOR. Tuner memory holds ant selection and tune settings. Circuit automatically turns off amp and attempts to rematch if SWR exceeds 2:1. Automatic selection of 4 antennas with optional unit. 5"h x 15"w x 15"d, 66 lbs..... \$2279.00

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YAESU FT-736R • All-mode, 2M/430 multi-band VHF/UHF transceiver. Optional modules for 50MHz, 220MHz, and 1.2GHz. 10W out on 50MHz and 1.2GHz, 25W on the others. 14 VFO modes, 100 multi-function memories, 10 full-duplex memories. Satellite function, independent or synchronous operation of VFOs and more! Built-in AC ps, or 12V DC w/opt. power cord. 5 1/2" h x 14 1/2" w x 11 1/2" d, 19.8 lbs..... **\$1922.00**

- AD-3 50w 2m/440 duplexer..... **48.00**
- FEX-736-50 6m module..... **294.00**
- FEX-736-220 220MHz module..... **322.00**
- FEX-736-1.2 1.2GHz module..... **589.00**
- FIF-232C Interface; RS-232..... **95.00**
- FTS-8 Encoder/decoder..... **55.00**
- FVS-1A Voice synthesizer..... **37.00**
- Keyer-B Electronic keyer unit..... **19.00**
- MD-1CB Desk microphone..... **115.00**
- MH-1B8 Extra hand microphone..... **29.00**
- SP-767 Speaker w/audio filters..... **99.00**
- TV-736 1.2 GHz ATV converter..... **163.00**
- E-736 DC cable..... **10.00**



Mark II • Shoulder-carried, FM/SSB/CW. Three models, same appearance and function. 2 1/2W out when operating from 12V DC @ 1.1A, or with optional snap-on battery case containing 9 (C) cells or nicads. DTMF microphone with up-down control, dual VFOs, 10 multi-function memories with scanning, programmable band scan. Offset tuning for satellites, LCD display. 2 1/2" h x 6 1/4" w x 7 1/2" d, 2.6 lbs.

- FT-290R Mk II • 2 meters, 25W..... **\$610.00**
- FT-690R Mk II • 6-meters, 50-54MHz, 10W.. **752.00**
- FT-790R Mk II • 430-450MHz, 25W..... **681.00**
- FBA-8 Holder for C-cell Nicads..... **32.00**
- NC-26B Wall Charger for FBA-8..... **10.00**
- CSC-19 Soft case..... **16.00**
- MH-10E8 Hand microphone..... **24.00**



YAESU FT-5200 • 2m/440MHz FM Mobile. Covers 140-150 (tx), 140-174 (rx) & 430-450MHz..32 tunable memories, 38-tone prog. CTCSS encoder and 7 DTMF memories. Output: (2m) 50/5W, (70cm) 35/5W. Cross band full duplex. Dual VFOs with DDS, superior SCF filter. Backlit DTMF mic, detachable front panel. 5 1/2" w x 1 1/4" h x 6" d, 2 lbs. **\$769.00**

- FT-6200 • 35/10w, 440MHz/1.2GHz..... **799.00**
- DVS-3 Digital voice memory..... **129.00**
- FRC-4 DTMF pager unit..... **34.00**
- FTS-22 CTCSS decode unit..... **54.00**
- MW-1 Wireless remote control mic..... **109.00**
- SP-7 External speaker..... **34.00**
- YSK-1L Separation kit w/18' cable..... **59.00**



YAESU FT-212RH/C8 • 2m FM mobile. 140-150MHz transmit, 138-174MHz receive. 45/5W. Large multi-function LCD display. User-selectable tuning steps with main tuning knob and up/down frequency entry with supplied DTMF mic. Digital VFO, 20 full-function memories with scan/lockout, encoder standard. Programmable band scan and offset, priority and call channels. CAT System bus for PC control. 12V DC @ 10A. 1 1/2" h x 5 1/2" w x 6" d, 2.8 lbs..... **\$405.00**

FT-712RHT/C8 • same as 212 but covers 430-450MHz, 35/3W, 12V DC @ 10A..... **\$497.00**

- FT-912RH • 1.2GHz, 10W, 12V DC @ 4A..... **\$581.00**
- DVS-1 Digital voice memory module..... **105.00**
- FTS-12 Decoder; 121/212RH/912RH..... **55.00**
- MH-15D8 Autodial TTP microphone..... **80.00**



YAESU FT-2400H • 2m FM mobile. Rugged, built to take the abuse of off-road use. Three power levels: 50W/25W/5W. Wide band receive 140-174MHz (140-150MHz tx). 31 full function memories, CTCSS encoder. 5 scan functions: Band; Memory; Memory channel lockout with selectable stops; Priority. Programmable call channel, auto. rptr offset. backlit DTMF mic. 6" w x 1 1/2" h x 7" d, 1 1/2 lbs..... **\$439.00**

- 2400 Mic Cable 2 ft. packet cable..... **8.00**
- FRC-6 DTMF pager unit..... **34.00**
- FTS-17A CTCSS decode unit..... **53.00**
- SP-3 Small mobile speaker..... **17.00**
- SP-4 Mobile speaker..... **22.00**



YAESU FRG-8800 • Shortwave Receiver. Covers 150KHz-29.99MHz and 118-173.99MHz with optional VHF converter. Manual tuning and 21-button keyboard for direct entry and programming of 12 memories. LCD with 100 Hz resolution, bargraph S/SINPO indicator. Three scanning modes, dual 24-hour clock/timer, computer compatible with optional interface. 110/220V AC or 12V DC with optional. cord. 14" w x 6" h x 9" d, 13 lbs..... **\$784.00**

- DC-8800 DC kit for FRG-8800..... **4.00**
- FIF-232C Interface for RS-232..... **95.00**
- FM-W/8800 FM-wide kit for FRG-8800..... **21.00**
- FRA-7700 Indoor active receive antenna..... **58.00**
- FRT-7700 Antenna tuner..... **77.00**
- FRV-8800 118-174 MHz VHF converter..... **107.00**

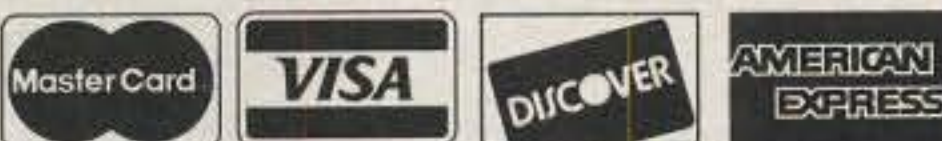
OTHER YAESU ACCESSORIES

- YS-60 1.8-60 MHz 2KW PEP wattmeter..... **127.00**
- YS-500 140-520 MHz 200w PEP wattmeter.... **99.00**
- YH-55 Lo-Z headphones..... **28.00**
- YH-77 Lightweight headphones..... **26.00**

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- G-500A Heavy duty elevation rotor..... **\$249.00**
- G-5400B Azimuth/elevation rotor combo..... **497.00**
- GC-038 Mast clamp for G-5400B..... **21.00**

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YAESU FT-411E (right) • 2m, 140-150MHz (tx), 140-174MHz (rx). 2 1/2w FM HT. LCD, keypad and rotary-dial frequency entry. Dual VFOs, 49 memories. Busy channel band, sub-band and selective memory scanning, priority. DTMF autodialer with 10 telephone number memories. Encoder/decoder, battery saver and automatic power off. *Optional* batteries for 5W or extended operation. Flexible ant., Ni-Cd battery, wall charger. 5 1/2" h x 2 1/4" w x 1 1/2" d, .85 lb. **\$355.00**

YAESU FT-811 (left) • 2w, 430-450MHz..... **394.00**

YAESU FT-911 (left) • 1w, 1.2GHz..... **489.00**

YAESU FT-470 (center) • 2m/440MHz, 2.3w, FM handheld. Similar to FT-411/811 above. Simultaneous receive on both bands, 21 memories for each band. 6 1/2" h x 2 1/4" w x 1 1/2" d, .88 lbs..... **\$499.00**

IMPORTANT!

All Prices shown in this ad are LIST. For **DISCOUNT PRICES** ...

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YAESU FT-415 (left) • Compact 2m FM HT. 2w, 130-174MHz/rx (140-150MHz tx). Dual VFOs, 41 tunable memories (odd splits on any channel), DTMF paging and coded squelch, 15 digit DTMF autodialer, CTCSS encode/decode, VOX. Direct DC (5.5-16V) jack to power the transceiver and charge the battery. Programmable 4 power levels, battery saver & auto power off. 2 1/2" w x 5 1/4" h x 1 1/4" d, 12 1/2 oz.... **\$409.00**

FT-815 • Similar to FT-415 but 70cm, 2W, 430-450MHz receive and transmit..... **\$439.00**

Similar to FT-415/815 but without TTP:

- FT-26/25 • 2-meters, 2W, 130-174MHz receive and 140-150MHz transmit..... **\$299.00**
- FT-26/27 • 2-meters, 5W, 130-174MHz receive and 140-150MHz transmit..... **\$329.00**
- FT-76/25 • 70cm, 2W, 430/450 MHz/tx-rx.. **\$329.00**

YAESU FT-23R-17 (right) • 2m FM HT 2.5w output, rotary dial frequency entry, LCD display, 10 full function memories, busy channel and memory scanning, priority channel monitoring. Rugged and weatherproofed. Flexible rubber antenna, nicad battery, wall charger. 4 1/4" h x 2 1/4" x 1 1/4" d, 1 lb..... **\$290.00**

FT-23R-12 • as above but 2m, 5w..... **309.00**

FT-33R • 220 MHz FM, 5w..... **328.00**

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3. NEXTSSB.EXE	NEXTMIX.EXE	NEXTCW.EXE

The files for each mode are "chained".

FOR ON-THE-AIR PREFIX DUPE CHECKING TYPE "SBDUPCHK" OR
"CWDUPCHK".

Press a key to continue...

Fig. 2- Depicted here is the main menu from Dick Genaille, W4UW's WPX Record Keeping Program. The software allows WPX dupe checking, sorting, and printing using three modules of three files each that are "chained" for each mode (CW, SSB, and mixed). The menu displays the starting command you need to type for each mode module.

P.O. Box 354, Calhoun, GA 30703-0354, for more information.

WPX Record Keeping Program. It's a small world, indeed! Dick Genaille, W4UW, a WPX Honor Roll member, happened to note the April column that profiled WB4RUA's PXDB WPX program. He, too, has written a program for similar purposes. Dick speculates that although working independently, John and he obviously worked from the same premise: that it was no fun keeping paper records on WPX accomplishments. The computer was the answer for both of them. Its use has turned WPX recordkeeping from a drudgery into a genuine pleasure.

Several months ago, Dick decided to "go public" with his software, which he calls the W4UW WPX Record Keeping Program. It takes a different approach to keeping WPX records than John's program. W4UW's entry features "chaining" of the various programs within the three mode modules (CW, SSB, and Mixed) to provide a methodical entry of prefixes and calls into the databases on a sequential basis. The program lets you track the six band and six continental totals for endorsements by creating and using a system of separate subdirectories. Some of the program's features include logging for up to 3000 calls and prefixes, dupe checking, sorting, and printing. A hard disk is required.

The W4UW WPX Record Keeping Program isn't shareware, but is available directly from the author for \$39.95. Contact Richard A. Genaille, W4UW, 719 Quarterstaff Road, Winston-Salem, NC 27104. Fig. 2 shows the program's main menu.

Marathon Update. In the March column we profiled the Marathon contesting software for the Apple Macintosh computer. To recall,

Marathon is offered by Kevin A. Krueger, N0IOS (1780 Ruth Street, St. Paul, MN 55109). The \$59.95 program is, of course, based on the Mac graphical user interface (GUI) and features easy-to-use windows and log entry screens. We'd like to add that Marathon was reviewed in some detail in the MacHam World column by Stan Horzempa, WA1LOU, in the January/February issue of *Digital Digest*. Stan's review was a very favorable one, so you might want to check it out if you're a Mac-equipped contester.

Incidentally, we recently received an inquiry from Jeffrey J. Lambert, VK8JJ, who laments the general unavailability of Mac-oriented contesting and logging software in Australia. He also notes the dearth of ads for such software in the U.S. amateur publications to which he has access. Jeffrey is particularly interested in a full-featured Mac logger. He indicates that the functions he wants to see in such a program include not only standard database functions, but also those which would allow for awards tracking, on-line searches, and other contest functions.

As we pointed out to Jeffrey in our reply to his letter, the U.S. amateur software market is IBM PC dominated, but there is a variety of Mac amateur software available if you dig deeply enough. Although we're not Mac equipped ourselves, we have reported on a variety of Mac amateur logging and contesting software in the column over the past several years, mentioning programs such as Marathon (N0IOS), FDLog! (WW0J), Six Shooter and QLog (KE1Z/ZCo Corp.), and several others. Also, we find that the highly capable IBM PC logging and contesting software, LOGic, soon will be available for the Mac. Too, there's a great deal of amateur Mac software on CompuServe's HamNet, which is accessible from

almost anywhere in the world (if you don't mind the connect charges). Finally, Stan Horzepa, WA1LOU, does a fine job of reviewing Mac software in his *Digital Digest* column. The moral: Amateur Mac software is available, but you have to look for it.

The Norton Backup V2.0. In the May issue we covered V1.0 of The Norton Backup for Windows and DOS, a reliable, highly automated, and very fast disk backup product that boasts data transfer speeds as high as 3.5 MB per minute. About the same time as the May column appeared, Symantec sent us an updated version. That confirmed our long-held belief that unfortunately, all computer software, when reviewed, is already obsolete!

New and outstanding features include an automatic backup scheduler, enhanced support for QIC 40/80 tape drives, preset options, and password protection. It's an easy product to use, one that doesn't compromise in either performance or features, thereby making it harder than ever to find an excuse to not back up the precious data most of us have on our computer's hard disk.

Apparently, Symantec now has split its backup software product into two distinctly marketed versions, one for DOS and the other for Windows. The new versions, like their predecessors, are priced at \$129, but previous Norton Backup customers qualify for special upgrade prices and, in some cases, for a free upgrade. For more information, contact Symantec Corporation, 10201 Torre Avenue, Cupertino, CA 95014-2132.

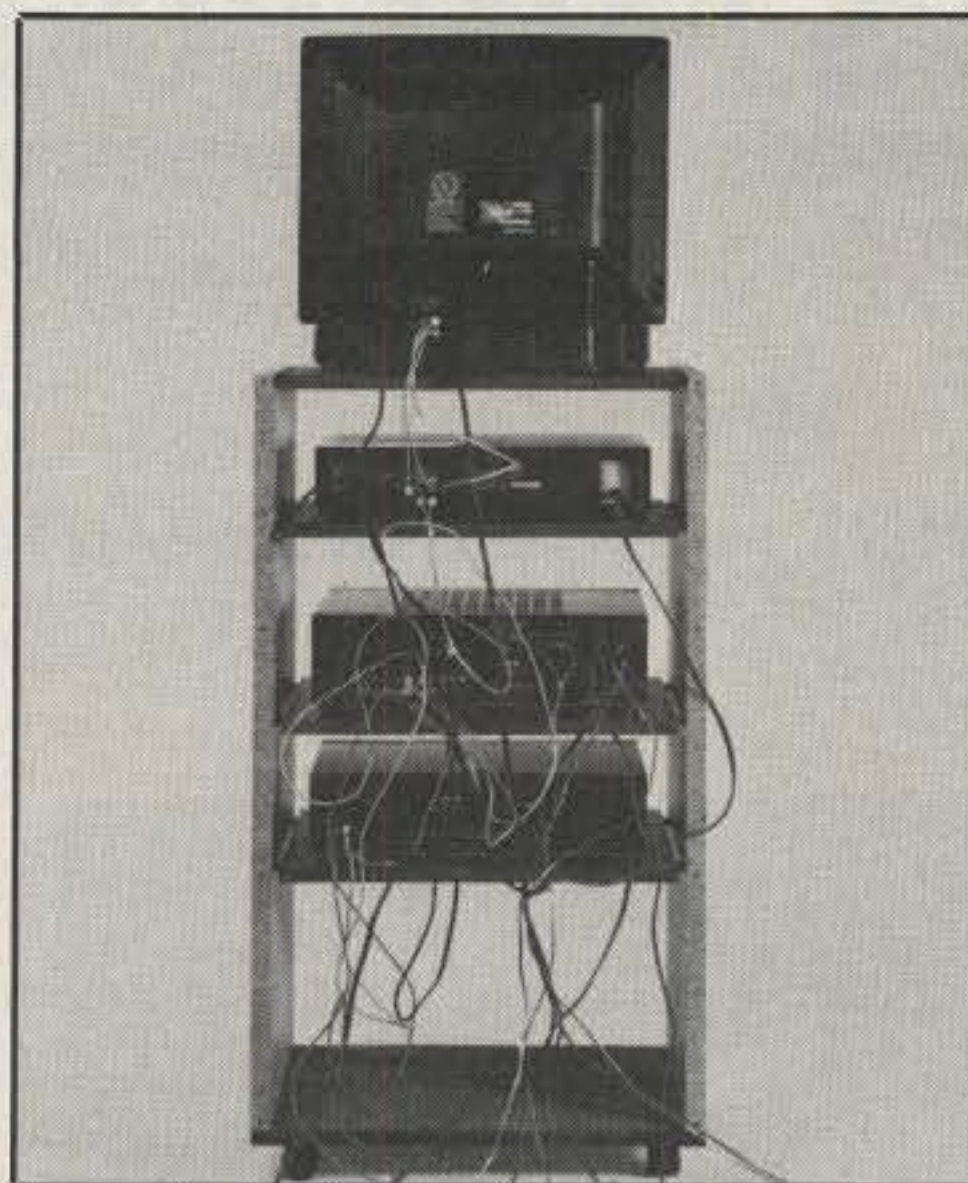
The American Heritage Dictionary. We don't often cover general-purpose application software, and instead stick mostly to amateur-radio-specific programs and PC utilities. Occasionally, though, we break our rule to cover good non-amateur software when the product is particularly outstanding and when it may be of general interest to CQ readers.

One such program (which we are using as we write this column) is The American Heritage Dictionary for DOS; it's an excellent writing aid. Incorporating Roget's II Electronic Thesaurus, it's a powerful reference tool that works with words in sophisticated ways, and it virtually eliminates the tedious page turning and cross-referencing of paper-based dictionaries. The program operates as a terminate-and-stay resident (TSR) utility you can pop up over practically any application program. Windows and Macintosh based versions also are available.

At its heart is the LOOKUP function. This lets you look up words and provides definitions, spelling, pronunciation, parts of speech, hyphenation, and inflections for more than 116,000 words. The THESAURUS function is based on the Roget's II Electronic Thesaurus, with 500,000 synonym choices for 42,000 words.

The SEARCH function lets you do things that are not possible with a printed dictionary, such as brainstorming for words. For example, you can find words even when you know only a definition, vague meaning, or related concept. You can choose from a list of general subjects and use the Boolean operators AND, OR, or NOT to fine-tune search criteria. There's also a WILDCARD function that finds a word when you don't know all of its letters. The PASTE function lets you transfer a retrieved word to your document.

Saving the fun for last, the ANAGRAM function finds other words hidden in the one you are using. If you like to play word games or complete crossword puzzles, this feature is for you. For



Does your operating table or computer desk look like this? If you have a tangled mess of cords and wires you're afraid to touch, you may want to invest in the \$12.95 Cord Control Kits offered by Get Organized. (Photo courtesy Get Organized)

example, if you type in the word "spot," the anagram function returns the words opts, post, pots, stop, and tops.

Overall, The American Heritage Dictionary is an excellent writer's tool. True, I find that the spelling definitions, spelling checker, and thesaurus in my personal wordprocessor (WordStar 5.5) are adequate for most work, and much faster than invoking the Dictionary and pasting word retrievals to the document. However, the Dictionary's LOOKUP, SEARCH, ANAGRAM, and WILDCARD functions truly are in a class of their own.

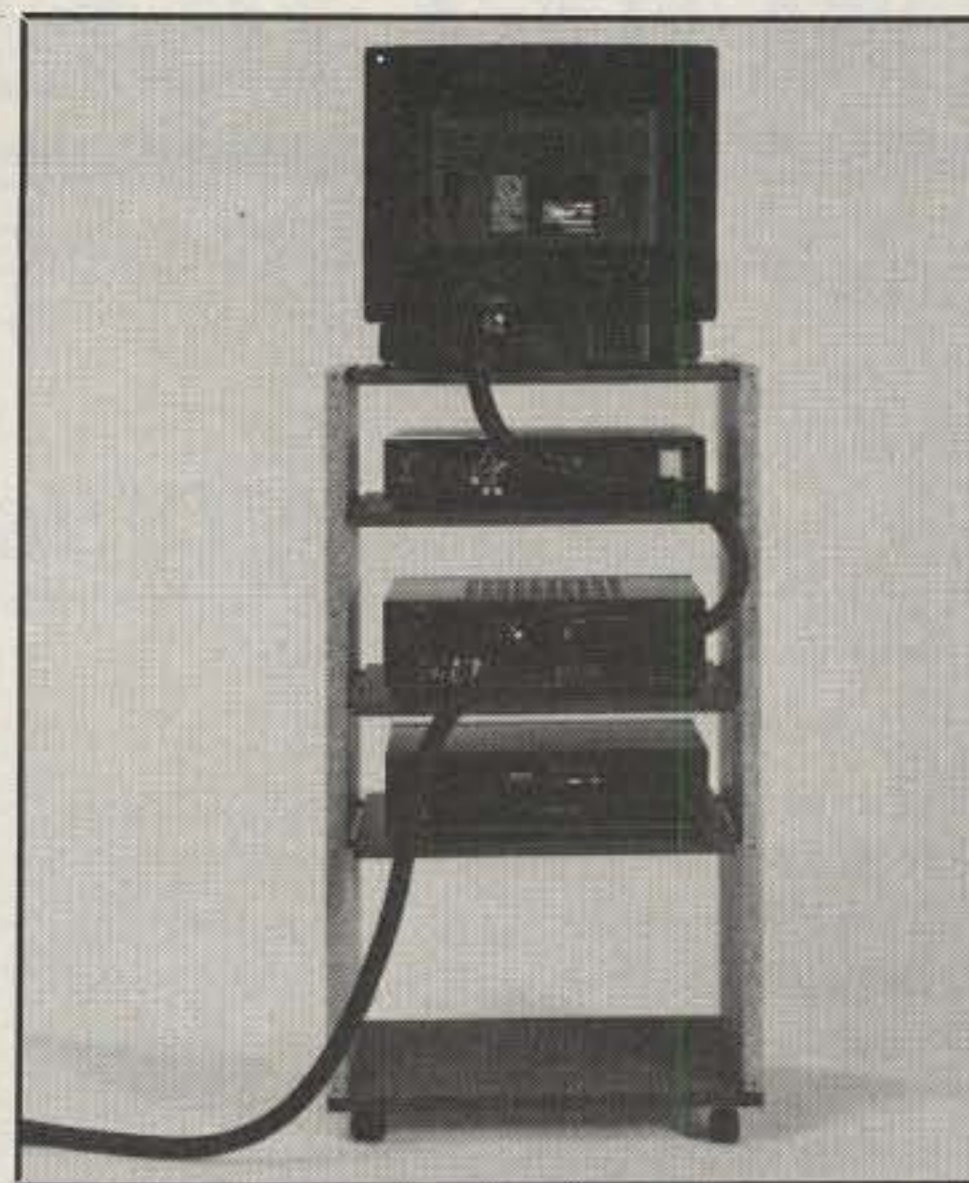
The DOS version is priced at \$99. For more information, contact WordStar International, Inc., 201 Alameda del Prado, P.O. Box 6113, Novato, CA 94948.

Short Bursts

A Call for Help from LZ1BB. Recently we received a letter from Haralampy ("Harry") Popov, LZ1BB. In it he detailed some of the myriad difficulties involved in obtaining commercial radio gear in countries lying beyond the former Iron Curtain. Harry noted that both amateur and CB equipment are practically unobtainable, even if personal earnings were at a level sufficient to purchase gear. To make matters worse, the average monthly wage is the equivalent of \$30-\$40 U.S., insufficient to buy commercial Japanese or western ham equipment.

Harry also noted the difficulty of building SSB gear, where the biggest problem is the filters. His activity from his home is CW only on HF, where he has built several crystal-controlled QRP transmitters. Until recently Harry's phone activity was only from his radio club, where he's active on 2 meter FM. Last year Bulgaria authorized amateur repeater operation, and he proudly constructed the first one on the air. He's now on FM with a homebrew 10 watt transmitter and a converter for his general-coverage HF receiver.

Harry also says that it's now legal for Bulgarian citizens to operate equipment on the 27 MHz CB band, although from the American experience with 11 meter CB, I'm not so sure



The Get Organized Cord Control Kits feature unique slit plastic tubing that neatly bundles your cords and wires. Beaded ties wrap up excess cord, and colored labels identify cord ends and plugs. (Photo courtesy Get Organized)

that this is a good idea! Regardless, Harry wants to experiment with SSB CB gear, and so would like to receive some leads on obtaining a second-hand unit. If anyone can help him locate an inexpensive SSB CW transceiver, or has one available for donation, please contact Harry directly. His mailing address is: H. D. Popov, "Bratya Bakston," Blok 207-A, A-6. 1618 Sofia, Bulgaria.

Cord Control Kits. A West Coast firm offers an interesting line of "wire management" products. Recently introduced were the Superflex™ Cord Control Kits, designed to neatly bundle and conceal cords and wires. They are designed primarily for computer, home-entertainment center, and office applications, but also have a very welcome place in the hamshack or in the workshop.

At the core of the Get Organized Cord Control Kit is the Superflex tubing, which works together with reusable beaded ties to secure and conceal all types of electronic equipment and computer wiring. Safely bundled inside the tubing, all cords remain accessible but out of sight, giving desks and operating consoles a clean and professional look. Each kit contains color-coded labels that provide a means of reconnecting equipment cables simply by matching colors.

The \$12.95 kits are available in several different colors. They can be obtained directly from the manufacturer or through audio and office supply outlets. The firm also sells a variety of wire management accessories, including the Trax System of wire ducting for containing and routing low voltage and power cable up to 300 volts. For more information, contact Get Organized, 328 Canham Rd., Scotts Valley, CA 95066.

Wrap-Up

That's about it for this time, gang. Next month we'll have more Antennas and Accessories items of current topical interest.

Overheard: Doing something the hard way is almost *always* easier.

73, Karl, W8FX

CONNECTING YOU AND PACKET RADIO IN THE REAL WORLD

A Different Approach—And More

Mid-year at the Albany, Georgia SouthNet Packet Conference we came face to face with some really great ideas for packet operation. Following are some of those ideas, and throughout are some of the photos taken at the conference by KA4KLN.

The PacComm integrated RF modem was something to behold (RF modem—a nice term for a TNC and transceiver rolled into one package).

Overheard in a conversation was some news about a totally new transceiver/TNC from Alinco. This jewel is purported to be a "plug-n-play" packet station complete with an RS-232 port. This means that all the user would have to do is connect the RS-232 from the serial port of the PC, or compatible, and the antenna to this transceiver/TNC and connect city here we come.

Alinco says this integrated transceiver/TNC will be on the market by Christmas. Remember, this was in June of this year, and Christmas is not far away. We'll see, I guess, as we've all seen times when a product is supposed to be out on the market and several years later it is still on the prototype board somewhere.

We were given a glimpse of Kantronics' 19,200 baud transceiver and modems that open up a broad range of ideas for backbones and trunks. No longer will we have to shop around for the bits and pieces that go together to make up one link of a backbone. I was also given a first-hand look at the Kantronics KPC-3. Kantronics has done quite a job for us in this shirt-pocket packet communicator!

MFJ had the MFJ-9600 modem and 1270B combination ready to attach to the radio or transceiver of the user's choice. As a matter of fact, that is where this month's column is about to go. With the impact of the Kantronics Data-Engine running 19,200 baud, we have one side of the backbone. This system will function in a Kanode and/or digipeater type network. However, I've received numerous requests for a "plug-and-play" system that will support the ROSE networking firmware.

A Different Approach

In consideration of these requests, I'm about to give the movers and shakers

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The SouthNet Packet Conference held in Albany, Georgia this past June was sponsored by the Albany, Georgia ARC. (All photos by S. Brinson Phillips, KA4KLN)



PacComm—with a lollipop is Chuck.



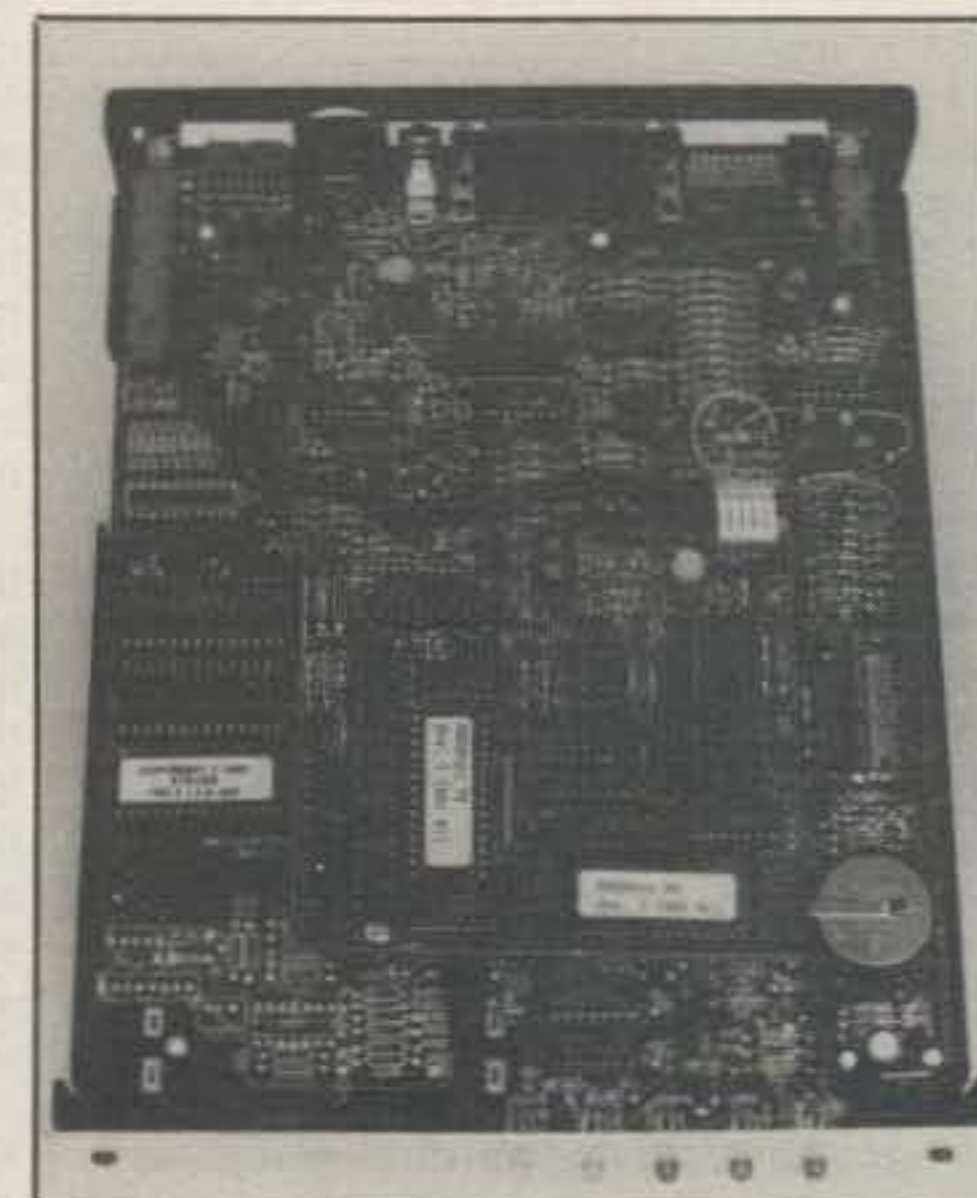
Bill Levy, WA4FAT, of BandMaster Quads. Hot pink hat!



The "chairmen" of the board—Leon (right) and John, K4XA, left.



Greg Pearson at the Alinco booth.



The MFJ-1270B with 9600 modem.



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COMET Antennas was represented at the conference.



NRC with the Kantronics KPC-3 and Alinco DataRadios.



Still setting up, just before the opening bell.

among you (called ROSE-ops) a combination that will make your lives easier. I'll depart from the way we would usually build a system, and this time I'll apply an approach that differs slightly from the "norm."

Since much of what is now occurring in digital communications is happening at the higher speeds, we are looking at easier ways and means of implementing our backbones. The only problem is that of compatibility. Whereas the Kantronics TNC does not (yet) support theNet or the ROSE code, the Kantronics D4-10 does present us with a transceiver that has the high-speed analog data port ready to "plug-'n-play." In addition, I've had the opportunity to use this transceiver in a moderately high RF environment with pleasing results. With the Kantronics D4-10 in mind

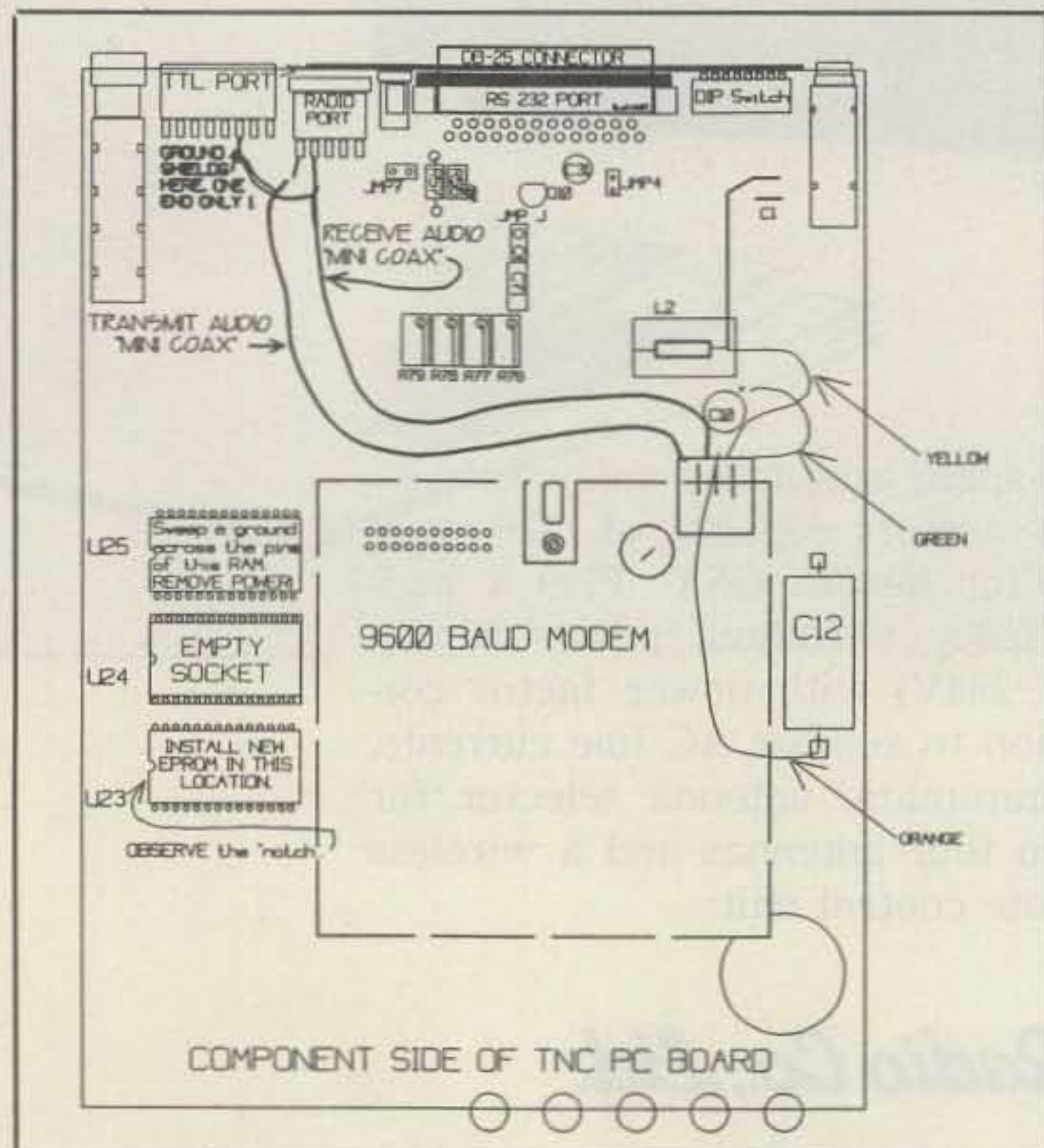
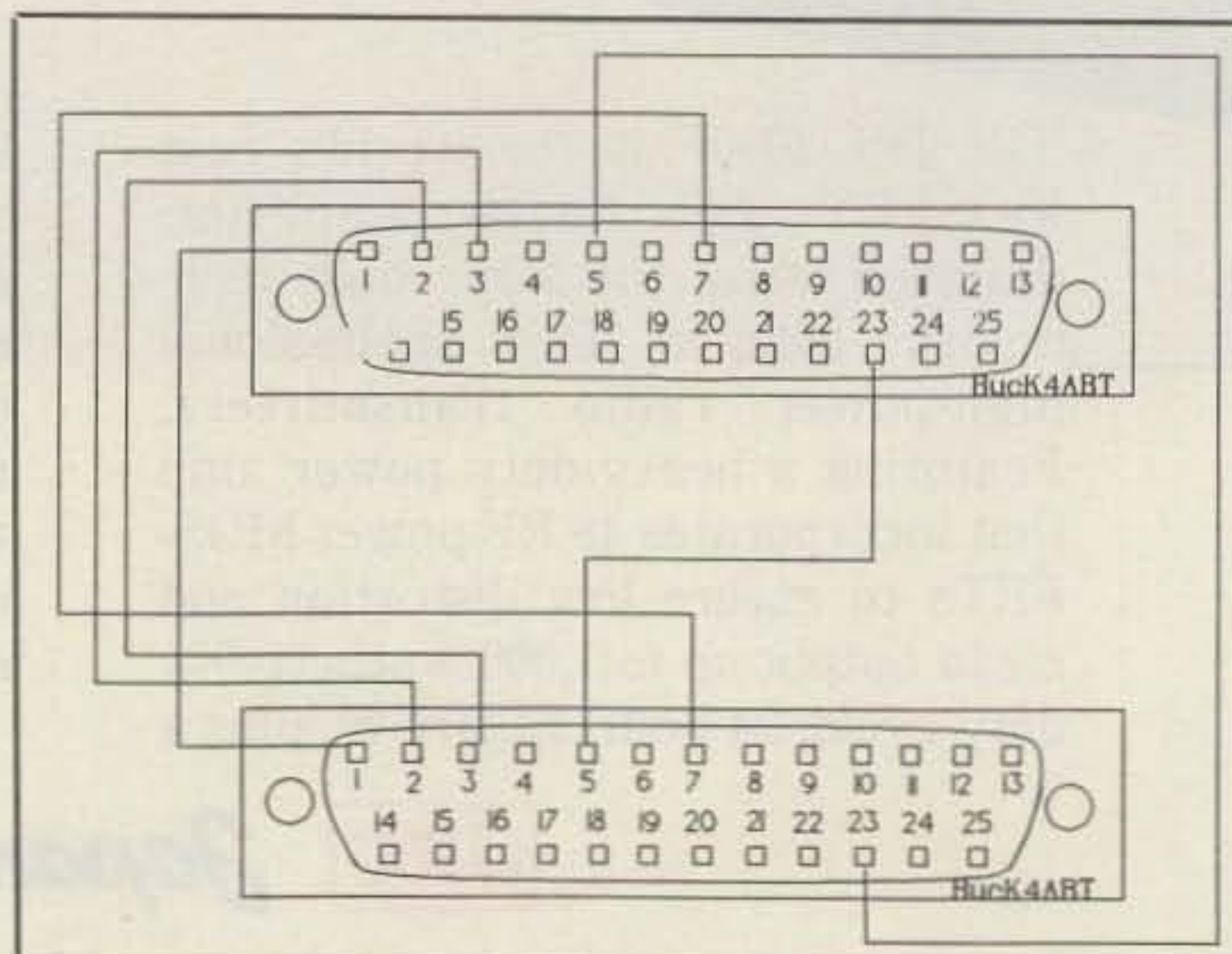


Fig. 1- TAPR TNC2 clone showing installation and wiring of the 9600 baud modem.

Fig. 2- This two-port connector is used to gateway between two ROSE switches that are on different frequencies and/or different baud rates. (Note: Pins 2 to 3 and pins 5 to 23 are rolled (inverted) between the two connectors.)



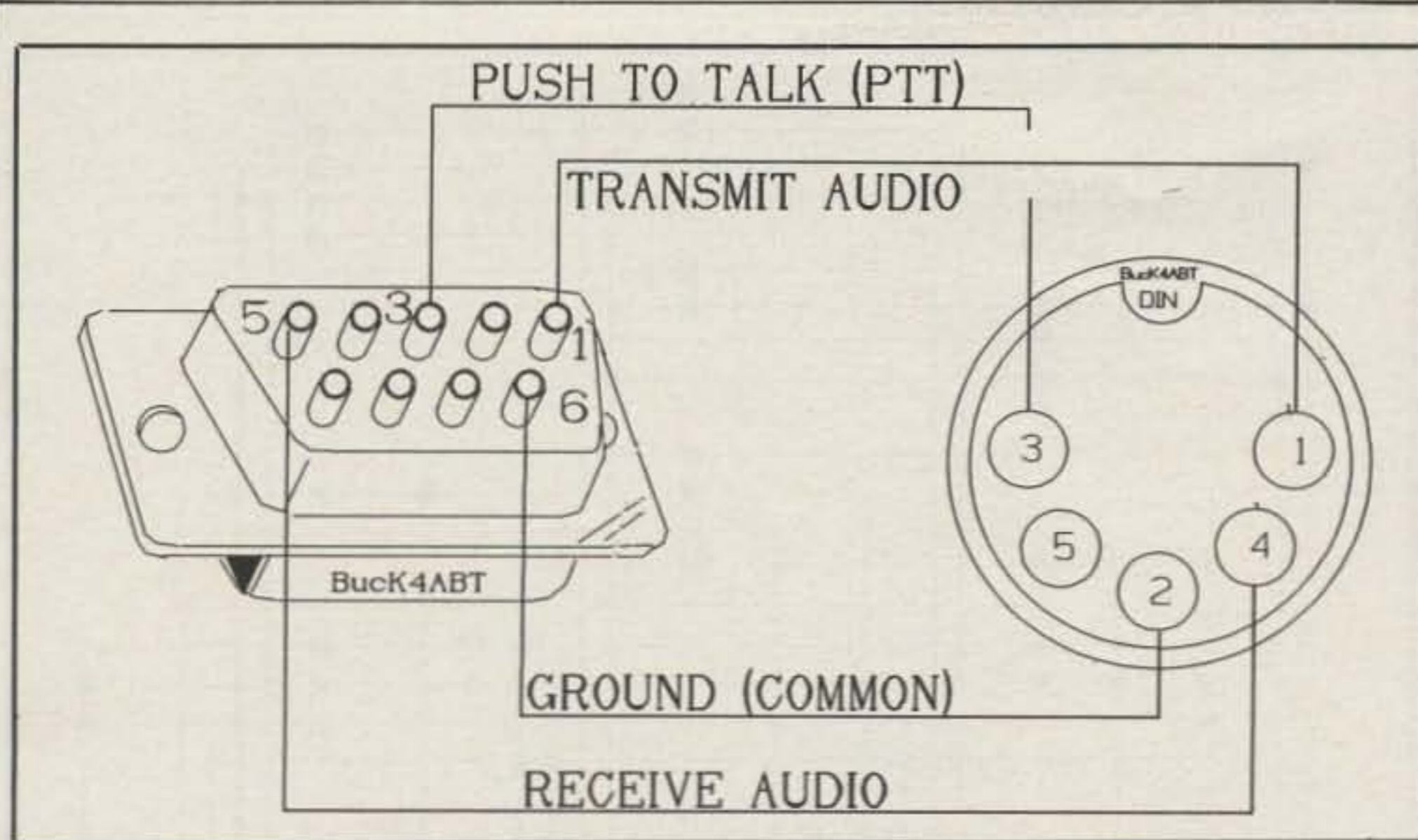


Fig. 3- Kantronics D4-10 DataRadio to MFJ-1270B equipped with 9600 baud modem and ROSE firmware (EPROM) installed.

as a ready-to-operate 9600 baud radio, all that's left is the addition of a TNC that is ROSE or theNet (EPROM) compatible and that is equipped with a 9600 baud modem.

Both the ROSE and theNet are two of the more popular protocols. However, we will use the ROSE hardware configurations for this month's project. This month's column may also catch the eye of some other transceiver manufacturers and motivate them to take a closer look at what is needed in the packet community.

I'm hoping the transceiver manufacturers will come up with easy access to the tie points inside the transceivers. The tie-points that we hope they will give us are "to" the varactor stage(s) of the true FM transceiver (transmit audio) and "from"

the quadrature detector and/or discriminator (receive audio). The push-to-talk line is another point that will need to be accessed via these external connectors.

Let's Get Busy

The input and output lines to and from each of these circuits must be shielded from each other. There is no common shield for both signals. I repeat: Each signal *must* have a separate shield (notice the transmit and receive audio lines inside the TNC in fig. 1). If these lines are not properly shielded (separately), the data within these lines can be corrupted and destroyed by noise ingress from surrounding circuitry. Don't

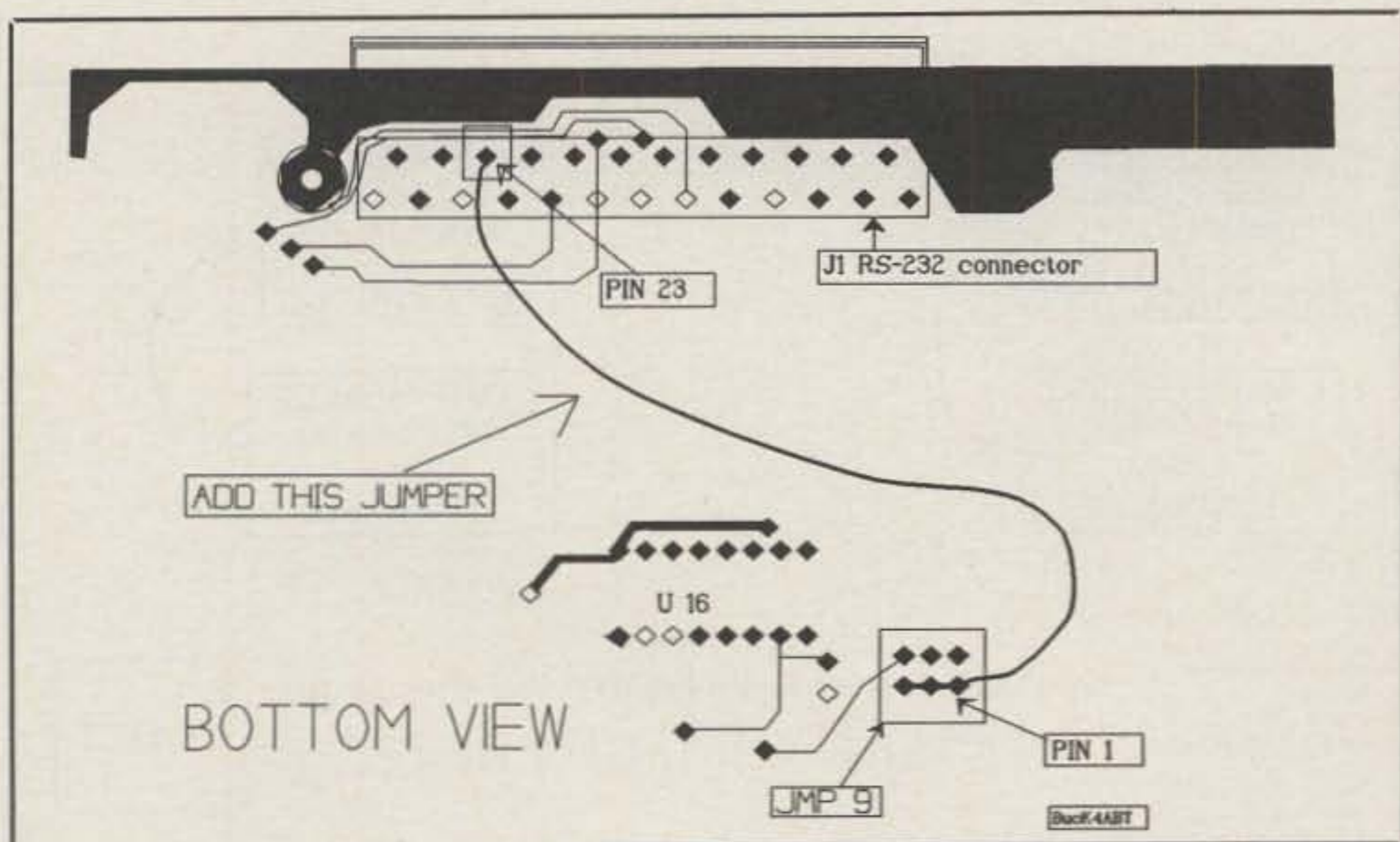


Fig. 4- This minor modification enables flow control when two or more ROSE switches are connected back to back or when connected to a diode matrix to form a multi-port gateway. (Note: This modification is already installed in the 1992 production models of the MFJ-1270B and MFJ-1274.

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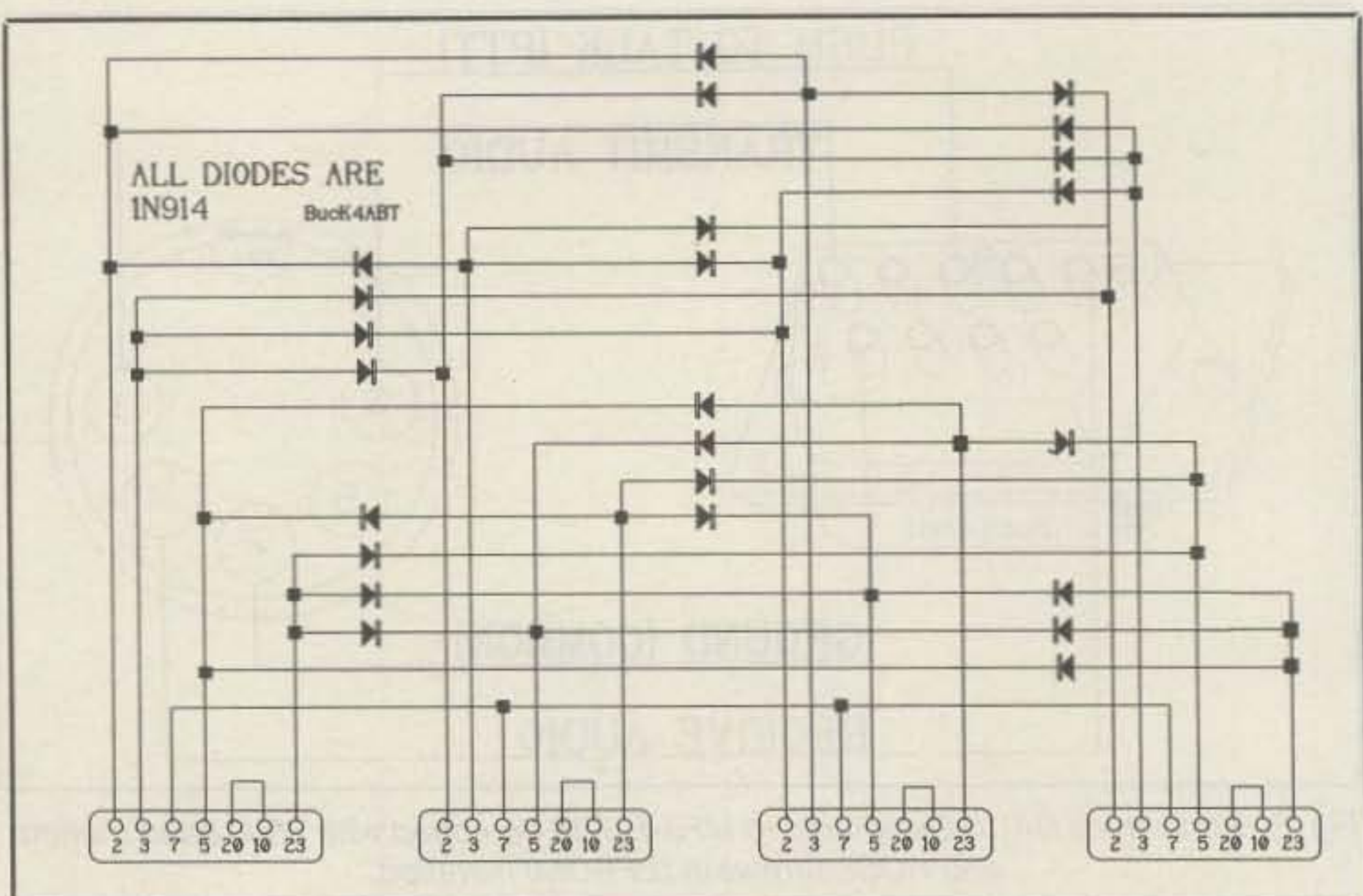


Fig. 5- Diode matrix used to interface up to four ROSE switches in a gateway configuration. Switches may be used to link to other frequencies, baud rates, or trunks. This matrix may be used to interface LANS into backbones.

forget to widen the IF filters, as a wider band-pass is needed with 9600 bauds and higher.

Give us a modular connector on the rear of the VHF and UHF transceivers that connect to the (True FM) varactor modulator, and the output of the quadrature detector. Include the push-to-talk line, and you have touched all bases—and our hearts.

No More Mods Let's Plug-'n-Play

Phil Anderson, W0XI, and the design team

at Kantronics in their wisdom presented us with the following choice(s), or better said, a set of building blocks to formulate the system we might need. On their 10 watt UHF transceiver, the D4-10, they gave us easy access to the varactor modulator and the receiver discriminator output, with both TTL or analog connectors *on the rear panel*. (Thanks for listening, Kantronics.)

A few months back (July CQ) I told you how we used the TTL port at 19,200 bauds. This time we will use the analog port of the Kantronics D4-10 UHF transceiver. The TNC will be the MFJ-1270B equipped with the MFJ-9600 baud modem, and the ROSE

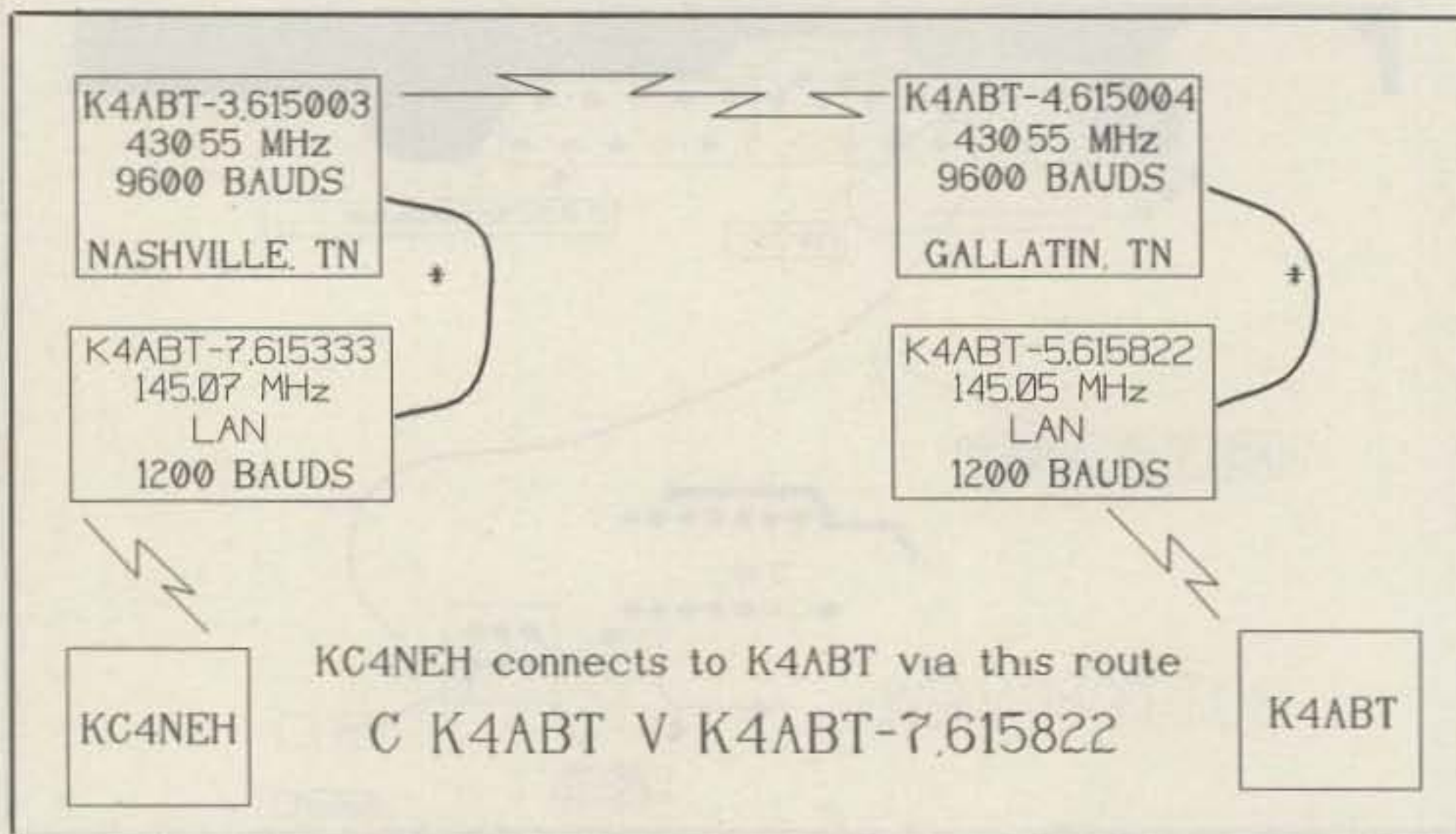


Fig. 6- KC4NEH connects to K4ABT via this route shown. An asterisk (*) indicates cable shown in fig. 2. Set both TNC dip switches for 9600 baud via the async ports. Some older TNCs may require that async ports be set to a lower speed. In any case, make sure that all are set to the same baud rate.

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code, version 3.0, or for those who use the ROSE dating system, 920730.

When constructing the interface cable that connects the TNC to the D4-10 (see fig. 3), it is necessary that mini-coax, or shielded cable be used on both the transmit and receive audio lines. This means a separate line for each, *not* both lines in a common shield. Tie the shields to pin 2 of the TNC exit connector only; *do not* ground these two cable shields at the transceiver end of these lines. In addition, it is wise to use ferrite beads over the center conductor of each line at the transceiver end of each line.

I was able to use the connector and cable that was included with the MFJ-1270B TNCs for the interface cable between the Kantronics D4-10 transceiver and the TNC. The shield in this cable is soft copper that is distributed around the signal-bearing lines inside the cable.

Hardware Configuration

If your needs are for a network backbone, or trunk, then you may wish to build the transition from a LAN frequency to a UHF backbone. If this is the case, a transceiver/TNC combination is necessary for the LAN frequency, and another transceiver/TNC combination is needed for the high-speed backbone side of this gateway.

It will be necessary to construct the gateway interface cable illustrated in fig. 2 and to set the async port dip switches on both TNCs to complement each other. The end result of this gateway configuration should allow connects similar to the one shown in fig. 6. This is a simplified approach, but the results can be removing heavy traffic from our Local Area Networks and moving it to the high-speed trunks. Make sure that your TNC is equipped with the modification shown in fig. 4.

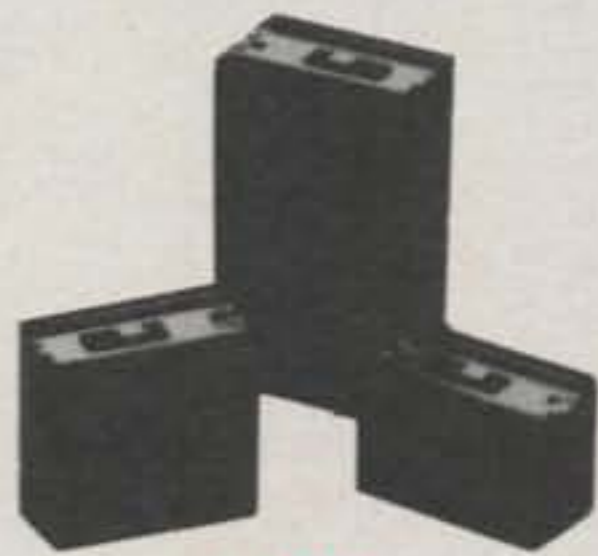
After studying the application of our gateway, you will notice that the local user does not experience the heavy traffic that is usually seen across the system.

This implementation of high-speed trunks can be a joint venture by other systems, such as BBS forwarding. If the LAN is set aside as an emergency or keyboard-to-keyboard-only system, there must be a means of barring access to the BBS via the LAN and backbone. A means to limit access to BBSes from a keyboard-to-keyboard-only system is supported within the ROSE firmware. Likewise, the same feature is supported from the BBS side of the high-speed backbone.

Through cooperation among SYSOPs, the backbone can be utilized to move vast amounts of traffic over long paths without affecting the throughput at the user level. Again, I caution the SYSOP who might consider mixing various kinds of traffic. *Please* consider the end result before leaping into this line of fire. Experience has taught

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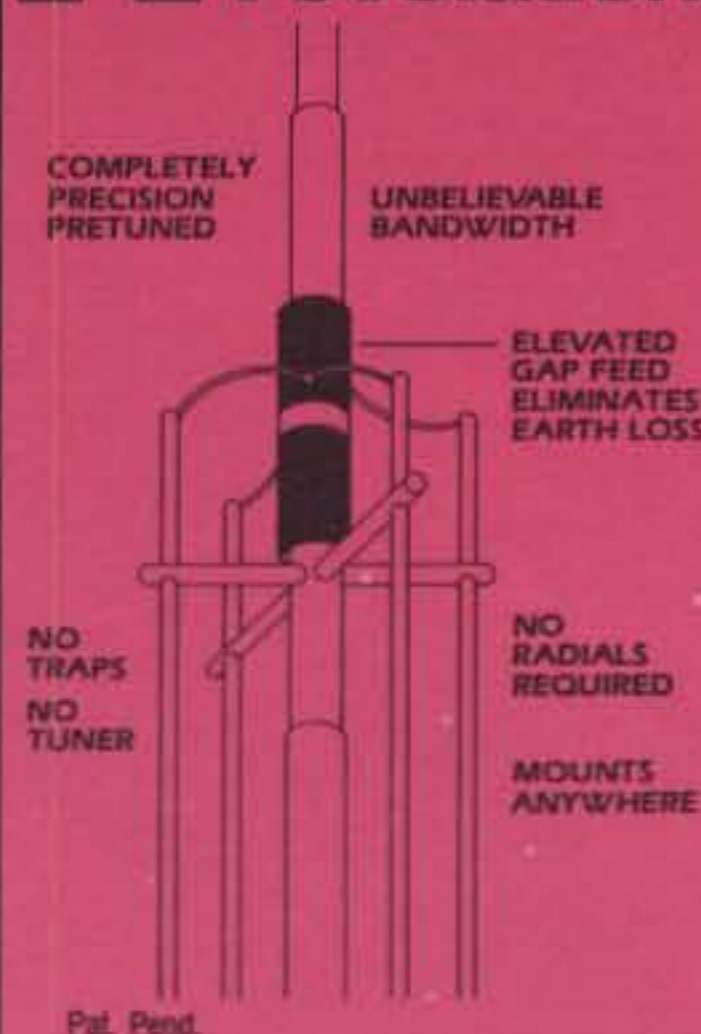


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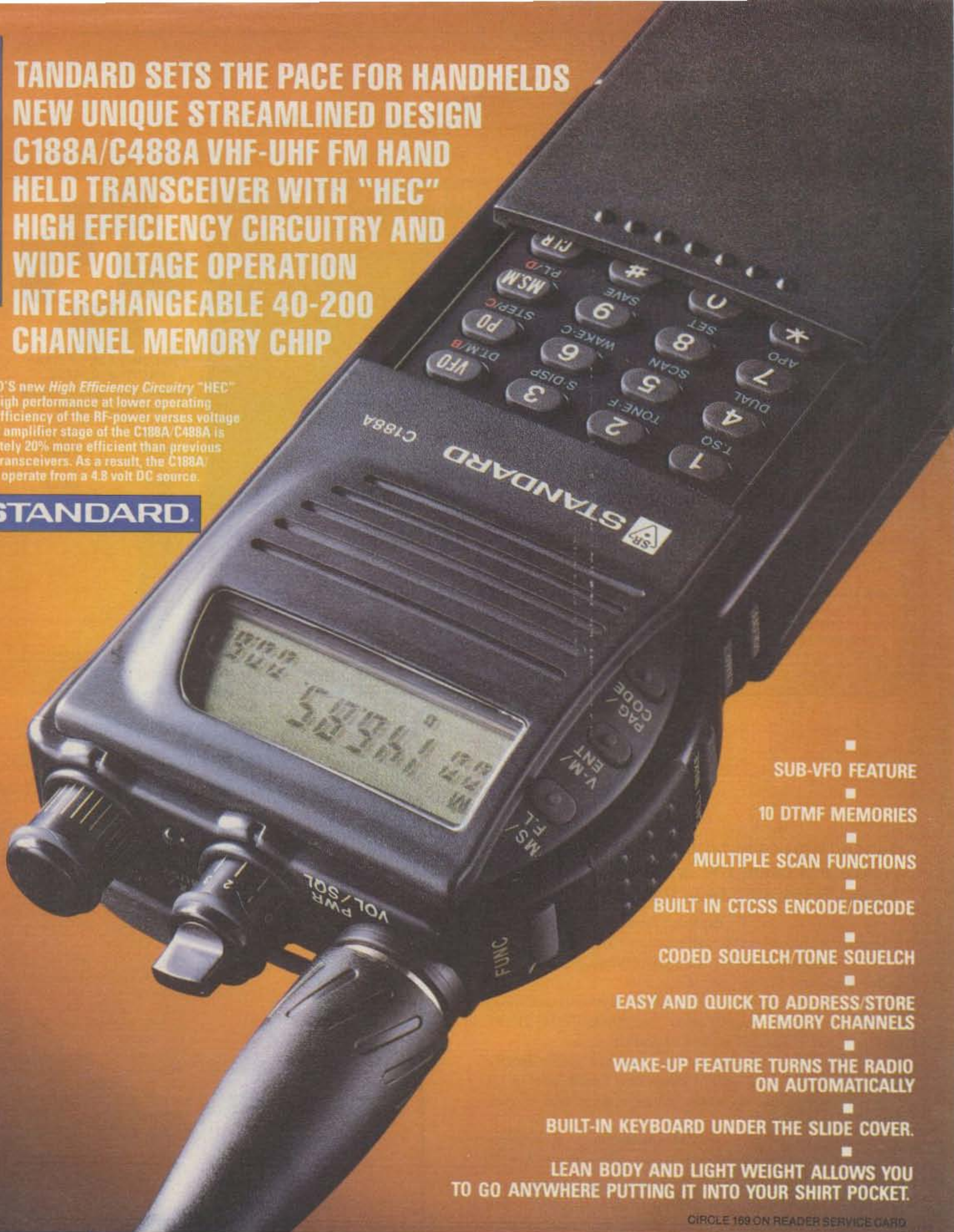
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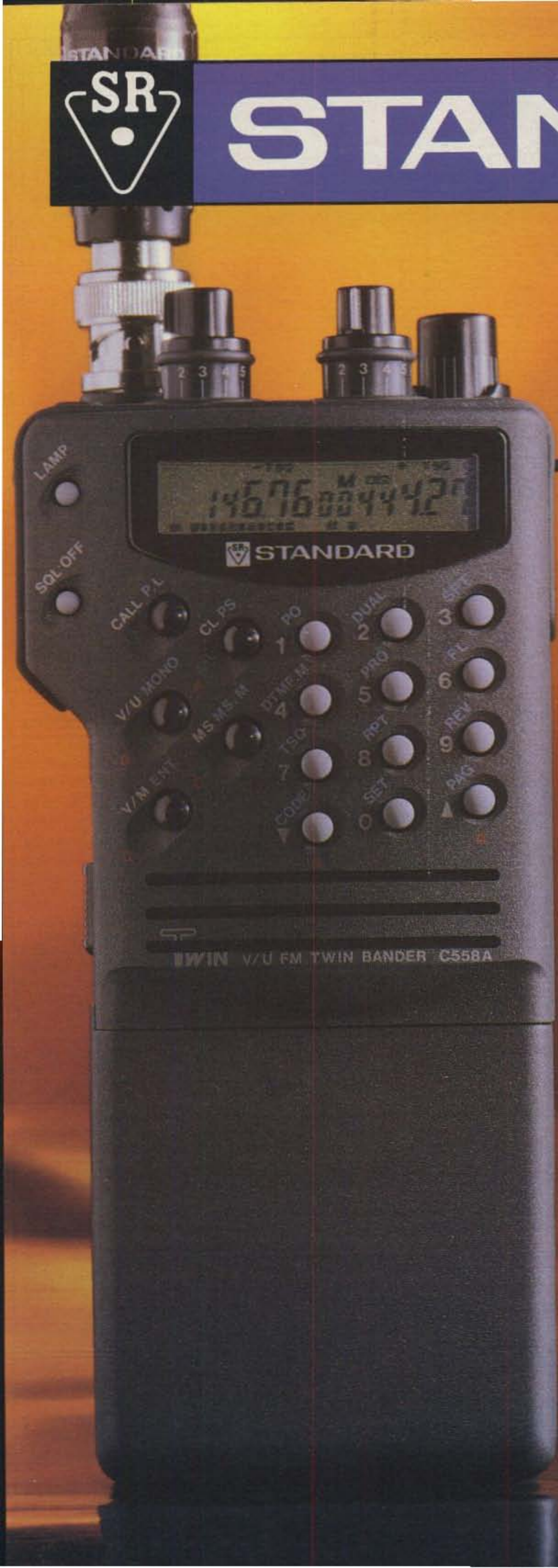
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Model	Pin (W)	Pout (W)	Ic (A)	Gain/NF (dB)	(13.8 V) Type
50 MHz					
0503G	1-5	10-50	6	15/0.6	LPA
0508G	1	170	28	15/0.6	Standard
0508R	1	170	28	+	Repeater
0510G	10	170	25	15/0.6	Standard
0510R	10	170	25	+	Repeater
0550G	5-10	375	60	15/0.6	HPA
0550RH	5-10	375	60	+	Repeater HPA
0552G	25-40	375	55	15/0.6	HPA
0552RH	25-40	375	55	+	Repeater HPA
144 MHz					
1403G	1-5	10-50	6	15/0.6	LPA
1406G	25	100	12	15/0.6	Standard
1409G	2	150	25	15/0.6	Standard
1409R	2	150	24	+	Repeater
1410G	10	160	25	15/0.6	Standard
1410R	10	160	24	+	Repeater
1412G	25-45	160	20	15/0.6	Standard
1412R	25-45	160	19	+	Repeater
1450G	5	350	56	15/0.6	HPA
1450RH	5	350	56	+	Repeater HPA
1452G	25	350	50	15/0.6	HPA
1452RH	25	350	50	+	Repeater HPA
1454G	50-100	350	40	15/0.6	HPA
1454RH	50-100	350	40	+	Repeater HPA
220 MHz					
2203G	1-5	10-40	6	14/0.7	LPA
2210G	10	130	20	14/0.7	Standard
2210R	10	130	19	+	Repeater
2212G	30	130	16	14/0.7	Standard
2212R	30	130	15	+	Repeater
2250G	5	220	40	14/0.7	HPA
2250RH	5	250	40	+	Repeater HPA
2252G	25	220	36	14/0.7	HPA
2252RH	25	250	36	+	Repeater HPA
2254G	75	220	32	14/0.7	HPA
2254RH	75	250	32	+	Repeater HPA
440 MHz					
4403G	1-5	7-25	4	12/1.1	LPA
4410G	10	100	19	12/1.1	Standard
4410R	10	100	18	+	Repeater
4412G	20-30	100	19	12/1.1	Standard
4412R	20-30	100	18	+	Repeater
4448G	5	100	22	12/1.1	HPA
4448R	5	100	22	+	Repeater HPA
4450G	5-10	175	34	12/1.1	HPA
4450RE	5-10	175	34	+	Repeater HPA
4452G	25	175	29	12/1.1	HPA
4452RE	25	175	29	+	Repeater HPA
4454G	75	175	25	12/1.1	HPA
4454RE	75	175	25	+	Repeater HPA



MODEL 1410G
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50 MHz	0520B	.5	25	BNC
50 MHz	0520N	.5	25	N
144 MHz	1420B	.5	24	BNC
144 MHz	1420N	.5	24	N
220 MHz	2220B	.5	22	BNC
220 MHz	2220N	.5	22	N
440 MHz	4420B	.5	18	GNC
440 MHz	4420N	.5	18	N
1.2 GHz	1020B	.9	14	BNC
1.2 GHz	1020N	.9	14	N



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```

OUT=K4ABT4.ROM
CALL=K4ABT-4
DIGI=K4ABT4
ADDRESS=3100615004
SETUP=WAIT! While your call is setup
COMP=CALL COMPLETE, You're connected to
BANner=430.55 MHz; 9600 b/s ROSE network, limited access trunk.
# This file is used for User Ports and Trunks over RF @ 9600 Baud
#
L3FRack      1
L3RESptime  1
L3MAXframe   6
L3RETry     12
L3CHECK     1800
L2FRack      1
L2RESptime  1
L2MAXframe   6
L2RETry     12
L2CHECK     500
OTXD        70
    
```

Table I- The above listing illustrates a new means to configure the 27C256 EPROM for the 9600 baud ROSE switch. Note: The OTXD 70, last item in the PAR file, is a TXD of 7, expressed in the MAKEPROM program as 70 milliseconds.

MAKEPROM /INCLUDE=K4ABT4.PAR

Table II- This short line is the batch file (K4ABT4.BAT) which executes the text file into MAKEPROM.EXE as shown in Table I.

some of us that mixing Conference, Convers, BBS forwarding, or DX Spotting nodes and networks into one system will bring the system to its knees. It is a matter of experience that has taught us to use separate frequencies for these multi-connect conference and spotting clusters.

When an application calls for integration of several baud rates and frequencies, the necessity for more than two TNCs arises. Shown in fig. 5 is the means to augment our multi-port gateway and baud rate transition.

Speed Calls For More Speed

One final tip to the high-speed switch SYSOP: When burning the EPROM for the TNC, I found that using a faster (150 nanosecond) 27C256 improved the throughput over the 200 and 250 ns EPROMs that we were able to get away with in the 1200 baud switches.

In the current ROSE code there are several "PAR" files that support RF or user levels ranging from 1200 to 9600 baud, and via the async and radio ports. Be sure to look at the "PAR" files and determine which one you wish to use. In my case I wrote my own to fit my application. By experimenting you can tailor the 9600 baud parameter files to give optimum throughput. If you don't care to experiment, you may wish to use the K4ABT4.PAR file shown in Table I. Table II is the K4ABT4.BAT file I use to execute the K4ABT4.PAR file. All examples are included in the ROSE 3.0 ZIP file.

Module and Component Vendors

The Kantronics D4-10 UHF transceiver is shipped standard with 430.550 MHz crystals installed and is priced at \$369.95. For more information or to order, you may contact your Kantronics dealer, or Kantronics at 1202 E. 23rd Street, Lawrence, KS 66046. Their telephone order line is 913-842-7745. Their BBS @ 300, 1200, 2400, N,8,1 is 913-842-4678.

The TNC2 type clone MFJ-1270B (TNC) and MFJ-9600 (9600 baud modem) combination is available for \$229.95 from MFJ Enterprises Inc., Box 494, Mississippi State, MS 39762. Their order line is 800-647-1800.

A similar TNC2, 9600 baud TNC is available (for \$259.00) from PacComm Packet Systems, Inc., 4413 N. Hesperides St., Tampa, FL 33614. Their order line is 800-223-3511.

ROSE networking software is available from The RATS, P.O. Box 93, Park Ridge, NJ 07656-0093.

To receive the free handbook *Having Fun with Packet Radio and the ROSE Network* and the ROSE software, send an SASE (large enough manilla envelope to return a handbook the size of CQ magazine, with \$2.90 postage) and a formatted MS/DOS disk. I will supply the ROSE software, and include the BUXTERM.EXE terminal program and documentation on your disk. I will not furnish postage, and I will not format disks. The return address must be on the envelope.

Having fun @ 9600 bauds!

73, de BucK4ABT

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WHAT'S NEW AND HOW TO USE IT

In this month's column I would like to pay my respects to the recent passing of an institution in the world of the amateur radio operator and electronic hobbyist as well. I am referring, unfortunately, to the Heath Company, manufacturer of the famous "Heathkit."

For years amateurs wishing to save money and still own high-quality equipment built Heathkits by the thousands. Who can forget the DX series, the "Benton Harbor Lunch Boxes," the first collection of professional-grade test equipment ever available to the experimenter at affordable prices, and the "hands on" introduction of P/C boards, transistors, and ICs.

"Put part A in hole A (check), strip and tin 2 inches of the blue #22 wire supplied with the kit (check), adjust R21 for 2.5 volts (check), adjust C21 until the plate of the 807 just glows dimly" were part of the lexicon of the hobby for decades. Learning that acid-core solder or solder paste was not the way to go or how to solder altogether was made very clear when one assembled—no, change that to built—a Heathkit, for each and every component was lovingly connected by hand—the kit builder's hand. By the time you were finished (which often involved a lengthy debugging ordeal) you not only knew what was going on behind the front panel, but you had the added thrill of actually having it work as specified. This thrill of accomplishment and satisfaction cannot be equalled today, even by purchasing the most complex piece of equipment built by someone else.

I had the privilege of reviewing many of the fine products manufactured by the Heath Company during its heyday, and I was always amazed at how up to date, circuit and component-wise, the various Heathkits were. With the advancement of IC technology, however, the hundreds and in some cases thousands of components that used to be required to build a piece of quality gear have given way to a few resistors and chips, making kit building on a large scale not as profitable a business as it once was. And so, dear Heathkit, a fond and sad farewell. We are not likely to see your kind again.

I apologize to those of you who read this column for not covering a technical topic

c/o CQ magazine



The passing of an era.

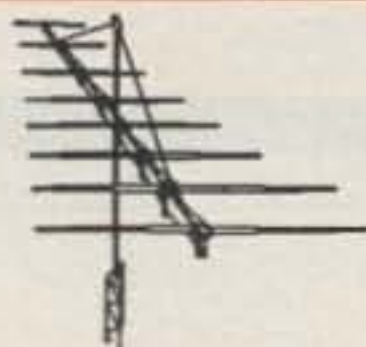
this month (and it will be back to business next month), but the passing of Heath is sad to me for another reason. I have always been a "home-brewer" and still feel that one of the problems with our hobby today is the lack of interest in "hands-on" building by hams. True, the wide range of sophisticated equipment advertised in magazines such as CQ is beyond the ability of most readers to design or build, but the simpler gear is certainly not. Also true is the fact that components are not as easy to obtain as they were in "the good old days," but outlets such as Radio Shack, the various surplus component and supply houses such as the ones also advertising in CQ and other magazines, and obsolete, discarded electronic equipment can still provide many "goodies" for experimental purposes. I still have an old RCA 630-TV set power transformer, by the

way (just in case), but I also have an excellent ultra-low noise front end from a four-year-old TV set UHF tuner, and with a little bit of hunting, maybe a letter or two to the manufacturer or a friendly repairman, I can get the schematic for it and probably use it up to a GHz. So, no excuses, at least not to this author!

When you do build something, even something simple with your own hands, and then use it to communicate with someone a mile or a thousand miles away, you are continuing a legacy that began before there was even an electronics industry. And, if you do get interested in this part of the hobby, you might actually discover something brand new, either technically or best of all about yourself!

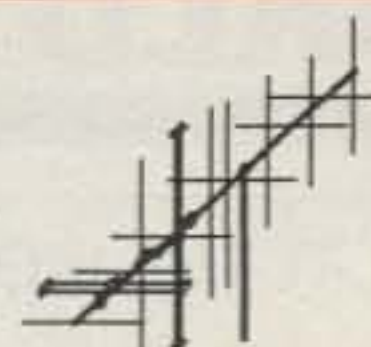
Please let me know your feelings about this.

73, Irwin, WA2NDM



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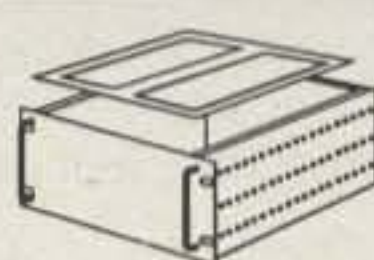
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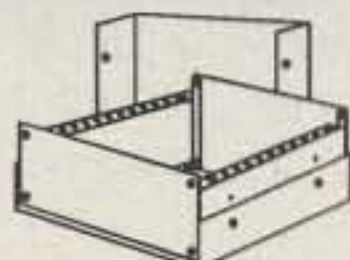
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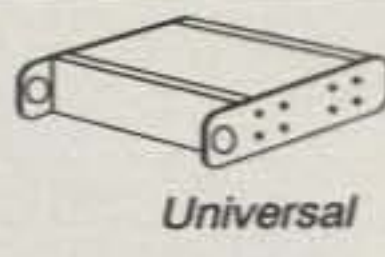


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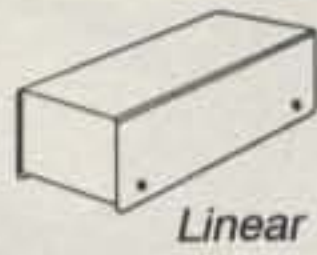
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A LOOK AT THE WORLD AROUND US

Mailbag Notes and HF Mobiling—Part II

Last month's discussion of Mailbag Notes and HF Mobiling overflowed available space, so we continue this month with more news and views of hamming on the open road. Before delving into that topic, however, I wish to thank everyone for your continuing support plus all the photos of keys for inclusion in our next "Keys Special" column. The wide variety of CW instruments produced over past years is simply incredible, and our 1993 "Keys Special" is shaping up to be another winner.

Particularly interesting was a video tape I recently received from Robert Holman (RD 1, Box 526, Mifflinburg, Pennsylvania) showing a half-dozen of his keys for sale. Robert's use of a home video camera to show his keys from every angle and demonstrate their use was so clever I immediately reasoned this video tape concept would be the ideal way for collectors and CW enthusiasts around the country to share views in a quasi-visit manner. Video taping keys works great, because you can see your own pictures right on the spot through the camera's viewfinder and focus or move around to avoid reflections. Does this traveling video of key collections and views hold merit, and how can a person like myself (with no spare time) coordinate the plan? Here is the basic idea.

I can begin the video by renting a camera from the local home video store and showing some of my keys plus adding some notes on telegraphy. I will then pay postage and ship the (VHS) video tape to the next collector to do likewise. Assuming a reasonable number of key enthusiasts join in this project, "first time around" views should be fascinating and "second time around" views should really get exciting. This concept will work if, and only if, everyone conscientiously follows the plan.

If you wish to see the video and add your own views, drop me a short note briefly telling about your keys and include two self-addressed postcards (three, if you have a question or want an immediate reply). I will mail the first postcard back to you when the video is available and the person "in front of you" is mailing it to you. I will mail

4941 Scenic View Drive, Birmingham, AL 35210



Photo 1—Jon, KA0ZFX, beside his super mobile. Bugcatcher antenna is mounted behind driver's door. Truck and trailer make a very effective ground system!

the second postcard to you 10 to 14 days afterward with the address of the "next person" to whom you should send it. After you ship the video, send me a third postcard and I will use it to notify you of the

"second time around." This technique should alleviate all letter writing on my end and keep the video moving. I will report results to you in a future column. Meanwhile, let's all have a ball looking at those



Photo 2—In-cab view of the 18-wheel KA0ZFX mobile setup. Kenwood 850 drives kilowatt amplifier barely visible on right. Note fan on dash for cooling.

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England Patent #2,046,529. Other Patents Pending



Photo 3- Lindell, AA7DG, and son Maxwell, with all-band mobile. Supertenna on left is flanked by Outbacker on right, 2m/70cm antenna on cab, and 1.2 GHz "spike" barely visible on cab's front.

beautiful keys in private collections nationwide.

Our good friend and 30 meter aficionado, Mike, W8XF, reports if all goes well and enough interest is indicated, he may soon become the U.S. importer for Hi-Mound keys. Mike purchased a couple of these keys during his recent trip to Japan,

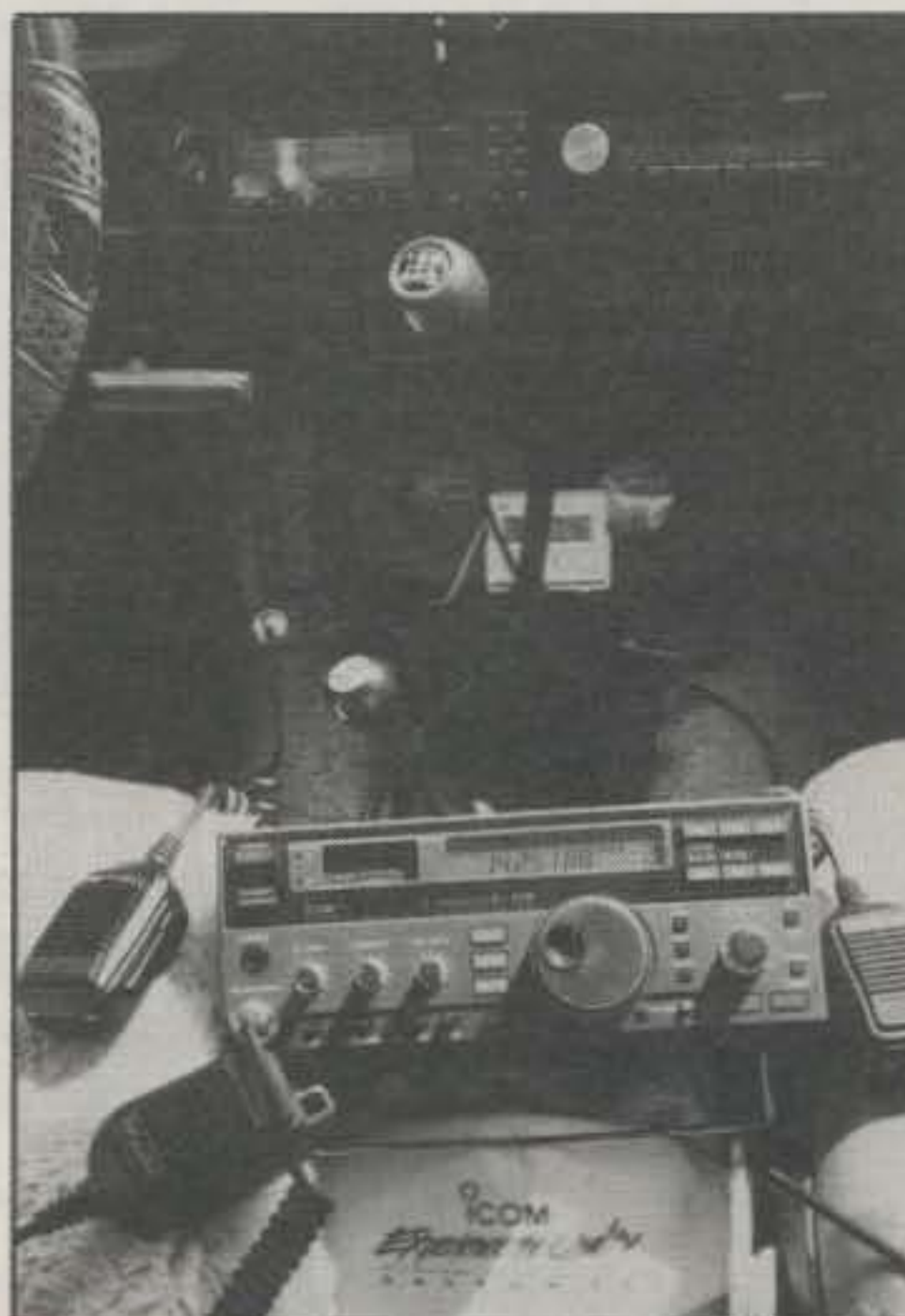


Photo 4- Interior view of AA7DG's mobile. IC-728 between seats is complemented by an IC-2500 mounted vertically and IC-901 control head on dash. Three mikes, and all-band coverage from 160 meters through 1.2 GHz!

and he was so impressed with their high quality that he began checking into distributorship. He sent me a Hi-Mound brochure, and the little gems look terrific. There are chrome hand keys on marble bases, precision dual- and single-lever paddles, a unique hand key with chrome rods rather than a flat mechanism (sits on base or side), and a self-contained keyer-paddle in a round cylinder case with flat base (for home and mobile use). We wish W8XF good luck with the Hi-Mound line, and I am sure he would welcome your postcards of encouragement.

From across the pond, G4ZPY reports his new miniature pump key is now in production and orders are rolling in. If you missed seeing this key in our recent New Products Showcase, it is 1 inch square, and the world's smallest operational key in production today.

Now let's shift from mailbag views and continue last month's discussion of HF mobiling.

Keep On Truckin'

If you work 40, 20, or 17 meters SSB during evening hours, you have surely heard the big signal of KA0ZFX/Mobile. Jon recently upgraded his vehicle and rig, and now rolls through the Dakotas with 1000 watts on 18 wheels. A view of Jon with his tall Texas Bugcatcher-equipped truck is shown in photo 1, and a cockpit view of the rig is shown in photo 2. The Kenwood TS-850 drives an adjacent mounted linear amplifier, and a boom-mounted Heil microphone is used for hands-free mobiling. The antenna is mounted on a custom support behind the door, so band changing simply involves reaching out the door and changing coil tap positions. The antenna's base is higher than most cars' roofs, and the complete truck/trailer makes a super ground system, so the setup "gets out" great.

What other activities does Jon pursue? Look at CQ's WW WPX Contest rules and results, and you will see KA0ZFX also sponsors one of the main trophies. This chap is a genuine good guy of amateur radio!

Truckin' and Bikin'

Thanks to Lindell Thieson, AA7DG, we have some interesting views of big-time mobiling in the great northwest. Lindell originally set up his truck for HF mobiling in the wide-open spaces of Montana and used a homebrew antenna that stood almost 16 feet from road to tip. It was centered on the bed of his Toyota pickup, and obviously radiated a whopping signal. After the good ole days of home life and college, Lindell migrated to Seattle and downsized his antennas for around-city use. AA7DG's present setup, shown in

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Photo 5- Bicycle mobile/portable setup of AA7DG. Now this is the way to go IOTA expeditioning in style!

photo 3, consists of a tall "supertenna" and 6 foot Outbacker for 80 through 10 meters, plus antennas for 2 meters, 440 MHz, and 1.2 GHz.

Equipment inside the truck (photo 4) consists of a new ICOM IC-728 squeezed between the seats, an IC-2500 mounted vertically on the console, and an IC-901A with its control head mounted on the dash beside the Sony radio. Lindell says the setup gets out great, although he admits mobiling from the semi-rare state of Montana during vacations still creates more excitement than truckin' in Washington.

AA7DG carried his zeal for mobiling a step further and set up the neat "super

bike" shown in photo 5. The trailer is a "Burley" weighing 30 pounds and it is made in Oregon. It carries his portable gear, FM handheld, keyer, batteries, and son Max, and has extra room for carting snacks and drinks. Where does one travel for bike mobiling and portable operating? AA7DG lives near the coast, so he rides the ferry to off-shore areas such as Orchas Island for weekend IOTA expeditioning. Clever!

Airplane Cockpit Mobile

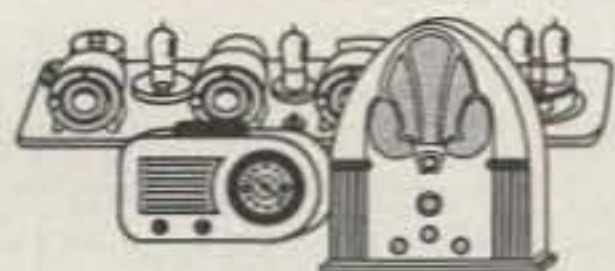
Don Arnold, WD4FSY, Terlin Antennas' (Australia) importer of the Outbacker line



Photo 6- Cockpit view of Outbacker WD4FSY's setup. Rigs are held in position by custom IIX bracket, as discussed in text.

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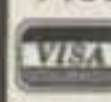



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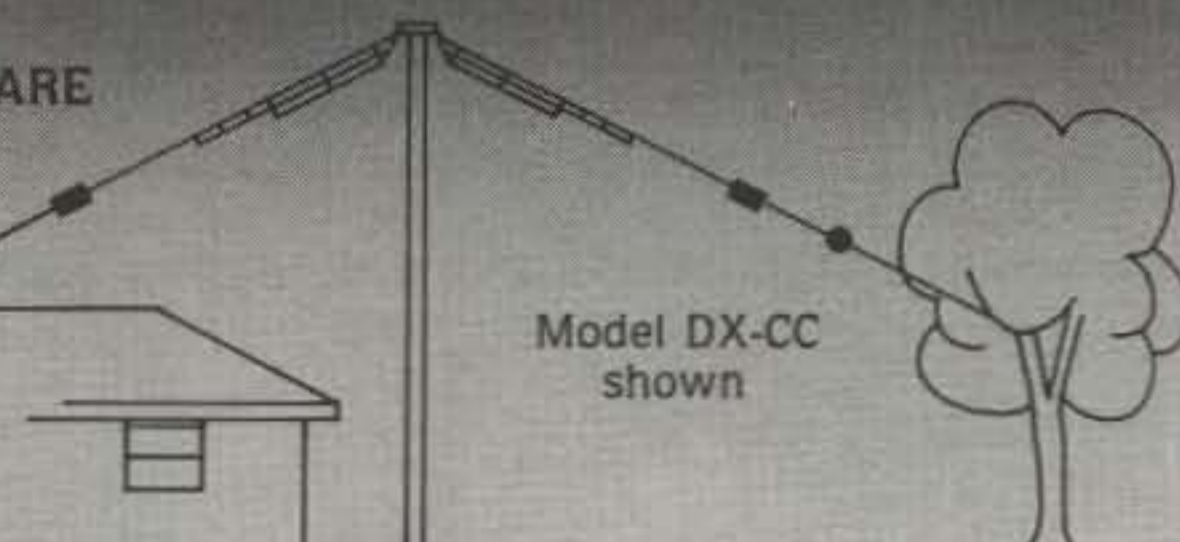
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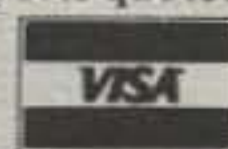
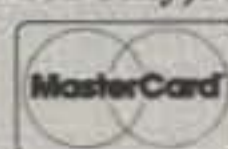
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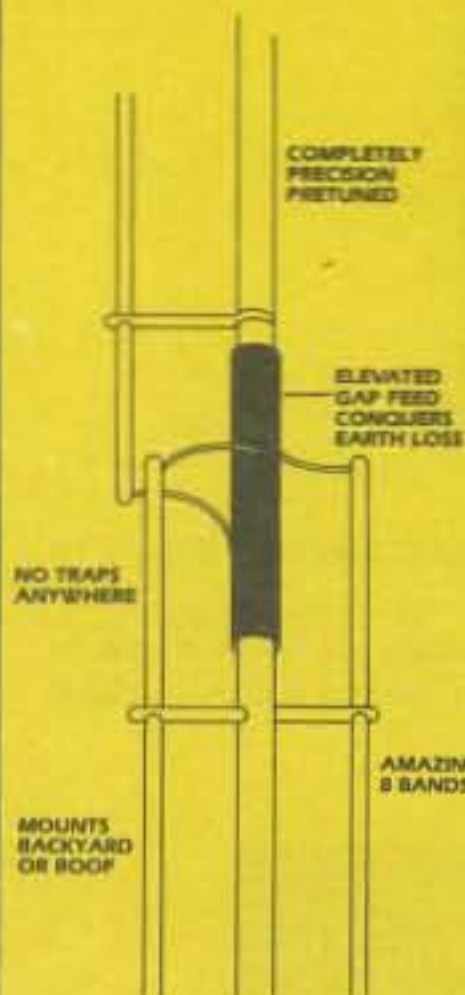


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Photo 7- Check out this new 8 foot Outbacker antenna on WD4FSY's mobile. It is supported by a hefty under-the-car steel bracket and super strong spring/mount that really "take a whammin and keep on hammin."

of antennas, is continuously expanding his mobile setup, and his vehicle now looks more like an airplane cockpit than a compact car (photo 6). An ICOM IC-728 and IC-2400 are held in position by a new-style mobile mount made by IIX Equipment, Ltd. (P.O. Box 9, Oak Lawn, Illinois 60454). This steel mount bolts to the car's floor and has an adjustable vertical brace plus horizontal bars that accept mounting brackets for various transceivers. Look beside the cell

phone, and you can see the braces' vertical adjustment nut. Look above the IC-728, and you will see the support bar holding the IC-728 and FM rigs' mounting brackets. The gooseneck night light was another handy item Don spotted during his travels and could not pass up, so he purchased a small supply of them.

I recently slipped into the driver's seat of Don's setup and everything is accessible without squirming or squinting. In fact, it is a serious mobileer's dream.

Don's mobile antennas, shown in photo 7, consist of an HF Outbacker (naturally!), 2m/70cm dualbander, and a cell phone antenna. A 6 foot 80-10 meter Outbacker is normally used on the upper bands, while a new 8 foot model for 160, 80/75, and 40 meters graces the car during evening hours. Top-band mobiles are scarce and real attention-getters. Most also use tall unwieldy whips with gigantic coils, so this new trim Outbacker fits a definite niche. I have heard WD4FSY on 160, and I must say the antenna radiates a respectable signal.

What else is new in "outbackin'"? If you remember this column's discussion of mobiling last year, I described an "Outbacker Supreme" I made by inserting a thin 3 foot whip in the top of my 4 foot Outbacker to radiate a stronger signal on 17, 20, and 30 meters. My home modification made the smaller "Junior" Outbacker a real stand-up performer, but it could only be used on three bands. Terlin Antennas in Australia followed through on the idea, and Don reports a new "Perth" model Outbacker with a 4 foot lower section and 3 foot stinger is now available for 80 through 10 meters. The stinger slides all the way into the lower section for storage and easy transportation. Since the antenna is pretuned, you slip the stinger out to its preset point and

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Photo 8- Ghostbusters mobile? No, it's an inexpensive emergency blanket used as a rig cover. (Details in text.)

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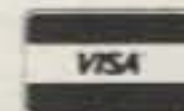
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My homebrewed version of this antenna worked great on three bands, so the new "Perth" should be a real winner. For more information on Outbacker antennas, incidentally, do not waste time by writing to me. Instead, mail your inquiry directly to Outbacker Antennas, 330 Cedar Glen Circle, Chattanooga, TN 37412 (also see ads in CQ).

No, a falling meteor did not crash on

WD4FSY's mobile setup like it seems in photo 8. Instead, Don shows us his latest "find" in a rig cover. This is a silver mylar emergency blanket available from camping stores nationwide. The blanket is lightweight, measures approximately 50 x 80 inches, and costs only a couple of dollars. The blanket helps keep the rig cool in hot southern temperatures, and probably leaves curious onlookers in a total state of confusion! Ah... visualize its additional benefits when caught by an unexpected

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A3S Tribander

A4S Tribander

A3WS 3-el WARC beam

R5 (10,12,15,17,20) **SPECIAL!**

AP8 (80 - 10 Vertical)

R7 (7 Bands, 28-7 MHz!)

A50-5 5-el 6M. beam

617-6B 6 Mtr "Boomer"

ARX-2B, -220B, -450B, AR-270

215WB 15-el wide band 2M

32-19 19-el. 2M beam

4218XL 18-el 2M Boomer

424B 24 el. 432 MHz

AOP-1 OSCAR pack

Call for prices on the entire line!

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Prices subject to change without notice. Shipping additional except as noted. Returns subject to 20% restocking fee. No antenna or tower returns.

IC-781



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YAESU FT-5200 DUAL-BAND MOBILE SPECIAL!

NYE-VIKING AMECO BENCHER HEIL SHURE KANTRONICS
ALINCO MIRAGE RF CONCEPTS AMERITRON ALLIANCE
ORION ALPHA DELTA DIAMOND KLM HUSTLER & MORE

MFJ



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All Mode TNC

HF And VHF Digital Modes

AEA



PK-232 MBX

Morse, Baudot, ASCII, AMTOR,
Packet, Facsimile, & Navtex
ISOPOLES & ISOLOOPS

ASTRON POWER SUPPLIES

RS-4A	RS-7A	RS-12A
RS-20A	RS-35A	RS-50A
RS-20M	RS-35M	RS-50M
VS-20M	VS-35M	VS-50M

CALL US FOR YOURS!

WIRE & CABLE

BELDEN COAX: (Performance ... not problems)

9913 low loss; 50 ohm.

RG-213/U (8267) 50 ohm. Mil-spec.

RG-8/U (8237) 50 ohm.

RG-8/U (8214) 50 ohm. Foam.

RG-214/U (8268) 50 ohm, double shield.

Don't settle for less than the best. Call us for Belden.

RG-8X (9258) 50 ohm; foam

RG-11A/U (8261) 75 ohm.

RG-58A/U (8259) 50 ohm.

RG-59/U (8241) 75 ohm.

COPPERWELD ANTENNA WIRE:

Solid: 12 ga; Solid: 14 ga.; & Stranded 14 ga. Cut to your specs.

ROTOR CABLE:

Standard(6-22, 2-18) Heavy Duty(6-18,2-16)

We stock Amphenol Connectors and Andrew Hellax.

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HC 86 Box 580
Merrifield, MN 56465

CIRCLE 62 ON READER SERVICE CARD

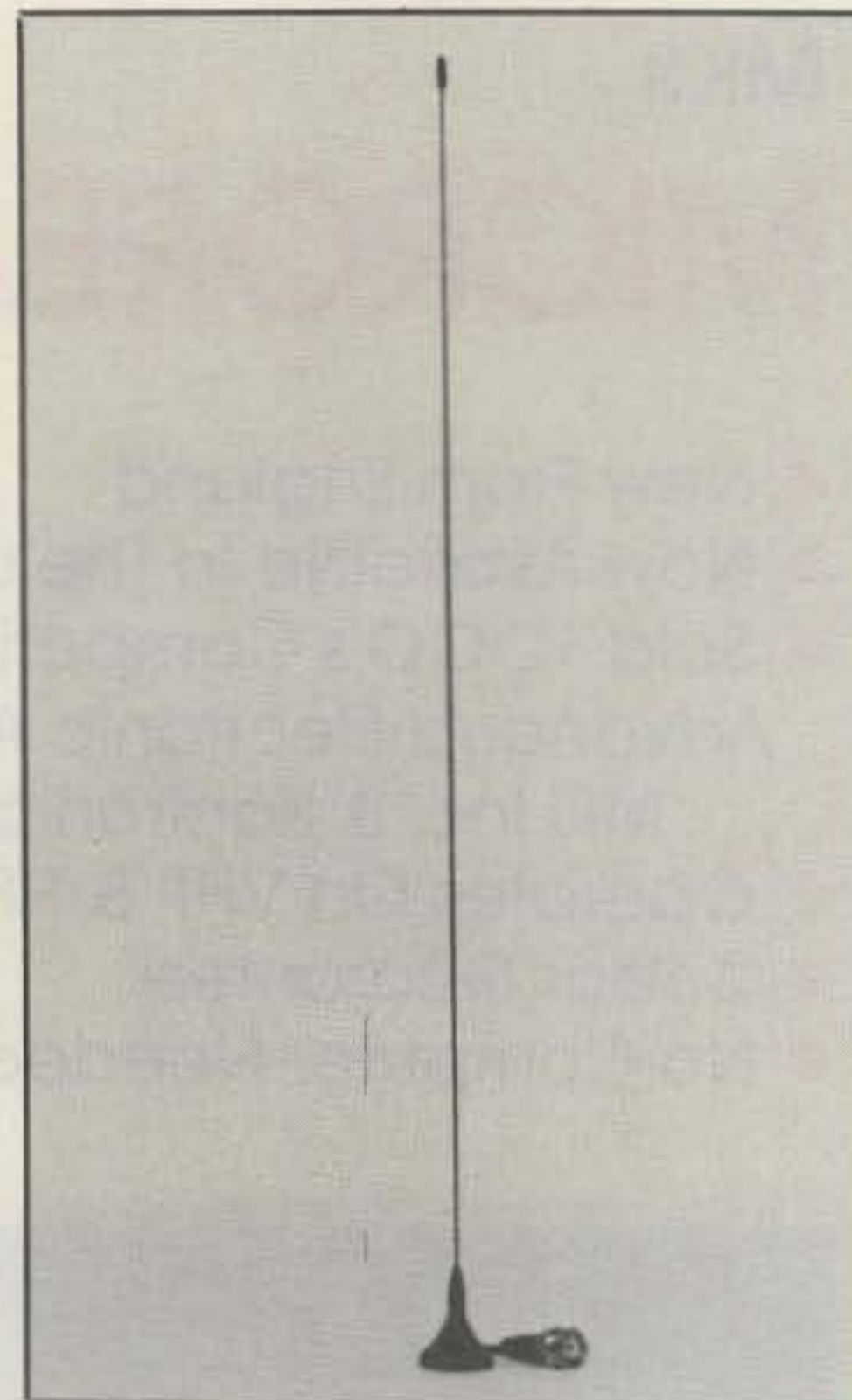


Photo 9- PRO-AM's new ultra-trim 2 meter dual-band mobile antenna. It looks unusual because this base is only 1 inch in diameter, but it works great and adds 3 dB in amateur appeal to any car. Note base size compared to adjacent BNC plug. Wow!

blizzard on a lonely freeway. Both mobileer and prized equipment could "pack in" for survival.

As we wound down this month's column, one of the neatest 2 meter mobile antennas I have seen arrived from PRO-AM. This little treat, shown in photo 9, has a mag-mount base that is only 1 inch in diameter by 1 inch tall and a 19 inch whip section made of super thin yet extremely strong stainless steel. The most interesting point of this little antenna is the rare earth/titanium magnet in that tiny base. It looks like a big Hershey's Kiss, but it holds onto a car like a bulldog. The antenna works terrific, and it adds an elite touch to classy mobiles. I understand this new "Kiss antenna" is available in your choice of silver or black chrome. Check them out! They should be available from PRO-AM dealers nationwide by the time you read this column. I also understand a 2m/70cm dual-band version that looks like a cell-phone antenna is coming in the near future.

That concludes the mobiling views and ideas for this time, gang, but stay tuned for more good special features on classic rigs, QRP, Christmas gifts, and keys in the future. We are also anxious to share views of what you are doing and your special projects, so keep the photos coming and remember to include an SASE and be patient with me on replies. 73 and good mobiling to you!

73, Dave, K4TWJ

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POWERFUL

- 12 Volt 6.5 AH PowerPack.
- Boosts H-T to 5/7 watts output.
- 15 times H-T nicad pack.



MODULAR

- Modular mounts for accessories.
- Carries H-T & adapters in one.
- Standard cigarette socket.



PORTABLE

- Built-in handle & strap.
- Always ready, no overcharge.
- For emergency, field day, etc.

"Communications coverage for 10 hours without coming ashore for recharge!"

NQ4K Robert Walters LakeRidge, VA

"The PowerPack was flawless and was still working when our (emergency) drill ended."

W6VKF/7 CE "Jim" Ware Concrete, WA

DC POWER PACK

12 VOLT · DC · CORDLESS · RECHARGEABLE



DC PowerPack—Sealed lead acid cell rechargeable up to 1,000 times.
Wt. 6.8 lbs., size 7" X 3" X 10".
Powers other DC products too.

DC Charger—Recharges in vehicle in 1 to 3 hours.

AC Charger—Recharges at home in 8 to 10 hours.

Modular Clip Holder—Holds H-T, or anything with a belt clip.

Modular Storage Pouch—Carries accessories & adapters.

Modular Light—Constant/flashing light for night or emergency. Powers 8 watts up to 8 hours.

Double Socket—Powers two 12 volt products.

HAM KIT INCLUDES



Optional Solar Charger Kit

Recharges in remote areas in 8 to 10 hours (sunny day).
Powers H-T in emergency (sunny day).
15 volt, 6.8 watts, wt.4.5lb., size 12"X18"X1/4".



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\$99.95
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*S & H in continental USA. Extra cost for others. CA residents add tax \$7.75/Kit. Allow 2-4 weeks for delivery. Extra charge for 2nd day express.

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October 1992

NEWS OF CERTIFICATE AND AWARD COLLECTING

The Story of the Month for October is:

Quentin Galbraith, K5TVC USA-CA All Counties #735 Mixed, 11-30-91

"I first learned of amateur radio in about 1955, at eleven years of age, by listening to hams on the big family console radio that had a shortwave band.

"I built two radio kits soon after that. The first was the Knight-Kit '6 in 1,' and then the Knight-Kit 'Space Spanner.' I have been hooked on radios since. I received my Novice call, KN5TVC, in 1959. My first station, which I shared with my father, KN5TVI, was an SX-28, DX-20, and a long wire antenna. I received my Conditional license in 1960, General and Advanced in 1973, and Extra in 1977.

"I put out some counties in the 60s on the old 75 meter net with my cousin, K0EQY (USA-CA 125), as one of the main NCs. My first mobile rig was the WRL Duo-Bander. At that time I was not interested in collecting the counties myself. It was much harder at that time to work them all.

"For about 20 years, my main interest in ham radio was DXing. By January 1990 I had worked and confirmed all DXCC countries but one—Albania. In between working the last few countries (which can take years), I worked 9 band WAS, QRPp, and RTTY.

"Wanting something new to work on, I finally decided to try for USA-CA. It's funny, even though I was never into county hunting, the USA-CA story of the month was always one of the first sections I read in CQ magazine, never thinking my story might some day be on its pages.

"So, on one cold Saturday morning in February 1990, I started collecting counties. Dave, N7BKW, was NC that morning when I called my first mobile with my suffix only. I was a DXer. Dave politely explained about using complete calls. Someone else told me about phonetics. I soon changed from a DXer to a CHer. Hi!

"It took me one day less than a year to work my last county, Nodaway, Missouri, which my brother, WA5YNB, gave me on a Saturday. It's one thing to work them all and another to get them all confirmed. I didn't even start confirming them until I had worked them all. In a way I don't recommend doing that, but in another way it



Quentin Galbraith, K5TVC, USA-CA All Counties #735, "Looking for Hinsdale County."

will save some stamps and envelopes. There are many MRCs from WA0SBR and N9DEH in my box.

"It took about nine months to get them all confirmed, plenty of reworks. I will never understand why a person won't return an SASE.

"Then on November 30, 1991, also a Saturday, while listening on the net, I heard Arnie, K9DCJ, come on with information on the new USA-CA All Counties holders. 735 is a nice number.

"I have been a school teacher for 25 years, married to the same lovely lady for 28 years, have three children and three grandchildren. I also enjoy rebuilding old radios. I have restored an Atwater Kent 40, Philco 90, SX-28, and many others to near mint condition. I like airplanes, motorcycles, and giving out counties. 73 and BCNU on 336, Quent, K5TVC (USA-CA 735). P.S.: I worked Albania."

USA-CA Special Honor Roll

Joseph Dinger, WM9F
USA-CA All Counties #768
All SSB Mobile, 6-5-92

Ray Weigand, N7POK
USA-CA All Counties #769
All CW, 6-11-92

Paul A. Scipione, AA2AV
USA-CA All Counties #770
Mixed, 6-16-92

Joyce Judy, KD8HB
USA-CA All Counties #771
All CW, 6-29-92

USA-CA Honor Roll

3000		1500	
WM9F	794	VE3DUS	1040
N7POK	795	N7POK	1041
AA2AV	796	KD8HB	1042
KD8HB	797		
2500		1000	
N7POK	875	VE3DUS	1239
AA2AV	876	N7POK	1240
KD8HB	877	KD8HB	1241
2000		500	
N7POK	952	N0LYK	2612
AA2AV	953	N7POK	2613
KD8HB	954	DL1HBT	2614
		SM5BMB	2615
		KD8HB	2616

The total number of counties for credit for the United States of America County Award is 3076. The basic award fee for subscribers to CQ is \$4.00. For non-subscribers it is \$10.00. Initial application must be submitted in the USA-CA Record Book which may be obtained from CQ Communications, 76 North Broadway, Hicksville, NY 11801 USA for \$2.00. To qualify for the special subscriber rate please send a recent CQ mailing label with your application. To be eligible for the USA-CA applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated June 15, 1991. A complete copy of the rules may be obtained by sending an SASE to Dorothy Johnson, WB9RCY, USA-CA Custodian, 333 South Lincoln Avenue, Mundelein, IL 60060 USA DX stations must include extra postage for airmail reply.

Awards Issued

Joseph Dinger, WM9F, put the finishing touches on his good record and received USA-CA ALL Counties #768 and USA-CA 3000 #794, All SSB Mobile, dated 6-5-92.

Ray Weigand, N7POK, filed his completely filled record book and was awarded USA-CA All Counties #769, USA-CA 3000 #795, USA-CA 2500 #875, USA-CA 2000 #952, USA-CA 1500 #1041, USA-CA 1000 #1240, and USA-CA 500 #2613, All CW, dated 6-11-92.

Paul A. Scipione, AA2AV, completed all of his paperwork and claimed USA-CA All Counties #770, USA-CA 3000 #796, USA-CA 2500 #876, and USA-CA 2000 #953, Mixed, dated 6-16-92.

Joyce Judy, KD8HB, took it all in one giant leap claiming USA-CA All Counties #771, USA-CA 3000 #797, USA-CA 2500 #877, USA-CA 2000 #954, USA-CA 1500 #1042, USA-CA 1000 #1241, and USA-CA 500 #2616, All CW, dated 6-29-92.

Bert White, VE3DUS, extended his good record by claiming USA-CA 1500 #1040 and USA-CA 1000 #1239, Mixed, dated 6-8-92.

USA-CA 500 certificates went to:
Dana Leonard, N0LYK, USA-CA 500 #2612, All SSB, 6-5-92.

333 South Lincoln Avenue, Mundelein, IL 60060

ASTRON POWER SUPPLIES

• HEAVY DUTY • HIGH QUALITY • RUGGED • RELIABLE •



MODEL VS-50M

SPECIAL FEATURES

- SOLID STATE ELECTRONICALLY REGULATED
- FOLD-BACK CURRENT LIMITING Protects Power Supply from excessive current & continuous shorted output
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- ONE YEAR WARRANTY • MADE IN U.S.A.

PERFORMANCE SPECIFICATIONS

- INPUT VOLTAGE: 105-125 VAC
- OUTPUT VOLTAGE: 13.8 VDC ± 0.05 volts (Internally Adjustable: 11-15 VDC)
- RIPPLE Less than 5mv peak to peak (full load & low line)
- All units available in 220 VAC input voltage (except for SL-11A)

SL SERIES



MODEL	Colors		Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
	Gray	Black				
SL-11A	•	•	7	11	2 3/4 x 7 5/8 x 9 3/4	11

- LOW PROFILE POWER SUPPLY

RS-L SERIES



MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
RS-4L	3	4	3 1/2 x 6 1/8 x 7 1/4	6
RS-5L	4	5	3 1/2 x 6 1/8 x 7 1/4	7

- POWER SUPPLIES WITH BUILT IN CIGARETTE LIGHTER RECEPTACLE



RM SERIES MODEL RM-35M

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
RM-12A	9	12	5 1/4 x 19 x 8 1/4	16
RM-35A	25	35	5 1/4 x 19 x 12 1/2	38
RM-50A	37	50	5 1/4 x 19 x 12 1/2	50
RM-60A	50	55	7 x 19 x 12 1/2	60
RM-12M	9	12	5 1/4 x 19 x 8 1/4	16
RM-35M	25	35	5 1/4 x 19 x 12 1/2	38
RM-50M	37	50	5 1/4 x 19 x 12 1/2	50
RM-60M	50	55	7 x 19 x 12 1/2	60

- 19" RACK MOUNT POWER SUPPLIES

- Separate Volt and Amp Meters

RS-A SERIES



MODEL RS-7A

MODEL	Colors		Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
	Gray	Black				
RS-3A		•	2.5	3	3 x 4 1/4 x 5 3/4	4
RS-4A	•	•	3	4	3 3/4 x 6 1/2 x 9	5
RS-5A		•	4	5	3 1/2 x 6 1/8 x 7 1/4	7
RS-7A	•	•	5	7	3 3/4 x 6 1/2 x 9	9
RS-7B	•	•	5	7	4 x 7 1/2 x 10 3/4	10
RS-10A	•	•	7.5	10	4 x 7 1/2 x 10 3/4	11
RS-12A	•	•	9	12	4 1/2 x 8 x 9	13
RS-12B	•	•	9	12	4 x 7 1/2 x 10 3/4	13
RS-20A	•	•	16	20	5 x 9 x 10 1/2	18
RS-35A	•	•	25	35	5 x 11 x 11	27
RS-50A	•	•	37	50	6 x 13 3/4 x 11	46

RS-M SERIES



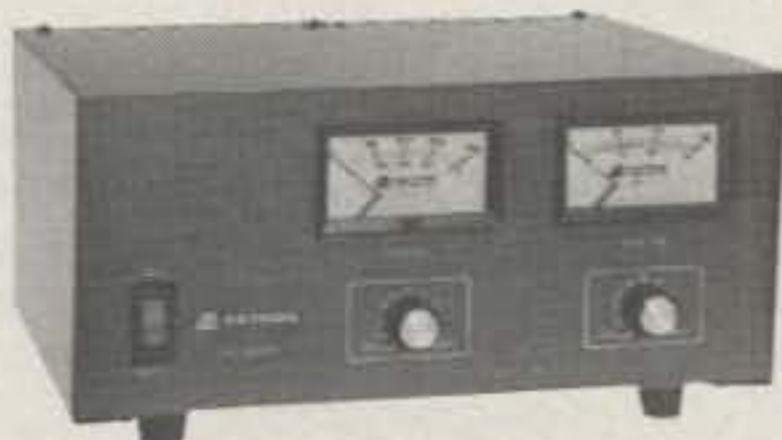
MODEL RS-35M

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
RS-12M	9	12	4 1/2 x 8 x 9	13
RS-20M	16	20	5 x 9 x 10 1/2	18
RS-35M	25	35	5 x 11 x 11	27
RS-50M	37	50	6 x 13 3/4 x 11	46

- Switchable volt and Amp meter

- Separate volt and Amp meters

VS-M AND VRM-M SERIES



MODEL VS-35M

- Separate Volt and Amp Meters • Output Voltage adjustable from 2-15 volts • Current limit adjustable from 1.5 amps to Full Load

MODEL	Continuous Duty (Amps)			ICS* (Amps) @13.8V	Size (IN) H x W x D	Shipping Wt. (lbs.)
	@13.8VDC	@10VDC	@5VDC			
VS-12M	9	5	2	12	4 1/2 x 8 x 9	13
VS-20M	16	9	4	20	5 x 9 x 10 1/2	20
VS-35M	25	15	7	35	5 x 11 x 11	29
VS-50M	37	22	10	50	6 x 13 3/4 x 11	46
VRM-35M	25	15	7	35	5 1/4 x 19 x 12 1/2	38
VRM-50M	37	22	10	50	5 1/4 x 19 x 12 1/2	50

- Variable rack mount power supplies

RS-S SERIES



MODEL RS-12S

- Built in speaker

MODEL	Colors		Continuous Duty (Amps)	ICS* Amps	Size (IN) H x W x D	Shipping Wt. (lbs.)
	Gray	Black				
RS-7S	•	•	5	7	4 x 7 1/2 x 10 3/4	10
RS-10S	•	•	7.5	10	4 x 7 1/2 x 10 3/4	12
RS-12S	•	•	9	12	4 1/2 x 8 x 9	13
RS-20S	•	•	16	20	5 x 9 x 10 1/2	18

Ray Weigand, N7POK, USA-CA 500 #2613, All CW, 6-11-92.

Thomas Milde, DL1HBT, USA-CA 500 #2614, All CW, 6-24-92.

Ulf Ericsson, SM5BMB, USA-CA 500 #2615, Mixed, 6-25-92.

Joyce Judy, KD8HB, USA-CA 500 #2616, All CW, 6-29-92.

Awards Available

Sevilla Universal '92 Award. During the celebration of Universal Exhibition Sevilla '92, the Union Radioaficionados Espanoles is sponsoring this special award. The award is available to radio amateurs and SWL stations for working stations, with special prefixes, in Andalusia, as follows:

Each AM7, AN7, and AO7 station is valid for one point.

Each AM92, AN92, and AO92 station is valid for 2 points.

The special station EF92EXPO is valid for 5 points.

A station may be worked for point credit in different modes and on different bands, but only with a span of at least 24 hours between QSOs.

One QSO with station EF92EXPO is obligatory.

All bands (including WARC bands) and modes are valid.

To qualify for the award: Spanish stations need 100 points, European stations need 75 points, American stations need 50 points, African and Asiatic stations need 40 points, and all others worldwide need 25 points.

QSOs in the period 6 May until 12 October 1992 are valid. Send QSLs via the buro, and log to Ure Sevilla, P.O. Box 479, CP 41080 Sevilla, Spain, before 31 December 1992.

The award is free. Do not send IRCs, green stamps, etc.

British International Police Award.

Alan John Fowler, G0GFP, 78 Beckingham Road, Guildford, Surrey, GU2 6BU, England, 0483 572060 is the manager of this award. Cost of the award is not known at this stage.

All bands and modes or mixed. No QSL cards are required. A certified check list signed by two Amateurs should be sent; it must show the police area of the station worked—e.g., G0GFP Band Force Area Surrey.

Two points each contact. Four points for a contact with a club or special event station, on each band. Silver Award 100 points; Gold Award 150 points; Trophy Award 200 points.

Silver Award: Contact with IPARC members, mobile or base contacts. Must have a contact within 10 police areas of the British Isles.

Gold Award: Contact with IPARC members, mobile or base contacts. Must have a contact with 15 police areas of the British Isles. Must have contacts with the follow-

ing force areas: Metropolitan, West Yorkshire, Surrey, Avon, and Devon.

Trophy Award: Contact with IPARC members, mobile or base contacts. Must have contacts with 20 force areas in the British Isles. Must have contacts with the following force areas: one contact in Scotland; one contact in Wales; one contact in Northern Ireland; one contact in Guernsey; one contact in Jersey.

Short wave Listeners: Awards are also available to SWLs with the required check-list.

IPARC Nets: Each Sunday evening on 80 meters at 1900 hours GMT, 3.767 ± 25 kHz. Well over 150 members within the British Isles are members of The International Police Association Radio Club.

Radio Club Zarya Pennant. The 15th anniversary of Radio Club "Zarya" pennant will be issued to amateur radio stations and SWLs for two-way contacts or SWL reports with members of Young Radioamateur's Club "Zarya," as well as with Young Pioneer's and Scout's stations of Voronezh region.

The application must contain two call signs from the list or one contact with Central Station of "Zarya" Radio Club, UZ3QYA. One contact per band is valid after January 1, 1990. QSL of Voronezh SWL is valid as a contact. Please send your application and 5 US dollars to W9NTU, Joel H. Levy, 8 Waterloo Drive, Morris Plains, NJ 07950, Morris County, U.S.A. Also send a copy of your application (no US dollars) to Award Manager, Alex Valchenko, RA3QR, P.O. Box 63, Voronezh 394000, Russia.

List of call signs: RA3QDX, RA3QEP, RA3QFB, RA3QFR, RA3QL, RA3QMU, RA3QPA, RA3QR, RA3QRU, RA3QW, RW3QR, U3QL, UA3QAH, UA3QBB, UA3QBK, UA3QBL, UA3QG, UA3QEA, UA3QHN, UA3QJ, UA3QJC, UA3QKO, UA3QKW, UA3QM, UA3QMR, UA3QOQ, UA3QOY, UA3QR, UA3QRG, UA3QSD, UA3QUK, UA3QVF, UA3QVO, UV3QA, UV3QAE, UV3QHF, UV3QIL, UV3QK, UV3QKR, UV3QLR, UV3QOB, UV3QQG, UV3QQK, UV3QQU, UV3QRJ, UV3QSJ, UV3QU, UW3QA, UW3QT, UZ3QYA, UZ3QYB, UZ3QYC, UZ3QYD, UZ3QYT, UZ3QYW, UZ3QZM, UZ3QZO, UZ3QZQ, UZ3QZR, UZ3QZU.

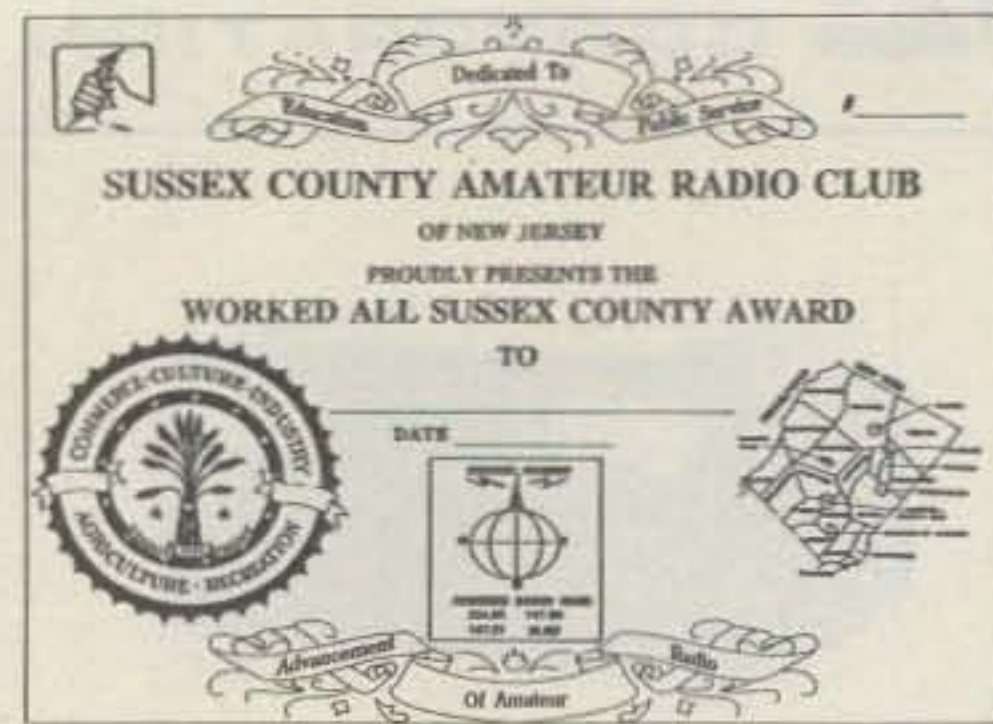
SWLs: UA3-121-1501 . . . 1680, UA3-121-1700 . . . 1800, UA3-121-2101 . . . 2300, UK3-121-101 . . . 200.

Worked All Sussex County Award

The Worked All Sussex County Award is sponsored by the Sussex County Amateur Radio Club. It is available to all amateurs for working five amateurs in the County of Sussex, State of New Jersey, U.S.A. The award is 3½ x 11 inches and is very suitable for framing.

Work five Sussex County, New Jersey amateurs on all amateur bands on AM, FM, SSB, CW (no repeaters).

Your log and QSLs MUST be verified



The Worked All Sussex County Award, offered by the Sussex County Radio Club of New Jersey.

and application signed by two licensed amateurs. DO NOT send QSL cards. Send list of five contacts showing ARS, date of contact, and frequency; with signatures and calls of two verifying amateurs, date of application, and your name, call, and complete address. Donation is \$2.00 US or DX 4 IRCs. Send to: SCARC Awards Manager, Box 11, Newton, NJ 07860-0011, U.S.A.

The club meets on the 3rd Thursday of every month at 8:00 PM in the Criminal Court building in Newton, NJ. Meet the Sussex County Club members on 28.357 MHz week nights.

Worked All Dayton Award. A special award is available to amateurs who make contact with Dayton, Ohio or any of the following Ohio counties: Montgomery, Greene, Preble, Darke, Clark, Miami, or Warren.



The Worked All Dayton Award, by the Dayton Amateur Radio Association.

Contacts can be made on any amateur band. All modes—no contacts through repeaters or digipeaters. Required contacts: Ohio stations 25 contacts; Continental U.S. stations (other than Ohio) 15 contacts; DX stations 10 contacts.

Special endorsements, for contacts to be made in addition to the required contacts (see above): YL endorsement—five YL contacts; Extra contacts endorsement—25 additional contacts; Double extra contacts endorsement—50 additional contacts; Sister city endorsement—two con-

tacts with either Auyer, Austria or Augsburg, Germany; W8BI endorsement—contact the Dayton Amateur Radio Association club station, W8BI.

Send a 9" x 12" SASE with log information (no QSL cards) to WAD Certificate, Dayton Amateur Radio Association, P.O. Box 44, Dayton, Ohio 45401-0044, U.S.A.

Ohio County Award. A special award is available to amateurs who make contact with Ohio counties.

Required contacts with 22 of the 88 counties, one must be Montgomery County. Additional endorsements will be given for 44, 66, and all 88 counties. Contacts can be made on any amateur band. All modes—no contacts through repeaters or digipeaters.

Cards must be in possession and available upon request. Send log information signed by two amateurs of General class or above, or signed by an official of a national level radio organization.

Basic award: Work one QSO with a station on Sakhalin Island and 3 QSOs with stations on any island of the Far East.

Basic + Silver: Work two QSOs with sta-

tions on Sakhalin Island and 5 QSOs with stations on two different islands of the Far East.

Basic + Gold: Work 3 QSOs with stations on Sakhalin Island and 10 QSOs with stations on 3 different islands of the Far East.

Do not send QSL cards. Send GCR and 5 US dollars (or 15 IRCs) for the Basic Award; or 7 US dollars (or 20 IRCs) for Basic + Silver; or 10 US dollars (or 25 IRCs) for Basic + Gold.

Basic + Gold is wrapped in plastic. If you order Basic + Gold you will automatically receive Basic + Silver.

Award managers are:

RA0FF, P.O. Box 79, Yu-Sakhalinsk-10, 693010, Russia;

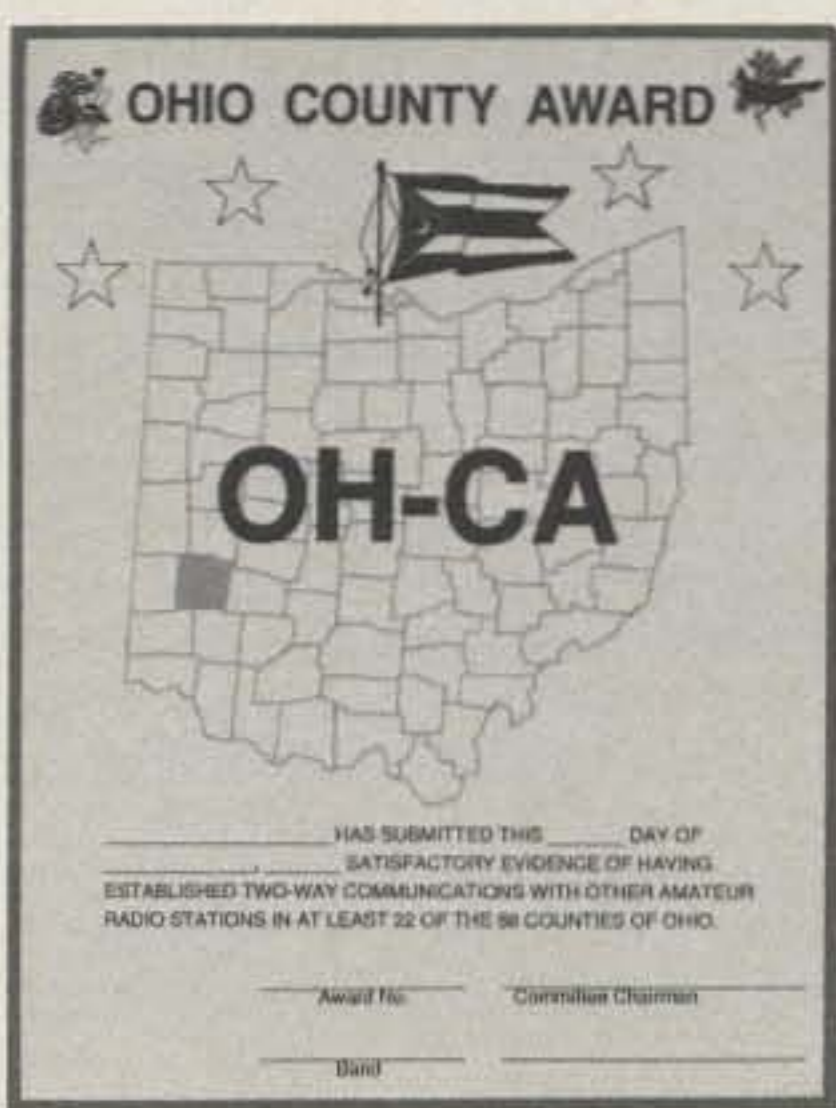
RA0FW, P.O. Box 37, Yu-Sakhalinsk-10, 693010, Russia.

Until next month . . .

73, Dorothy, WB9RCY



The Far East Islands Award, sponsored by the Far East Islands DX Club, Russia.



The Ohio County Award, available from the Dayton Amateur Radio Association.

Send a 9" x 12" SASE with log information (no QSL cards) to Ohio County Award, Dayton Amateur Radio Association, P.O. Box 44, Dayton, Ohio 45401-0044, U.S.A.

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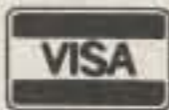
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THINGS TO LEARN, PROJECTS TO BUILD, AND GEAR TO USE

More on the ATU

Last month I discussed the antenna tuner (ATU) and the pros and cons of shelling out hard-earned cash to buy one. The bottom line is that it is a good idea to have this handy accessory in the shack, especially if you are the proud owner of a so-called "multiband antenna." I also stated that I liked the inductor-capacitor-inductor (LCL) design better than the capacitor-inductor-capacitor (CLC) design, as the former provided a degree of harmonic attenuation that the latter did not possess (fig. 1).

The reason the LCL design provides better harmonic attenuation is that the capacitor provides a low-impedance path to ground for harmonics. The CLC design, on the other hand, impedes the harmonic path to ground because the inductor acts as an RF choke at the harmonic frequencies.

The harmonic attenuation of the LCL circuit is a function of the SWR the ATU is trying to match, and the circuit Q, which is fixed by the design. The SWR is a factor of your particular antenna.

Theoretically, the attenuation of a perfect LCL circuit runs better than 25 dB for the second harmonic, 35 dB for the third, and 45 dB for the fourth. A practical LCL tuner, however, is not designed for harmonic rejection but for ease in matching and for a good-looking front panel. Leads are relatively long at the harmonic frequencies and attention is not paid to small details that make a good harmonic filter. After all, that's not what the designer had in mind. In addition, maximum harmonic attenuation does not occur at the same control settings at which the impedance match occurs.

A representative LCL tuner, under test and properly adjusted for a 50 ohm load, provides about 25 dB attenuation to the second harmonic when operated on 80 meters. Third harmonic attenuation is 24 dB, and fourth harmonic attenuation is 23 dB. In the low TV channels harmonic rejection runs about 15 dB.

On 10 meters second harmonic rejection runs about 19 dB. That would afford some protection to TV channel 2, depending upon the frequency of your transmitter and the precise adjustment of the tuner.

So there you are. A well-designed LCL

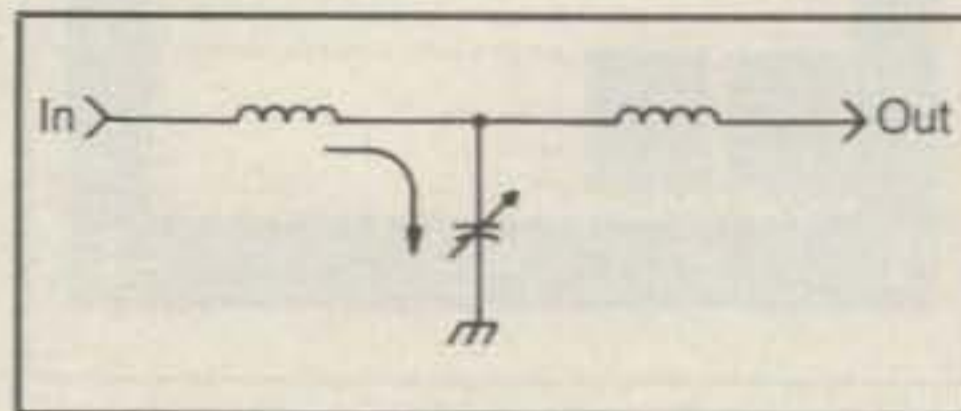


Fig. 1—LCL tuner provides degree of harmonic rejection. Arrow shows harmonic current flowing to ground.

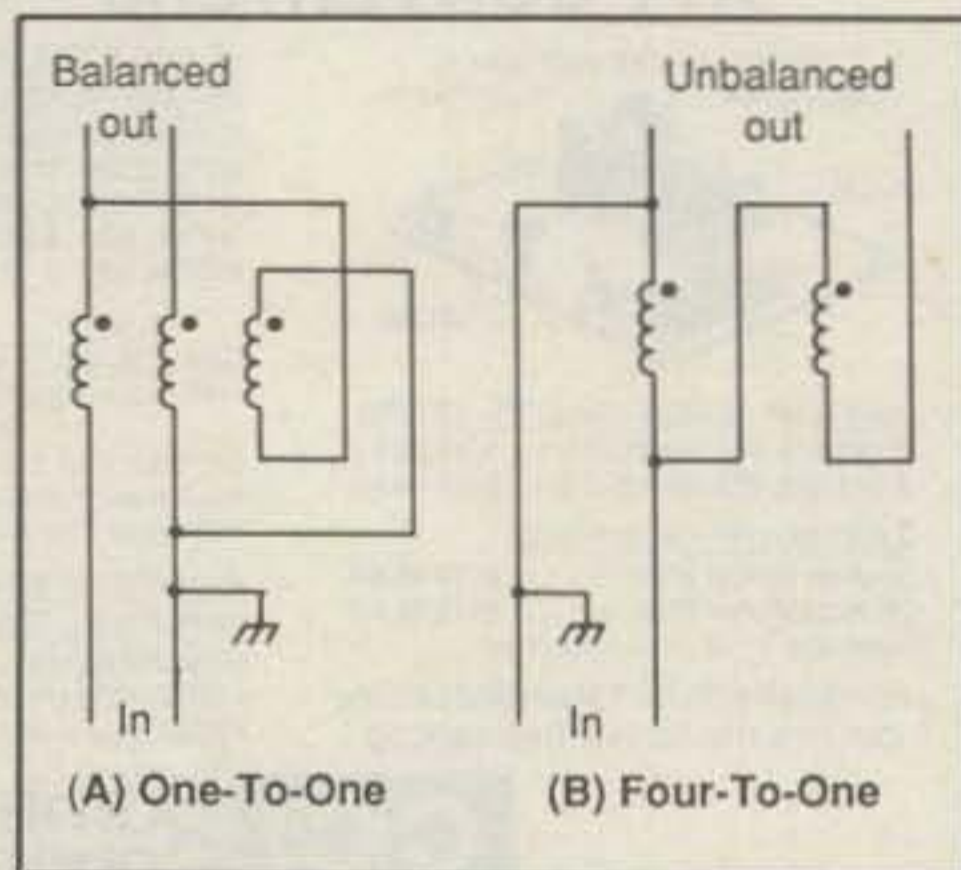


Fig. 2—Voltage-type valuns. May be air or ferrite core. (A) One-to-one (50 to 50 ohms) balanced out. (B) Four-to-one (50 to 200 ohms) unbalanced out.

tuner does provide a degree of harmonic attenuation, but it should not be considered a substitute for a low-pass antenna filter, particularly in rural areas where the TV signals are weak. The LCL tuner will back up a good low-pass filter in any event. If a TVI filter is used, it should be placed between the transmitter and the ATU.

A New Breed of Balun

A new form of 1-to-1 balun has appeared recently, and it offers improved performance over the popular trifilar ferrite core design. An extensive review of baluns by Roy Lewallen, W7EL, emphasized the fact that there are two classes of baluns for general amateur use.¹ He defines these devices as voltage baluns and current baluns. The voltage balun (fig. 2) is the common trifilar type. It performs a balanced to unbalanced voltage conversion.

The current balun, on the other hand, performs a balanced to unbalanced current conversion (fig. 3). Since most conventional antennas are current-fed (the dipole, for example) and the antenna field is proportional to the current, it would seem reasonable that balanced current, as opposed to balanced voltage, is required at the feed-point. Balanced current in a coax line is achieved only if the antenna is balanced and no current flows on the outer shield of the line. The current balun reinforces this situation, as it acts as an RF choke, impeding unwanted shield current and providing balanced current to the antenna.

The current balun can consist of a number of turns of coax wrapped into an air coil, or wrapped around a ferrite core. The air coil is bulky (about six turns of coax, 8 inches in diameter for RG-8/U or RG-58/U serves in the 14–30 MHz range). This is an inexpensive choke coil, as it can be a portion of the feedline, held together with cable ties. For best results it should be placed at the antenna terminals.

Wrapping coax around a ferrite core is difficult, as anyone who has tried this scheme can affirm. The bulky air coil is better.

Taking an idea from the VHF solid-state world, Doug DeMaw, W1FB, proposed in 1980 that ferrite "sleeves" passed over a coax line could serve as an RF choke, or current balun, to decouple the line.² Shortly thereafter, Walt Maxwell, W2DU, built and measured such a decoupling sleeve made up of a number of ferrite beads on a length of the coax.³ The W2DU HF balun consisted of 50 type 73 beads on a foot-long length of 50 ohm Teflon dielectric cable. The only fly in the ointment with this design is that specified RG-303/U cable isn't obtainable at Radio Shack, nor at most amateur radio distributors. The suggested alternative cable, RG-141/U, also is not a household word!

A Practical Sleeve Balun

A practical and inexpensive balun can be made either of readily available RG-58/U or RG-8/U. Luckily, toroid beads (sleeves) having inner diameters of 0.5 inch and 0.25 inch that will pass the coax lines are available in either 43 or 77 ferrite material (Table I). The original W2DU design used 73

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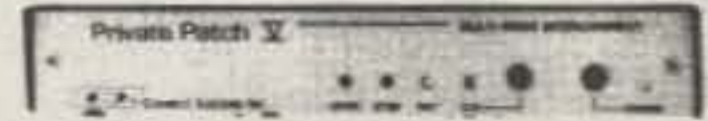
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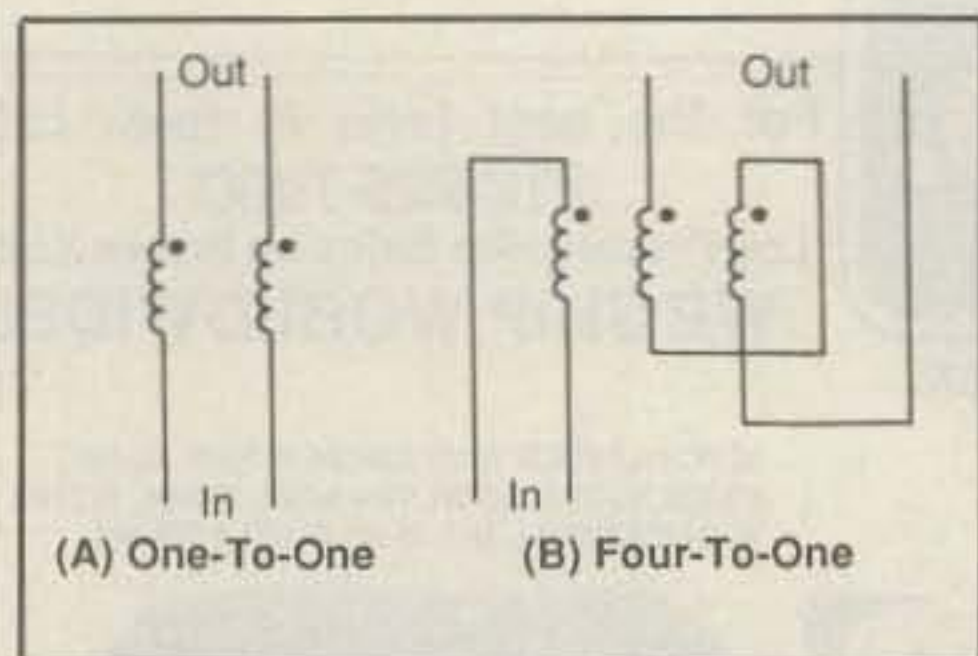


Fig. 3—Current-type baluns. May be air or ferrite core. (A) One-to-one, balanced or unbalanced. (B) Four-to-one, balanced or unbalanced.

material which is similar to the 77 stuff, but large cores that slip over coax lines are presently available only in 43 and 77 material, not the 73 material W2DU used. No matter. The 77 material is very similar to the 73 stuff.

Test baluns were constructed using the two available types of ferrite and the baluns were tested using a General Radio RF impedance bridge. Each balun was made up of a short length of RG-58/U cable. The test setup recommended by W2DU was duplicated (fig. 4).

It was arbitrarily decided that the impedance presented by the choke balun should be about ten times the coax line impedance over the operating range of the balun. That's an impedance of 500 ohms for a 50 ohm coax line.

My conclusion was that the balun using 77 material performed best below 10 MHz and the one using 43 material was better above 10 MHz. In both cases excellent current balance was obtained in the load, even when the load itself was purposely unbalanced.

Building the Sleeve Balun

A ferrite sleeve balun can be built by sliding six beads of the proper size over the coax at the antenna end of the transmission line. The beads can be held in position against each other by application of heat-shrink tubing. Use the 77 beads below 10 MHz and the 43 beads above 10 MHz. If you don't mind a slightly poorer balance at the low frequency end, the 43 beads can be used down to 3.5 MHz.

That's all there is to it. Six beads plus some heat-shrink tubing does the job. You'll have a current balun that is hard to beat!

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Now that the sunspot cycle is on the downswing, DXers need all the help they can get! Good DX openings are growing shorter; 10 and 12 meters are showing signs of pooping out. From now until 1997 conditions will become steadily poorer, accord-

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FB-77-5621	.562	.250	1.125	RG-58/U
FB-43-5621	.562	.250	1.125	RG-58/U

Nomenclature	Permeability	Material
#77	2000	Manganese-Zinc
#43	850	Nickel-Zinc
#73	2500	Manganese-Zinc

Table 1—Specifications of toroid beads (sleeves). (See text for details.)

ing to the predictions of George Jacobs, W3ASK, in the August 1992 issue of CQ. It will then take a year or so for the MUF to permit good DX conditions to bounce back. That means until the year 2000 or so the glory days of super-DX on the higher bands will be conspicuous by their absence.

One DX aid that will be of comfort in the bleak years ahead of us is the popular MINIPROP™ computer-aided propagation program released in 1985 by Sheldon Shalton, W6EL. The good news is that it has been upgraded to MINIPROP™ Plus, a follow-on program which, in addition to the excellent propagation predictions of MINIPROP 3.0, features a world map display showing the "gray line" terminator and the great-circle path between two DX stations. Gray-line propagation will be increasingly important in the bleak days ahead!

In addition to the nifty MUF data, signal-level prediction, beam headings, radiation angles, and other good stuff, an on-disk atlas provides latitudes and longitudes of more than 360 locations and a DXCC list that can be edited by the user. Also in the program is a customized table of beam headings from the user's QTH to all of the locations in the atlas.

MINIPROP™ Plus is for IBM and compatible machines with at least 512K RAM, DOS 2.11 or higher, and CGA/EGA/VGA or Hercules graphics.

Noteworthy is the 62-page manual accompanying MINIPROP™ Plus. It has a

comprehensive tutorial on propagation, plus clear directions on running the program. It's sort of like having W3ASK in your shack giving you constant information on propagation!

I can't cover all the impressive details of this program. You can find these out by contacting W6EL Software, 11058 Queensland St., Los Angeles, CA 90034-3029. Current price of MINIPROP™ Plus is \$60, postpaid in the U.S. and Canada, US \$65 elsewhere.

Low-Pass TVI Filters and SWR

Most stations operating in the HF bands employ a 50 ohm low-pass harmonic filter in the feedline to the antenna. Plenty of filter stopband curves are available^{4,5} which provide an insight as to the degree of harmonic attenuation available in these little boxes. One unanswered question is: To what degree is filter attenuation affected by SWR on the transmission line? As the SWR rises, does filter performance deteriorate? Does high SWR mean more TVI? One way to determine this is to examine the filter stopband under SWR conditions. With the assistance of Tiff, W6GNX, and his Hewlett-Packard 141T Spectrum Analyzer and HP 606B signal generator combination a quick check of the problem was made.

A Drake TV-3300LP filter was tested.

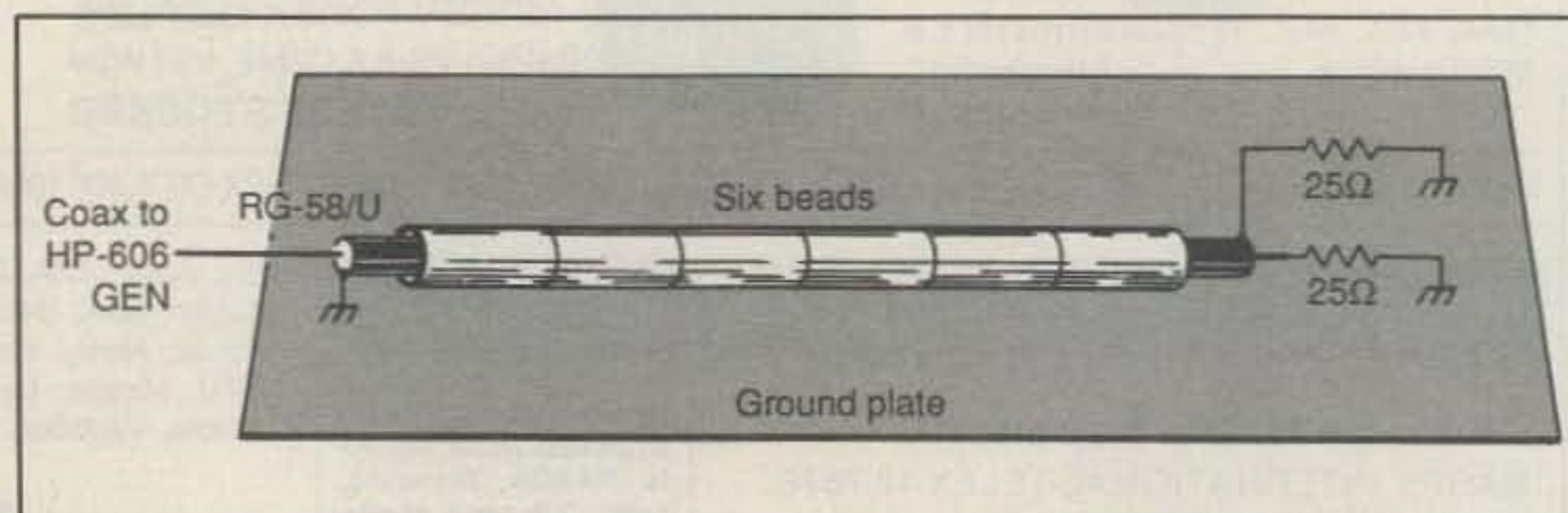


Fig. 4—Duplicate of W2DU test bed for current balun. RF voltmeter compares voltage across load resistors. Voltage across resistors is proportional to their resistance. RF bridge determines impedance of balun from one end to the other.

(Filter connoisseurs acknowledge the superiority of this model over lesser designs.) When terminated with a 50 ohm load the filter exhibited better than 70 dB attenuation above 41 MHz. Terminating the filter in various load combinations (providing up to 3-to-1 SWR) indicated that SWR has little effect when it comes to filter attenuation. The W6GNX curves are almost identical to those run by W6FR at an earlier date using 50 ohm filter termination. That is comforting to know, as most antennas do not maintain a flat SWR response across an amateur band.

Commentary for The Month: Technology In Reverse

"Let me introduce you to retarded technology. It's the opposite of advanced technology. Advanced technology allows us to do useful new things or to do old things more efficiently. By contrast, retarded technology creates new and expensive ways of doing things that were once done simply and inexpensively. Worse, it encourages us to do things that don't need doing at all.

"The survival of stupid technology is ordained by ego and money. New technologies often require a hefty investment. Once investments are made, they can't be easily unmade. To do so would be embarrassing. Old and inexpensive ways of doing things

are eliminated to help pay for new and expensive methods. Retarded technology becomes institutionalized and is permanent."

So says Robert J. Samuelson in an essay in the July 20, 1992 issue of *Newsweek* magazine.

His remarks bring to mind my first VCR. It was a dandy. Four buttons on it, plus an on-off switch. Even I could work it. Today my new technology-perfect VCR has a confusing remote control with a plethora of commands that would take a rocket scientist months to figure out. I've struggled with it for over a year and have finally mastered most of the tricky functions. What a waste of time!

If the AC power goes off for an instant, a painful re-entering of data is required. Time? AM or PM? Date? Year? SAP? Mono? Stereo? Yes? No? Maybe? I long for my old 4-button VCR. It demanded so little of me.

Is amateur radio gear going the same way? My zippy up-to-date transceiver has 16 knobs (some of them dual controls) plus the tuning dial, and 62 push-switches. Most of them I ignore. I just can't be bothered with all this fol-de-rol. Is amateur radio entering the dark ages of retarded technology? What do you think?

New Yagi Optimizer Program

The new Yagi Optimizer 5.0 antenna pro-

gram was introduced to hamdom at the ARRL National Convention in August by Brian Beezley, K6STI. It is a great improvement over the older program, which I have used many times to determine the worthiness of a Yagi design. The Yagi Optimizer does what the name implies: If you input Yagi dimensions specifying element spacing, diameters, taper, and other attributes of the design, the Optimizer will crunch away at your command. You can specify parameters for the Optimizer to emphasize. Best front-to-back ratio? The Optimizer will search for that. Highest gain? No problem. Best combination of gain and front-to-back ratio, using your definition of "best"? Easy. Many, many choices are at your disposal. You can determine the effects of mounting brackets, or find out how much gain you'll lose if an element comes off during a hurricane.

Broadband a design? Yes, and the Optimizer will tell you if you lose or achieve gain and front-to-back ratio in this exercise.

It's as if you have antenna range, complete with instrumentation at hand! All you need is an IBM-style computer, a graphics driver (CGA, EGA, VGA, or HCG), and you are off to the races!

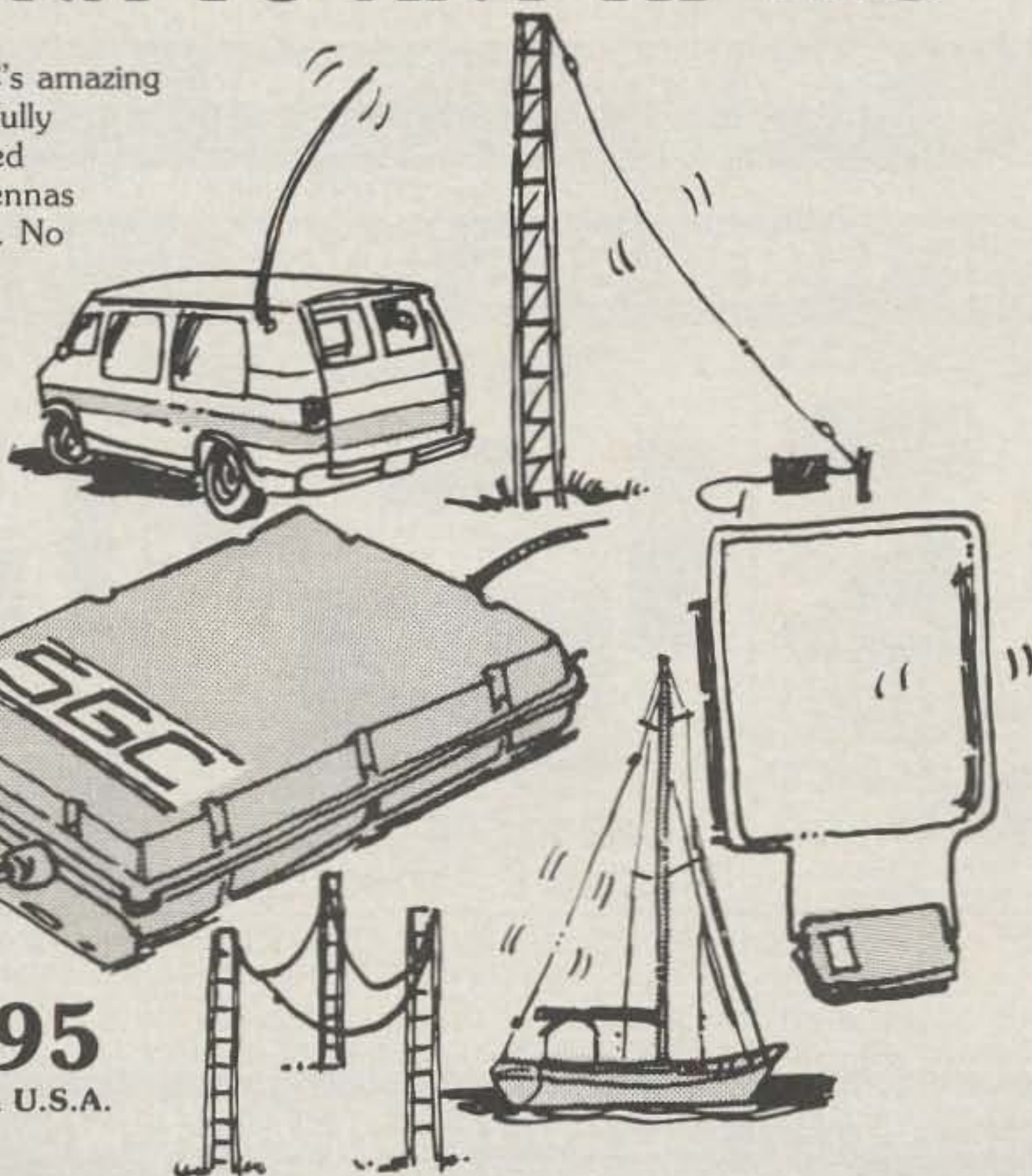
Well, I think it's a neat program with potential that will surprise you. If you didn't attend the National Convention, you can get full information on this and other computer-driven antenna programs from Brian Beezley, K6STI, 507 1/2 Taylor St., Vista, CA

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The Dead Band Quiz

I appreciate the cards and letters concerning these little brain ticklers. I hope you continue to enjoy them. To bring things up to date, here are some more readers who have solved past quizzes:

Danny Kaye (. . . the flagon with the dragon . . .): VE4AHR and K1XA.

RMS, Average and peak voltage: N9HWC, K1SRR, K5RA, AC4DY, KA0ZFK, K0ALL, N4UZ, W7FSP, N0MCD, and K6JG.

Twilight Zone: N3CTB (He must have been the producer! He knew it all!).

And my warmest thanks to the following who wrote personal letters. I really appreciate your input: Mike, WA8MCQ; Charles, WD4PAH; Charles, W8JI; Wayne, AG4R; Carl, W6OZA; Henry, W6TDP; George, W2CFX; Sam, W5AG.

Shop Talk

I've gotten several letters recently concerning filament-grid shorts in 3-500Z and 4-400A tubes. Interestingly enough, commercial users of these tubes almost never have this annoying problem. Why is it endemic among radio amateurs? Here's the story.

Thoriated-tungsten filaments used in these tubes have a 10:1 ratio of cold to hot resistance. That is, if the filament draws 15 amperes when hot, it will draw about 150 amperes when it is first turned on. Filament current quickly drops to normal value in less than a second as filament resistance increases.

In real life the tube practically never gets the chance to draw 150 amperes, as the filament transformer "sags" under the huge load.

"Inrush" filament current in many cases is limited to about 50 to 70 amperes per tube depending upon design of the transformer. The filament transformer in

the old Heath SB-220 was built to limit filament current, as the transformer would saturate under heavy load. Even so, 50 amperes inrush current is still too high.

The effect of high inrush filament current is to place a heavy physical strain on the coiled filament. The filament actually reacts by a violent movement, the coils collapsing toward each other in a haphazard way. If the filament moves far enough, it will touch the grid, causing an electrical short between the two elements. Each time the tube is turned on the filament experiences a quick distortion and then returns (nearly) to its previous shape. Enough inrush shocks can permanently distort the filament, causing it to lean nearer and nearer to the grid. After repeated turn-on cycles—zap—the elements are shorted and the tube is ruined.

Leaving the filaments on 24 hours a day as is done in broadcast stations is not the solution. The solution is to turn the tube on, limiting the filament current as you do so. There are several ways to do this:

1. Use a variable voltage transformer (Variac) to bring the filaments up to proper voltage over a period of a second or so.
2. Use a step-start circuit. A series resistor in the filament circuit is shorted out by a time-delay relay or a manually operated switch.
3. If the filament winding is on the large plate transformer, use a step-start circuit on that.
4. For 3-500Zs or similar tubes, use a 6.3 volt transformer with a series primary resistor to drop the voltage to the correct value under tube operation. The resistor will absorb inrush current.
5. For sideband service, undervolt the filament. Instead of 5.0 volts, run it at 4.85 to 4.9 volts.
6. Use an RMS-responding meter or a solid-state VOM of known accuracy to check your filament voltage.

73. Bill, W6SA

Footnotes

1. Lewallen, Roy, W7EL, "Baluns: What They Do And How They Do It"; *The ARRL Antenna Compendium, Vol. 1*.
2. DeMaw, Doug, W1FB, *Ferromagnetic-Core Design and Application Handbook*, p. 140; Prentice-Hall, Inc., Englewood Cliffs, NJ 07632.
3. Maxwell, Walter, W2DU, *Reflections*, ARRL, Newington, CT 06111 (chapter 21).
4. Gonsior, Marv, W6FR, "Low-Pass Filter Performance," *Communications Quarterly*, Spring 1992, pp. 75-84; Box 465, Barrington, NH 03825.
5. Grammer, George, W1DF, "Eliminating TVI with Low-Pass filters," Part III, *QST*, April 1950, pp. 23-30.

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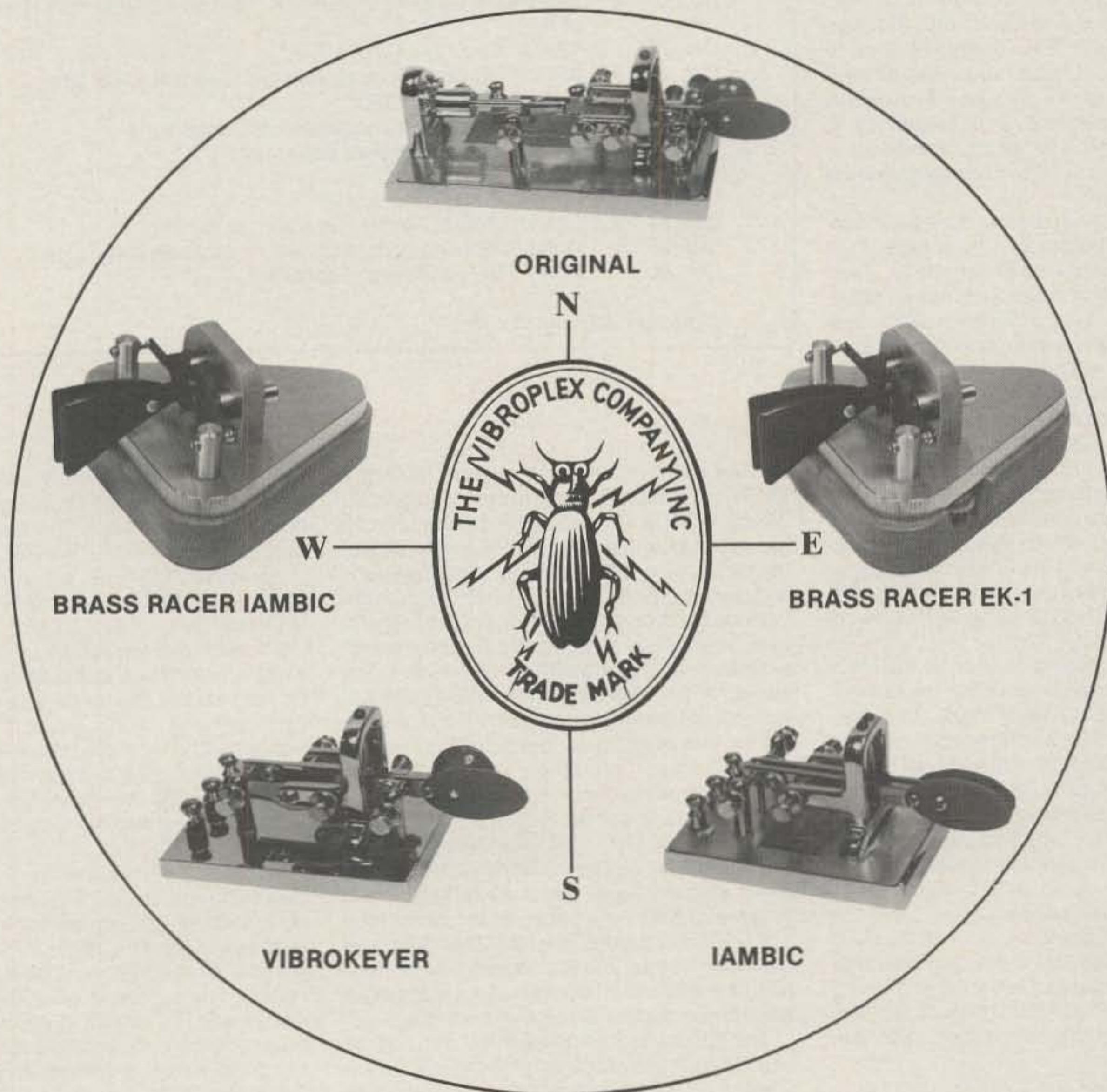
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CSVHF Conference an Enormous Success

What is known as the premier VHF conference in the country, the Central States VHF Conference (the 26th annual), was held in Kerrville, Texas from July 17-19, 1992. Thanks to hosts Bill, W3XO, and Mattie Tynan, over 200 amateurs enjoyed southern Texas hospitality as well as each other's exaggerations. As always, the purpose of the conference was to present talks. The lectures included the following.

On Friday morning the first Worldwide VHF Ionospheric Propagation Symposium shared the facilities of the conference to present its session one. The moderator of the symposium was Dave Batcho, N5JHV. The first speaker, Steve Wagner, W7CI, gave an overview of 50 MHz propagation modes and conditions. Norman Cohen of the Space Environmental Service Center spoke about solar influences on VHF ionospheric propagation and gave an overview of the services provided by radio station WWV. J. R. Kennedy, K6MIO, spoke about some of the physical principles of 50 MHz propagation via a prerecorded tape.

The Friday afternoon session of the main conference started off with a talk presented by Paul Wilson, W4HHK, and Paul Shuch, N6TX. Their talk was on sun noise measurements as correlated to solar activity data. The microwave session of the conference was moderated by Kent Britain, WA5VJB. Al Ward, WB5LUA, and Kent made presentations on making communications via microwaves simple. Dave Chase, KY7B, and Terry Wilkinson, WA7LYI, presented a slide show of their various laser shots and told of future proposed attempts.

The Friday evening was consumed with the annual regularly scheduled swapfest and noise-figure measurements. Late Friday night was occupied by the hearty members of the SNOTTS sub-organization (SNOTTS stands for Silly Numskulls on Two Twenty).

The Saturday morning session of the main conference was on propagation and was moderated by your editor. Al Ward, WB5LUA, talked about using TV carriers for propagation monitoring. Kent Britain, WA5VJB, talked about bouncing signals off aircraft. Dave Meier, N4MW, talked about the use of multiple power level beacons. Your editor wrapped up the session by talking about on the invisible meteor shower that took place in June 1975 (this storm was mentioned in the August column).

The Saturday afternoon session of the main conference covered EME and was moderated by Derwin King, W5LUU. Derwin gave an overview and update to the EME form of communications. Ray Soifer, W2RS, talked about QRP EME communication.

The remainder of the afternoon was consumed by a business meeting of CSVHF.

The evening banquet presented the forum for awarding the Wilson and Chambers awards and certificates to the winners of the antenna range

VHF PLUS CALENDAR

Sept. 24	Canada Sprint, 902, 1296, 2304 MHz (see text for details)
Sept. 30	Canada Sprint, 432 MHz (see text for details)
Oct. 2	Noisy Sagittarius A
Oct. 3	First quarter moon
Oct. 4	Very poor EME conditions
Oct. 6	Apogee
Oct. 6	Canada Sprint, 222 MHz (see text for details)
Oct. 8	VK5MC Europe: 1742 UTC
Oct. 9	Draconids meteor shower peak
Oct. 11	Full moon; moderate EME conditions
Oct. 12	Canada Sprint, 144 MHz (see text for details)
Oct. 15	VK5MC NA: 1248 UTC, 144.012 (call .010-)
Oct. 16-18	Microwave Update Conference, Rochester, New York (see text for details)
Oct. 16	VK5MC NA: 1344 UTC
Oct. 17-18	ARRL EME Contest, first weekend (see text for details)
Oct. 17	VK5MC NA: 1436 UTC
Oct. 18	Last quarter moon; moderate EME conditions
Oct. 21	Orionids meteor shower peak, 1841 UTC
Oct. 22	Perigee
Oct. 23	VK5MC Europe: 0526 UTC
Oct. 24	Canada Sprint, 50 MHz (see text for details)
Oct. 25	Good EME conditions until new moon, then noisy
Oct. 30	Noisy EME conditions, Sagittarius A

(Courtesy W4ZD and others)

and the noise-figure-measurement contests. The Wilson award is given in memory of Melvin Wilson, W2BOC, to honor a person who has contributed outstanding and continuing service to the society or to VHF/UHF in general. This year's recipient was Bob Taylor, WB5LBT. The Chambers award is given in memory of John Chambers, W5NLZ, to honor a person who exhibits technical excellence in VHF/UHF activities. The award remembers John for his many contributions, most notably his work with KH6UK in proving the existence of the West Coast to Hawaii duct. This year's recipient was Chip Angle, N6CA, who has continued research on the duct with last year's successful contacts on 3456 MHz and 5760 MHz with Paul Lieb, KH6HME.

The banquet attendees were entertained by a well-narrated slide show presented by Jim Treybig, W6JKV. Jim spoke of the dangerous and not so dangerous (the fun) DXpeditions he has been on over the past dozen years. Word has it, however, that he left out some of the more hair-raising details of some of his trips.

The Sunday morning session continued the VHF ionospheric propagation symposium. Bob Cooper, ZL4AAA, talked about a worldwide system of smart 6 meter beacons. Pat Dyer, WA5IYX, talked about his 30 years of sporadic-E observations. Mike Owen, W9IP, read a paper prepared by Emil Pocock, W3EP, concerning trans-Atlantic sporadic-E openings. A panel discussion featuring all the speakers followed their talks.

Those who could attend were treated to a Bill Tynan, W3XO, hosted Texas-style barbecue at his Tierra Linda Ranch. The food was expertly prepared by Pat Rose, W5OZI.

As always, the ARRL prepares proceedings of the conference. Copies may be purchased from the ARRL for \$12.00 each, plus shipping.

Those of you who have ever been elected to a club office know what the sound of a train whistle means. For the uninitiated, it means that someone who cannot get out of the way fast enough will be railroaded into an (elected) office. For your editor, the train whistle blew and I did not get out of the way. Therefore, I was "elected" president of the society for the forthcoming year.

The position of presidency is reserved for the host of the conference. This means that I am the host, and the 1993 conference will be held in Oklahoma City. The theme for the conference is involving the beginner in VHF and above activities. The technical coordinator is Tommy Henderson, WD5AGO. If you wish to make a presentation or submit a paper for the proceedings, contact Tommy at 12476 E. 13th, Tulsa, OK 74128, or call him at 918-438-0099.

As the plans are formulated for the conference, you will read about them in this column, as well as through the various newsletters within the VHF community. I invite all of you readers to be the recipients of the Sooner State hospitality at the Central States VHF Society conference next summer. Make your plans now for the

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Chip Angle, N6CA's van parked at the exact intersection of grid squares DM05, DM06, CM95, and CM96 during his microwave experiment in July. (Photo courtesy N6CA)

greatest ever of the paramount VHF/UHF conference of the country.

Current Conferences

Microwave Update '92. While the CSVHF Society presents the premier in VHF/UHF work at its conferences, the Microwave Update confer-

ences are the premier in the microwave arena. This year's conference will be hosted by the Rochester VHF Group and held at the Holiday Inn Holidome and Convention Center, 1111 Jefferson Road, Rochester, New York. To date, the scheduled speakers include: Barry Malowan-chuk, VE4MA (HEMT preamps for 3.4 and 5.7 GHz); Paul Wade, N1BWT (5.7 GHz mixers); Richard Frey, WA2AAU (24 GHz operation); Bill Olson, W3HQT (hints and kinks for the Down East type transverters); Kent Britain, WA5VJB (microwaves made simple); Al Ward, WB5LUA (design and construction of HEMT LNA's for 2, 3, 5, and 10 GHz); Tommy Henderson, WD5AGO (a complete 1296 MHz EME system); Rich Campbell, KK7B (no tune microwave transceivers); Mike Owen, W9IP (computer control of antennas); Dave Hallidy, KD5RO (meteor scatter and aurora at 902 MHz and above); and Paul Shuch, N6TX (fiber optics, the waveguide of the future). An excellent list of family attractions has been prepared for the conference attendees. Additionally, the banquet features a gourmet's delight menu. For registration information write to: Microwave Update '92, c/o Rochester VHF Group, P.O. Box 92122, Rochester, NY 14692, or call Dave Hallidy at 716-272-1582, or Frank Pollino, K2OS, at 716-594-0502. A block of rooms has been set aside at the hotel for the conference. You can reserve your room by calling 716-475-1510.

I would like to mention one significant aspect of Dave Hallidy's talk. As this column is being prepared, I have learned that Dave and Al Ward, WB5LUA, will be running a meteor sked on 902 MHz during the Perseids. Dave will discuss the experiment as part of his talk on 902 MHz meteor scatter and aurora. This talk alone makes all the

more reason for you to attend. See you there this month.

Current Contests

Canadian Sprints. The Canadian Sprints have been set for the following days: the microwave bands (902, 1296, and 2304 MHz), September 24 from 7 PM to 11 PM local time; 423 MHz, September 30 from 7 PM to 11 PM local time; 222 MHz, October 6 from 7 PM to 11 PM local time; 144 MHz, October 12 from 7 PM to 11 PM local time; and 50 MHz, October 24 from 1000 to 2400 UTC. Exchange is grid square, and contacts are worth one point per QSO in each contest. Scoring for each sprint is grid squares multiplied by total QSOs. Please note that no FM contacts are allowed on 146.52 simplex or any repeaters. Mail your logs to Dana Shtun, VE3DSS, 500 Willard Ave., Toronto, Ontario, M6S 3R6, Canada. This is an excellent time to turn our stateside antennas northward and communicate with our Canadian brethren (as if we shouldn't be all the time). Dana mentioned that there are a number of amateurs on 2 meters in EN92-94 and FN03-05, 15 and 25. He also mentioned that Richard Staron, VE3FAC, is QRV on 1296 MHz with four loop Yagis and 180 watts. You may want to contact Richard for skeds at 416-288-0569.

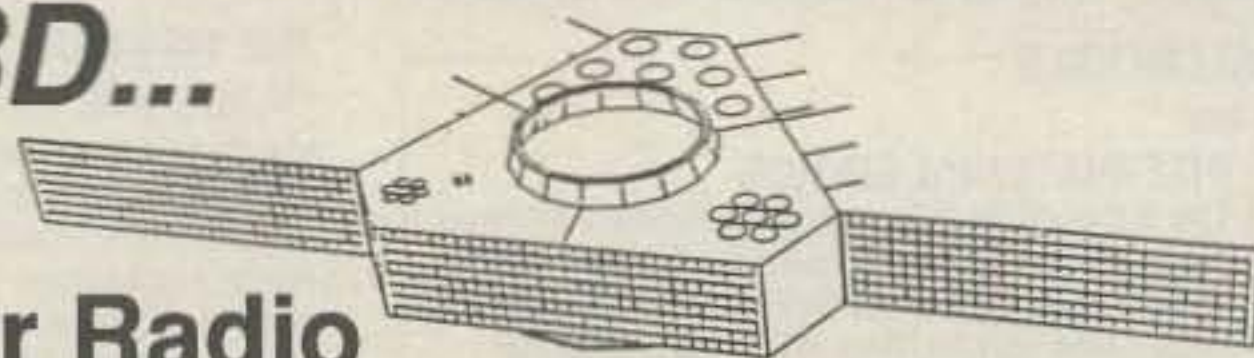
ARRL EME Contest. The first weekend of the ARRL International EME Competition will be October 17-18 from 0000 to 2400 UTC. The second weekend will be November 14-15. Contacts are to be made on any band above 50 MHz. Scoring is 100 points per completed EME QSO. Multipliers include each US and Canadian callsign

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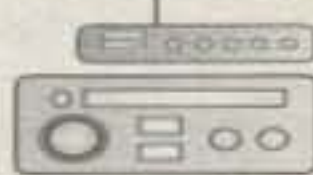
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area, plus each DXCC country (excluding US and Canada) worked via EME on each band. Stations operating outside their traditional callsign area must indicate so by identifying the callsign area of the operating site. It is requested that partial contacts be listed in your log, although no points are allowed for incomplete QSOs. Special rules apply for multi-op stations. You may obtain log sheets and full rules from the ARRL. Logs are due no later than 30 days after the last day of the contest, or December 15, 1992.

Second DXCC on 2 Meters Now Completed

Completing a contact via EME with the club station UZ2FWA in Kaliningrad gave Gary Crabtree, KB8RQ, his 100th country on 2 meters. He is awaiting his card from this QSO and one other card to have the necessary paper. However, he indicated that he plans to contact one other country for "insurance" before having his cards checked for the award. Congratulations, Gary!

Expedition Reports

New 6 Meter EME Distance Record Set. Mike Stahl, K6MYC, Gary Crabtree, KB8RQ, and Jim Treybig, W6JKV, operating from Mike's Hawaiian QTH on July 3 each completed a 6 meter EME contact with Kiri, OH2BC (Jim's contact actually came on the next day). To date, this is the longest (terrestrial) distance worked via EME on this band. Coincidentally, these QSOs provided Kiri with his 100th country on this band.

While at Mike's QTH Gary used Mike's new 54 foot long 2 meter antenna to make contacts with I2FAK, W7FN, K2GAL, W7HAH, VE7BQH, WA3HKM, and W8WN. Gary also reported that he had a partial with W5UN/KL7. Even on vacation Dave is not far from an EME-equipped station.

More on 6 Meter EME. Shep, W7HAH, reported that on July 20 he completed his fifth 6 meter EME QSO, this time with VE6JW. Shep also reports that the following stations are either on 6 meters EME or in the process of constructing antenna arrays: Jim, W6JKV, Bob, K6QXY, and the Fishes, W5FF/K5FF. Additionally, your editor has learned that Bill, AA6TT, and Victor, K6FV, will be QRV on 6 meters EME. Shep says that a good way to check for your echoes is to send a series of O's on your moon rise. He states, however, that you will need a long-boom antenna and a KW output in order to be successful with this experiment. Due to the Doppler shift, you should hear your return about 100 Hertz above your transmit frequency. Most operation occurs on the very bottom 10 kHz of the band, and then on CW. A growing number of dedicated 6 meter operators feel that there is a future in EME work and that EME may well be the only way to complete DXCC for many because of the waning F2 seasons.

WZ8D, WA8R, and WA8NJR Grid Expedition to Canada. As reported last month John, WZ8D, Jerry, WA8R, and Byron, WA8NJR, made an extensive trip to EN68, EN73, EN74, EN78, EN79, EO50, EO70, and EO80. They made approximately 550 QSOs, with most of them on 6 meters. Of these 550 QSOs, 45 were made on 2 meters meteor scatter. Of those, six were made while the guys were in motion through EN68, EN78, and EN79. The lucky recipients were Hal, KC4YO, and Steve, KI3W. Also

while in motion, they made contacts from EN73 and EN74 on 1296 MHz with WW8M and WA8TJO. Byron reported that the bugs were horrendous and the weather was terrible. He said that while traveling on a dirt road on their way to EO50, he and Jerry walked in front of the truck clearing branches and debris while John drove behind them.

One incident that got Byron the nickname Sparky was very dangerous and almost tragic. While pouring gasoline into the generator, Byron was bitten by a mosquito, which caused him to spill gasoline on the can, the muffler, and his hands. The gas hitting the hot muffler instantly ignited and caused the gas on the gas can and his hands to also ignite. Fortunately, through quick thinking by John and Byron, plus use of a nearby paper sack and the contents of the coffee pot, the fires were extinguished with no harm caused. Whew! One can never be too safe.

He reported that many helped with scheduling of contacts and tracking of their progress. He especially appreciated the assistance of Bob, KD8AX, who called their wives often to keep them informed of their trip. Byron says that despite the inconveniences, they are ready to go on another trip next year.

WB9MSV Grid Expedition to EN56. Larry Reiser, WB9MSV, made his eighth annual trip to northern Michigan this past July. Unfortunately, unlike previous years this year produced only 20 contacts from only one grid square. All but one of these contacts were during a very brief sporadic-E opening on 6 meters. The remaining contact was on 2 meters. Larry said that he was not discouraged with this year's results and will be back next year.

N6CA Grid Expedition to Kettleman City, California. On July 25, Chip Angle, N6CA, set up a grid expedition at the survey marker at 36°N and 120°W, an altitude of 640 feet. This location is the four corners of DM05, DM06, CM95, and CM96. From that position he operated on all bands, from 50 MHz to 10 GHz. Contacts made on all microwave bands were approximately 184 miles in distance. Chip remarked that this is the first time that non-mountaintop microwave contacts were made out of the Los Angeles basin north to the central valley of California. In order to cover this path, it is necessary to traverse an 8000 foot mountain range. Chip reported that he could consistently work Dave, WA6CGR, on Signal Hill near Long Beach at an altitude of 200 feet during a period between 1600 and 2300 UTC. Chip suspects that the propagation was via a knife-edge effect to clear the mountain range. Chip also stated that the Palos Verdes 30 watt ERP omni-directional X-band beacon located at a 1440 foot elevation was workable over the same 8000 foot mountain range. He said that beam headings were direct, discounting any reflections around the mountain range. Chip used a 4 foot dish for his end of the contacts and reported that Dave used a 2 foot dish or single loop Yagis for the other end. Chip also said that he planned another trip to the same location during the second weekend of the 10 GHz contest (in September). You will see the results of his efforts in this column.

On The Air

More June Contest Reports. Larry, N0LL, claims a score in excess of 290 k. His DX on 6 meters included VE8KM, VP5/KA3B, C6AFP, VP2MO, CO2KK, and 6Y5/KB4CRT. Carl, KM1H, worked 193 grids and four new countries (VP5,



The cab-over-camper setup (at grid square EO50) of the WZ8D gang during their DXpedition to Canada. (photo courtesy WABNJR)

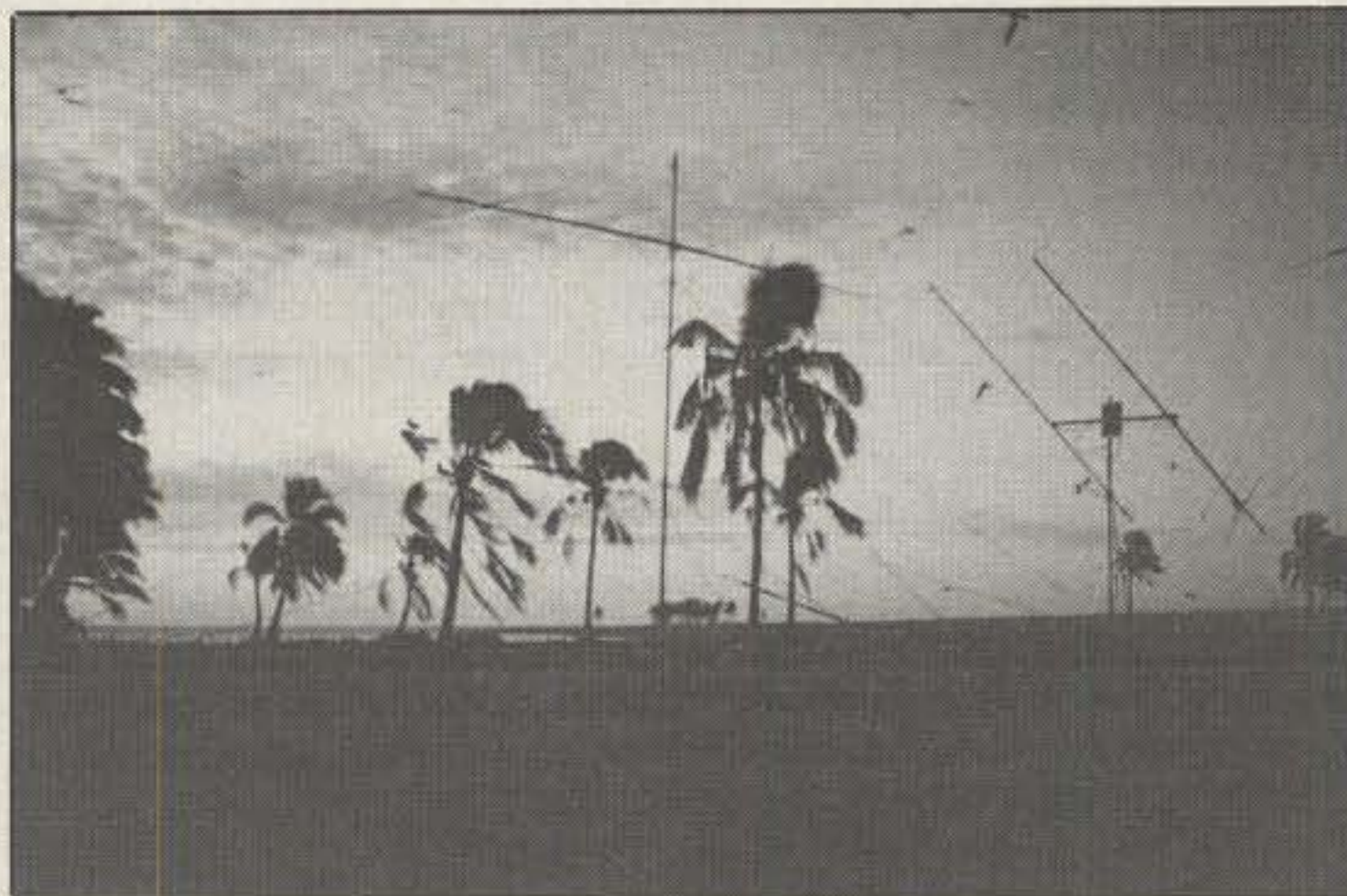
6Y5, KP4, and VP2MO). Shep, W7HAH, grid mobiled through DN68, DN77-78. Total QSOs was 291. Scott, VE7FYC, reported working Seattle, a path of 230 miles on 1296 MHz. Kevin, WB9GKA, worked 88 grids on 6 meters and into Texas (from EM58) on 144-432 MHz. Bob, WA6IJZ, reported a limited opening to W5s, W7s, and VE7s.

More on 6 Meter Europe Opening. Carl, KM1H, reported working 237 Europeans in 19 countries in 3.5 hours. The best was UZ2FWA, for probably the first U.S. to Kaliningrad 6 meter QSO.

CQ WW VHF WPX Contest. To date in excess of 40 logs have been received. Conditions ranged from fair to poor. Your editor grid mobiled through EM15, EM05, and EM04 and stopped in DM94 for an hour to work 6 stations on 6 meters. Results will be published sometime right after the first of the year. Hope you had fun too!

California to Hawaii QSOs Once Again This Year. The California to Hawaii tropo season began unceremoniously with a QSO between Terry, N6CW, and Russ, KH6FOO, at 2100 UTC on June 3rd. Terry reported that following the QSO he continued to hear the KH6HME beacon for ten more hours. While the beacon was heard off and on during the next two months, no contacts were made until August 2 (UTC, actually, Saturday night, local time). That evening reception of the beacon was reported widely across southern California. A call was placed by Gordon West, WB6NOA, to Russ. During the conversation Gordon suggested that if Russ was to work the mainland, it would likely be that night. Calls were also placed to Paul, KH6HME, to no avail. For the next three hours efforts were made to complete contacts with Russ, but with no success. Russ is in a location at least 4000 feet below the beacon in elevation and often shut out from the duct effect. Finally, however, at around 0550 UTC Russ completed with N6XQ, KD6EVV, K6HXW, and N6CL, in that order.

Did you catch my call in that list? Well, yes! During my visit to San Diego for my niece's wedding, I mentioned to Jack, N6XQ, that I sure would like to be able to at least hear the beacon, let alone work someone in Hawaii on 2 meters. Jack called me while I was having dinner at my sister's home to alert me to the reception of the beacon. After dinner I drove over to Jack's QTH. As I drove over the rise in Point Loma, I heard the beacon on my TR-751 using that SQLOOP antenna. (Remember the picture in the July column? Same setup, different rental car.) After arriving at Jack's QTH and during the next two



▲ The skyline of FO0CI at sunset, showing the 6 meter and satellite antenna arrays. (Photo courtesy PA3DUU)

◀ Wayne Overbeck, N6NB, and Chip Angle, N6CA, the movers and shakers behind the Western States VHF-Microwave Society, posing behind Wayne's van.

hours I experienced the frustration of hearing the beacon but not being able to work anyone.

At 0500 UTC, after hearing the beacon completely fade out and come back up to S1, I finally gave up and drove to my brother's home, a half-hour's drive from Jack's. On the way home I continued monitored 144.200 MHz. As I rounded the corner to my brother's house, I heard Jack call Russ. As soon as I got inside the house, I called Jack to ask him what was going on. He replied by telling me that I had better get back out there right away.

I began the return trip again monitoring 144.200 MHz. As I drove up the hill in Point Loma, I heard Jack complete his QSO and then KD6EVV complete his QSO. As I arrived at Jack's house, he urged me inside, saying that Russ had just completed calling CQ. I got inside and immediately called him on CW. He instantly came back to me. We then switched to SSB and completed another contact. Thanks to the generosity and hospitality of Jack and the assistance of Gordon, I experience one of the most enjoyable contacts in my ham radio career.

Widespread 2 Meter Sporadic-E Opening Reported Throughout the West. I returned to Oklahoma on Tuesday, August 4, apparently a day too soon. On Wednesday night 2 meters came alive with stations in southern California reporting contacts with VE6s and W7s. At the same time stations in Oregon reported contacts with New Mexico, Arizona, and Nevada. Additionally, stations in Washington state reported contacts in Montana and Wyoming. The fun lasted around two hours between 0000 and 0200 UTC. During most of the opening Bill, N0XX/7, reported hearing Mark, KN5S, with S9-plus signals. Todd, KB6IGC, got wind of the opening when his co-workers reported hearing distant stations on the FM radio. He got home in time to work WE7P and VE6s TA and AFO. When

Jack, N6XQ, discovered that his hastily installed (for the KH6 QSOs) 11-element beam hit the neighbor's bamboo tree upon rotation to the north, he quickly switched to his 3-element beam. With that antenna, in short order he worked W7XC, WE7P, and VE6TA, the last for his first ever VE6 on 2 meters. Also getting in on the fun from southern California were K6UIY, AJ6F, and N6CA. Chip, and further to the north, Mike, K6MYC, also heard bursts (meteors?) from possibly Bill, AA6TT. Bill was also worked by stations farther north in the Oregon and Washington state area. Additionally, Fred, W5FF, Bob, N5EPA, and Dan, WA7TDZ, were heard participating in the fun.

Excellent Widespread Midwest-Southwest Tropo Opening Reported. A tropo opening that began around 1800 UTC on August 8 grew to encompass wide areas of the midwest and southwest parts of the U.S. and the Canadian province of Manitoba. By all reports the opening was erratic, in that it came and went at various locations around the affected areas. Some of the highlights include: W0PW with NT0V and K0CQ on 1296 MHz; AA5C and WB5LUA with WB9OJR on 1296 MHz; WN5J and KG5MA with K0CQ, K3SIW, and W9ZIH on 1296 MHz; VE4KP with KW0A on 144 MHz; and VE4AQ with WB9MSV on 432 MHz. Others who participated include: WA5MUB, KA5ZKI, W5PIC, WD5BKV, WB5ABN, N5DDB, N5RSS, K5SW, WB5YWI, KB5IHD, NN9K, N9GA, WB9UWA, K9VSW, AF9Y, KB5RF, W0RAP, KE0SM, WR0F, N0SXW, N0AKC, KC0P, KD9IV, WA0FLS, KM0A, N0JPE, and K1LL/0. Don, W0PW, reported that this was the first opening to the north on 1296 MHz from his QTH in Missouri since he moved there. Glen, WN5J, reported that this was his first ever out-of-state contact on 1296 MHz. Reports from Texas indicate that K5LLL was worked in the DFW area on 902 MHz.

Perseids. This column is being written dur-

ing the Perseids meteor shower. The peak seemed to have occurred between 1800 and 2000 UTC August 11 with the most intense activity being between 1900 and 1930 UTC. Next month's column will contain a more extensive report on the activity.

New VE Beacon on 6 Meters

VE6UBL is now operating on 50.059 MHz. It uses a 10 watt transmitter feeding a vertical dipole. It is located at Brougham, Ontario, in FN03, and is run by the South Pickering Amateur Radio Club, P.O. Box 53, Pickering, Ontario, L1V 2R2, Canada.

FP and TG Now on the Air On 6 Meters

FP/VE1KM. Using a KA3B loaned transceiver and a W4DR supplied 5-element beam, Ron Thompson, VE1KM, operating as FP/VE1KM, is now on 6 meters. This should be a good catch during this fall's F2 openings.

TG9AJR. This station has been reported worked in the U.S. and Caribbean on 6 meters in June. Look for him as well this fall.

10 GHz Experiments Underway

Two reports of 10 GHz experiments over water have come to my attention. The first involves Chip and Paul's continuing efforts to break the over-water record by making a QSO between KH6HME and N6CA. Although the season has produced some receptions of the 2 meter beacon (see above), conditions have not yet

been favorable for the sustained effort necessary to make the try.

The second effort involves Kevin, ZL1UHG, and Lyle, VK2ALU. They are trying to complete a contact on 10 GHz between New Zealand and Australia over a path that has been previously worked on 144, 432, and 1296 MHz. In order to aid in the detection of propagation, Kevin is constructing a 10 GHz beacon. We will keep you informed of any successes.

Spain Finally on 6 Meters

A year ago in a sidebar in this column I announced that Spain amateurs were soon to get 6 meters privileges. This past July 2 the authorization finally went through. Spanish amateurs who have permits to operate on 6 meters will sign their call sign with the prefix "EH" in place of the regular "EA" prefix. The frequency of operation is limited to 50.000-50.200 MHz. The maximum ERP is 30 watts. Permits are issued for one year at a time and on a very strict non-interference basis. To date there have been 80 permits issued, including within the Spanish possessions operating under the EA prefix.

Incidentally, Spain authorized the use of the "EA92" prefix during the Olympics. At least two stations, EA92G and EA92M, were worked on 2 meters EME. Also heard was EA92SOB, for Special Olympics Barcelona. QSL information will follow in a future column.

Current Meteor Showers

Draconids. This shower has a checkered past. In 1985 it produced 200 rocks per hour at its peak. However, since then there has been insufficient activity to support much meteor-scatter communications. This year earth will pass through the orbit of the comet Giacobinid-Zinner, the originator of this shower. However, the orbits of earth and the comet are such that we will miss the prime rock days of the comet's orbit. The next big storm is predicted to be 1998. This year the peak of the shower will be between October 6-10.

Orionids. The peak of this shower is scheduled to be around October 22nd. It is considered a minor shower, producing only 8 meteors per hour at its maximum. While visibly entertaining, it is not much use for meteor scatter communications.

While neither one of these showers shows much promise, it is not out of the question that something will happen in space during the months leading up to the scheduled appearances. Affects of the sun's gravitational pull on comets have created unexpected showers and storms. As always, being prepared is the best bet for success in any VHF and above communications.

V73AT Now QRT V73SG Now QRV

After a long and successful stay on the Marshall Islands (specifically Kwajalein Island) Tim, V73AT, returned stateside to settle in Colorado. His QSL manager will remain K2CL. In his place Sam, V73SG, is now QRV with 100 watts and an old 5-element beam. He is single and quite ac-

tive at the amateur radio club station. He has indicated a commitment to 6 meters with a recent purchase of the appropriate equipment from Oklahoma Comm Center by Ken, V73CT, on his behalf, at the Oklahoma City Ham Holiday Hamfest.

A22MN Now QRV on 6 Meters

Dave Heil, K8MN/A22MN (and formerly 9L1US), is now on the air in Botswana. He is running 160 watts into a 5-element beam. If there is to be any F2 this fall, he will be workable in the U.S. His QSL manager continues to be WA8JOC.

VHF Plus Products

EME Software. There are two software packages available for the EME enthusiast. They are: Skymoon, by Dave Blaschke, W5UN, and Realtrack, by Mike Owen, W9IP.

Skymoon. This software is specifically designed for the EME enthusiast. It is a graphics-based package that uses a flat map of the world to locate your position and the position of the station you wish to work. By accessing a data base supplied by W4ZD you can have in front of you all the information needed for arranging the sked. Among the information supplied is the distance of the moon from earth, the AZ and EL settings for your antenna, and the common window for you and the station you wish to work. Additionally, the estimated sky noise temperature is supplied. The one drawback is that because of the intense use of graphics, version 3, the current version will only run on a VGA monitor. They continue to have version 1 available, which will run on Hercules compatible monitors. The original version is available for \$40 and version 3 is available for \$50 from Skymoon, 9102 Kings Drive, Manvel, Texas 77578.

Realtrack. This software package not only supports EME work, but 100 satellites as well. It supplies much of the same information as Skymoon, however, without much of the graphics. The graphics supplied allows the user to see the footprint of the moon or satellite on a round globe or on a flat map. It is supplied with graphics drivers for Hercules, CGA, and VGA type monitors. It also has a data base that is maintained by Mike. However, Mike's data base only contains call signs and grid squares. Additionally, the software can be used to key your transmitter and rotate your antenna, through both azimuth and elevation movements. The price is \$50. Mike is currently shipping version 8.3. You may order your copy by writing to: Northern Lights Software, c/o Mike Owen, Star Route, Box 60, Canton, NY 13617. When ordering, specify type of disks and type of D/A board in your computer.

A full review of both of these products will be forthcoming.

New Books. Two new books, one for the beginner and one for the more advanced, have recently become available. The book for the new VHFer is entitled *Your VHF Companion*. It is edited by Steve Ford, WB8IMY, and is written for the new amateur. It is designed to get the new ham off the repeater and interested in other forms of communications on VHF. It is an excellent book for the operator who is new to the wonderful world of VHF plus.

The book for the more advanced VHFer is entitled *Microwave Handbook Volume 3*. It is the third volume of books published by RSGB pertaining to microwave communications. This volume contains equipment recommendations and construction projects for each of the microwave bands. If you have volumes 1 and 2, you must obtain this one to complete your set. If you do not have any of the volumes, you need these to start your microwave library.

Both of these books are available from the ARRL. *Your VHF Companion* sells for \$8.00 plus shipping, and each volume of the *Microwave Handbook* sells for \$35 plus shipping.

New M2 Long-Boom Antenna. The 54 foot long antenna that Mike Stahl, K6MYC, took with him to Hawaii is now part of his product line. Mike brought the antenna to the CSVHF conference for measurement on the antenna range. It beat out all the competition. When the guys used it in Hawaii, they pumped around 900 watts into it. They reported being able to hear their own echoes, both on the horizon and when the antenna was pointed straight up at the moon (absence of ground gain). The antenna is 54 feet long and has 24 elements. The model number is 2M8WL and it is available directly from M2 for \$275, plus shipping. Contact Mike at 7560 N. Del Mar, Fresno, CA 93711 (phone 209-432-8873).

Terrestrial VHF + Directory. Are you looking for a source of telephone numbers and a list of who is operating from what grid square? If so, then the *Terrestrial VHF + Directory* is for you. It is maintained by John Carter, KØIFL, and can be purchased for \$3.00 postpaid. For your copy, send to: John Carter, KØIFL, P.O. Box 554, Union, MO 63084. If you would like a free listing in the directory, send John a postcard with your grid square, your name, your call, the bands you operate, and your phone number (including area code). Also, please include any notes about your station, such as "EME equipped" or "meteor skeds welcomed."

And Finally . . .

While I was in California I had dinner with my mentor, Herb, K6BTO, at his son, Frank, AE6L, and daughter-in-law, Sherri's, home. We talked about the good old days as one would expect. We also talked about the future of the VHF + bands. Toward the end of the conversation he made a statement that he had previously said so many years ago. He stated that when hams were first given 40 meters they had to learn how to use it. I reflected on that statement as we concluded our visit that evening. I continued to reflect on it during the rest of my stay in California. The next day, when Chip, N6CA, was describing what he concluded to be knife-edge paths for his microwave contacts, I thought about it. I reflected again on it as I relived John Chambers' experience during my California to Hawaii 2 meter contact. And I continue to reflect on it as I write this column during this week of the Perseids meteor shower.

The future of amateur radio is in microwave and you are the future explorers. It is up to you to learn "how to use" the bands. When you make your discoveries, write me, or call me at 405-528-6625.

My thanks to "West Coast VHFer," "Feedpoint," "DX Magazine," John Carter, KØIFL, Ted Collins, G4UPS, and you, my friends on the VHF + frequencies, for contributions to this month's column. Until next month. . . .

73, Joe, N6CL

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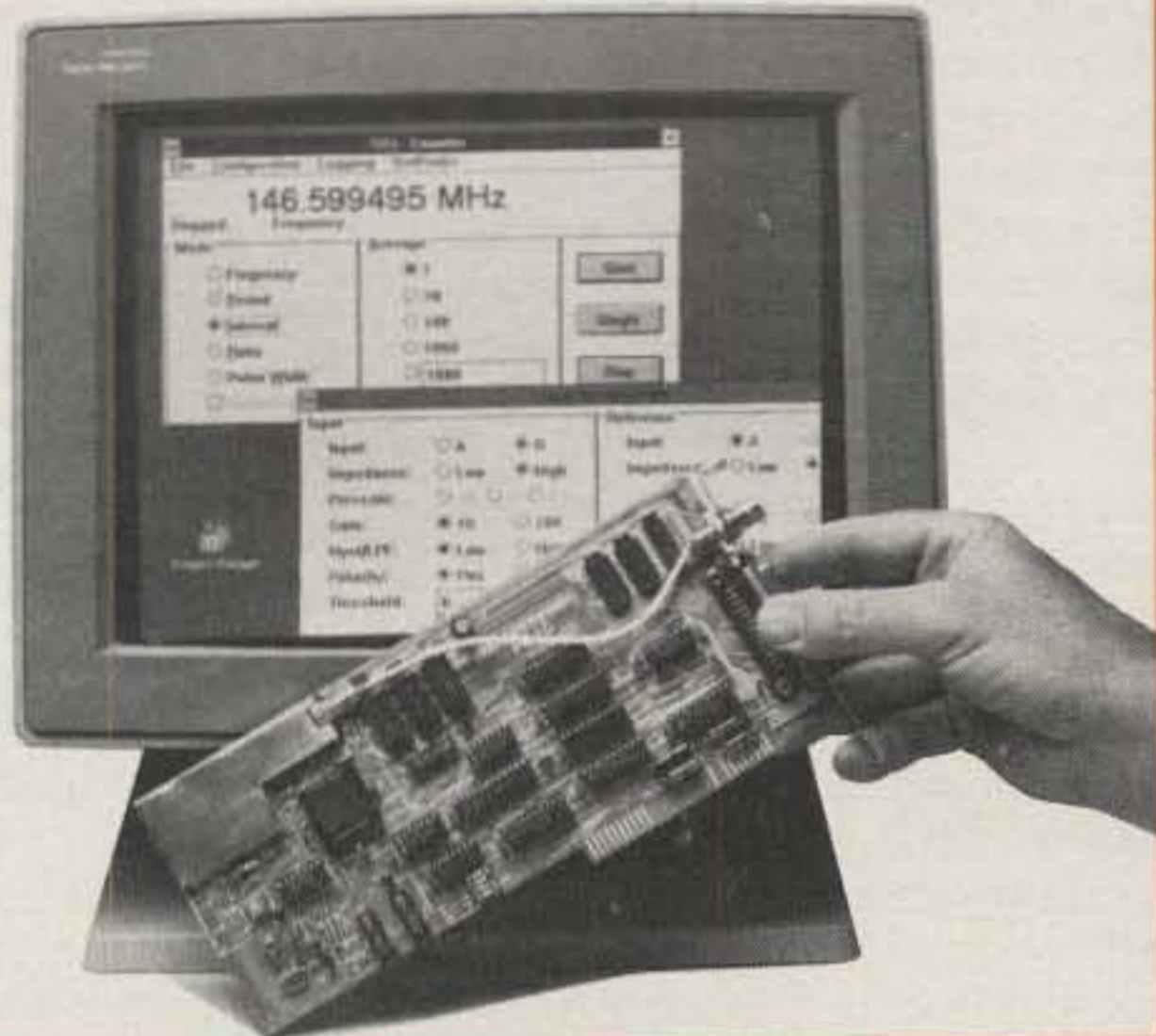


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NEWS/VIEWS OF ON-THE-AIR COMPETITION

Recruiting New Contesters

When contemplating the conversations related to contesting I've had in the past year or two, there always seems to be one topic that rises to the surface. What are we doing in the world of contesting to recruit new participants? Unfortunately, the contest community has all too often spent more time *talking* about this important topic than *doing* something about it.

This month I don't plan the discussion to be an all-encompassing tutorial on recruitment opportunities. Rather, I thought I would focus on one area that could have an impact and offer immediate results.

Most of us belong to at least one local amateur club organization. There is a minute subgroup within our population that even dares to take on leadership responsibilities as club officers. If you have ever lived through this experience, as I have, one of the most difficult challenges is planning meeting programs. Herein lies our opportunity.

Over the years I have given dozens of presentations on contesting to various groups. For reasons worth pursuing, these events tend to draw larger crowds and always seem to achieve successful results. From what I have been able to observe, the "non-contester" views contesting to be somewhat of a mystery. We have a language of our own that is foreign to others. If you think about it, our focus on the leading edge aspects of the hobby together with specialty in operating is truly unique. We are often labeled as "contesters" rather than amateurs. The possibilities lie in attracting the interested person who simply wants to learn how to break into the game, meet the right people, and identify the means to learn more. There is no better setting than that of a local club meeting to seize this opening.

The Presentation

Giving a presentation to a local club is easy, and you don't need to be the world's most gifted speaker to achieve success. Enthusiasm more than compensates for your nervousness. Another point to consider is your qualifications. Most people think that a prerequisite for being a competent speaker on contesting is to have 20

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Calendar of Events

Sept. 26-27	Scandinavian SSB Contest
Sept. 26-27	CQ WW RTTY Contest
Sept. 27-28	1992 Fall Classic Radio Exchange
Oct. 3-4	California QSO Party
Oct. 3-4	VK/ZL SSB DX Contest
Oct. 3-4	1992 F9AA Cup Contest
Oct. 10-11	VK/ZL CW DX Contest
Oct. 10-11	X Concorso Iberoamericano
Oct. 11	RSGB 21/28 MHz SSB Contest
Oct. 11-12	Illinois QSO Party
Oct. 14-15	YLRL CW Anniversary Party
Oct. 17-18	ARCI QRP Fall CW Contest
Oct. 18	RSGB 21 MHz CW Contest
Oct. 18	Worked All Germany Contest
Oct. 24-25	CQ WW DX SSB Contest
Oct. 28-29	YLRL SSB Anniversary Party
Nov. 7-9	ARRL Sweepstakes CW Contest
Nov. 14-15	Worked All Europe RTTY Contest
Nov. 14-15	OK-DX Contest
Nov. 21-23	ARRL Sweepstakes SSB Contest
Nov. 28-29	CQ WW DX CW Contest
Dec. 4-6	ARRL 160 Meter Contest
Dec. 12-13	ARRL 10 Meter Contest

or 30 trophies on the wall. In reality, experience and measured perspective from a smaller station can be equally compelling.

If I have you convinced that you can be one of our ambassadors, then what follows may be of some use to you. The ensuing text is a proposed outline that I have designed to be functional as a general contest presentation for most club settings. Of course, it is likely that you will want to put your own personal and geographic "spin" on the presentation. This particular framework reflects my own experience and that of others as a starting point.

The Outline

- I. Introduction/Background of Speaker
 - a) Introduction: family, occupation, other interests
 - b) Your own entry into contesting: how, when
 - c) Detail personal contest experience(s)
- II. What is a Contest?
 - a) Brief description of contesting
 - b) Types of contests
 - c) Introduction to contest terminology
- III. The History of Contesting
 - a) ARRL SS, CQ WW, etc.
 - b) Modern contesting vs. "the past"

IV. The "Black Magic" of Contesting Revealed

- a) Equipment and antennas
- b) Station layout
- c) Operating techniques
- d) SSB vs. CW
- e) Going on that DXpedition
- f) Some "real-world" war stories

V. Why Contest?

- a) Benefits of contesting to: operating skill, amateur radio, pushing state of the art
- b) Fun and camaraderie

VI. This Sounds Great—Now What?

- a) Publications and sources for further information
- b) Contest clubs
- c) Local contest operator resource list

VII. Summary and Conclusions

- a) Why contesting can be for you
- b) Tell 'em what you told them

VIII. Questions and Answers (Be prepared for lots!)

Some Other Pointers

Most of us, despite our best intentions, are not gifted speakers. If you are like most, it will be difficult to hold the attention of your audience for more than 20 or 30 minutes by flipping one overhead chart after another. This is where creativity is required to make for an outstanding effort. Here are a few ideas to break the monotony and help keep your audience on the edge of their chairs.

1. Deliver a mixture of overheads, 35 mm slides, and audio tapes showing various stations/antennas (including your own) and operating situations.

2. Depending on the size of the crowd, try conducting a simulated contest with the audience. Any format will work and this technique has always been a big hit for me. Picking a randomly selected attendee as the "run station" with the audience "tuning the bands" (or a pre-briefed alternative) really gets them going!

3. There are many interesting videos available, including the N2AA Multi-Multi, Goodwill Games, Frankford Radio Club,

etc., which are excellent program additions.

4. Consider demonstrations of contest logging programs such as CT, NA, or the new K1EA DVP board. Of course, a Packetcluster demonstration is always a good icebreaker.

5. Try partnering with someone for the presentation; a multi-op can really be effective in this setting.

6. Coordinate a presentation with a known major antenna follow-up project. This is an excellent opportunity to provide further contact with interested attendees and get some needed extra help. Alternatively, offer a supplementary demonstration of a contest station (yours or someone else's) the week or two immediately following your talk.

7. Humor is a good thing. Try to include individual anecdotes and funny experiences. There has never been a multi-op effort without at least one or two stories worth telling others.

8. Charts and graphs are good to break up pages of bulleted words. Non-contesters are not as interested in rate sheets as we are, but it is interesting to show how many DXCC countries you have worked in a weekend or other general information in graphical form.

9. If you belong to a contest club, speaking to an "old-timer" can be enlightening and extremely useful to a general audience. In addition, be sure to bring lots of information about your local contest club (e.g., newsletter, roster, etc.).

10. If you have the resources, quality presentation materials (e.g., slides, computer-generated overheads) are extremely effective.

11. Above all, show enthusiasm. It is entirely appropriate to get excited during your presentation, even showing a little pride in your special interest.

The ARRL and other national amateur organizations can provide you with data about local clubs. This will detail meeting times and locations, club officers, and other important information. And now it's off to the speaking circuit!

Final Comments

If you haven't yet taken the time, please spend a few minutes to complete this year's Contest Survey found in last month's issue (September). Your input is appreciated and invaluable to all of us!

The CQ WW DX Contest is only a few weeks away. Don't miss out on contesting's premier operating event. With the popular low-power category, there are even more chances to win an operating category and award.

As always, please remember that the deadline for the January issue is November 1st.

73, John, K1AR

California QSO Party

1600Z Sat. to 2200Z Sun., Oct. 3-4

This year's party is again being sponsored by the Northern California Contest Club. All efforts are being made to activate all CA counties and make this the most successful of all state parties.

Operating time is limited to 24 out of the 30-hour contest period for single operator stations. Multi-operators may use the full 30 hours. Off times must be at least 15 minutes and clearly indicated in the log.

The same station may be worked on

each band and mode, and CA stations may contact other in-state stations for QSO and multiplier credit. CA mobiles may be worked in each county change.

Exchange: QSO no. and QTH. County for CA stations; state, province, or DX country for others.

Scoring: Two points for phone contacts; 3 points on CW.

Multiplier: CA stations use states (50) and VE call areas (8). VO/VE1-7 and VY1/VE8. Out-of-state use CA counties (maximum of 58).

Final Score: Total QSO points times the sum of the multiplier.

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Awards: Certificates to the highest scoring single operator in each state, province, and country. Also each CA county and stations scoring 100 or more QSOs.

Trophies galore. Single operator, top three out-of-state, and CA top three. Also CA county expedition, and a special award for the CA and out-of-state stations making the most CW QSOs. Multi-single and multi-multi winners in CA and county expedition. The CA mobile team making the most QSOs. And the top scorer outside the United States and Canada, high-scoring low-power entry (less than 200 watts). A Special Award of a personalized bottle of California wine goes to the top 20 single operators in CA and 20 out of state. And to the top-scoring Novice/Tech entry, both in CA and out of state. In addition, 200 special CQP tee-shirts will be awarded to top entrants.

Include a summary sheet showing the scoring, etc., a dupe sheet if you make more than 200 QSOs, and a large SASE for a copy of the results. Entries may be submitted in CT Ver. 8 format with a signed hardcopy summary sheet.

Mailing deadline is November 15th and entries go to: NCCC c/o Ken Anderson, K6PU, Box 853, Pine Grove, CA 95665.

A contest paperwork packet containing log, summary sheet, contest records, county abbreviations, and Special Awards List is available by sending a large SASE to K6PU.

F9AA Cup 1992 Contest

1200Z Sat. to 1200Z Sun., Oct. 3-4

This contest was created in 1986 to celebrate the memory of Fernand Raoult, F9AA, who was the founder of the French Club Group. The URC was designed to benefit amateur radio by facilitating friendships between different club organizations.

Classes: Single operator private stations for multi-op club stations.

Bands: All HF bands according to IARU rules.

Exchange: Club stations—59(9) plus serial number and club name. Others eliminate the club designation.

Modes: First 12 hours are CW with the remainder of the contest on SSB. QSOs can be credited per band and mode.

Scoring: Club stations—5 points same continent, 10 points different continent. Individual stations—1 point same continent, 3 points different continents.

Fifty bonus points/QSO for working FF6URC. Multipliers are DXCC countries and different radio clubs.

Awards: The first-place club station, single operator, and SWL outside of France will receive the special F9AA Cup Award. The top five individual stations receive other awards. All foreign club entries will be notified of the final results.

The log deadline for this one is November 4th and they should be mailed to: Union Des Radio Club, Coupe Fernand Raoult, 11 Rue de Bordeaux, 94700 Maisons Alfort, France.

VK/ZL/Oceania DX Contest

SSB: Oct. 3-4 CW: Oct. 10-11
1000Z Saturday to 1000Z Sunday

This is the 57th year of the VK/ZL contest. Use all bands, 1.8-28 MHz, except WARC bands.

Oceania stations can work anyone. The rest of the world can work VK, ZL, and Oceania stations only. The same station may be worked on each band for QSO and multiplier credit.

Exchange: RS(T) plus a three-figure QSO number starting with 001.

Points: Two points per QSO.

Multiplier: Each VK/ZL/O prefix worked on each band.

Final Score: Total QSO points from all bands times the sum of the prefix multiplier from each band.

Awards: Special large, color certificates to top scorers in each country and to each continental winner. A participation certificate to all on request (2 IRCs, please).

There is an SWL section. Only VK/ZL/O stations are logged. Call of station being worked and RS(T) being sent must be reported. Scoring same as above but both SSB and CW scores are combined for final score (maximum total of 24 hours).

Use a separate log sheet for each band and underline each new VK/ZL/O prefix as it is worked on each band. Include a summary sheet showing the scoring and other essential information, and the usual signed declaration that all rules and regulations have been observed.

This year logs go to the Contest Manager, John Litten, ZL1AAS, 146 Sandspit Rd., Howick 1705 New Zealand, and they must be received no later than February 1, 1993.

Iberoamericano Contest

2000Z Sat. to 2000Z Sun., Oct. 10-11

Organized by "Seccion Territorial de URE del Valles Oriental" and by "CQ Radio Amateur de Boixareu Editores," this contest will be sponsored every year the weekend before October 12th to commemorate the anniversary of the discov-

ery of America. This is a phone-only contest with the emphasis on Latin-American areas.

Classes: Single operator and multi-operator, single transmitter; both Latin-American and non Latin-American. Single operator EC (EA novice), QRP, less than 5 watts output, and SWL.

Exchange: RS plus a progressive QSO number (001, etc.).

Bands: All six bands, 1.8 through 28 MHz, SSB only.

Points: Latin-American stations score one point per QSO. Non-Latin-Americans, 3 points per QSO with Latin-Americans, 1 point with other non-Latin-Americans.

Multiplier: Latin-Americans use the DXCC list. Non-Latin-Americans use the following country list: CE, CO, CP, CR, CT, CX, C3, C9, DU, EA, HC, HI, HK, HP, HR, HT, KP4, LU, OA, PY, TG, TI, XE, YS, YV, ZP, 3C, and dependencies. There are two additional multiplier stations: EG92G and EH92G.

Final Score: Total QSO points from all bands times the sum of multipliers from all bands.

SWL: Same rules apply to SWL entries. The same station cannot be logged more than 15% of the total logged. And the same station can only be logged again after 5 other entries.

Penalties: Taking credit for excessive duplicate contacts, and violation of rules and amateur radio regulations could result in disqualification.

Awards: Certificates will be issued to the highest scores in each DXCC country. Participating certificates will go to non-Latin-American stations making 50 or more QSOs. There are plaques for overall winning scores showing at least 4 hours of operation and 100 or more QSOs.

Mailing deadline for entries is November 30th to: X-Concurso Iberoamericano, Gran Via de les Corts Catalanes, 594, 08007 Barcelona, Spain.

RSGB 21/28 MHz SSB Contest

0700 to 1900 GMT Sunday, Oct. 11

It's the world working the British Isles on 21 and 28 MHz.

The same station may be worked on each band for QSO and multiplier credit. Following are the rules for areas other than the British Isles.

QSY Rule: All stations who QSY from one band to the other and make a scoring contact may not change bands again for a period of at least 10 minutes after the last contact on the original band (this does not apply to SWLs).

Sections: Single operator and multi-operator, both bands only, and SWL.

Exchange: RS report plus a progressive QSO number starting with 001.

Scoring: Each contact with a B.I. sta-



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tion is worth 3 points. Multiply total QSO points from each band by the sum of U.K. counties worked on each band.

Unmarked duplicate contacts will be penalized 10 times the points claimed. Logs containing more than 5 unmarked duplicates will be disqualified.

Awards: Certificates to the three leading overall winners, and at the discretion of the committee, to the leading station in each country. Both for transmitting and SWL.

There is also an SWL section. Only B.I. stations are to be logged. Scoring is the same as indicated above. The same call sign may appear once only in every three contacts, except when the logged station is a new multiplier.

Awards: Overseas stations will be awarded certificates to the leading station in each country and the leading station in the multi-operator section, and to the SWL winner in each country. The first, second, and third overall winners will also receive certificates of merit.

Separate log sheets are required for each band. Include a summary sheet showing the scoring, prefixes worked, and a signed declaration that rules and regulations have been observed.

Logs must be received by December 1st. This year they go to: RSGB Contest Committee, c/o G3UFY, 77 Bensham Manor Road, Thornton Heath, Surrey, CR7 7AF, England.

Illinois QSO Party

1800Z Sun. to 0200Z Mon., Oct. 11-12

This is the 30th anniversary of the Illinois QSO Party sponsored by the Radio Amateur Megacycle Society. It's a shorty, only 8 hours long.

Stations may be worked once per band and mode, and IL stations can contact other in-state stations for QSO and multiplier credit.

Exchange: RS(T) and QTH. County for IL stations; state, VE province, or DX country for others.

Scoring: One point for phone contacts, 2 points if on CW. Illinois stations multiply total QSO points by (states + provinces + IL counties + maximum of 5 countries) worked. Additional DX QSOs count for points but not multiplier.

Others use IL counties for their multiplier (maximum of 102).

Illinois mobiles add 200 points to final score for each county from which 10 or more QSOs were made.

Frequencies: CW—3550, 7050, 14050, and 30 kHz above bottom edge of Novice subbands for CW and 28390 for phone. SSB—3890, 7290, 14290. Other bands may also be used.

Awards: Certificates to the top 10 scoring IL fixed stations, 5 IL mobiles,

winners in each state, province, country, and the highest club/team aggregate score. A plaque goes to the top-scoring Illinois station (fixed and mobile).

Logs: Indicate band and mode, circle each new multiplier, and IL mobiles must indicate each county change. Stations with over 100 QSOs must submit a dupe sheet.

A summary sheet showing the scoring and the usual signed declaration is also requested.

Mailing deadline for logs is November 12th to: RAMS, c/o Joe LeKostaj, WB9GOJ, 9134 Ewing Ave., Evanston, IL 60203.

YLRL Anniversary Party

CW: Oct. 14-15 SSB: Oct. 28-29
1400Z-1359Z, Wed.-Thurs.

This is the 53rd annual party run by the YL Radio League. It is open to all YL's around the world. Activity will be found on all bands, 10 through 80 meters, and will be between YLs only.

CW and SSB are separate contests and require separate logs. A station may be worked *once on each band* for contest credit.

Exchange: QSO no., RS(T), and QTH; U.S. state, VE province, or DX country.

Scoring: One point per QSO between stations within the U.S. and Canada (including Alaska and Hawaii). Two points for contacts with stations in other areas.

DX YLs score 2 points for QSOs with the U.S. and Canada and with other continents, but 1 point with stations in own continent.

Final Score: Multiply total QSO points from all bands by the sum of states, provinces, and DX countries worked.

There is a low-power bonus multiplier of 1.5 for stations using 100 watts or less on CW and 200 watts PEP on SSB.

For each duplicate contact removed from your log there is a penalty of 3 additional and equal contacts removed from your log.

Frequencies: CW—3555, 7055, 14055, 21135, 28195. SSB—3955, 7255, 14265, 21395, 28395 (plus or minus 15 kHz). Look in DX portions of band on 40 and 80 meters.

Awards: Certificates to winning scores in each district, province, and DX country, and first, second, and third place overall winners. There are cups and plaques for YLRL members in North America and DX countries.

Include a summary sheet with your entry showing the scoring and other essential information. Logs must be in their original form, no carbon copies.

Your entry must be received by November 30th, and this year logs go to: L. Carla Watson, YLRL Contest Logs, 473 Palo Verde Drive, Sunnyvale, CA 94086.

ARCI QRP Fall CW Contest

1200Z Sat. to 2400Z Sun., Oct. 17-18

This is the fall edition of the QRP Amateur Radio Club International. This year's activity will be found on CW only. Participants are limited to 24 hours out of the 36-hour contest period.

Exchange: RST and state, province, or country. Members will include their number; non-members their power output.

Scoring: Contacts with members, 5 points. Non-members, 2 points if in same continent, 4 points if in a different continent. The same station may be worked on each band for QSO and multiplier credit.

There is a power output bonus: 0 to 1 watt— $\times 10$; 1 to 5 watts— $\times 7$. Over 5 watts check log only.

The following bonus multipliers are also available: solar or wind power— $\times 2$; battery power— $\times 1.5$. Must be used for duration of contest.

Multiplier: Each state, VE province, and DX country worked on each band.

Final Score: Total QSO points from all bands \times (states + provinces + countries) \times power bonus \times power type if any + homebrew bonus.

Frequencies: 1810, 3560, 7040, 14060, 21060, 28060, 50060. Novice—3710, 7110, 21110, 28110.

Awards: Entries may be single or all band. Certificates to the top ten scores overall; to the top score on each band for single band entries; and to the top scores in each state, province, and DX country. There is a team category, 2 to 5 members, with a certificate to the highest scoring team.

Use a separate log sheet for each band. Include a summary sheet showing the scoring, equipment description, and other essential information. Include a large SASE for a copy of the results. It is suggested you send a large SASE to K5VOL for official log forms.

Logs must be received by November 20th and go to: QRP ARCI Manager, Red Reynolds, K5VOL, 835 Surryse Road, Lake Zurich, IL 60047.

Worked All Germany Contest

1500Z Sat., Oct. 17 to 1500Z Sun., Oct. 18

This worldwide contest has been organized to encourage QSOs between Germany and the rest of the world. Operation is permitted on SSB and CW using 80-10 meters (no WARC bands). Note: DX packet spotting is allowed for all stations.

Classes: Single Operator, Multi-Single, QRP, and SWL.

Exchange: Signal Report (RS) and serial number (59001). German stations use RS(T) and their DOK number. A station may be worked once per band and mode. QSOs can only occur between Germans and non-Germans.

Scoring: Contacts between stations in Germany and other continents are worth 3 points. QSOs in Europe are worth 1 point. Multipliers are German districts (determined by the first letter of the DOK number) and DXCC countries for Germans. Final score is total QSO points times multiplier.

Awards: Certificates will be awarded to the highest scorer in each classification in each country.

Logs must be postmarked no later than 30 days after the contest and should be sent to: Klaus Voigt, DL1DTL, P.O. Box 427, O-8072 Dresden, Germany. Be sure to include the usual summary sheet and signed declaration.

RSGB 21 MHz CW Contest

0700 to 1900 GMT Sunday, Oct. 18

Like the 21/28 MHz Phone Contest, the activity in this one is between the British Isles and the rest of the world. Competition is limited to single operator stations only. There is a separate QRP section in which power input must not exceed 10 watts, and there is also an SWL section.

The following rules are for areas other than the British Isles.

Exchange: RST report plus a progressive QSO number starting with 001. U.K. stations also send their county codes.

Scoring: Each contact with a B.I. station is worth three points. Multiply total QSO points by the number of U.K. counties worked.

Unmarked duplicate contacts for which credit has been taken will be penalized ten times the points claimed. Logs containing more than five unmarked duplicates will be disqualified.

Only British Isles stations are to be logged by overseas SWLs. The same call

may be reported only once in every three contacts, unless the logged station is a new multiplier. Scoring is the same as above.

Awards: Certificates to the sectional leaders and highest multi-op, and at the discretion of the committee, to the leading station in each country.

Include a summary sheet with a list of multipliers worked, station description, the usual signed declaration, and your name and address in block letters.

Logs must be received by December 14th and go to: RSGB Contest Committee, c/o G3UFY, 77 Bensham Manor Road, Thornton Heath, Surrey, CR7 7AF, England.

CQ World-Wide DX Contest

Phone: Oct. 24-25 CW: Nov. 28-29
0000Z Saturday to 2400Z Sunday

Complete rules were published in last month's issue. There were several minor rule changes that should be reviewed. Of note is the tightening of log extension requirements. With the growing number of entry categories, be sure to list your entry category on your summary sheet.

A few trophies have been eliminated, but there are many new additions which fill in quite a few of the category gaps from previous years. The detailed trophy list can be found in the rules announcement.

All entries must be postmarked **no later** than December 1, 1992 for the phone section, and January 15, 1993 for CW.

Again this year all logs must be sent directly to: CQ World-Wide DX Contest, 76 North Broadway, Hicksville, NY 11801. **Be sure to indicate Phone or CW on the envelope.**

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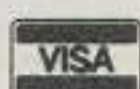
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NEWS OF COMMUNICATION AROUND THE WORLD

The Progress of Sunspot Cycle 22

DXers used to the good-to-excellent band conditions of the past few years got a taste of things to come in early summer. The monthly mean sunspot number for June 1992 plummeted to 65, its lowest value in several years. The low solar activity, combined with seasonal effects, gave DXers some mediocre band conditions. DXers had best get accustomed to this.

Sunspot Cycle 22's unpredictable behavior has confounded propagation experts for some time. The cycle rose more quickly, to a higher level, than any previous cycle except the record-setting Cycle 19, which produced the spectacular band conditions in the late 1950s. Then, instead of continuing this pace, Cycle 22 abruptly

turned downward in mid-1989, raising speculation that it would be a brief-lived, flash-in-the-pan cycle.

Cycle 22 reversed its downward trend in early 1990, climbing to a secondary peak in the first months of 1991. Finally, this June it was as if someone had thrown a switch to "off"; sunspots practically disappeared for days in a row. Given this erratic behavior, what does the future hold for Cycle 22 and DX?

Some Basics

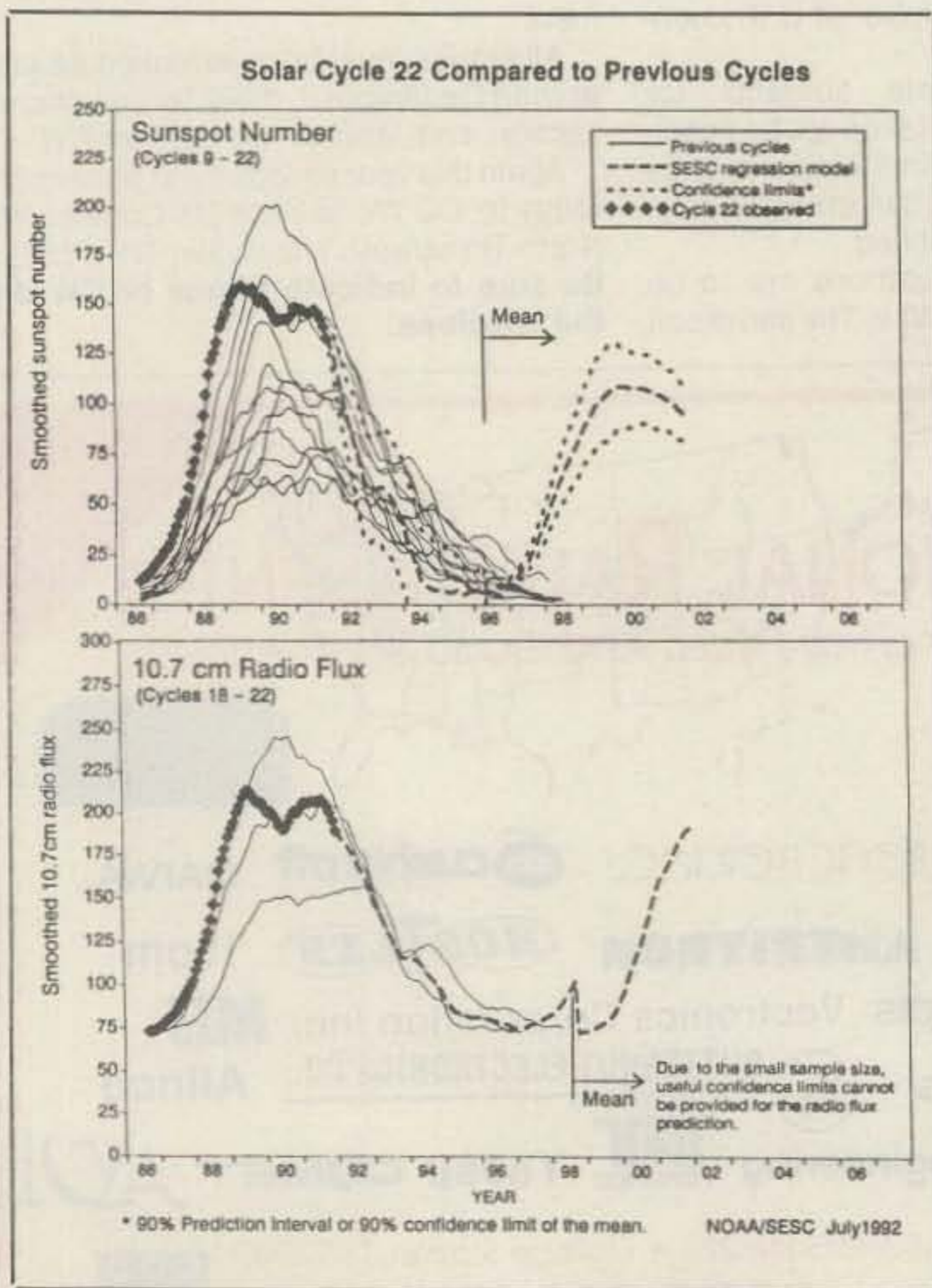
To answer this question we need to review some fundamentals. The most basic of these is that scientists frankly don't have any good theories as to the cause of the sunspot cycle. They have lots of *bad* theories, but none correlate with observations. In fact, they are only reluctantly com-

ing to the conclusion that the actual "sunspot cycle" is not 11 years long, but about 22 years, with *two* sunspot peaks during the 22 years. However, whatever causes the variations in the turbulent flow of plasma in the sun that ends up as visible sunspots remains unknown.

Without any workable theory as to driving force behind the sunspot cycle, predicting solar activity becomes an art, not a science. Any predictions are really educated guesses formed by looking back at previous cycles, deciding what trends to choose and which to ignore, and rolling the dice. Small wonder that Cycle 22 baffled the experts; the previous 21 cycles did, too!

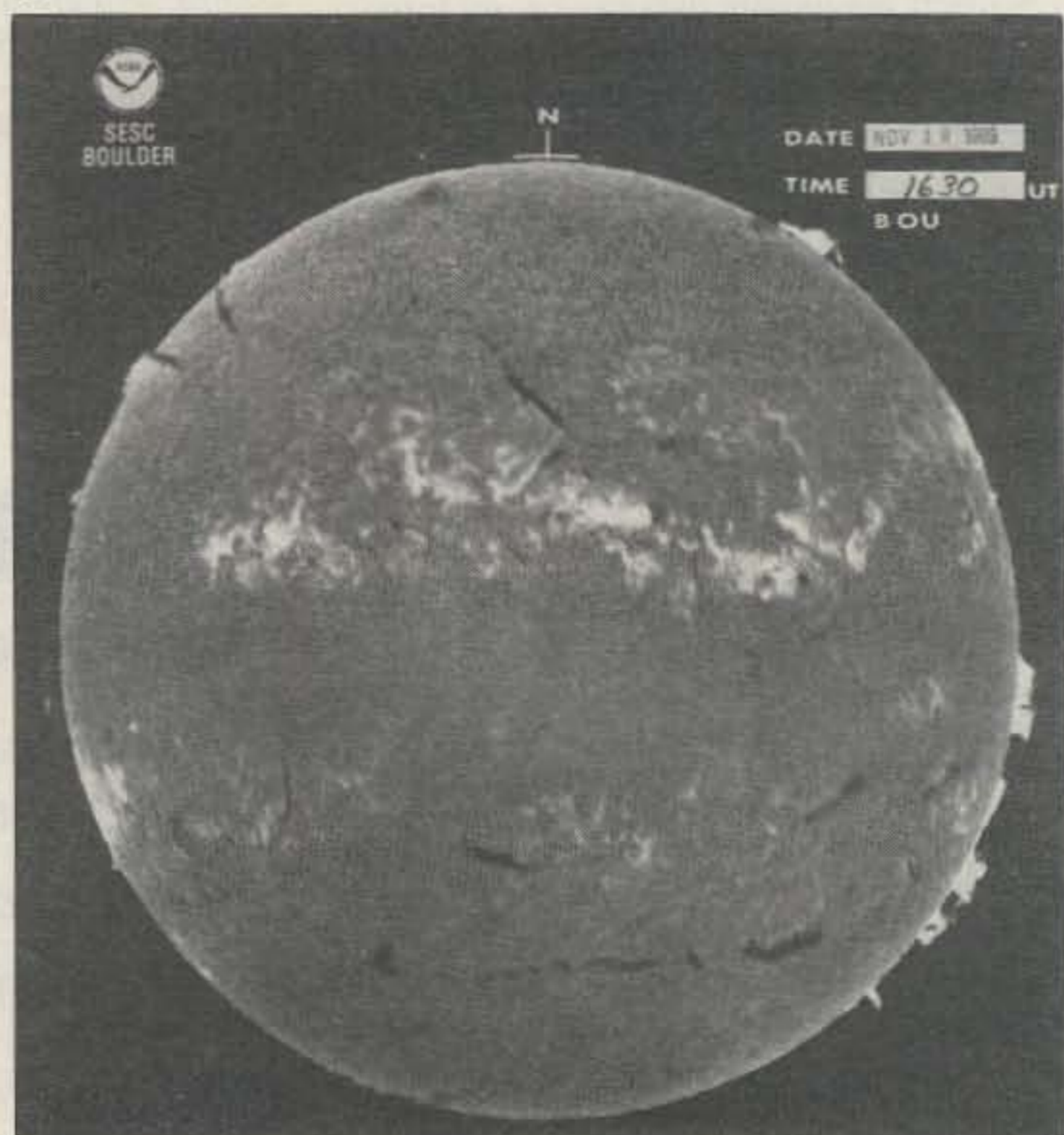
What's even worse as far as propagation prediction is concerned is that sunspot numbers are not closely correlated with HF propagation. The use of sunspot numbers to define a cycle and record its pro-

P.O. Box 50, Fulton, CA 95439



◀ Sunspot Cycle 22 and predictions for its progress. (Charts courtesy the SESC.)

The sun in hydrogen-alpha light in late 1989. DXers won't see this level of solar activity again before the year 2000.





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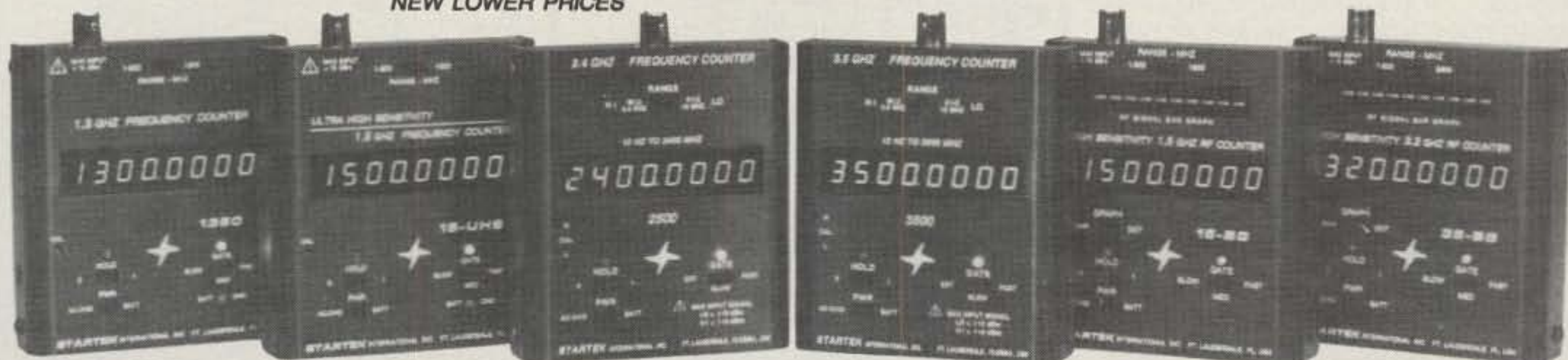
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gress is based on history, not science. Visible sunspots have been recorded since 1750 and provide the only long-term record of the pattern of solar activity. Unfortunately, these sunspot numbers themselves are suspect.

The actual sunspot "number" is determined by assigning 10 points for each active sunspot region and adding a point for each spot within that region. Whether a given group of spots should be a single region or split into more than one, and the number of individual spots within each region, is very subjective. Every observer will end up with a different number. For example, the daily sunspot number recorded at the Space Environment Services Center (the people in Boulder, Colorado, who generate the WWV/WWVH "numbers") is typically half again as high as the "official" sunspot count generated at the Royal Observatory in Brussels, Belgium. To "correct" the SESC sunspot number to the official RI value, one usually multiplies the former by about .66. This is the "fudge factor" necessary to produce reasonably consistent results.

The problem is compounded by the recent conclusion that sunspot cycles overlap. That is, one cycle begins before the current cycle ends. This means the date of the beginning of each cycle is essentially arbitrary; it is the month of minimum smoothed sunspots, which may occur many months after spots from the new cycle begin appearing. Since all theories and predictions as to progress of sunspot cycles are based on the arbitrary start date, they are little better than guesswork.

At least the 10.7 cm radio flux value given on WWV and WWVH is not subjective; every observer will record the same value. However, 10.7 cm flux is also not closely correlated with HF propagation. The actual part of the spectrum that directly affects the level of ionization in the upper atmosphere, and thus radio propagation, is extreme ultraviolet light (EUV). Fortunately for DXers (and for everyone else), light of these wavelengths (2000-40 angstroms) is completely blocked by earth's atmosphere. (If not, this high-energy light would eliminate all surface life.) To accurately measure EUV, we would need a dedicated satellite about the atmosphere. No such satellite exists. (How about adding an EUV monitor to the Phase-3D satellite, AMSAT?)

Now that we've reviewed what we *don't* know about sunspot cycles and propagation, let's look at what we *do* know. Despite all the foregoing disclaimers, there is a sunspot cycle that goes from a time of few sunspots through a sunspot peak, and back to a nearly spotless sun every 11 years or so. All such cycles recorded, going back to the 18th century, show a similar pattern of a relatively rapid rise and a slower tapering off. From these empirical data, one can make predictions as to the fate of Cycle 22 with some confidence.

The WPX Program

Mixed

1569 N1IR 1570 W2EZ

SSB

2324 N0QMY 2325 WA3KKO

CW

2745 CT4AN 2747 PU2KER
2746 PY2NY

WPNX

273 KB8NTY 274 N9JXU

Endorsements

Mixed: 450 N1IR, 500 N1IR, 550 N1IR, WW0E, 600 N1IR, 650 N1IR, WK3Z, KB3WN, 700 N1IR, 750 N1IR, AA7FL, IK3DRO, 800 N1IR, AA7FL, NH6T, W4TYU, 850 N1IR, NH6T, 900 N1IR, NH6T, 950 N1IR, NH6T, 1000 N1IR, NH6T, 1050 I1-21171, 1100 KU0A, I1-21171, 1150 KU0A, 1250 KS0Z, SM4-3434, 1300 SM4-3434, 1350 SM4-3434, 1400 SM4-3434, 1500 W3KH, 2050 HA0HW, W4UW, 2100 HA0HW, 2150 HA0HW, 2700 W2FXA, 3100 N4NO, 3150 N4NO, 3250 W8RSW, 3300 W8RSW, 3350 W8RSW.

SSB: 350 KA3LCF, WA3KNO, KI6PG, 400 KA3LCF, KI6PG, 450 KI6PG, 500 N3CYD, IV3JDD, KI6PG, 550 N3CYD, JR3TOE, NH6T, KI6PG, 600 JR3TOE, NH6T, KI6PG, 650 JR3TOE, NH6T, 700 NH6T, 750 NH6T, HP2CWB, 800 NH6T, CE7ZK, 850 CE7ZK, 900 CE7ZK, 950 CE7ZK, 1000 CE7ZK, 1050 KU0A, CE7ZK, 1100 CE7ZK, 1200 IK2DUU, 1250 IK2DUU, 1300 IT9JKY, 1350 IT9JKY, AC3T, 2300 N4NO, 2350 N4NO, 2400 N4NO, 3500 ZL3NS.

CW: 350 CT4AH, PU2KER, 400 CT4AH, PU2KER, I0WOK, 450 CT4AH, I0WOK, PU2KER, 500 CT4AH, PU2KER, I0WOK, 550 CT4AH, PU2KER, I0WOK, 600 PU2KER, I0WOK, 650 PU2KER, I0WOK, 700 PU2KER, I0WOK, 750 PU2KER, 800 W4UW, 850 PY2YN, 900 PY2YN, 950 PY2YN, W9IAL, AH6JF, 1350 VS6UW, 1450 K4MF, 1500 K4MF, 2650 N4NO, 2700 N4NO.

10 Meters: W4TYU
15 Meters: W4TYU
160 Meters: NH6T

Asia: AC3T, N1IR
Africa: N1IR
No. Amer.: KA3LOF
So. Amer.: JR4NUN, KU0A, N7JXS, N1IR, N7JXS, SM4-3434
Europe: JR3TOE
Oceania: I1-21171, N1IR

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Complete rules and application forms may be obtained by sending a business-size self-addressed, stamped envelope (foreign stations send extra postage if air-mail desired) to: "CQ WPX Awards," 880, CR13, Clovis, NM 88101-9511 USA.



K1DRN has found an activity he can pursue during periods of low sunspots: collecting ham license plates from all states and US territories and possessions.

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435 I4WZK

12 Meter SSB

3 YB0WR

15 Meter SSB

426 G3NDC 428 KA9I
427 I4WZK

17 Meter SSB

4 K1MM

20 Meter SSB

891 G3NDC 893 IK6BSN
892 XE2FL

40 Meter SSB

76 I4WZK 77 JE1WZB

15 Meter CW

232 KC7V 234 JE1QMV
233 JN3SAC

20 Meter CW

423 HB9BMU 424 W5EW

40 Meter CW

156 HA3NU

17 Mixed

12 KL7CYL

All CW

14 LU2BRG 15 W2FV

All Phone

612 KC7V

All Band WAZ SSB

3967	F2BJ	3972	DL6KY
3968	K8NIW	3973	WA6AJB
3969	I8OCA	3974	KA1FOW
3970	IK5FTV	3975	JH1FTS
3971	IT9YXO	3976	HC2HVE

CW/Phone

7238	W6MVW (CW)	7242	NY1L
7239	I5OQV (CW)	7243	AD8E (CW)
7240	WJ1D	7244	K2PF (CW)
7241	DK6MT	7245	VE3CWP

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (75 cents) size 4 1/2 x 9 1/2 to the WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Rd., Sudbury, MA 01776. Applicants forwarding QSL cards either direct to the WAZ manager or to a check point should include sufficient postage for safe return of their QSL cards. The processing fee for all CQ awards is \$4.00 for subscribers and \$10 for non-subscribers. Please make all checks payable to the Awards Manager. In order to qualify for the subscriber rate, please enclose your latest CQ mailing label with your application. Send any questions to K1MEM by mail and include an SASE (please do not telephone).

The first prediction is that Cycle 22 is definitely on the downslope. We will not see an unprecedented triple peak in solar activity. No cycle in history has shown a 13-month smoothed sunspot number of more than 125 six years after the (admittedly arbitrary) start. Cycle 22 "started" in September 1986. By September 1992 the smoothed sunspot number will be well be-

low 100. This will be its lowest value since early 1988.

Thus, we can say confidently that the prolonged peak of solar activity that gave us such good DXing over the past four years will end this year.

We can also state with considerable confidence that the number of coronal holes, large solar flares, and the level of geomagnetic activity will *increase* in the next year or two. Although scientists have been able to track solar phenomena such as x-ray flares and coronal holes for but a few cycles, even these limited data show that the peaks of the coronal-hole cycle and the major-flare cycle are a couple of years *later* than the sunspot peak. DXers can thus expect an increase in band-disrupting flares and coronal holes for the next couple of years. (Unlike sunspots that seldom last more than a couple of months, many coronal holes persist for six to seven months. Eruptions from these coronal holes can disrupt HF propagation as much as the output from a major flare.)

What's the Future for DX?

DXers can expect rapidly decreasing solar activity and some increase in geomagnetic activity. This is not good news. The decline in solar activity leads directly to a diminished level of ionization in the upper atmosphere, and thus lower Maximum Usable Frequencies (MUFs) and lower signal-to-noise ratios. The lower MUFs will decrease the number and duration of openings on the higher bands, especially 10 and 12 meters. The lower levels of ionization in the atmosphere will also reduce MUFs at night. The ionization that refracts radio signals back toward earth will dissipate more quickly, and MUFs at night will drop below 14 MHz, eliminating nighttime DXing on 20 meters. The lowered MUF will squeeze DXers into fewer bands.

This drop in MUF will be accompanied by a more active geomagnetic field, the result of the increase in coronal holes and major flares. An active geomagnetic field will reduce signal-to-noise ratios, especially in the higher latitudes, where the earth's magnetic field dips closer to the surface. Openings on polar paths and long-haul DX paths that pass near the poles will be rarer with poorer signals.

Further, an increase in major flares will increase the chances of a Sudden Ionospheric Disturbance (SID), when propagation simply vanishes on the sunlit side of the earth for an hour or more.

Lowered MUFs; fewer, poorer polar-path openings; and more SIDs—not a pretty picture for DXers. However, we had better get accustomed to these problems, as we will have to live with them for another five years or so.

Sunspot Cycle 22 officially peaked in July 1989 at a 13-month smoothed sunspot

count of 158.1. The forecasts suggest Cycle 22 will end in 1996 with a smoothed sunspot count of 10 or so. Much of the drop in the smoothed sunspot number will occur in 1992. The index stood at 147.6 at the beginning of this year, Cycle 22's secondary peak. It will likely be less than 100 before the end of 1992. It may drop most of the rest of the way down in 1993.

That's the bad news. The good news is that DXing will continue, even with the reduced MUFs and increased geomagnetic activity. While DXers will miss the good signals on very long paths, the flood of rare DX over the pole, and the worldwide openings on 10 meters, there will still be ample DX opportunities for the dedicated DXer. DXers will have to pay more attention to band conditions, and make the most of a more limited range of openings, but smarter DXers will continue to log plenty of DX.

The DXer can do several things to prepare for the decline of Cycle 22. Perhaps the most useful activity would be to improve the antenna farm. The lower MUFs will squeeze DXers into less spectrum. The louder stations, with the best antennas, will get through. The "100 watts into a vertical" crowd will find the competition tough. Any improvements the DXer can make to his or her antenna farm will pay big dividends over the next few years.

5 Band WAZ

As of June 30, 1992, 344 stations have attained the 200 zone level.

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

JR3IIR
HA3NU
4N2HDE

The top contenders for 5 Band WAZ are:

N4WW, 199	W9WAQ, 199
SP9PT, 199	K6EID, 199
K6YRA, 199	IK8CNT, 199
PY7ZZ, 199	W1JR, 199
DL9WW, 199	W8SEY, 199
K0CS, 199	N7RT, 199
KB0G, 199	VE7AHA, 199
AA4KT, 199	W1FZ, 199
K7UR, 199	I8IGS, 198
K9EL, 199	SM6AHS, 198
NA0Y, 199	K1ST, 198
VE7DX, 199	4X4DK, 198
W0PGI, 199	UA3AGW, 198
W2YY, 199	KL7Y, 198

790 Stations have attained the 150 zone level as of June 30, 1992.

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THE WPX HONOR ROLL

The WPX Honor Roll is based on the current confirmed prefixes which are submitted by separate application in strict conformance with CQ master prefix list. Scores are based on the current prefix total regardless of an operator's all-time count. Honor Roll must be up-dated annually by addition to, or confirmation of, present total. If no up-date, file will be made inactive. Lifetime Honor Roll fee is \$4.00 (U.S.) for each mode, with no fee for additions.

MIXED

4351	9N2AA	2667	KA5W	2276	IT9QDS	1956	K8LJG	1604	WB4RUA	1332	YU3PG	1025	NH6T
4016	F9RM	2649	I2PHN	2205	SM0AJU	1914	YU1GR	1599	KB0G	1329	F1HWB	1008	IK2BLA
3956	K2VV	2609	W2FXA	2202	SM6DHU	1905	DK5AD	1589	YU2CQ	1323	YU1PJ	994	WM0G
3344	EA2IA	2607	IN3ANE	2202	I2MQP	1856	N6JM	1572	NV9S	1306	WB3DNA	975	F6CDJ
3231	VE3XN	2577	ZP5JCY	2158	KF2O	1855	W8UMR	1553	VE1RJ	1294	JA6GWU	963	CT3CU
3206	K6JG	2573	YU7SF	2141	YU4EXA	1835	WE2L	1548	LA7JO	1287	I2EAY	920	WB2PCF
3175	K6XP	2564	PA0SNG	2133	3A2LF	1829	K9AGB	1522	YU3NU	1249	N3ED	915	W4USW
3103	N4NO	2557	4N2NA	2121	HA0HW	1812	K2OLG	1497	W7CB	1241	TF1MM	906	YU7FT
3005	N6JV	2546	YU7BCD	2106	K5UR	1811	I2DMK	1485	YB0TK	1236	KI3L	904	WK0B
2965	PY1APS	2534	IT9TQH	2068	K9QFR	1793	YT7WW	1483	PY2DBU	1229	KS0Z	875	RB5MP
2961	W4BQY	2508	N2AC	2062	4N7ZZ	1789	YU7RU	1476	W3KH	1222	WD9IIC	815	W6LC
2904	I2PJA	2499	YT7DX	2053	K2POF	1778	YU1GR	1468	K5DB	1197	LU8DY	778	VE3OMM
2845	WA8YTM	2479	I2UIY	2040	W0SFU	1776	W6OUL	1455	YU7DR	1164	W9IAL	750	JN3SAC
2840	SM3EVR	2471	I6SF	2040	YT3AA	1760	WB2YQH	1417	I0AOF	1120	W0JIE	733	N3KR
2829	N4MM	2418	HA0DU	2020	N4UU	1709	G4OBK	1405	CT1YH	1101	G4SDJ	720	EA3CWK
2821	N9AF	2409	K9BG	2013	UA3FT	1667	VE3MS	1384	KS4S	1094	K0IFL	714	VE6BMX
2817	YU1AB	2382	SM7TV	2010	YU3EO	1646	N2AIF	1381	IK2ILH	1081	K9BOL	684	K6DYP
2801	K0BLT	2376	I8YRK	2006	W4UW	1629	DF6EX	1352	WB2ABD	1075	NJ1T	670	WK3Z
2779	PY40D	2340	4X4FU	2001	I2EOW	1628	WB8ZRL	1342	KA5TQF	1041	I5ZTC	642	VE3GOV
2748	W9DWQ	2295	HA8XX	2000	KL7AF	1626	SM6CST	1341	DF4ZL	1037	W0IZV	640	JR3TOE
2694	I1EEW	2288	W1BWS	1970	HA0IT	1604	W9IL	1335	A16Z				

SSB

3937	F9RM	2280	I4CSP	1856	KF2O	1508	I2TZK	1227	KB0C	1044	WB6SRK	869	DK7NP
3780	I0ZV	2268	W4BQY	1854	W4UW	1465	CX6BZ	1216	WN5MBS	1038	WB6GFJ	854	VE3MS
3303	K2VV	2256	PA0SNG	1850	K5RPC	1448	YU7SF	1207	K2EEK	1035	IT9SVJ	831	NH6T
3288	ZL3NS	2250	WA8YTM	1841	LU8ESU	1406	N4UU	1203	DK5WQ	1029	W5LLU	829	KB4HU
3114	VE1YX	2244	I4ZSQ	1797	K5UR	1394	K9LJN	1200	ZS6AOO	1028	OE2EGL	822	WD5KBB
2917	K6JG	2213	KA5W	1762	I2EOW	1392	KE6KT	1167	W5ILR	1019	CT1CQK	806	I6KYL
2889	I2PJA	2159	I5ZJK	1747	SM0AJU	1391	HA0IT	1152	W5AWT	1017	CT1BWW	791	KA9MOM
2810	K6XP	2111	I2UIY	1739	KD9OT	1367	LA7JO	1151	G4OBK	1016	5Z4BP	787	CT1YH
2714	WD8MGQ	2089	HA8XX	1703	WE2L	1367	N2AC	1128	N2AIF	1010	CT1DIZ	771	HP2CWB
2622	I2PHN	2085	I2MQP	1690	CT1AHU	1360	K8LJG	1136	I7VEZ	1010	LU1VK	750	NM5Y
2608	CT4NH	2067	I8YRK	1684	4X6DK	1345	IT9JKY	1112	WA2FKF	990	NG9L	736	EA1IF
2554	N4MM	2041	WA4QMO	1673	EA4KK	1335	EA1AK	1104	HP6AYV	981	K8MDU	728	YU1PJ
2484	ZP5JCY	2024	W9DWQ	1655	CT1BY	1332	F1HWB	1101	FE6FNA	976	I8IYW	728	CT1ZW
2481	I6ZJC	2010	PY40D	1645	IK8GCS	1315	CT1UE	1097	W6OUL	972	K9BOL	708	EA3EQT
2466	I0AMU	1994	YU7BCD	1642	SM6DHU	1305	KF7RU	1092	KA5TQF	958	IK2DUW	707	KE7UH
2445	EA2IA	1986	YU2NA	1633	KC8YM	1294	KA0ZFX	1091	TF1MM	948	IK2AEQ	697	YV7QP
2421	N4NO	1971	WF4V	1590	XE1OX	1288	WB8ZRL	1090	I3ZSX	942	KC2FC	664	SM6CST
2409	W0YDB	1944	EA3AQC	1581	IN3QCI	1286	IK7DBB	1081	K3IXD	917	KK5P	646	KB8DAE
2403	I8YZP	1920	IKCI	1574	IK5ACO	1285	EA3FHT	1073	KS4S	910	KB0G	643	JR3TOE
2379	IT9TQH	1913	K9QFR	1550	KL7AF	1278	IK2DUU	1062	IK0EIM	899	A16Z	632	IK5DNE
2362	I1EEW	1897	W3ARK	1543	K3POF	1277	LU7HJM	1056	G4SDJ	894	N3ED	625	G4XTA
2354	OZ5EV	1885	CT4UW	1534	EA2AOM	1267	G4MVA	1055	OE6CLD	885	EA3BOX	610	K16PG
2322	NJ0C	1883	HR1KAS	1514	N6FX	1265	LU8DY	1050	KB2DE	881	WM0G	608	CE5FSB
2303	EA8AKN	1871	PY40Y										

CW

3315	K2VV	2147	WA8YTM	1642	I2UIY	1439	YU3NU	1294	ZS6BCR	1013	WB8ZRL	808	YV7QP
3173	WA2HZR	2128	LZ1XL	1584	W8IQ	1433	F6HKD	1293	I1EEW	1010	YU1PJ	797	W4UW
2984	N6JV	2085	4X4FU	1574	G4SSH	1428	I7PXV	1280	IK3GER	993	N3ED	794	LA7JO
2717	VE7CNE	2042	YU7BCD	1560	KL7AF	1427	G3VOO	1244	DL2HBX	954	W9IAL	754	WB5MTV
2674	N4NO	1948	KA6W	1557	K2POF	1417	KF2O	1243	KB0G	951	N4IR	754	KA5TQF
2486	PY40D	1926	YU7LS	1556	SM0AJU	1405	CT1YH	1222	YU2CQ	949	IS0FIC	752	EA7AAK
2452	EA2IA	1899	N4MM	1553	N6FX	1362	I2IWM	1187	YU3PG	933	K3UA	749	W8LRY
2406	K6JG	1884	VE7DP	1526	HA0IT	1360	VS6UW	1133	JA9CWJ	923	YU4BR	744	RB5MP
2386	W3ARK	1710	N4YB	1525	VE1RJ	1359	HA8XX	1110	I2EAY	909	AH6JF	700	EA1MV
2373	K6XP	1708	N4UU	1517	SM6CST	1319	W6OUL	1093	EA1AK	907	IK2ECP	700	VE3OMM
2345	IT9TQH	1700	YU2NA	1513	K9LJN	1310	G4OBK	1091	NF5Z	900	3A2LF	699	JH3SAC
2344	I1YRL	1699	KA7T	1511	W1WAI	1306	LA9XG	1090	LU2YA	858	KS4S	698	4X6DK
2344	YU7SF	1692	IT9VDO	1509	W9PWM	1305	W5AWT	1059	A16Z	855	W0JIE	659	TF1MM
2321	W4BQY	1686	EA7AZA	1490	OZ5UR	1303	N2AIF	1036	KA1CLV	851	K9QFR	617	DK7NP
2275	N2AC	1678	T14SU	1486	SM6DHU	1299	DJ1YH	1033	NJ1T	846	AC5K	606	I50QV
2252	W9DWQ	1673	K4UR	1468	IK0ADY	1296	I8YRK	1022	EA5AR	813	ZP5JCY	601	N5GFX
2211	I6SF	1656	G4UOL	1442	K8LJG								

The DXer can also improve low-band antennas. As the MUF drops below 14 MHz, conditions on the lower bands will improve. Forty meters will be the choice of the early riser, as 20 meters is today. The late-night DXer will search 80 meters for good DX. One-sixty meters will attract more than the die-hard top-banders who have had the band to themselves for several years. Low-band DXing requires good receiving anten-

nas, and the biggest, highest transmitting antenna you can put up.

The DXer can also make increased use of the new bands. While 12 meters will probably go the way of 10 meters into the doldrums, 17 meters should be a good daytime DX band at all but the solar minimum. And 30 meters should be an excellent DX band. If you don't have equipment and antennas for these new bands, this would be

a good time to upgrade your station.

Finally, the DXer can operate "smarter." The days when a DXer could simply turn on the rig and work DX are fading. The DXer will have to learn to anticipate openings and copy weaker signals through increased QRM. While the casual DXer may find pickings scarce, the more dedicated DXer will continue to work DX at a barely diminished rate. (We'll explore the tech-

"Wow!! I HAD TO RECORD QSOs...TO CONVINCE FRIENDS THE DX WAS REALLY THERE."

DX ENGINEERING DESIGNS AND MANUFACTURES
HIGH PERFORMANCE ANTENNA SYSTEMS FOR
THE MOST DEMANDING APPLICATIONS.

- Full range of rugged, monoband Yagis for each band 80 through 10 meters (including the WARC bands), including the awesome DX Engineering 3 element full-size 80 meter Yagi (serial number 001 recently delivered to N7AVK).

- HF log periodic arrays, broad-banded and DX/contest-worthy.

- Full range of 6 meter Yagis (the world's largest 6 meter amateur array — at AA6TT — uses eight DX Engineering 10 element Yagis).

- Heavy-duty phasing boxes for low-band vertical arrays and stacked Yagi systems, including the new Universal Phase Box for stacking and phasing tribanders and log periodic arrays.

- High-power remote coax switches compatible with ETO's DASC (Digital Antenna Switch Control) and LTA's RBC (Remote Band Controller) devices.

- All DX Engineering products are optimized for DX and contest performance and built for the most demanding environments. Give us a call and we'll recommend a system to replace the Brand X antennas which came apart in your last blizzard.

- The DX Engineering staff are all active DXers and testers. Day in, day out, we use the products we sell!

L. W. Sayre, M.D., P.C.
P.O. Box 3110
Salem, OR 97302

May 12, 1992

DX Engineering
618 Spaulding Ave.
Brownsville, Oregon 97327

Dear Bill,

I'm writing to thank you for the excellent help and hardware I've received from DX Engineering.

A few years ago I ran an average station with an average tri-bander and obtained average results in dxing and contesting. I enjoyed radio so much that I decided to upgrade my situation. After researching what was available, I cautiously purchased the 3 element full size 40M monobander.

Wow!! I had to record qsos with the dx to convince friends that the dx was really there.

This prompted me to put up 2 5 element 20's, 2 6 element 15's, and 2 6 element 10's on a rotating tower. The installation went up quickly, made easy from the help of DX Engineering with regard to the phase & switch boxes, spacing and actual antenna construction.

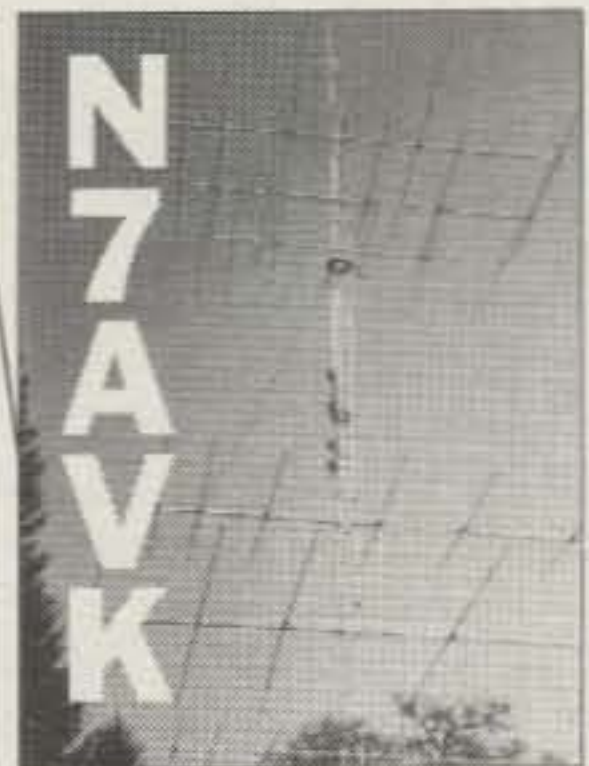
These antennae and systems work great! Dx pileups are cracked with 1 or 2 calls. My contest scores have soared. In short, your hardware has performed like my research indicated it would.

I've put the log periodic up now and am constructing the 3 element full size 80M monobander. By the start of this contest season I expect the 80 to be up performing like gangbusters like all of my DX Engineering hardware does.

I am developing a top single-op station, and DX Engineering has delivered spectacularly! All I can say is Thanks! You have surpassed my high expectations!

Further improvements here are left to cunning, guile, and operating ability as DX Engineering has maximized the hardware side of my station!

73, *LWS*



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FAX NOTE: our old fax number is out of order. If you sent us a fax and did not receive a reply, please resend the fax to our new number above. DXE apologizes for any inconvenience.

niques of "smarter DXing" in future columns.—ed.)

What about the near term—the rest of 1992? The "experts" predict a short rebound in solar activity this fall. While the 13-month smoothed sunspot number will continue to decline, activity on a month-to-month basis is expected to be higher than in early summer. Coupled with seasonal improvement around the equinox (September 22), this anticipated rebound should give DXers good shots at 10 and 12 meter DX. Since this will probably be the last opportunity for several years to work long-haul DX on these bands, the smart DXer will make good use of the openings. Sunspot Cycle 22 is not dead yet, by any measure, but it is on the decline.

DX Activity in October

The CQ WW DX SSB Contest October 24–25 is the occasion for dozens of amateurs to travel to far-off spots. It is an excellent opportunity for DXers to increase their band-country counts, and maybe pick up a couple of new countries. Among the operations that should be available are **V2/G6QQ** from Antigua. David will be active October 14 to November 4, with most non-contest activity around 21350 kHz at 1100-1300Z and 2200-0100Z. QSL home call. Charles Frost, K5LBU, who was active as **9J2CF**, will be operating from Belize V3 for the test. Look for him October 22–26; QSL home address: 2911 Camelot Lane, Missouri City, TX 77459. Steve Telenius-Lowe, G4JVG is organizing a shot at the Oceania multi-single record in this test, operating **P2A** from Papua New Guinea. (For a more complete, detailed list of CQ WW SSB, see "The DX Bulletin"'s annual summary.)

Among the special-event stations that are scheduled to be active this month are **YV500EA**, celebrating the 500th anniversary of the discovery of America; QSL via YV5ARV, P.O. Box 3636, Caracas 1010-A, Venezuela. Also look for amateurs in the

QSL Information

3A/F9UW to F9UW
3D2BX to VK2BEX
3V8AD to DJ0AD
3X0HNU to F6FNU
4J1FS to OH2BU
4J4JJ to UG6JJ
4K2MAL to UA4RC
4K20LQ to UV3CC
4K4/UA6WCG to I8YRK
4K48VI to UY5XE
4K4POL/A to UA0KCL
4K5ZI to DF8BK
4N2GIJ to YU2GIJ
4N3AA to YU3VM
4U1UN to W8CZN
4U1WB to KK4HD
5B4ADR to YU2AJ
5N0CEP to K15NF
HR5/F2JD to F6AJA
5R8GW to F6FNU
5T5CJ to W4BAA
6Y5/WJ3U to KJ6BK
7P8DX to K9VAL
7Q7DC to K3WUW
7Q7RM to G0IRS
7Q7XX to JA3RRA
9A2TW to YU2TW
9A3ST to YT2ST
9A4AA to 4N2AA
9H3JR to DJ0QJ
9K2GS to WB6JMS
9K2IGS to I2IGS
A22MN to WA8JOC
A35JM to JA3JM
AM1EK to EA1EK
AM25DWX/B to EA3DW
AM3CCN to EA3CCN
AM92TV to EA7TV
AP/WA2WYR to KK6TX
C6AFP to N4JQQ

C9RDM to W8GIO
CN2NA to NX1L
CO2JA to W6JOX
CO2KK to W9JUV
CO6CG to HK5LEX
CT1AUR to W6JOX
CT3/DK8WF to DK8WF
CU1AC to W2FXA
CU30C to CU3AN
D68WN to DJ8CR
DK9IP/5B4 to DK9IP
DU7AF to AA6ZP
EL2PP to I5CZE
EU9WO to UC2WO
FG4GC to FG5BG
FK8GJ to F6CXJ
F05BI/P to F6HSI
FS4PL to FG4BG
FY/ON4ZX to DL7UE
H2STT to 5B4AS
H9VA to HP2CWB
HB0/DL2HRF to DL2HRF
HB0/Y33VL to Y33VL
HF0POL to SP9DWT
HI50UD to HI3UD
HP2CWB to W6JOX
HR5/F2JD to F6AJA
IE9/IK0PXD to I0IA
J5UAI to NW8F
J73A to N6CW
JW8E to UC2AHZ
JW8G8 to LA8PF
JW5NM to LASNM
KH2/W2IMO to WB2OOY
KH2T to AA4UJ
KH9/WR1Z to VK9NS
OD5/SP1MHV to SP1MHV
OD5/SP7LSE to SP7EJS
OD5SK to KB5RA
OH0/DL5FF to DL5FF

OH0/DL5FFX to DL5FFZ
OH0/DL9FAZ to DL9FAZ
OH0BBF to OH2BBF
OH0MMM to OH1VR
OK1DTG/P5 to OK1DTG
OX/DK2OY to DK2OY
OX/DL3LAB to DL3LAB
OX/DY2OY to DK2OY
OX3XR to OZ3PZ
P29SL to KC2ZH
P4/N4BWS to WB4CKO
P4/W1XP to W1XP
P4BT to W3BTX
PY0FF to W9VA
RF6FP to UF6DZ
RN8A to Y23VF
RT4UA to DK1RV
RY1R to UB4RWW
S79EC to DK3EC
S79KMB to KN2N
S79SGA to OE3SGA
S92QM to ON4OM
SU1ER to OE6EEG
SV0HW/SV9 to KA5EJX
T32CRR to VK4CRR
TM1EMB to F5DE
TM5CHA to F6BFH
TR8JH to W3HCW
TR8JWH to G4TWT
TR8MD to F6FNU
TT8ZH to FF6KSE
TU2QW to F6EXQ
TU4SR to OH8SR
UC2AAA to F6AML
UD6D/Y42DA to Y42DA
UD6DKW to Y42DA
UF6FJ to OZ1HPS
UR5M to Y22QE
UY7U to SM2DYS

V31IV to W6JKV
V63AD to KC6INH
V63BJ to JG3RPL
V73CT to OKDXA
V73DO to KX6DC
VI4AAF to VK2LEN
VK8AV to WD8LLD
VP2EXX/HI7 to KC8JE
VP2MEH to WB2LCH
VP2MLD to KC4DAI
VP8CGK to VK4MZ
VQ9AC to WN8O
VS6WO to K9EC
WB8LGL/KH7 to W0LGL
WJ3U/6YS to KJ6BK
XJ3S to VE3VM
XU8CW to FD1GTR
XV7TH to SK7AX
Y10EB to JY3ZH
YJ8RN to N9DRU
ZA1A to OH2BBF
ZA1J to I2MQP
ZA1TAA to I2MQP
ZA1TAE to I2MQP
ZC4DG to G0OAB
ZD8EB to N4WQB
ZD8Z to VE3HO
ZP6CW to ZP6XDW
ZV92WAS to PY4KL
ZX4VG to PY4KL
ZZ2ECO to PP2JF
9A2NA to P.O. Box 19, Novigrad
 51466, Croatia
9V1XR to P.O. Box 80, Singapore
Y87KD to P.O. Box 129, Banjarmasin
ZD7DP to P.O. Box 86, St. Helena

Cincinnati, Ohio area signing **ITS**, celebrating the Tall Stack steamboat gathering. Special QSL cards will feature the 17 steam paddle boats that will assemble in Cincinnati October 15–18. OH-KY-IN Club station **K8SCH** will be especially active that weekend. **K8SCH/0CK** will be another OH-KY-IN club operation, this one from Okraoke Island (NA-067) October 19–25, including the CQ WW SSB test. Try 25 kHz up on CW, and 14195, 21295, and 28450 kHz on SSB. QSL via club station trustee N8FU.

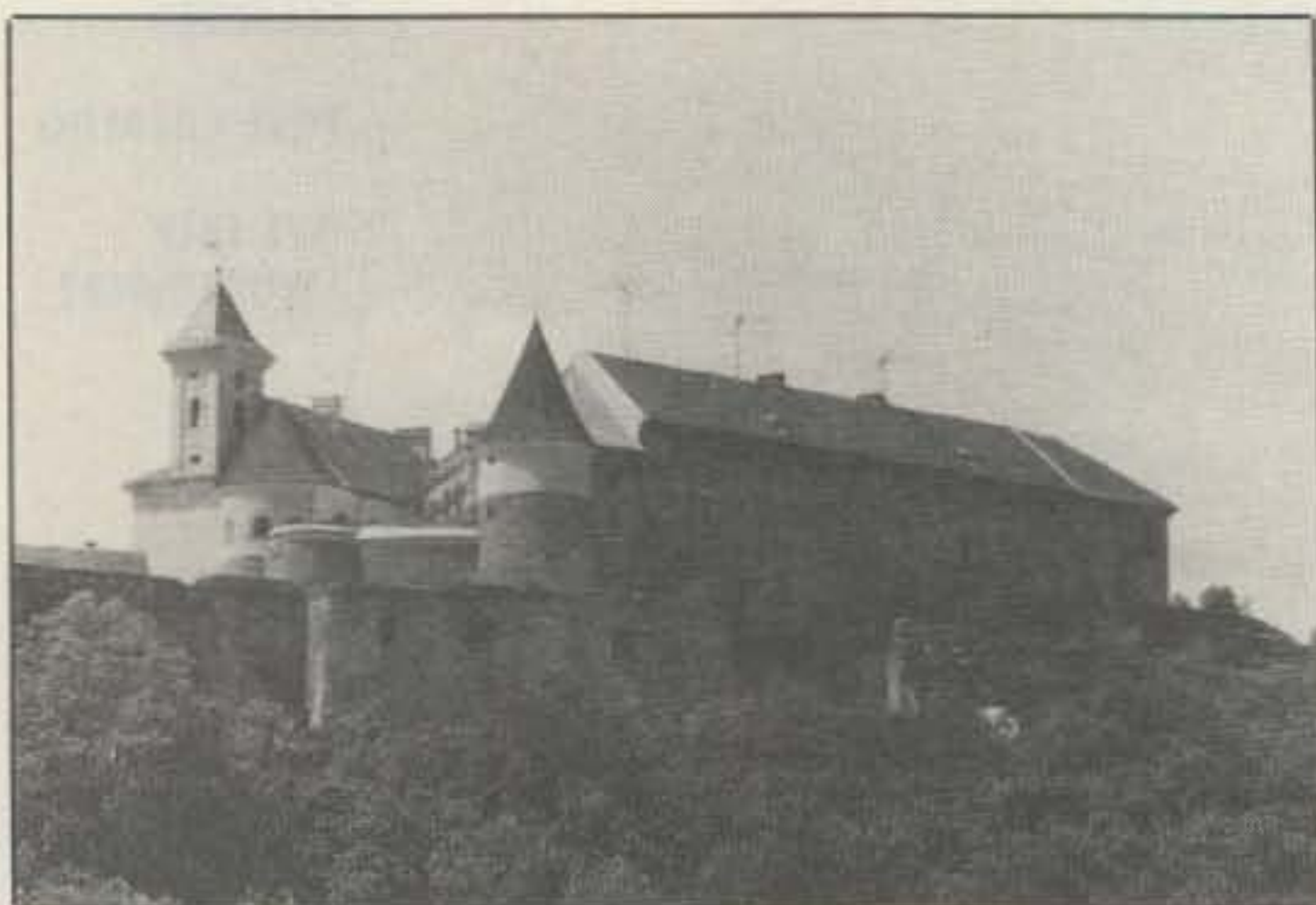
Among the DXpeditions that will take advantage of the expected good propagation this month will be another M-V Island

4J1FS operation. (They may have to come up with another callsign; the breakup of the USSR has led to changes in the international prefix allocations to the former Soviet republics.)

QSL Notes

Romeo, **3W3RR**, has a new stateside address for QSLs: P.O. Box 766, Brooklyn, NY 11230. Stations outside the US may also send cards for Romeo via the W1 bureau; special arrangements have been made to handle same.

8A2DX and **YE2C**, which were active in



This hilltop castle QTH is the site of RB5DX's contest station. It is available for guest operation.



Ken Miller, K6IR, on the right discusses operating from Africa with Dave Heil, who is very active as A22MN from Botswana, and Dave's wife Leila. (K6IR photo)

CQ DX Awards Program

SSB

1966 WD4REX 1968 WA6OET
1967 G4UJL

CW

854 WG5G/QRP 855 AA2X

SSB Endorsements

320	VE7WJ/323	310	PA0XPQ/318
320	T12HP/323	310	KF5AR/316
320	VE3GMT/323	310	W4SSU/313
320	WA6OET/323	310	I8INW/313
320	WB3DNA/322	310	LU7HJM/310
320	A18M/321	300	W3SOH/301
320	A18S/321	275	VE3CKP/297
310	W6NLG/319	150	G4ASL/150
310	K9TI/319	28 MHz	WD4REX

CW Endorsements

320	K2ENT/321	300	KA2DIV/301
320	K2OWE/321	275	AA2X/282
310	AA6AA/318	275	WG5G/QRP/276
310	K9TI/317	QRP	WG5G
310	W1WA/317		

Total number of active countries is 323. The basic award fee for subscribers to CQ is \$4. For non-subscribers, it is \$10. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement stickers are \$1.00. Updates not involving the issuance of a sticker are made free when an SASE is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for air-mail reply. Please make all checks payable to the awards manager.

the WPX CW test, should be confirmed via Sidik Tandjung, YB2FRR, P.O. Box 605, Semarang 50060, Central Java, Indonesia.

Randy Rowe, N0TG, reports that all direct QSL request for his Navassa operation (see June 1992 issue) have been answered. If you have not yet sent in your QSL request for any of the /KP1 calls, send direct to Randy at 2120 Reverchon Dr., Arlington, TX 76017 for a fast response.

The new address of the **Guantanamo Bay KG4** Amateur Radio Club is Box 73, FPO AE 09593. Do not use the Norfolk VA address.

QSLs for **LZ2TU** should go to Kash Kashdin, WB2RAJ, 136 Westcliff Dr., West Seneca, NY 14224. LZ2TU does not receive cards via the LZ bureau. WB2RAJ also handles cards for **EM3W** and **UZ3AYR**.

7P8SR reminds DXers that IRCs cannot be exchanged for postage in Lesotho; please send US\$1 instead. 7P8SR will no longer respond to QSL requests with IRCs.

Andy Chadwick, G4ZVJ, says his correct address is 3 Park Vista, Cheadle, Stoke-on-Trent, ST10 1HZ, United Kingdom. Andy handles cards for his operations as **ZD8VJ**, **ZD7VJ**, **ZD80V**, **3D2VJ**, **T20VJ**, **A35VJ**, **5W1VJ**, and **KH8/G4ZVJ**. Cards via the UK bureau are also okay.

SV3AQR, listed QSL manager for **J43A**, is not in the 1992 Callbook; his address is Box 30, Amalias 27200, Greece.

QSL **VK9LH** on Lord Howe Island via Dick Hoffman, Anderson Road, Lord Howe Island, NSW 2898, Australia. Dick's previous call of **VK2AGT** has been re-assigned; do not QSL **VK9LH** via **VK2AGT**.

Cpt. Roger Hackler, KD4FYT, will operate from South Korea as **HL9AXT** until April 1993. QSL to him at ACO 4-58 AVN Regt., Unit 15348, APO AP 96258-0197.

Corrections

3B8CF reports that the only QSL route for his QSOs is direct, via his Callbook address. Likewise, **G4EGZ/VO1FG** cannot help with 3B8 confirmations.

The UDRA says that **HI9UD** should be confirmed via their Santiago club station **HI3UD**, P.O. Box 449-3, Santiago, Dominican Republic, and not via **HI3AMF**.

QSL Help Wanted

KR4M seeks a QSL route for **3DA0AZ** from 1988.

N2UN wants to confirm a QSO with **ZC4SR** from 1984.

Chuck Bowers, KJ6DO, continues to seek information about the previous users of his call, when it was used for the US Army's 267th Chemical Co. club station on Johnston Island: dates of operation, operators, QSL managers, etc., would be of interest. Chuck knows about the KJ6DO/KH7S hoax; he seeks *real* information.

AA5NN says a QSL request for **BY5FS** sent to **G3RSF** was returned with the marking "gone away." Any ideas?

WB9Z seeks help with **EL7X** from 1990,

and **LU1ZA** from 1990; no response from **LU2CN**. Any help?

KF9FU seeks help with **5V9NDX** March 1989, and **3B7AA** September 1990. (Neither call looks legit.—ed.)

KD0ZR continues to look for a way to QSL a 1969 QSO with **VQ9/A**; **W4ECI** and **W2MZV** are not listed in current Callbooks. Anyone know how to confirm **VQ9/A** today?

K0JN says his card to **CU8AI**'s 1992 Callbook address was returned; any ideas? **KE6KT** wants QSL info for **U07DJ** from November 1990.

W0DFT needs an up-to-date QSL route for **8Q7AC** from 1989. The P.O. Box in the Maldives is inactive.

WB4RFZ seeks help with a couple of oldies: **CR5VE** from the deleted country of Timor, from August 1972. No response from **F6AZI**. Also **9G1MB** from 1978; **WA4OOM** has not been able to help.

W6PUW wants help confirming **9G1KB** from April 1981. Operator was John Bergen. Any ideas?

K2TQC seeks info on **5A5TA** from late 1960, operator John. **K0DQI** is not in the Callbook.

W3CEI seeks a QSL route for **D2CCC** from August 1984.

W2HCA wants help with **KH6HSS/5N0**; cards to Lagos come back marked "not there."

Several readers have asked for an address for **W4LK**, reported QSL manager for **9K2FZ**.

IK0ADY wants an address for **N2FM**, reported manager for **A71ND**.

JA3BKP seeks a QSL route for **AZ1S/KH9** from October 25, 1991.

KA3KWH seeks QSL info for **PJ5JP**, 73, Chod, VP2ML

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1310 RG217/U 50 ohm 5000 watt dbl shld.	1.05
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"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

QSL Information

I have received several requests for information regarding the design and use of QSL cards. I wrote an article about QSL cards, and that article was printed a few years ago in *CQ* magazine. However, it just covered part of the information, since my column does not have unlimited space available to it. Questions about QSL cards continue to be received, which prompted me to write a book on this subject. It is filled with every piece of QSL data I think readers might find useful. This book contains everything you need to know to obtain excellent cards, and to make good use of them. My experience in handling a couple of operating awards, plus work in two incoming DX QSL bureaus, disclosed that very few amateurs know much about QSL cards and their uses. This new book can help most amateurs.

PSE QSL! covers all aspects of QSL design and selection, plus their uses. The advantages and disadvantages of various card styles are detailed. Card stock, color, cost, graphics, type/font, and point size are explained in a manner that is easily understood. QSL bureaus and QSL managers are covered in detail.

The ten sections of this book are introduction, factors to consider, types of QSL cards, QSL printed matter, QSL design choices, getting sample cards, how to get good cards, bureaus, QSL managers, and potpourri. The book includes lists showing sources of foreign postage, QSL printers, countries served by the ARRL Incoming DX QSL Bureau, and countries not served by the ARRL Outgoing DX QSL Bureau.

PSE QSL! is about 70 pages long. It has more than 15 illustrations, plus several extremely useful lists. This is an 8.5" x 11" soft-cover book. The domestic price is \$11.95 per copy, which includes shipping and handling charges. Add \$1.00 if a book is to be shipped to a foreign (non-U.S.A.) address. If a local store markets Tiare Publications items, they should have this book available at \$9.95. The author is Bill Welsh, W6DDB. *PSE QSL!* can be ordered from Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147. Visa and MasterCard orders are accepted. Their telephone number is 414-248-4845.

The rest of this article contains bits of

information that have been extracted from my *PSE QSL!* book, plus a few related items.

Amateur radio operators use three-letter signals (which start with the letter Q) to make statements and to ask questions during on-the-air contacts. QSL means that the receipt of a message is confirmed, whereas QSL? asks whether or not a message has been received. Therefore, it is natural that the cards we use to confirm our radio contacts are called QSL cards. These written contact confirmations are often used to prove eligibility to receive any of the thousands of operating awards that are available to us. The most distinctive cards usually are displayed on the walls of a radiator room (shack). Such wall displays can be of interest to visitors, whether or not they are amateurs. QSL cards are an interesting facet of amateur radio, and they are particularly important to new amateurs.

Worldwide QSL bureaus handle most of the QSL cards that are exchanged between amateurs in different countries. Their operation is slow, but they are popular because they provide the easiest and least expensive way to swap cards. QSL managers (including DXpedition QSL managers) handle cards for amateurs who operate from rare DX (foreign) locations. These QSL managers are commonly swamped with requests for cards, which can cause delays in getting cards mailed. However, QSL managers process card requests faster than they are handled by the International DX QSL Bureau system. It is more expensive (by far) to exchange cards via a QSL manager than it is to swap them through the Bureau. The third way to exchange DX QSL cards is via direct mail. This is the fastest and most expensive way to get DX cards. If a DX amateur you worked lives in a country which does not have a national QSL bureau, and she/he does not have a QSL manager, direct mailing can be the proper method of exchange. If you contact an amateur from whom you are extremely anxious to receive a card, the high exchange costs may be acceptable to you, despite cheaper methods being available.

There are bureaus which provide a variety of services. Their costs and requirements are unique. These special bureaus usually run advertisements in amateur magazines. If you are interested in making use of their services, request data and



This is Don Hardy, KC6RCT, of Redlands, California. I recently enjoyed a good code contact with him. Don advises that the world of amateur radio has reawakened his interests in physics, mathematics, meteorology, and geography.

enclose an SASE, as usual. Despite the existence of several special bureaus, an on-the-air reference to the buro (bureau) almost certainly means the worldwide DX QSL bureau which handles most of the cards that are exchanged between amateurs in different countries. No matter what is said on the air, any DX amateur you contact is very likely to send her/his card via the International DX QSL Bureau system. It is too time-consuming for a busy DX operator to QSL any other way. The American Radio Relay League (ARRL) handles DX cards sent to American amateurs. One



The Peacock family of North Carolina proudly boasts four generations of amateur radio operators. The photograph shows (left to right) great grandfather James, W4LWU; grandfather George, W4WYV; father Kelvin, KO4MX; and (in front) six-year-old Allison, KD4NNH. Allison regularly talks with her grandfather using the Morse code.

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CIRCLE 76 ON READER SERVICE CARD



Angela (Angie) Fischer, KB0HXV, is the "Westlink Report" Ham of the Year. This bright young lady was initially licensed when she was 10 years old. She is 13 now, and she has upgraded to a General license. The Yaesu U.S.A. Corporation has underwritten this program from its inception to help recognize the accomplishments of our young amateur operators. Angie co-produced a rap song extolling the benefits of the Morse Code. She helped organize the Gateway to Amateur Radio Club, which helps young people get started in amateur radio. Angie also established a 2 meter net in St. Louis to promote amateur radio activities. Missouri governor John Ashcroft commented, "I am delighted that it is a Missouri youngster who is a national and international example of so much good done by so many youngsters. My compliments also go to Angie's parents, Tony and Laura Fischer." Angie's teacher said that she is "hard working, cooperative, and respectful. She exhibits a high level of maturity, gets along well with others, and has a positive personality that makes her a pleasure to work with."

does not have to be an ARRL member to benefit from this service; simply provide self-addressed stamped 5" x 7 1/2" (6" x 9" maximum) envelopes to your regional group. Fig. 1 shows the front side of a properly prepared envelope that is ready to be submitted to a regional group of the ARRL Incoming DX QSL Bureau. The American regional groups are listed herein for your convenience. An asterisk is used to denote groups which sell envelopes.

***First Call Area:** W1 QSL Bureau, YCCC, Box 216, Forest Park Station, Springfield, MA 01108.

***Second Call Area:** ARRL 2nd District QSL Bureau, NJDXA, P.O. Box 599, Morris Plains, NJ 07950.

Third Call Area: C-CARS, P.O. Box 448, New Kingstown, PA 17072-0448.

Fourth Call Area, Single-letter prefixes: Mecklenburg Amateur Radio Club, P.O. Box DX, Charlotte, NC 28220.

Fourth Call Area, Two-letter prefixes: Sterling Park Amateur Radio Club, Call Box 599, Sterling Park, VA 22170.

***Fifth Call Area:** ARRL W5 Incoming QSL bureau, P.O. Box 50625, Midland, TX 79710.

***Sixth Call Area:** ARRL Sixth (6th) District DX QSL Bureau, P.O. Box 1460, Sun Valley, CA 91352.

Seventh Call Area: Willamette Valley DX Club, Inc., P.O. Box 555, Portland, OR 97207.

Eighth Call Area: 8th Area QSL Bureau, P.O. Box 182165, Columbus, OH 43218-2165.

***Ninth Call Area:** Northern Illinois DX Assn., Box 519, Elmhurst, IL 60126.

***Zero Call Area:** W0 QSL Bureau, P.O. Box 4798, Overland Park, KS 66204.

***Puerto Rico:** KP4 QSL Bureau, P.O. Box 1061, San Juan, PR 00902.

U.S. Virgin Islands: Virgin Islands ARC, GPO Box 11360, Charlotte Amalie, Virgin Islands 00801.

***Hawaiian Islands:** Wayne Jones, NH6GJ, P.O. Box 788, Wahiawa, HI 96786.

***Alaska:** Alaska QSL Bureau, 4304 Garfield St., Anchorage, AK 99503.

Guam: MARC, Box 445, Agana, Guam 96910.

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

It is normal to wait months to years for a DX QSL card to arrive via the bureau, but that is how most of the DX cards are received. There is no need to hunt for a name or address to write on any card that is going to be sent via the bureau, which saves a lot of time that is better spent on the air. If you work any DX stations, you should get a few of your envelopes to your regional group immediately. Even when a DX amateur tells you she/he will QSL directly, her/his card will probably be sent via the bureau to save time and expense.

QSL managers do a good job of getting rare DX QSL cards to us. This includes the dedicated amateurs who process cards for DXpeditions. If you listen to a rare DX station for a while, you will probably hear her/him provide QSL mailing data, which is usually the callsign of the amateur to whom cards should be mailed. The amateur radio publications frequently print QSL routing instructions for rare DX stations. I like the "W6GO/K6HHD List" that is published every month by Jay/Jan O'Brien. This newspaper-size list sells at \$2.50 for a single issue, and \$25 for 12 issues to domestic (USA) addresses. The annual subscription rate to Canadian and Mexican addresses is \$32, with the cost of a single issue being \$3. The annual overseas air-mail subscription price is \$38, with the price of a single issue being \$4. Their address is P.O. Box 700, Rio Linda, CA 95673-0700. There are several other good lists of QSL managers. If you are an active DX op-

erator, you should take advantage of the information that is contained in such lists. At the present time there are 65 countries that are not served by the ARRL Outgoing DX QSL Bureau. If you want to send your QSL to an amateur in one of these countries, you will have to send it via a QSL manager or by direct mail. These countries are:

Common Prefix	DXCC Country
A5	Bhutan
A6	United Arab Emirates
A7	Qatar
C9	Mozambique
D2	Angola
EP	Iran
ET	Ethiopia
J5	Guinea-Bissau
KC4	U.S. Antarctica Bases
KC6	Belau
KH1	Baker & Howland Islands
KH4	Midway Island
KH5	Palmyra & Jarvis Islands
KH7	Kure Island
KH8	American Samoa
KH9	Wake Island
KH0	Mariana Islands
KP1	Navassa Island
KP5	Desecheo Island
OD	Lebanon
P5	North Korea
S2	Bangladesh
T2	Tuvalu
T3	Kiribati
T5	Somalia
TJ	Cameroon
TL	Central African Republic
TN	Congo
TT	Chad
TY	Benin
TZ	Mali
V4	St. Christopher & Nevis
V6/KC6	Micronesia
VP2E	Anguilla
VP2M	Montserrat
VR6	Pitcairn Island
XT	Burkina Faso
XU	Kampuchea
XW	Laos
XX9	Macao
XZ/1Z	Burma/Myanmar
YA	Afghanistan
YI	Iraq
ZA	Albania
ZD7	St. Helena
ZD9	Tristan da Cunha
ZK3	Tokelau
3C	Equatorial Guinea
3C0	Pagalu Island
3V	Tunisia
3W/XV	Vietnam
3X	Guinea
5A	Libya
5H	Tanzania
5R	Madagascar
5T	Mauritania
5U	Niger
5X	Uganda
70/4W	Yemen
7Q	Malawi
8Q	Maldives
9G	Ghana
9N	Nepal
9Q	Zaire
9U	Burundi

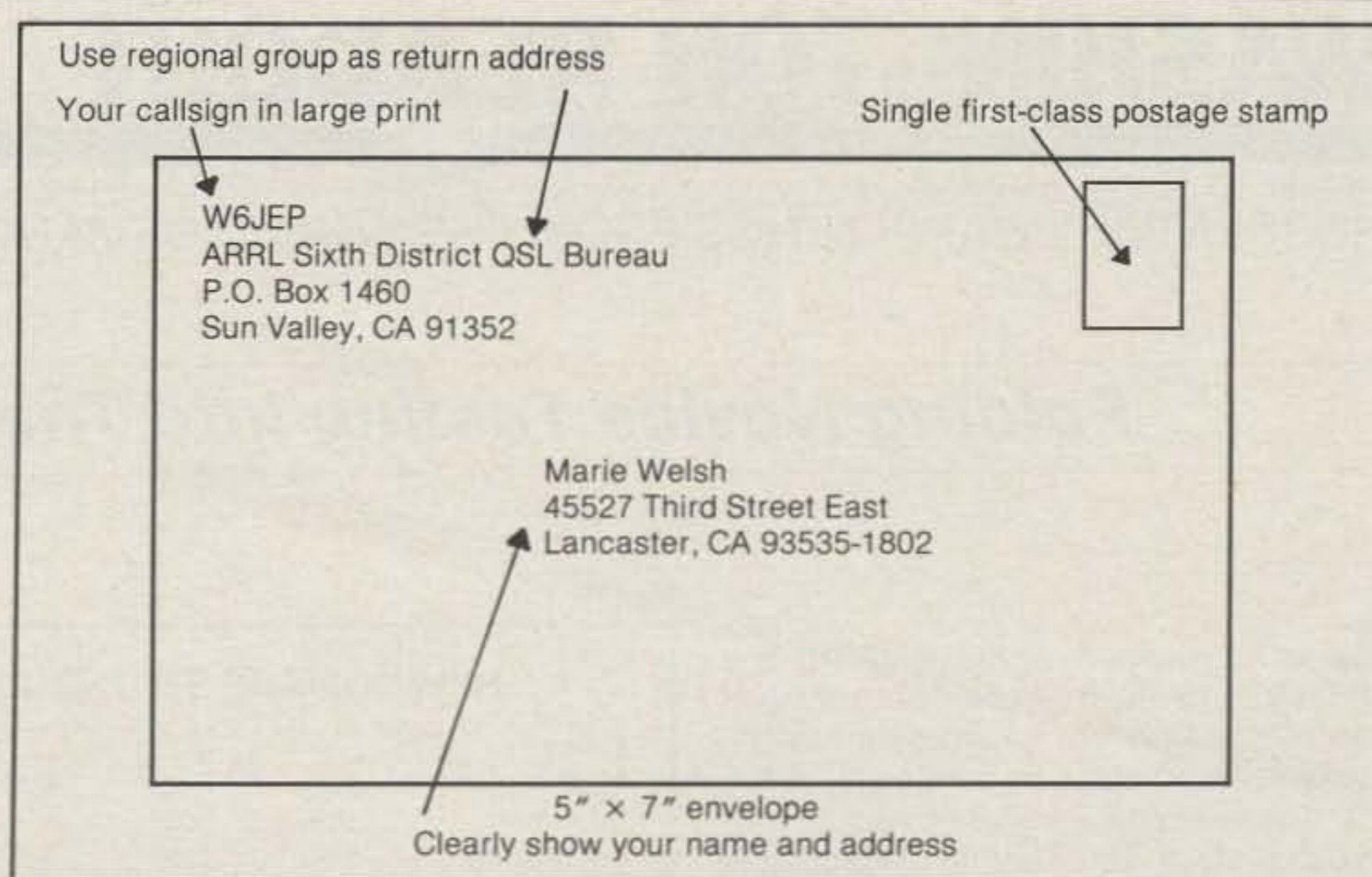


Fig. 1—Incoming DX QSL Bureau envelope.

Restrictions. Egypt, France, Germany, Japan, Monaco, Morocco, and Portugal only forward cards to members of their national radio organizations.

Note that the ARRL Outgoing DX QSL Bureau only handles cards received from ARRL members, whereas you do not have to be a League member to receive cards via the ARRL Incoming DX QSL Bureau. QSL cards should be 2¾ to 4¼ inches (70 to 110 mm) high and 4¾ to 6¼ inches (120 to 160 mm) wide. Larger and smaller cards cause handling and storage problems. The standard postcard size of 3½ by 5½ inches is preferred.

The quickest way to get a desired QSL is to mail your card directly to the address of the DX amateur. Include a self-addressed envelope. Do not show a callsign anywhere on either envelope. If you are sending your card to a country which does not object to their citizens possessing foreign currency, you may enclose a green stamp (a \$1.00 bill), but be sure her/his country does not object to this practice. It is safer to simply enclose an International Reply Coupon (IRC), which you should be able to purchase at your local post office. Under the present regulations, one IRC

can be exchanged for one-half ounce of airmail postage anywhere in the world. The DX amateur makes this exchange at his post office. Green stamps and IRCs are subject to being stolen. This problem can be overcome by attaching foreign airmail postage to your self-addressed envelope before you mail it to the DX operator. A few good sources of foreign airmail postage stamps are:

James E. Mackey, P.O. Box 270569, West Hartford, CT 06127-0569.

William J. Plum, 12 Glenn Road, Flemington, NJ 08822.

DXQSL Associates, Brian W. Treadwell, WV4V, 434 Blair Road NW, Vienna, VA 22180.

The information in the preceding paragraphs is just the "tip of the iceberg" in regard to the data that is included in my *PSE QSL!* book. Licensing-course instructors (and others) may want a copy of a very detailed index which applies to this book. If so, send \$1.00 to my California address (shown on the first page of this article) to cover reproduction, envelope, and postage costs. The existing table of contents should suffice for most readers.

73, Bill, W6DDB

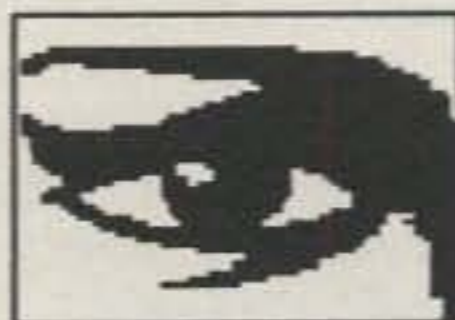
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REGULATORY HAPPENINGS FROM THE WORLD OF AMATEUR RADIO

Folding Novice Testing Into The VEC System

Last May we told you that the ARRL and W5YI-VEC had filed separate petitions with the FCC asking that all amateur radio license examinations be administered under the volunteer-examiner coordinator (VEC) system. The Federal Communications Commission has now acted on those two petitions and has adopted a Notice of Proposed Rulemaking which looks towards consolidating the two existing amateur radio operator license testing programs. The FCC also has issued another NPRM proposing a temporary operating system for visiting foreign amateur radio operators.

The existence of the Codeless Technician Class has had a major impact on the Novice Class—certainly more than the amateur community expected! Comments filed on the No-Code proceeding a couple of years ago said that the Novice and any code-free entry level would be about equal in popularity. Not so! Seventy-five percent of all first-time licensees now are Technician Class and growing! In 1990 eighty-eight percent of all newcomers entered amateur radio at the Novice level.

All operator license examinations, except for the Novice Class, are administered in the VEC System. That system has some 30,000 trained and accredited volunteer examiners (VEs) closely coordinated by 18 VE coordinators. Each examination for the Novice Class operator license is administered more informally by two amateur operators selected by the examinee.

The result has been a sharply decreased demand for the Novice testing program. It is clear that amateur radio beginners are learning and passing the code after they achieve the Technician level. Although they do not get another license, Techs who pass a telegraphy exam become "Tech Plus"—for Technician plus code. This allows them to operate on the Novice high-frequency bands below 30 MHz.

The VECs keep track of all candidates who achieve Tech Plus and periodically no-

*National Volunteer Examiner Coordinator,
P.O. Box 565101, Dallas, TX 75356-5101
(817-461-6443)*

NEWCOMERS TO THE AMATEUR RADIO SERVICE

Class	Jan.	Feb.	Mar.	Apr.	May	Jun.	Total
1988							
Novice	989	1466	2407	1996	2714	1234	1086
Technician	165	126	251	168	233	186	1129
Other	35	32	75	31	55	74	302
Total	1189	1624	2733	2195	3002	1494	12237
1989							
Novice	1930	1041	1933	2512	2869	1805	12090
Technician	247	200	181	255	356	176	1415
Other	57	33	33	54	77	22	276
Total	2234	1274	2147	2821	3302	2003	13871
1990							
Novice	2434	1679	2466	2368	3875	1724	14546
Technician	191	219	205	239	359	214	1427
Other	46	43	56	51	50	46	292
Total	2671	1941	2727	2658	4284	1984	16265
1991							
Novice	1713	1810	1734	2651	1801	1088	10797
Technician	89	307	882	3025	2858	2112	9273
Other	14	45	40	73	55	41	258
Total	1816	2162	2656	5749	4714	3231	20328
1992							
Novice	655	1260	1364	1330	1066	1371	7046
Technician	3318	2764	3347	3810	3058	4525	20822
Other	57	68	95	75	54	61	410
Total	4030	4092	4806	5215	4178	5957	28278

Table I—The number of first-time amateur licensees has skyrocketed since spring 1991 when the FCC eliminated the code requirement from the Technician Class. Most beginners are choosing code-free entry into the Amateur Radio Service. The number of applicants choosing the Novice route is at an all-time low.

tify the FCC. The VEC's Tech Plus Data Base allows FCC monitoring stations to know which Technician licensees are authorized to operate below 30 MHz, especially on the 10 meter band.

In calendar year 1991 the VEC System administered 172,061 examination elements to 103,251 persons at 8,118 sessions—an increase of 62% over 1990. And so far this year the VEC System figures are up about 30% more than 1991. The VEC System is a growing program.

In 1992, Novice licensees, however, are down a staggering 35% over 1991, and 52% over two years ago. This is particularly significant when you consider that there are 40% more beginners in total this year

(see Table I). There were 7,046 new Novices for the six month period through June 1992 versus 10,797 for the same period last year. (In 1990 there were 14,546 new Novices between January and June.)

At the present rate only 12,000 of the anticipated 55,000 first-time licensees will enter amateur radio at the Novice level this year. And many new Novices are already being tested at VEC coordinated test sessions.

The ARRL and W5YI-VEC both recommended to the FCC that all Novice examinations be included in the VEC System in the interest of efficiency. Actually, the FCC had already been working on exactly such a proposal since last fall.

VEC System is Superior

The VEC System screens all amateur radio Form 610 applications before submission to the FCC licensing facility in Gettysburg, Pennsylvania. The FCC keeps track of all defective applications received. The error rate in the VEC System, which processed nearly 70,000 applications last year, was less than one percent.

On the other hand, applications submitted under the Novice program have an error rate of 9.4 percent. This means that about one in every eight Novice applications must be returned. At the recent VEC Conference, FCC's Johnny Johnston, Personal Radio Branch Chief, pointed out the costs involved to correct those errors. "Labor that should be spent on providing a faster speed-of-service must be diverted to obtaining the correct information. It delays the processing of all licenses... and it delays the newcomer from getting on the air," he said.

The better performance of the VEC System is primarily due to improved communications between the FCC, VEC, and volunteer examiners. No such channel of communication exists in the Novice testing program. The VEC System is also perceived as a more credible testing system because all VEs must be approved by the VEC, and examination records are centrally maintained for FCC inspection if warranted. Unlike the VEC System where pass and fail records are closely monitored, there are no statistics available on Novice examination failures.

NPRM Issued By FCC

On July 13 the FCC preliminarily adopted new rules that would fold Novice testing into the VEC System. "Our experience with VEC System and with the current Novice examination system indicates that the VEC System is the superior system," FCC said in the Notice. "The informal ad hoc Novice system is inefficient and susceptible to various irregularities... By including the Novice examinations in the VEC System we can simplify the license application form by eliminating the separate certifications by VEs administering Novice examinations. In addition, one standardized form would avoid the confusion that now exists because of the two different procedures that are used in the administration of amateur service examinations." The FCC pointed out that all Novice examinations are already being administered in the VEC System as a part of other classes of operator licenses.

The FCC proposed to include the responsibility for the preparation and administration of Novice Class operator license examinations under the VEC System with the same conditions that apply to the four higher classes of license. These conditions

include requiring each VE to be accredited by a VEC, three VEs for the administration of an examination, coordination by a VEC of each examination session, and issuance of a Certificate of Successful Completion (CSCE) to every examinee who scores a passing grade on an examination element.

Novice Test Fees Permitted

The NPRM also provides for expense reimbursement—that is, a test fee—for administration of the Novice examination. The maximum reimbursement currently permitted for coordinating the higher class

examinations is \$5.44, although this figure is rounded off to \$5.40 by most VECs. "The VECs and VEs are not required to accept reimbursement..." FCC said.

This fee could be waived for youngsters if it is determined that such a fee would have an adverse impact on school amateur radio classes and amateur radio growth. In any event, the presence of a test fee certainly has not hindered the popularity of the Codeless Technician Class! Amateur radio has never been in better health.

A footnote in the Notice points out that the language of Public Law 98-214 (December 8, 1983) which provided for expense reimbursement for out-of-pocket costs incurred in preparing, processing, administering, or processing examinations

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... is broad in that it applies to all classes of operator license.

"Senator Goldwater, however, in discussing the legislation before the Senate stated that the reimbursement fee should not apply to Novice examinations. The statutory language contains no such exception. Because the statute is clear on its face, there is no need to resort to the legislative history." The FCC said that "While we have considered Senator Goldwater's comment, it does not rise to the level of a statutory requirement binding on us.

"Moreover, the structure of the amateur service has changed considerably since those remarks were made. Most note-

worthy is the introduction of the Codeless Technician Class operator license. In addition, Novice Class licensees now enjoy additional privileges in the 10 meter band, as well as extensive VHF and UHF privileges, that were not available in 1983. Within the limits of the law, and in accordance with prudent administration, we are constrained to adapt our rules to accommodate situational changes."

General Class VEs

Many General Class VEs appear needlessly concerned that their amateur radio testing and training activities would be cur-

tailed if Novice testing falls under the VEC System. Not true. The effect on these examiners would be minimal. They would simply be accredited by VECs—the same as Advanced and Amateur Extra Class VEs are now. General Class examiners could participate with existing VEC System teams or could form their own. The main difference would be the need for three accredited VEs instead of two to conduct a test session.

By far, the biggest advantage to bringing the Novice program under the VEC System was not mentioned in the NPRM. VEC coordination provides a mechanism for circulating needed examination information. A channel of communication from the FCC through the VEC to the VE is of great importance. VECs routinely keep their testing teams current on exam program changes. Constantly changing rules are always impacting the examination questions.

When the FCC adopted the Codeless Technician last year it was necessary for the Question Pool Committee (QPC) to make several adjustments in the Novice question pool. All VECs were advised of the changes by the QPC so their examinations could be adjusted and VE teams notified.

Novice VEs could not be notified since their identity was unknown to the QPC. This caused some problems because many examinees used study manuals that contained questions that had recently been deleted from the Novice Element 2 exams. Most Novice-level VEs prepare their Element 2 examination from license preparation material available in the publishing marketplace.

In fairness to the examinee and publishers who have study manuals on the shelf, VEC System policy is to eliminate (rather than revise or replace) any examination question involving recently amended rules. Bringing Novice testing under the VEC System will allow the VEC to inform the VE of recent changes to question pools and procedures.

W5YI-VEC Accrediting General Class VEs

It is assumed that all VECs will begin advanced accreditation of General Class VEs almost immediately in anticipation of the proposal being adopted. We invite you to become an accredited volunteer examiner in the W5YI-VEC program if you are a General or higher class amateur who participates (or wishes to participate) in Novice testing. Every VEC furnishes their testing teams with complete instructions, forms, and testing materials.

To become an accredited VE, simply write to the W5YI-VEC (P.O. Box 565101, Dallas, Texas 75356) and request a VE application. You can also phone us at

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Say You Saw It In CQ

817-860-3800 during the business day or 817-461-6443 at other hours. The two largest VEC organizations, the ARRL-VEC and W5YI-VEC, account for about 85% of all amateur radio operator license testing. Both share expense reimbursement (test fees) with their VE teams.

It should be clearly pointed out that even if this proposal is eventually enacted into law, it still could easily be another year before it takes effect. Government rule-making takes time. Our best guess is that it will be summer 1993 before Novice testing is folded into the VEC System. Perhaps the effective date will coincide with the release of new Novice Element 2 questions now being prepared by the VECs internal Question Pool Committee.

New Novice (and Technician Element 3A) questions will begin showing up in examinations after June 30, 1993. Massive changes will be made to the Novice and Technician questions and a mechanism is needed to ensure that the new question pools are known and used.

Interested parties may file comments on the proposal to bring Novice testing under the VEC System on or before October 9, 1992; reply comments by November 9, 1992. To file formally, you must file an original plus four copies with the Office of the Secretary, Federal Communications Commission, Washington, DC 20554. If you want each Commissioner to receive a personal copy, you must file an original and nine copies. Be sure to mention you are commenting on PR Docket 92-154 so your views will end up in the right file!

VEs To Examine Foreign Visitors

The Federal Communications Commission has suggested a system whereby foreign amateur operators visiting the United States for a short time could operate their ham radios for up to 60 days.

Such persons would include tourists and meeting attendees who wish to operate their amateur stations while in this country. The Commission believes this proposal would extend the amateur operator's ability to enhance international goodwill.

Currently, there are two ways a foreign amateur operator can be authorized to operate an amateur station in the United States: (1) by passing the necessary examinations and receiving a 10-year term amateur service license; (2) citizens of the 76 countries whose governments have signed reciprocal operating agreements with the United States may, on the basis of the amateur service licenses issued by their own countries, be issued one-year permits to operate amateur stations while in this country.

The FCC's proposal would provide a sin-

gle, consecutive 60-day period of authorization that would meet the time requirements needed by such visitors. To accomplish this goal, the Commission would: (1) confirm that the person currently holds an amateur service license from the country of citizenship; (2) determine the extent of the operating privileges granted by the license; (3) make certain that the person is qualified to perform the duties of an amateur operator in the United States and that authorization is in the public interest; (4) provide the foreign amateur operator with a document attesting to his/her qualification; and (5) record pertinent data to contact the person if necessary. The Commission said this process would be designated as the licensing of a temporary visiting amateur operator, be available throughout the country, and be completed quickly.

All amateur operator license examinations are currently administered in the private sector either in the volunteer-examiner system or for Novice Class operator examinations by two volunteer examiners (VEs). As mentioned above, this is in the process of being changed to single VEC System handling.

Therefore, the FCC proposed by a Notice of Proposed Rulemaking that the VEs examine the foreign operator's amateur service license, review identification credentials, and determine the extent of the operating privileges prior to administering a 20-question examination.

Finally, because of the diverse privileges afforded amateur operators by the various countries, it is not feasible to equate directly the classes of amateur operator licenses issued by those countries with an FCC-issued amateur operator license.

For example, Commission rules authorize a Canadian licensee or a reciprocal permittee the same privileges in the United States as those authorized by his/her own government, but not to exceed those granted to the Commission's most privileged licensees.

Thus, the Commission proposed that the temporary visiting foreign amateur operator also be so limited. The FCC said this approach leaves the issue of specific operator restrictions entirely to the country issuing the license. The Commission also proposed to include for temporary visiting foreign amateur operators the present limitation that any person holding an FCC-issued operator/primary station license is authorized only the privileges of that license.

The NPRM was issued on July 24, but as of the time we went to press, comments dates on the Notice had not yet been released. Comments are solicited, however. Refer to PR Docket 92-167 if you wish to make your views known to the FCC.

73, Fred, W5YI

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THE SCIENCE OF PREDICTING RADIO CONDITIONS

DX Contest Special

It's CQ WW DX Contest time again! The 1992 CQ World-Wide DX Contest will be held on the following dates:

Phone: 0000 UTC Sat., Oct. 24 to
2400 UTC Sun., Oct. 25
CW: 0000 UTC Sat., Nov. 28 to
2400 UTC Sun., Nov. 29

For the 42nd consecutive year this month's propagation column is devoted to special forecasts and information applicable to both the Phone and CW contest weekends. The accuracy of the forecasts for the previous 41 contests is considerably greater than 90%!

Looks Like Another Good Contest

The sunspot cycle is decreasing steadily, but it still looks like another good WW Contest. The Royal Observatory of Belgium reports a monthly mean count of 65 for June 1992. This results in a smoothed sunspot number of 132 centered on December 1991. This is a drop of six from the previous month. A corresponding 10.7 cm mean solar flux level of 118 was reported for June by the Dominion Radio Astrophysical Observatory at Penticton, B.C. This results in a smoothed value of 189 centered on December 1991.

A smoothed sunspot number of approximately 100 is forecast for the 1992 contest periods in October and November. A corresponding 10.7 cm solar flux level of approximately 160 is expected.

The smoothed sunspot number recorded for the 1991 Contest was 142 during the Phone period and 138 during the CW period. Solar activity for the 1992 contest period is expected to be considerably lower by approximately 40 numbers. This would be the lowest level of solar activity during any CQ World-Wide DX Contest period since 1987. But don't despair. Despite lower solar activity, the sunspot count will still be high enough during the 1992 contest to ensure generally good DX conditions on all of the amateur HF bands, barring the de-

11307 Clara Street, Silver Spring, MD 20902

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for October 1992

Propagation Index	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 9-10, 17, 22, 26	A	A	B	C
High Normal: 3, 7-8, 11, 15-16, 20-21, 25, 30	A	B	C	C-D
Low Normal: 2, 5-6, 18, 23-24, 27, 29	B	C	D	D-E
Below Normal: 1, 4, 12, 14, 19, 28, 31	C	C-D	D-E	E
Disturbed: 13	C-D	D	E	E

Where expected signal quality is: A—Excellent opening, exceptionally strong, steady signals greater than S9.
B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.
C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.
D—Poor opening, with weak signals varying between S1 and S3, and with considerable fading and noise.
E—No opening expected.
3 dB per S-unit.

HOW TO USE THIS FORECAST

1. Find *propagation index* associated with particular band opening from Propagation Charts appearing on the following pages.
2. With the *propagation index*, use the above table to find the expected signal quality associated with the band opening for any day of the month. For example, an opening shown in the charts with a *propagation index* of 3 will be fair-to-poor (C-D) on October 1st, fair (C) on the 2nd, good (B) on the 3rd, fair-to-poor (C-D) on the 4th, fair (C) on the 5th, etc. Fair (C) conditions are forecast for October 24th, improving to good (B) on the 25th, during the CQ World-Wide DX Phone section weekend.

velopment of a sudden radio storm.

Compared to last year's contest, when solar activity was in the 140 range, expect somewhat shorter periods of daytime openings this year on 10 and 15 meters, and shorter periods of nighttime openings on 20 meters. On the other hand, there could be a noticeable increase in openings during the hours of darkness on 40, 80, and 160 meters.

Storm Possibility Slim During Contest

A long-range CQ day-to-day forecast that is based primarily on the 27-day recurrence tendencies of geomagnetic, solar,

and ionospheric conditions indicates a high probability of at least Normal propagation conditions during the phone contest weekend of October 24-25, with a good chance of increasing to High Normal to many areas of the world. At the present time the chance of a radio storm developing during the contest weekend appears to be slim. See the Last Minute Forecast at the beginning of this month's column for additional information concerning expected day-to-day conditions for the entire month of October. An updated day-to-day forecast for the phone contest weekend will appear as a bulletin at the beginning of next month's column. The November issue of CQ should reach most subscribers before the phone contest weekend.

Expect another good CQ World-Wide DX Contest during 1992, as long as Mother Nature doesn't produce a surprise radio storm!

Band-By-Band Conditions

The following is a band-by-band summary of DX propagation conditions expected from mid-October through mid-December and centered on the 1992 contest period.

10 Meters: Good, solid openings are expected to just about every corner of the world during the daylight hours, and the band may remain open to southern and tropical regions into the early evening. Openings towards Europe and in a generally easterly direction should peak an hour or two before noon, while those towards South America and Africa are expected to peak during the *early afternoon* hours. Optimum conditions towards the Far East, Australasia, Southeast Asia, etc., are forecast for the late afternoon and early evening hours.

15 Meters: Excellent DX propagation conditions are expected from shortly after sunrise through the early evening hours. Look for a peak on 15 meters towards a particular geographical area about an hour or so after the peak has occurred to the same geographical area on 10 meters. Openings are expected to all areas of the world, and exceptionally strong signals should be possible most of the time. *Fifteen* meters should be the best DX band during the daytime hours.

20 Meters: Expect good-to-excellent openings almost around the clock. DX con-



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CIRCLE 51 ON READER SERVICE CARD



George Jacobs, W3ASK, CQ's Propagation Editor for the past 41 years, on his annual "salt the ionosphere" expedition. This year, because of decreasing solar activity George salted at two locations: in Electric City, Washington, where he hoped to harness the power of Coulee Dam to excite the ionosphere, and shown here at the Arctic Circle in North America, where George could almost touch the misty lower layer of the ionosphere! (Photos by Bea)

ditions should peak an hour or two after sunrise, and again during the late afternoon and early evenings hours. It should be possible to work into most areas of the world between sunrise and sunset. Excellent openings are expected to many southern and tropical areas well into the hours of darkness, and when conditions are High Normal, or better, the band should remain open for DX during most of the night. Expect exceptionally strong signal levels during peak periods, with openings possible in almost all directions. Look for *long-path* openings for about an hour or so after sunrise and again for an hour or so before local sunset. If you plan to operate on a *single* band during the contest, this should be it!

40 Meters: DX openings towards Europe and the east should first be possible during the late afternoon hours and should steadily improve towards evening. Good openings are forecast to all areas of the world during the hours of darkness. Expect a peak in signals from an easterly direction about midnight, and from a westerly direction just after sunrise. Excellent conditions towards the south should exist throughout most of the nighttime period. *Forty* meters should be the best DX band during the night, but when conditions are High Normal, or better, it may be nip and tuck with 20 meters for this honor.

80 Meters: Good DX openings are forecast to most areas of the world during the hours of darkness and into the sunrise period. For openings towards Europe and the east, peak conditions, often with very strong signals, are expected around midnight. For openings in a westerly direction,

check for a peak just before sunrise. The band should remain open most of the night towards the north and south. Propagation on this band is similar to that expected on 40 meters, except signals will be a bit weaker, noise levels will be somewhat higher, and the period for band openings in a particular direction will be a bit shorter.

160 Meters: Considerably decreased static levels and longer hours of darkness in the Northern Hemisphere should welcome back DX openings in this band during the hours of darkness and into the sunrise period. Because of relatively high signal absorption and the lower power levels used in this band, openings will often be weak and noisy, but some fairly good ones should be possible. Best bets are for openings towards Europe and towards the Caribbean and Latin America from the eastern half of the country, and towards the Far East, Australasia, the South Pacific, and Latin America from the western half of the country. DX openings to other areas of the world may also be possible. The best propagation aid for this band (and for 40 and 80 meters as well) is a set of sunrise and sunset tables, since DX signals tend to peak when it is *local sunrise* at the *easternmost* point of a path.

Contest Work Charts

The DX Propagation Charts on the following pages show the times when each amateur band from 10 through 160 meters is expected to open from each time zone area in the continental USA to the major

DX areas of the world. The information contained in the charts, while useful during the contest period in their present format, can easily be reorganized into more convenient formats to meet specific operational work plans or schedules. Experience gained during previous contests has shown that specifically tailored schedules derived from the charts can be extremely useful in piling up contacts and points with a minimum of wasted time.

Table I is an example of one of several types of plans that can be devised. It is a *multi-band* operational work plan, which shows the times and bands when propagation conditions are expected to be optimum to various areas of the world for each two-hour period throughout the day. An Eastern QTH has been chosen for this example, but similar plans can be devised for Central and Western locations.

Table II is another sample work chart for single-band operation, in this case 20 meters. The chart is intended for the PST zone, but similar charts can be devised for other bands and for other time zones.

Do-It-Yourself Forecasting

If you have a modem-equipped personal computer, you can obtain a wealth of updated daily summaries of solar and geophysical activity and a daily HF propagation summary and forecast (updated every six hours) directly from the NOAA Space Environmental Services Center (SESC) bulletin board in Boulder, Colorado. Information about a variety of other useful SESC services and products is also posted on the board.

The SESC bulletin board has been upgraded and is in operation 24 hours a day. Modem-equipped PCs can access the system at 303-497-5042. Either 300, 1200, or 2400 baud can be used. Protocol is the standard 8-bit data word with one stop bit and no parity. There is no charge for the data that can be obtained from the SESC bulletin board, but the telephone call is not toll-free. The program is very user friendly and menu driven. A wealth of propagation data is available, including propagation and solar reports, solar and geomagnetic data, and MUF predictions.

Another excellent propagation bulletin board service is provided by the Solar Terrestrial Dispatch (STD) BBS, located in Stirling, Alberta, Canada. It can be accessed by dialing 403-756-3008. It provides without cost and on a very timely basis loads of solar, geomagnetic, auroral, and ionospheric propagation data for both the professional and amateur. Much of this data is updated continuously and is often not more than a few minutes old when accessed. For more information about the STD-BBS, dial up the bulletin board directly, especially during the DX Contest periods.

Another new BBS featuring solar and ionospheric data has recently come on-

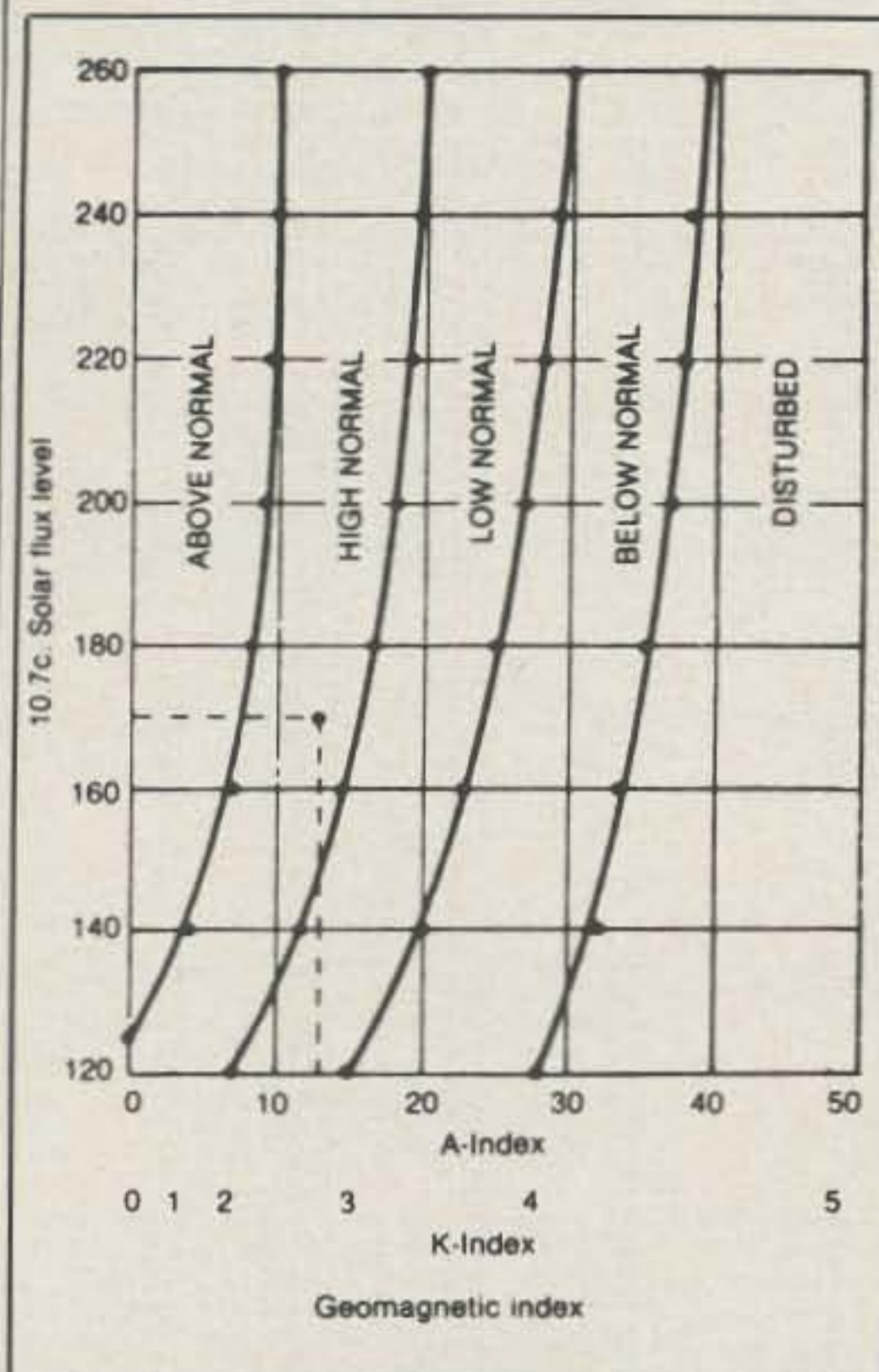


Fig. 1— Intersection of given values of solar flux and geomagnetic activity determine expected HF ionospheric propagation conditions (ex.: Solar flux is 170 and A-index is 13; expect High Normal conditions).

line. This is the National Geophysical Data Center's (NGDC) Solar-Terrestrial Data bulletin board. It is dedicated to all areas of Solar-Terrestrial Physics and is now available for public access. Among the data contained in this BBS are 10.7 cm solar flux values, sunspot numbers, and statistics concerning sudden ionospheric disturbances. The board supports all baud rates from 300 to 9600 as well as ANSI and non-ANSI users. After answering a brief log-on sequence, a user is granted free and full access to file downloads and executable programs. All available files are scanned daily for computer viruses and no outside uploads are permitted. The BBS number is 303-497-7319.

Fig. 1 can be used with the updated values of geomagnetic activity (A_p or K figures) and the latest reading of solar flux available from SESC to determine real-time day-to-day conditions in terms of Disturbed, Below Normal, Low Normal, High Normal, or Above Normal. If you do not have a modem-equipped computer, the latest geomagnetic and solar flux levels can be obtained from National Bureau of Standards Radio Station WWV broadcasts at 18 minutes past each hour. These broadcasts are transmitted simultaneously on 2.5, 5, 10, 15, and 20 MHz. They contain the latest available geomagnetic A_p and K figures, as well as the 10.7cm solar flux level and short-term forecast of expected conditions. The same information

Time EST	Optimum Band Meters	Areas To Which Band Is Expected To Be Open
00-02	40	Most of Europe, Eastern Mediterranean, and Middle East. Most of Central and South America. A few African areas and possibly Antarctica.
02-04	20	Some South Pacific, New Zealand, and Australasia. A few Far East and Asian areas. Some South America and Antarctica.
04-06	40	South Pacific, New Zealand, Australasia. Many South American areas. A few Far Eastern and Asian area. Possibly Antarctica.
06-08	20	Most of Europe. South Pacific, New Zealand, and Australasia. Most of Central and South America. A few African areas. Some Far East and Asian areas.
08-10	15	All of Europe, Eastern Mediterranean, and Middle East. Some of Africa. Most of Central and South America. South Pacific, New Zealand, and Australasia. A few Asian areas.
10-12	10	Most of Europe and Africa. Most of Central and South America. A few Asian areas, New Zealand, South Pacific, and Australasia.
12-14	15	Some of Europe and most of Africa. Most of Central and South America. A few areas of South Pacific, New Zealand, and Australasia.
14-16	15	Most of Africa, and Central and South America. Some of South Pacific, New Zealand, and Australasia. A few Asian areas.
16-18	20	Most of Europe, Eastern Mediterranean, and the Middle East. All of Africa, and Central and South America. A few Australasian areas.
18-20	15	Lots of South Pacific, New Zealand, and Australasia. Some of Far East and Asia. Most of Central and South America. Possibly Antarctica.
20-22	20	Most of Africa, Far East, South Pacific, New Zealand, Australasia, Central and South America. A few European areas and Middle East. Some Antarctica.
22-00	20	Lots of Far East, South Pacific, New Zealand, Australasia, Central and South America. A few African and Asian areas. Antarctica.

Table I— Sample multi-band work plan for Eastern USA QTH.

Time PST	Areas To Which Openings Should Be Possible
00-03	South Pacific, New Zealand, Australasia, Antarctica.
03-06	About the same as previous period, with some South Americans as well. Good time to catch some sleep.
06-09	All of Europe, Eastern Mediterranean and Middle East, Far East and Asia, South Pacific, New Zealand, Australasia, and northern and central South America.
09-12	Some European, Far East and northern South Americans, as well as some South Pacific, New Zealand and Australasians.
12-15	Most of Europe, Eastern Mediterranean, and Middle East. Most of Africa. Northern and Central South America and a sprinkling from the Far East.
15-18	All of Africa, all of South America, and some European and a few Far Eastern.
18-21	Most of Africa. All of South America, South Pacific, and New Zealand. Most of the Far East and Asia. A few Europeans.
21-00	Most of the South Pacific, New Zealand, and Australasia. Antarctica and most of deep South America. A few Europeans.

Table II— Sample single-band operating plan 20 meters, western USA QTH.

can be obtained at any time by calling 303-497-3235 (collect calls will not be accepted).

WWVH, located on the Island of Kauai, Hawaii, broadcasts geophysical alerts at 45 minutes past each hour on frequencies of 2.5, 5, 10, and 15 MHz, with its signal audible throughout the Pacific Oceania area and farther into other parts of the world, depending upon radio propagation conditions. These augment the same alert broadcasts from WWV, which can be heard throughout the Western Hemisphere and other parts of the world as well.

Both WWV and WWVH solar alert broadcasts are updated every three hours beginning at 0000 UTC, and they contain the latest information concerning geomagnetic and solar conditions, as well as radio-storm warning data. Alert data is also available at any time by calling the "on-duty forecaster" at SESC at 303-497-3171.

Another excellent source of timely solar, geomagnetic, and propagation information is the "KH6BZF Report™". This two-page newsletter is prepared by Lee Wical, KH6ZF, and it is dispatched weekly by air-mail from Hawaii. It contains a review of

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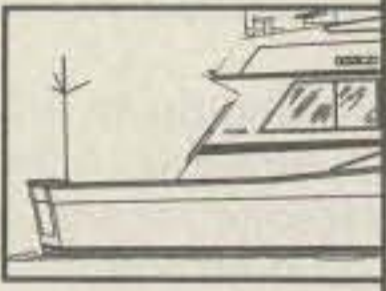
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HOW TO USE THE DX PROPAGATION CHARTS

1. Use chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8, KP4, KG4, and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9, and 0 areas; the Western USA Chart in the 6 and 7 areas; and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 meters) for a particular DX region, as shown in the left-hand column of the charts. An * indicates the best time to listen for 160 meter openings.

3. The propagation index is the number that appears in () after the time of each predicted opening. The index indicates the number of days during the month on which the opening is expected to take place as follows:

- (4) Opening should occur on more than 22 days
- (3) Opening should occur between 14 and 22 days
- (2) Opening should occur between 7 and 13 days
- (1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

4. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. Appropriate standard time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 8 hours in PST Zone, 7 hours in MST Zone, 6 hours in CST Zone, and 5 hours in EST Zone. For example, 13 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 04 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts CW, or 1 kw, PEP on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the propagation index will increase by one level; for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce, Boulder, Colorado 80302.

Region	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern & Central Africa	08-09 (1)	07-11 (1)	07-14 (1)	19-22 (1)
	09-11 (2)	11-13 (2)	14-16 (2)	22-00 (2)
	11-13 (3)	13-14 (3)	16-17 (3)	00-01 (1)
	13-15 (2)	14-16 (4)	17-18 (4)	22-00 (1)*
	15-16 (1)	16-17 (3)	18-21 (3)	
		17-18 (2)	21-01 (2)	
		18-19 (1)	01-03 (1)	
Southern Africa	08-09 (1)	07-10 (1)	07-13 (1)	18-19 (1)
	09-10 (2)	10-12 (2)	13-15 (2)	19-22 (2)
	10-12 (4)	12-13 (3)	15-17 (3)	22-23 (1)
	12-13 (3)	13-15 (4)	17-19 (4)	19-21 (1)*
	13-14 (2)	15-16 (3)	19-23 (3)	
	14-15 (1)	16-17 (2)	21-01 (2)	
		17-18 (1)	01-02 (1)	
Central & South Asia	08-10 (1)	07-08 (1)	06-07 (1)	18-21 (1)
	17-19 (1)	08-10 (2)	07-09 (2)	06-08 (1)
		10-11 (1)	09-12 (1)	
		17-18 (1)	18-20 (1)	
		18-20 (2)	20-23 (2)	
		20-21 (1)	23-02 (1)	
Southeast Asia	09-10 (1)	09-10 (1)	06-07 (1)	18-20 (1)
	10-12 (2)	10-12 (2)	07-09 (2)	05-07 (1)
	12-13 (1)	12-14 (1)	09-13 (1)	
	17-20 (1)	14-16 (2)	18-23 (1)	
	16-18 (1)			
	18-20 (2)			
	20-21 (1)			
Far East	08-10 (1)	08-10 (1)	16-18 (1)	04-08 (1)
	17-18 (1)	17-18 (1)	18-21 (2)	05-07 (1)*
	18-19 (2)	18-20 (3)	21-23 (3)	
	19-20 (1)	20-21 (1)	23-04 (2)	
		04-07 (1)		
		07-09 (2)		
		09-12 (1)		
South Pacific & New Zealand	11-13 (1)	07-08 (1)	17-19 (1)	00-03 (1)
	13-15 (2)	08-10 (2)	19-22 (2)	03-05 (3)
	15-17 (1)	10-15 (1)	22-00 (4)	05-07 (2)
	17-19 (2)	15-17 (2)	00-02 (3)	07-09 (1)
19-20 (1)	17-19 (3)	02-04 (2)	03-04 (1)*	
	19-20 (2)	04-06 (1)	04-06 (2)*	
	20-21 (1)	06-07 (2)	06-07 (1)	
		07-09 (4)		
		09-11 (2)		
		11-13 (1)		
Australasia	08-09 (1)	08-10 (1)	06-07 (2)	03-05 (1)
	09-11 (2)	10-13 (2)	07-10 (3)	05-07 (2)
	11-12 (1)	13-15 (1)	10-12 (2)	07-08 (1)
	14-16 (1)	15-17 (2)	12-15 (1)	05-07 (1)*
16-18 (2)	17-19 (3)	15-17 (2)		
18-19 (1)	19-20 (2)	17-19 (1)		
	20-21 (1)	19-21 (2)		
		21-23 (3)		
		23-03 (2)		
		03-06 (1)		
Caribbean, Central America & Northern Countries of South America	07-08 (1)	06-07 (1)	07-09 (4)	18-19 (1)
	08-09 (3)	07-08 (2)	09-11 (3)	19-21 (3)
	09-11 (4)	08-10 (4)	11-14 (2)	21-03 (4)
	11-13 (3)	10-14 (3)	14-16 (3)	03-05 (2)
13-15 (4)	14-16 (4)	16-21 (4)	05-06 (1)	
15-16 (3)	16-18 (3)	21-01 (3)	19-21 (1)*	
16-17 (2)	18-19 (2)	01-03 (2)	21-03 (2)*	
17-18 (1)	19-20 (1)	03-05 (1)	03-05 (1)*	
		05-07 (2)		
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	07-08 (1)	06-07 (1)	06-09 (2)	20-23 (1)
	08-13 (2)	07-08 (2)	09-11 (1)	23-04 (2)
	13-15 (3)	08-10 (3)	14-16 (1)	04-06 (1)
	15-17 (4)	10-14 (2)	16-17 (2)	23-04 (1)*
17-18 (2)	14-17 (3)	17-19 (3)		
18-19 (1)	17-18 (4)	19-00 (4)		
	18-19 (3)	00-02 (3)		
	19-20 (2)	02-04 (2)		
	20-21 (1)	04-06 (1)		
McMurdo Sound Antarctica	17-19 (1)	06-09 (1)	16-18 (1)	00-06 (1)
		15-17 (1)	18-21 (2)	
		17-20 (2)	21-02 (3)	
		20-21 (1)	02-04 (2)	
		04-06 (1)		
		06-08 (2)		
		08-09 (1)		

October 15 - December 15, 1992 Time Zones: CST & MST (24-Hour Time) CENTRAL USA TO:

Region	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Southern Europe & North Africa	07-08 (1)	06-07 (1)	05-06 (1)	17-18 (1)
	08-09 (2)	07-10 (2)	06-08 (3)	18-20 (2)
	09-11 (3)	10-12 (3)	08-12 (2)	20-22 (3)
	11-12 (2)	12-13 (2)	12-15 (3)	22-00 (2)
	12-13 (1)	13-14 (1)	15-19 (2)	00-02 (1)
			19-22 (1)	19-20 (1)*
			00-02 (1)	20-22 (2)*
				22-00 (1)*

October 15 - December 15, 1992 Time Zone: EDT (24-Hour Time) EASTERN USA TO:

Region	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Central Europe & North Africa	07-08 (1)	06-07 (1)	06-07 (3)	16-17 (1)
	08-09 (2)	07-08 (2)	07-09 (4)	17-18 (2)
	09-11 (4)	08-09 (3)	09-10 (3)	18-20 (3)
	11-13 (2)	09-12 (4)	10-12 (2)	20-01 (4)
	12-14 (2)	12-13 (3)	01-02 (3)	
	14-15 (1)	13-15 (4)	02-03 (2)	
		15-16 (3)	03-04 (1)	
		16-21 (2)	19-21 (1)*	
		21-00 (1)	21-23 (2)*	
		00-02 (2)	23-01 (3)*	
		02-04 (1)	01-02 (2)*	
		04-06 (2)	02-03 (1)*	
Northern Europe & European USSR	07-08 (1)	07-08 (1)	03-06 (1)	17-19 (1)
	08-10 (2)	08-11 (3)	06-07 (2)	19-02 (2)
	10-12 (1)	11-12 (2)	07-09 (3)	02-04 (1)
		12-13 (1)	09-11 (2)	20-03 (1)*
		11-13 (3)		
		13-14 (2)		
		14-20 (1)		
		20-22 (2)		
		22-00 (1)		
Eastern Mediterranean & Middle East	07-08 (1)	07-08 (1)	06-10 (1)	18-20 (1)
	08-10 (2)	08-09 (2)	10-13 (2)	20-22 (2)
	10-11 (1)	09-10 (3)	13-14 (3)	22-00 (3)
		10-11 (4)	14-16 (4)	00-01 (2)
	11-12 (3)	16-19 (3)	01-02 (1)	
	12-13 (2)	19-21 (2)	20-00 (1)*	
	13-14 (1)	21-23 (1)		
		23-01 (2)		
		01-03 (1)		
Western Africa	07-10 (1)	07-10 (1)	04-05 (1)	18-22 (1)
	10-12 (2)	10-12 (2)	05-07 (2)	22-01 (2)
	12-14 (4)	12-13 (3)	07-13 (1)	01-03 (1)
	14-15 (3)	13-16 (4)	13-15 (2)	00-03 (1)*
15-16 (2)	16-17 (3)	15-16 (3)		
16-17 (1)	17-18 (2)	16-18 (4)		
	18-19 (1)	18-22 (3)		
		22-00 (2)		
		00-02 (1)		

Northern & Central Europe & European USSR	08-10 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-12 (1)	06-07 (1) 07-08 (2) 08-10 (3) 09-10 (3) 10-11 (2) 11-12 (1)	00-02 (1) 06-07 (1) 07-09 (2) 09-11 (3) 11-12 (2) 12-14 (1) 16-18 (1) 18-20 (2) 20-22 (1)	18-20 (1) 20-23 (2) 23-01 (1) 20-23 (1)*
Eastern Mediterranean & Middle East	07-08 (1) 08-10 (2) 10-11 (1)	07-08 (1) 08-09 (2) 09-10 (3) 10-11 (2) 11-12 (1)	06-08 (1) 08-11 (2) 11-13 (3) 13-15 (2) 15-17 (1) 17-19 (2) 19-22 (1) 22-01 (2) 01-03 (1)	17-19 (1) 19-22 (2) 22-23 (1) 20-22 (1)*
Western Africa	07-09 (1) 09-12 (2) 12-14 (4) 14-15 (3) 15-16 (2) 16-17 (1)	06-10 (1) 10-12 (2) 12-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	06-12 (1) 12-14 (2) 14-16 (3) 16-19 (4) 19-22 (3) 22-01 (2) 01-04 (1) 04-06 (2)	17-19 (1) 19-21 (2) 21-22 (1) 19-21 (1)*
Eastern & Central Africa	09-10 (1) 10-12 (2) 12-14 (3) 14-16 (2) 16-17 (1)	08-10 (1) 10-13 (2) 13-16 (3) 16-18 (2) 18-19 (1)	06-14 (1) 14-17 (2) 17-20 (3) 20-21 (2) 21-22 (1)	20-00 (1) 21-23 (1)*
Southern Africa	07-08 (1) 08-10 (2) 10-12 (3) 12-14 (2) 14-15 (1)	06-10 (1) 10-12 (2) 12-13 (3) 13-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	07-13 (1) 13-15 (2) 15-17 (3) 17-19 (4) 19-21 (3) 21-23 (2) 23-02 (1)	18-19 (1) 19-21 (2) 21-22 (1) 19-21 (1)*
Central & South Asia	07-10 (1) 18-20 (1)	07-08 (1) 08-10 (2) 10-11 (1) 18-19 (1) 19-21 (2) 21-22 (1)	06-07 (1) 07-09 (2) 09-11 (1) 17-18 (1) 18-21 (2) 21-23 (1)	06-08 (1) 18-20 (1)
Southeast Asia	09-10 (1) 10-12 (2) 12-13 (1) 15-16 (1) 16-18 (2) 18-19 (1)	08-09 (1) 09-12 (2) 12-16 (1) 16-18 (2) 18-20 (1)	06-08 (1) 08-11 (2) 11-14 (1) 16-18 (1) 18-19 (1) 19-21 (2) 21-22 (1)	04-07 (1)
Far East	16-17 (1) 17-19 (2) 19-20 (1)	08-10 (1) 15-16 (1) 16-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	06-07 (1) 07-08 (2) 08-10 (3) 10-12 (1) 16-18 (1) 18-20 (2) 20-22 (1)	02-03 (1) 03-06 (2) 06-09 (1) 02-04 (1)*
South Pacific & New Zealand	11-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-20 (1)	08-09 (1) 09-10 (2) 10-12 (3) 12-16 (2) 16-17 (3) 17-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	11-17 (1) 17-18 (2) 18-20 (3) 20-23 (4) 23-02 (3) 02-04 (2) 04-06 (1) 06-07 (2) 07-09 (4) 09-10 (3) 10-11 (2)	23-01 (1) 01-06 (3) 06-07 (2) 07-08 (1) 00-02 (1)* 02-06 (2)* 06-07 (1)*
Australasia	08-09 (1) 09-11 (2) 11-15 (1) 15-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	07-08 (1) 08-09 (2) 09-11 (3) 11-13 (2) 13-15 (1) 15-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	07-08 (2) 08-10 (3) 10-12 (2) 12-14 (1) 12-15 (1) 21-23 (1) 23-02 (2) 02-04 (3) 04-05 (2) 05-07 (1)	02-04 (1) 04-07 (2) 07-08 (1) 03-04 (1) 04-06 (2)* 06-07 (1)*
Caribbean, Central America & Northern Countries of South America	06-07 (1) 07-08 (2) 08-10 (3) 10-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	05-06 (1) 06-07 (2) 07-14 (3) 14-16 (4) 16-18 (3) 18-19 (2) 19-20 (1)	06-07 (2) 07-09 (4) 09-11 (3) 11-13 (2) 13-15 (3) 15-19 (4) 19-23 (3) 23-02 (2) 02-06 (1)	18-19 (1) 19-21 (2) 21-02 (3) 02-04 (1) 04-05 (2) 05-06 (1) 19-21 (1)* 21-02 (2)* 02-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	06-08 (1) 08-12 (2) 12-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-14 (2) 14-15 (3) 15-19 (4) 19-20 (3) 20-22 (2) 22-23 (1)	02-06 (1) 06-08 (2) 08-14 (1) 14-16 (2) 16-17 (3) 17-22 (4) 22-00 (3) 00-02 (2)	19-21 (1) 21-01 (2) 01-03 (1) 03-04 (2) 04-05 (1) 21-04 (1)*
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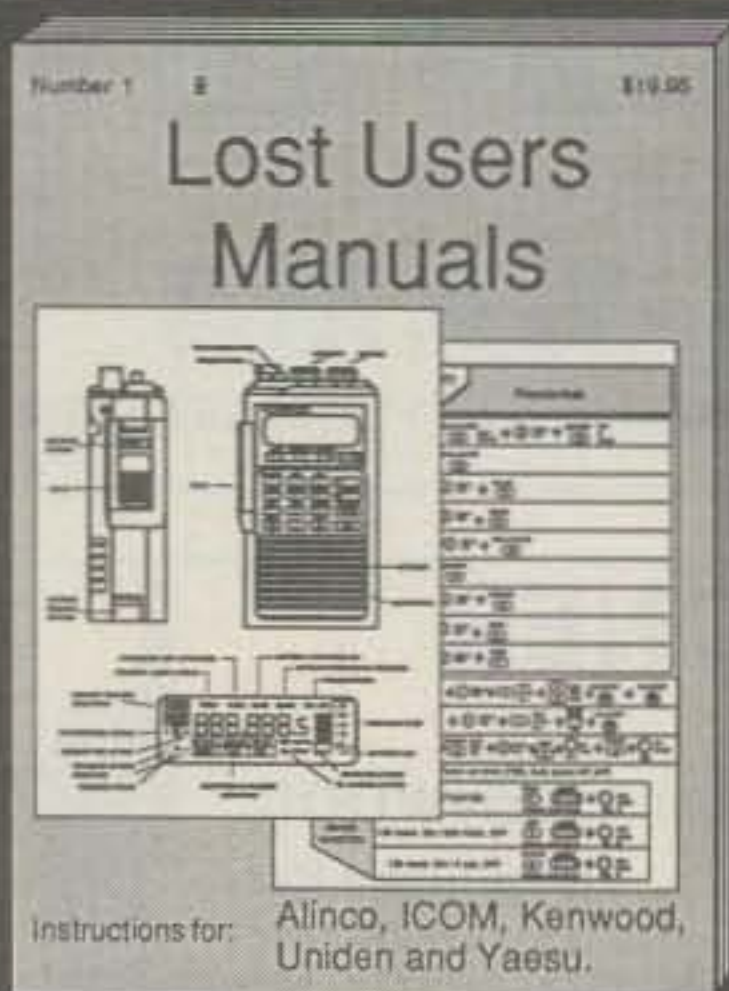
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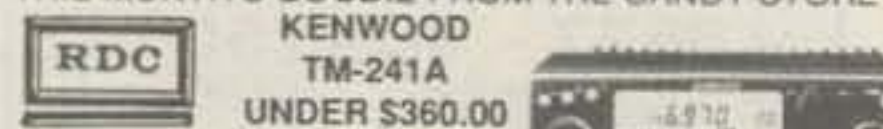
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Antarctica	17-19 (2) 19-20 (1)	16-18 (1) 18-20 (2) 20-02 (3) 02-04 (2) 04-06 (1)
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October 15 - December 15, 1992 Time Zones: PST (24-Hour Time) WESTERN USA TO:

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Southern Europe & North Africa	07-08 (1) 08-10 (1) 10-11 (1)	06-07 (1) 07-09 (1) 09-11 (3) 11-12 (2) 12-13 (1)	05-06 (1) 06-08 (1) 08-10 (1) 10-12 (2) 12-14 (3) 14-16 (2) 16-20 (1) 00-02 (1)	18-20 (1) 20-22 (1) 22-00 (1) 19-23 (1)*
Central & Northern Europe & European USSR	07-09 (1)	06-07 (1) 07-09 (2) 09-11 (1)	06-07 (1) 07-09 (2) 09-11 (3) 11-12 (2) 12-14 (1) 14-19 (2) 19-23 (1) 23-02 (2) 02-04 (1)	21-00 (1)
Eastern Mediterranean & Middle East	07-10 (1)	07-08 (1) 08-10 (2) 10-11 (1)	06-07 (1) 07-10 (2) 10-14 (2) 14-16 (2) 16-18 (1) 18-20 (2) 20-22 (1) 00-02 (1)	18-22 (1) 06-08 (1)
Western Africa	07-09 (1) 09-11 (2) 11-14 (3) 14-16 (2) 16-17 (1)	06-10 (1) 10-12 (2) 12-14 (3) 14-16 (4) 16-17 (2) 17-19 (1)	06-10 (1) 10-14 (2) 14-16 (3) 16-18 (4) 18-20 (3) 20-22 (2) 22-00 (1)	18-23 (1)
Southern Africa	08-09 (1) 09-10 (2) 10-11 (3) 11-12 (2) 12-13 (1)	06-10 (1) 10-11 (2) 11-12 (3) 12-14 (4) 14-15 (2) 15-17 (1)	06-12 (1) 12-14 (2) 14-15 (3) 15-17 (4) 17-20 (3) 20-21 (2) 21-22 (1) 00-02 (1)	18-19 (1) 19-20 (2) 20-21 (1) 06-08 (1) 18-19 (1)*
Eastern & Central Africa	08-12 (1) 12-14 (2) 14-15 (3) 15-16 (2) 16-17 (1)	08-12 (1) 12-16 (2) 16-17 (3) 17-18 (2) 18-19 (1)	08-13 (1) 13-15 (2) 15-18 (3) 18-19 (2) 19-20 (1)	18-21 (1) 06-08 (1)
Central & South Asia	17-18 (1) 18-19 (2) 19-20 (1) 06-09 (1)	16-17 (1) 17-19 (2) 19-21 (1) 06-09 (1)	06-07 (1) 07-09 (2) 09-11 (1) 16-18 (1) 18-20 (2) 20-22 (1)	04-09 (1) 17-19 (1)
Southeast Asia	09-11 (1) 14-15 (1) 15-16 (2) 16-17 (3) 17-18 (2) 18-19 (1)	08-09 (1) 09-11 (3) 11-12 (2) 12-15 (1) 15-18 (2) 16-20 (1)	06-07 (1) 07-08 (2) 08-09 (3) 09-11 (2) 11-12 (1) 17-19 (1) 19-20 (2) 20-21 (1)	02-03 (1) 03-05 (2) 05-08 (1) 03-05 (1)*
Far East	13-14 (1) 14-15 (1) 15-17 (3) 17-18 (2) 18-19 (1)	11-13 (1) 13-15 (2) 15-18 (4) 18-19 (3) 19-20 (2) 20-21 (1)	06-07 (1) 07-08 (2) 08-10 (4) 10-11 (3) 11-14 (2) 14-15 (1) 16-18 (2) 18-20 (3) 20-21 (2) 21-23 (1) 02-04 (1)	23-02 (1) 02-05 (2) 05-08 (1)*
South Pacific & New Zealand	09-10 (1) 10-13 (2) 13-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	07-08 (1) 08-10 (3) 10-12 (1) 12-16 (2) 16-17 (3) 17-19 (4) 19-20 (3) 20-22 (2) 22-23 (1)	11-18 (1) 18-19 (2) 19-21 (3) 21-23 (4) 23-02 (3) 02-03 (2) 03-06 (1) 06-07 (2) 07-09 (4) 09-11 (2)	21-22 (1) 22-05 (3) 05-07 (2) 07-08 (1) 22-00 (1)* 00-05 (2)* 05-06 (1)*

Australasia	07-08 (1) 08-10 (2) 10-13 (1) 13-14 (2) 14-15 (3) 15-17 (4) 17-18 (2) 18-19 (1)	07-08 (1) 08-10 (2) 10-12 (3) 12-14 (2) 14-17 (1) 17-19 (2) 19-22 (1)	18-20 (1) 20-00 (2) 00-04 (3) 04-06 (2) 06-07 (3) 07-09 (4) 09-10 (3) 10-12 (2) 12-14 (1)	02-03 (1) 03-04 (2) 04-06 (3) 06-08 (1) 03-04 (1)* 04-06 (2)* 06-07 (1)*
Caribbean, Central America & Northern Countries of South America	06-07 (1) 07-08 (2) 08-10 (4) 10-12 (3) 12-14 (4) 14-15 (3) 15-16 (2) 16-17 (1)	05-06 (1) 06-08 (2) 08-10 (3) 10-13 (2) 13-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	07-09 (4) 09-13 (2) 13-15 (3) 15-18 (4) 18-00 (3) 00-01 (2) 01-03 (1) 03-06 (2) 06-07 (3)	18-19 (1) 19-01 (3) 01-04 (2) 04-05 (1) 19-22 (1)* 22-01 (2)* 01-04 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	06-07 (1) 07-11 (2) 11-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	05-06 (1) 06-09 (2) 09-13 (1) 13-14 (2) 14-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	12-14 (1) 14-16 (2) 16-17 (3) 17-19 (4) 19-23 (3) 23-02 (2) 02-04 (1) 04-07 (2)	20-22 (1) 22-00 (2) 00-02 (1) 22-00 (1)*
McMurdo Sound Antarctica	07-09 (1) 16-20 (1)	07-08 (1) 08-10 (2) 10-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-22 (1)	16-18 (1) 18-20 (2) 20-02 (3) 02-04 (2) 04-06 (1) 06-08 (2) 02-08 (1)	00-05 (1)

*Indicates best times to listen for 80meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2) or higher.

**Indicates best times to listen for F-2 layer openings on 6 meters.

For 12 meter openings interpolate between 10 and 15 meter openings.

For 17 meter openings interpolate between 15 and 20 meter openings.

For 30 meter openings interpolate between 40 and 20 meter openings.

propagation indices observed for the previous week to ten days, a forecast of expected conditions for the following week and for the next 27 days, as well as lucid explanations of propagation, solar, geomagnetic, and astronomical phenomena affecting an HF transmission. Lee also generally includes in each newsletter an example of his Hawaiian-spun, good-humored philosophy!

The "KH6BZF Report™" is a successor to the "MAIL-A-PROP" newsletters that I published several years ago, and I always have the latest issue handy. For additional information, subscription rates, and a free sample copy, contact Lee Wical directly. His address is: Lee Wical, KH6BZF, 45-601 Luluku Road, Kaneohe, HI 96744-1854 (daytime telephone 808-656-2154). Please include SASE for reply.

Computer Programs

There are several good computer programs available for supplementing band-opening predictions contained in the CQ DX Propagation Charts appearing on the following pages. Many of these have been reviewed on a regular basis by my CQ colleague Karl Thurber, W8FX, in his excellent monthly column "Antennas & Accessories."

The following is a listing of the more pop-



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ular programs. All of them contain band opening data. Most of them also contain grayline data, sunset/sunrise times, distance, great circle bearings, and other useful information. All of the listed programs are well prepared, menu-driven, relatively easy to use, and well documented.

MINIPROP.3™: IBM; reviewed in "Antennas & Accessories" column August 1989 and in "Propagation" column October 1990. Sheldon C. Shallon, W6EL, 11058 Queensland Street, Los Angeles, CA 90034. A new update, MINIPROP.4™.

Super DX Edge™: IBM and Commodore versions; reviewed in Propagation column October 1990. Xantek, P.O. Box 834, Madison Square Station, New York, NY 10159 (212-566-8240).

Ham Companion™: IBM. Brinson Microwave Corporation, 1044 Downing #107, Denver, CO 80218, (800-874-0771).

IONOPROP™: IBM; demo disk available for \$3.00. Herb Hitney, 712 Tarento Drive, San Diego, CA 92106 (619-222-1056). Version 4 was reviewed in "Antennas and Accessories" column of June 1992.

BANDAID™: IBM; reviewed in "Propagation" column October 1990. **MUF-MAP 2™**: IBM; reviewed in "Antennas & Accessories" column May 1990. **MUF-PLOT™**: Apple and Commodore; reviewed in "Propagation" column October 1990. Base (2) Systems, 2534 Nebraska Street, Saginaw, MI 48601 (517-777-5613).

MAC TRAK™: Apple; reviewed in "Propagation" column October 1990. MacTrak Software, P.O. Box 1590, Port Orchard, WA 98366.

The listing of the above products does not necessarily indicate an endorsement by the editor of this column. Additional information and prices should be obtained directly from the program producers.

Radio Storm

If Mother Nature should play a trick and produce a radio storm during the contest period, expect conditions to drop to Below Normal or Disturbed to many areas of the world, depending on the storm's severity. The storm's influence will generally extend outward from the polar regions, the more severe the storm becomes. Under storm conditions expect considerably fewer openings on 10, 15, and 20 meters, with weaker signals, increased fading, flutter fading, and higher noise levels. Paths passing through the polar regions and the upper latitudes are often more adversely affected than signals coming from mid and lower latitudes.

Conditions on 40, 80, and 160 meters are likely to become erratic as well. During certain types of storms conditions may actually improve at times for openings on all bands towards southern and tropical areas, and on 40, 80, and 160 meters during the hours of darkness.

If a radio storm should develop, concentrate on working trans-polar paths on 10, 15, and 20 meters during the daylight hours. Check the 40, 80, and 160 meter bands for possible openings to some areas of the world during the hours of darkness.

VHF Ionospheric Propagation

Solar activity is still high enough so that good DX openings can be expected on the 6 meter band during the hours of daylight. During October it should be possible to work stations in areas of the world where this band is allocated for amateur use. Although the DX Charts contained in this month's column do not include the 6 meter band directly, 6 meter DX openings can be expected at those times and to those areas

of the world where 10 meter openings are shown with a propagation index greater than 3. Generally speaking, check for openings from the eastern half of the USA toward Europe and the east *before* noon, and toward Africa an hour or so after noon. Best chance for 6 meter DX openings toward the Caribbean and Central and South America from all areas of the USA should be during the afternoon hours. Look for openings toward the Far East, the South Pacific area, New Zealand, and Australasia during the late afternoon hours. These openings will favor stations located in the western half of the USA, but some openings should extend considerably eastward. There will be lots of DX surprises in store for the 6 meter band during the next six months, with a good chance for some new DX records to be established.

Trans-continental and 6 meter openings over shorter distances are also expected to increase dramatically during October and the fall, winter, and early spring months, with conditions likely to peak during the afternoon hours.

A major meteor shower, which could produce meteor-reflection-type ionospheric openings on the VHF bands, is expected October 17-22. Called *Orionids*, the shower should reach peak intensity on October 21 or 22 with an hourly meteor count of about 25. Peaks in minor meteor showers are expected on October 2 and 11.

Auroral activity generally increases during October, and an increase in auroral-scatter-type VHF openings can be expected. There is also the likelihood for increased short-skip sporadic-E propagation resulting from expected auroral activity, particularly on 10 and 6 meters. The best time to check for such openings is when conditions on the HF bands are expected to be Below Normal or disturbed, as shown in the Last Minute Forecast at the beginning of this column.

CW Contest Forecast

This month's DX Propagation Charts are valid for both the Phone and CW sections of the contest. Be sure to keep them handy for use during next month's CW section as well. Short-Skip Propagation Charts for use during October appeared in last month's column.

Experience from the past 40 contest years has shown that DX Contests are excellent periods in which to test the accuracy of prediction and forecast methods used in this column. Contests generate a large amount of activity in every corner of the world and on all HF bands. Previous results and observations have helped considerably in improving the accuracy of this column. Comments concerning the 1992 contest and the accuracy of these forecasts and predictions should be sent directly to W3ASK at P.O. Box 1714, Silver Spring, MD 20902.

73, George, W3AS

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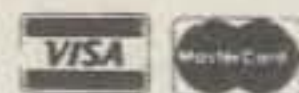
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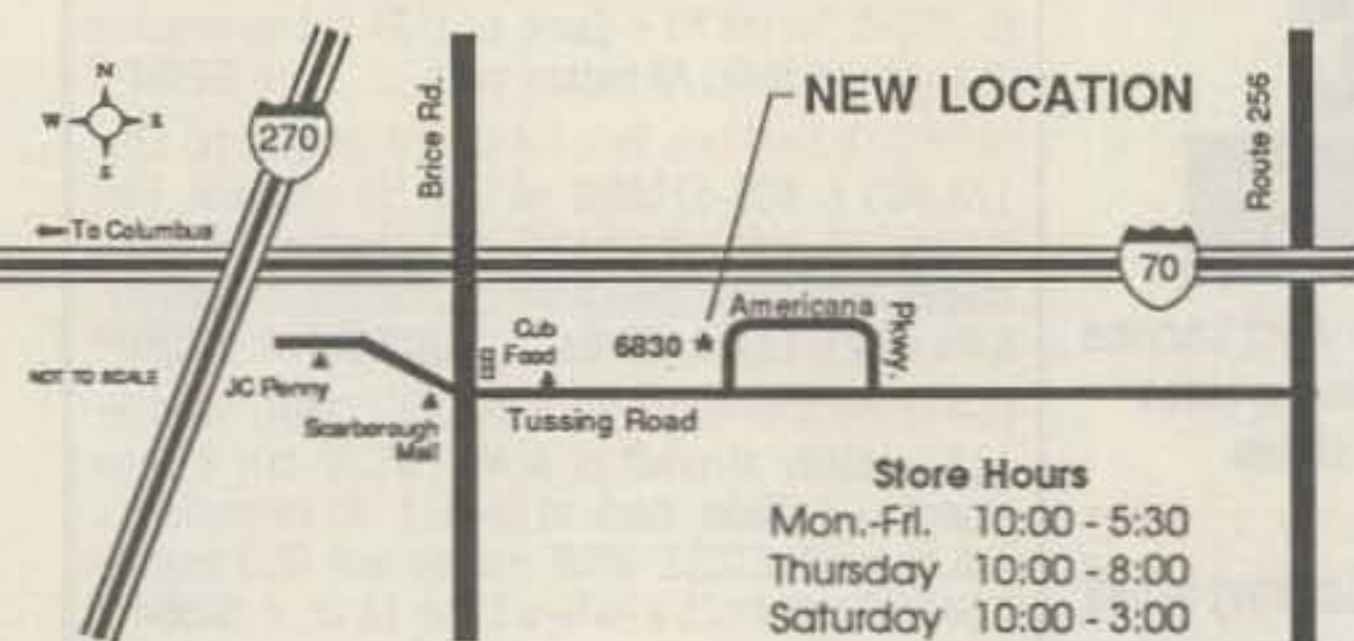
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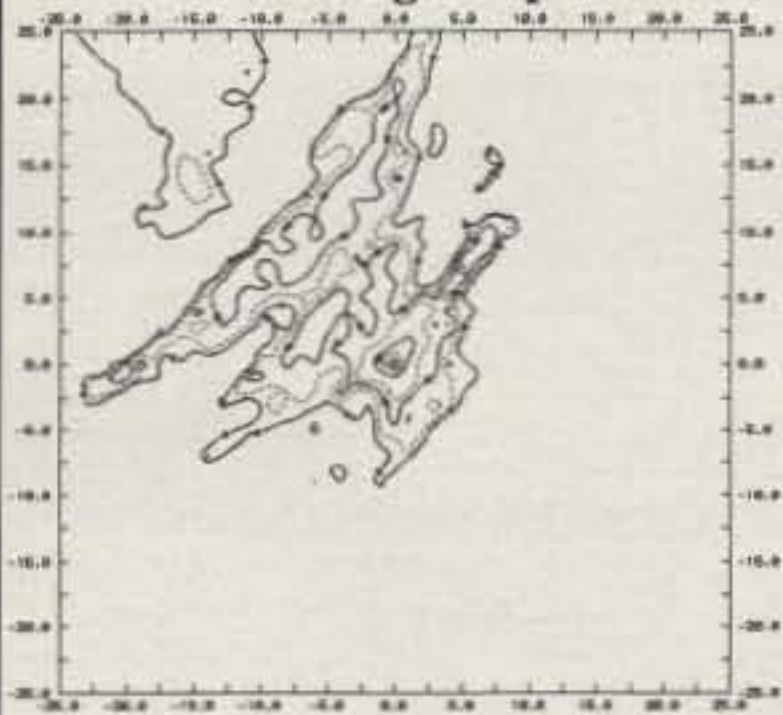
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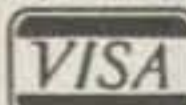
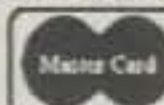
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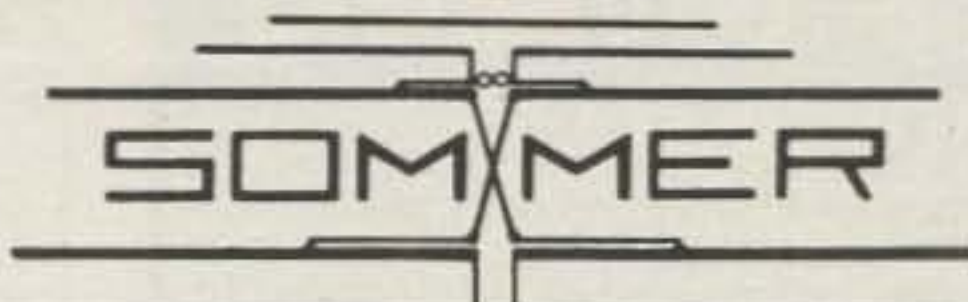
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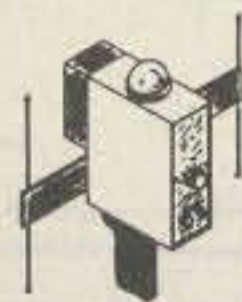
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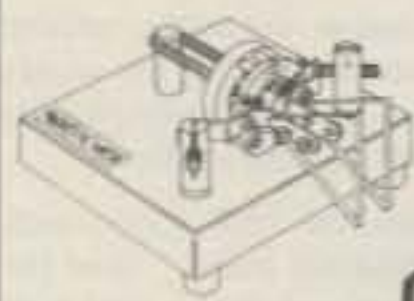
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FOR SALE: Kenwood DM-81 grid dip meter, as new, \$125; TS430S transceiver with general-coverage receiver, real nice, \$649; TS-930S/AT transceiver includes CW filter and manual, \$1,100. ICOM SP-3 ext. spk, \$49; IC2AT 2 mtr HT, with some xtras. carr. case, like new, \$225. ALPHA 76A HF amp excellent condx, \$1250. Add UPS pse. Tony Musero, K3UKW, 1609 So. Iseminger St., Phila., PA 19148-1010 (215-271-8898).

WANTED: SWAN 510X crystal oscillator or schematic. Les Basham, W7TCT, 563 W. River St., Cave Junction, OR 97523.

WANTED: Information on the Western Electric Aviation Type 13 transmitter and the Bendix RA-1 Receiver. Wes Fisk, 374 Malcolm Dr., Pasadena, CA 91105 (phone 213-681-5533).

WANTED: Heath HW-5400 Transceiver with or without power supply. Call 606-236-6510, WQ4Z, George Griebel, 650 Chestnut, Parksville, KY 40464-9624.

**YAESU FT-890 FOR SALE. This 6 month old unit includes the TCXO-3 unit, 500 Hz filter, and the YF-101 2.6 SSB 2nd IF filter. The transceiver is like new. With mobile mount (I have not used it mobile). Total package \$1,095. KD4AJ, 404-396-0276.

MINIATURE TELEGRAPH ITEMS WANTED. Dick Randall, K6ARE, 1263 Lakehurst Rd., Livermore, CA 94550-1851.

TEN-TEC OMNI V, with matching power supply/speaker, both 500 Hertz CW filters, mint, \$1595. Gerry Skloot, KE2N, 2923 Mandalay Beach Road, Wantagh, NY 11793 (516-221-3535).

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Announcements (from p. 8)

Airport, Wall Township, New Jersey. Contact Al Jackson, NK2O, P.O. Box 635, Eatontown, NJ 07724 (908-922-8121). (VE exams)

Oct. 11, **Kettle Moraine RAC Ham & Computer Swapfest**, Waukesha County Exposition Center, Waukesha, Wisconsin. Contact Rod Kleist, WB9AZH, 210 W. Newhall Ave., Waukesha, WI 53186 (414-524-0757). (VE exams)

Oct. 17, **Twelfth Annual Tri-Cities Hamfest**, Appalachian Fairgrounds, Gray, Tennessee. Contact P.O. Box 3682 CRS, Johnson City, TN 37602.

Oct. 17, **Central Louisiana ARC Hamfest**, Farmers Market, Alexandria, Louisiana. Contact Jim Draeger, N5OGI, 318-473-9193. (VE exams)

Oct. 17, **TCRA Hamputer Fest**, Union Catholic Regional High School, Scotch Plains, New Jersey. Contact Dick Franklin, W2EUF, 908-654-4943. (VE exams walk-in, must arrive by 9:30 AM)

Oct. 18, **1992 FARA Hamfest & Computer Fair**, Ehoove Vocational School, Milan, Ohio. Contact Gene Hutchins, 45 Welton Ave., Norwalk, OH 44857, or call 419-668-5796.

Oct. 18, **Centralia Wireless Assn. Hamfest**, Kaskaskia College Gym, 3 miles northwest of Centralia, Illinois. Contact Centralia Wireless Assn., Inc., Hamfest Info, P.O. Box 1166, Centralia, IL 62801.

Oct. 18, **Hall of Science ARC Hamfest**, New York Hall of Science parking lot, Flushing Meadow Park, Queens, New York. Call Charles Becker, WA2JUJ, 516-694-3955 or Arnie Schiffman, WB2YXB, 718-343-0172.

Oct. 18, **Heart of Ohio Hamfiesta & Computer Show**, Marion County Fairgrounds Coliseum, Marion, Ohio. Contact Dan Burns, N8JMF, 844 Robinson, Marion, OH 43302 (614-382-2384 Mon.-Fri. after 4 PM or all day Sat. and Sun.).

Oct. 18, **Rocky Mountain Radio League Hamfest**, Jefferson County Fairgrounds, Golden, Colorado. Contact David Avery, N0HEQ, 6616 South Lafayette St., Littleton, CO 80121-2545 (303-795-5718). (VE exams)

Oct. 18, **Tucson Hamfest '92**, De Anza Drive-in, Tucson, Arizona. Contact A.J. Pawlowski, KB7KZ, 3418 W. Green Trees Dr., Tucson, AZ 85741 (602-742-2605).

Oct. 24, **Sumter Hamfest**, Sumter County Exhibition Center, Sumter, South Carolina. Contact Dan Mask, WB5SGH, P.O. Box 193, Sumter, SC 29151 (803-775-9106). (VE exams)

Oct. 24, **Southside ARC Octoberfest**, Grandview East Junior High School, Grandview, Missouri. Contact Southside ARC, P.O. Box 1142, Grandview, MO 64030, or call Frank Staudenraus, N0GXO, 816-331-7338. (Handicapped accessible)

Oct. 24-25, **Hamfest Chattanooga**, Chattanooga-Hamilton County Convention & Trade Center, Chattanooga, Tennessee. Contact Barbara Gregory, WA4RMC, P.O. Box 3377, Chattanooga, TN 37404, or call 615-892-8889.

Oct. 24-25, **Palm Beach County Hamfest**, Fairgrounds, West Palm Beach, Florida. Contact PBRA Hamfest, P.O. Box 461, Lake Worth, FL 33460, or call Vi Kiekenapp, KC4LCF, 407-585-9074. (Exams)

Oct. 25, **RF Hill ARC Hamfest**, Dublin Firehouse, 5 miles from Doylestown, Pennsylvania. Contact Bob Frantz, 215-536-9098. (VE exams)

Oct. 31, **Tri-City ARC Auction**, Senior Citizens Center, Waterford Municipal Complex, Connecticut. Call KA1BB at 203-739-8016. (Handicapped accessible)

Oct. 31, **St. Louis Gateway to Ham Radio Club Hamfest**, West County Tech School, St. Louis, Missouri. Contact Dave Novak, N0DN, 314-225-1952. (VE exams, to register call 314-567-8777)

Oct. 31, **Hamfest Minnesota & Computer Expo**, St. Paul Civic Center, St. Paul, Minnesota. Contact Hamfest Minnesota & Computer Expo, P.O. Box 5598, Hopkins, MN 55343, or call 612-535-0637. (VE exams)

Oct. 31, **Franklinfest '92**, Franklin, Kentucky. Contact Ed Schwab, KA4REF, P.O. Box 9656, Bowling Green, KY 42102 (502-843-4389).

Oct. 31-Nov. 1, **Alford Memorial RC Hamfest & Computer Expo**, Gwinnett County Fairgrounds, Lawrenceville, Georgia. Call 404-985-8750 evenings/weekends.

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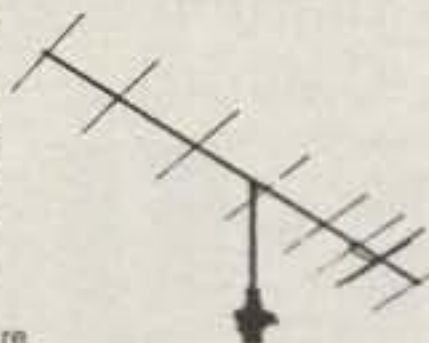
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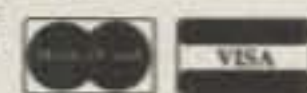
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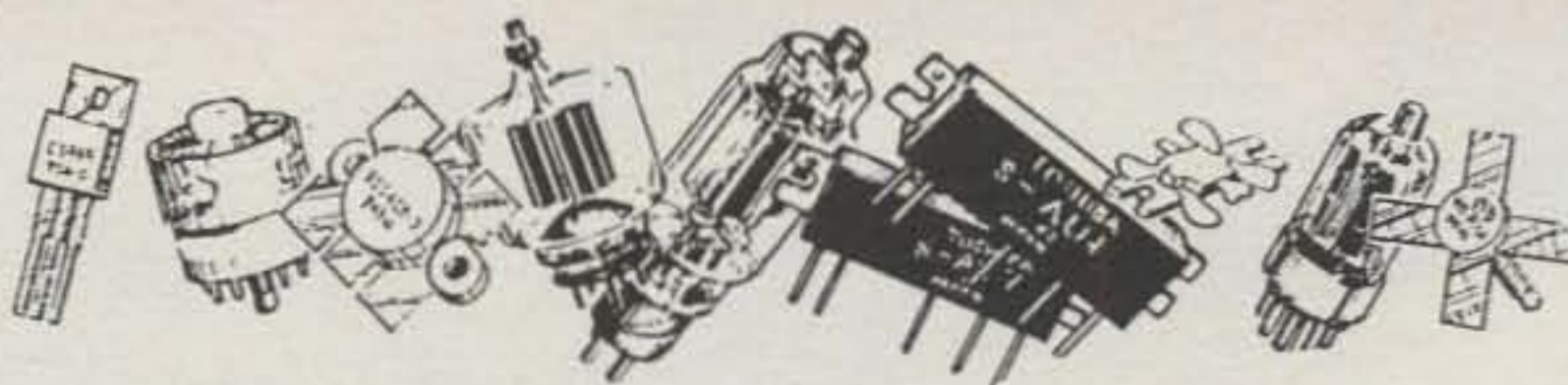
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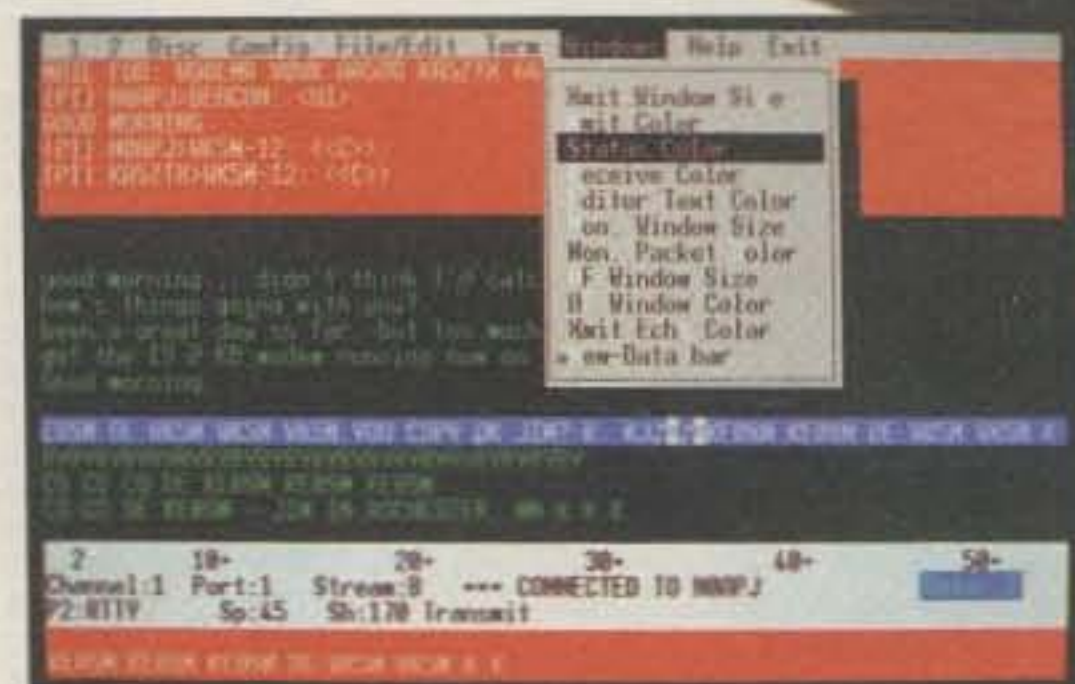
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- packet monitor window
- separate packet connect window per channel
- xmit echo display line
- non-packet window (for KAM only)
- status display lines
- xmit buffer per channel
- file buffer per channel
- file transfers and file captures
- compatible with all Kantronics 5.0 firmware: KAM, KPCs and DataEngine 2.0.



Hostmaster on the PC



Hostmaster on the Mac



Hostmaster on the Commodore 64

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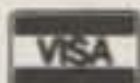


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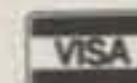
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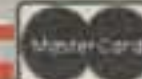
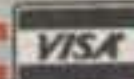
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• Message Paging

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"Built-in duplexer and 94 memories!"

"Great price and smallest dual band made, too!"

"Comes with a backlit DTMF Mic!"

"Yaesu did it again!"

FT-5100 Dual Band Mobile

- **Frequency Coverage:**
2M: 130-174 MHz RX
140-150 MHz TX
70 cm: 430-450 MHz RX/TX
- 94 Memories (47 per band)
Odd Splits In Any Memory
- Dual in-band receive
(V/V, U/U or V/U Receive Operation)
- DTMF Paging and Coded Squelch Included.
- Packet Radio TNC Jack Built-In To Back of Radio
- CTCSS Encode Built-In
- Dual Receive with Balance Control
- Full Duplex Cross Band Operation
- Built-In Antenna Duplexer
- Back Lit DTMF Microphone
- Automatic 8 Level Display Dimmer
- Built-In Cross Band Repeat
- RF Output Power:
2M: 50/5 watt (high/low)
70 cm: 35/5 watt (high/low)
- **Accessories:**
FTS-22 CTCSS Dual Decoder
SP-7 External Speaker
MW-1 Wireless Microphone/Controller

The ultimate definition of Dual Band.



Now you can listen to two, 2 meter frequencies, or two, UHF frequencies, at the same time with In-Band Dual Receive*. Although equipped with traditional dual band, Yaesu has taken receive two steps beyond in the remarkable FT-5100. Combined in one compact mobile transceiver, it's the ultimate meaning of "dual band".

With 94 memory channels – more than any other radio in its class – and the optional MW-1 Wireless Mic, the flexibility of the FT-5100 is matchless. But to make sure the FT-5100 is complete, and an even better value, unlike the competition, there's a backlit DTMF mic included.

Through advanced miniaturization technology you'll find practical additions like the built-in antenna duplexer – an option on similar transceivers – and equally important, DTMF paging and coded squelch. All in the smallest dual band made!

Priced for the shrewd buyer, you've got to hear it to believe it. Dual band re-defined. Combinations like this can't

Three Dual Receive Configurations



VHF/UHF



UHF/UHF



VHF/VHF

Dual band redefined.
And the choice is yours.

In-Band Dual Receive available only on FT-5100.

Here's another Yaesu exclusive!
The MW-1 Wireless Mic
with Remote Control.



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*In-Band Dual Receive available only on FT-5100.

"200 watts, real cross band receive, even two flywheel-weighted main knobs!"

"Right, there's only one real performer - the FT-1000."

"Yaesu did it again!"



never heard before.

large, flywheel-weighted tuning knobs for the two receivers, front panel RX antenna selector for quick switch to a spotting antenna and two large displays so you can see what's happening all the time. This is the type of practical design you'd expect from a world leader in radio communications.

The FT-1000 is the perfect blend of electronics and human engineering. It's the Best of our Best.

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MD-1C8

SP-5

DVS-2

FT-1000

FL-7000

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True Cross-band Dual Receive:
Two Large Tuning Knobs
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Switch: For Beverage or Loop
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Automatic Antenna Tuner:
Built-in, 30 Memories
Frequency Range:
100kHz-30MHz (RX),
160-10 meters (TX)
100 Memories: Independent
ATU and Mode/IF Filter
Memory
CW Spot and Two CW Key
Jacks for Maximum
Convenience
Dynamic Range: 108 dB
Optional Digital Voice Recorder
(DVS-2): 16 Seconds Each
RX/TX

Accessories:

- SP-5 External Desk-top Speaker
- LL-5 Phone Patch Unit
- MD-1C8 Desktop Microphone
- YH-77ST Stereo Headphones
- FL-7000 500W Linear Amplifier
- DVS-2 Digital Voice Recorder



Hear signals you've never

You're a competitor. You want optimum receiver performance and you want "muscle" on transmit. With the FT-1000 you'll hear signals you've never heard before, and it's first with 200 watts – more power than any competing transceiver.

Recognized throughout the world by experts such as *Radio Communications* magazine in the UK for the FT-1000's "excellent top flight receiver", *cq DL* magazine in Germany for its

"hand warm" operation at maximum RF output, and the ARRL Lab which judged it "best overall", it's easy to see why the FT-1000 is the choice of top DX'ers all over the world.

A peerless combination for elite-class contesting and DX operation, these exclusive features will maximize your score: Dual Receive – mixed at audio for either mono or

stereo monitoring, lets you watch a multiplier or new country on one frequency while running QSOs on another frequency or band; Diversity Reception – using two antennas at different heights or opposite polarizations; and Extensive Cascaded IF Filtering – for unmatched selectivity in those battles on "the low end". Outstanding front panel design features two



DVS-2 Optional Digital Voice System provides instant playback.

Two Antennas

Twice the Fun!

"...bringing you another nonstop 60 minutes of your kind of music from..."

"...unidentified object does not respond to radio; attempting to make contact..."

"...search from the northwest quadrant and proceed south, maintain visual..."

"...campers are advised to leave upper elevations before sundown due to..."

"...bright yellow, red trim Piper last reported lost and disoriented in fog near..."

"...fire has jumped to adjacent apartment building; requesting additional units..."

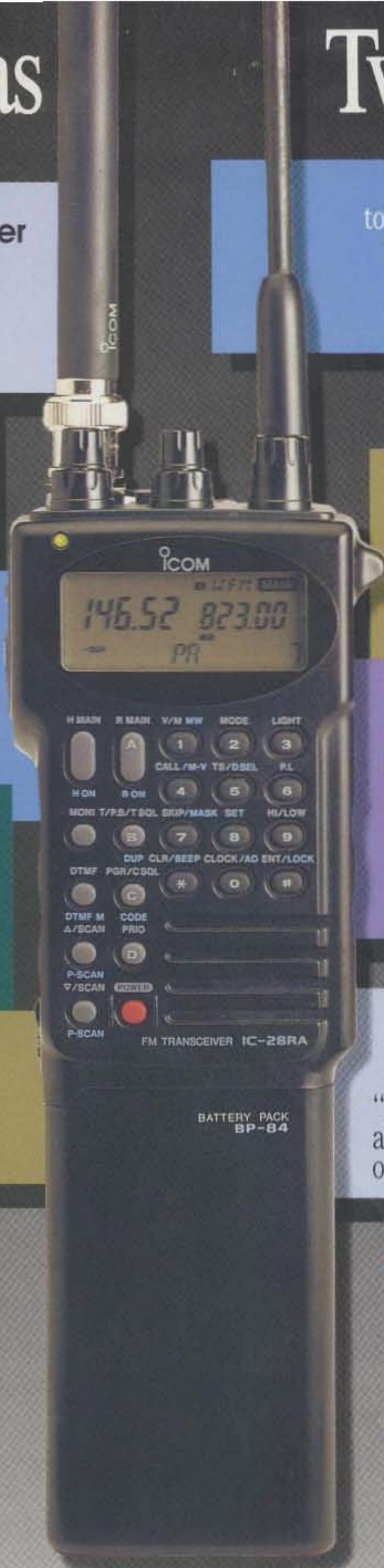
"...appears to be gang-related, large number of youths on foot moving toward..."

"...blackout apparently caused by car striking utility pole at corner of..."

"...do not, repeat do not approach intake by boat since dock is damaged in..."

"...conditions for trout in the deeper pools best before 6 am, they're taking..."

"...sending a chopper over to have a look before the news people find out about..."



IC-2SRA

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