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JULY 1994

CQ

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50th
Year

1994

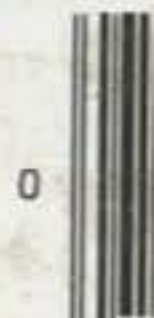
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On the cover: Bill Kollenbaum, K4XS

THE RADIO AMATEUR'S JOURNAL

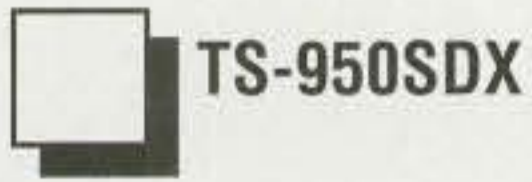
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TM-733A

50 watt (144MHz), 35 watt (440MHz) with 5/10 watt settings • "6 in 1" multi-user programable memory • 72 memory channels • Dual RX on same band • DTSS selective calling with page function • AIP for improved intermod rejection • Quick release front panel • 1200/9600 bps. packet compatible • Wireless cloning function • Built-in CTCSS encoder/optional TSU-8 decoder



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TH-42AT**

3 watt output from MOS-FET power module and supplied 6-volt battery (TH-22AT: approx. 3 watts, TH-42AT: approx. 2.5 watts), and 5 watt output with optional PB-34 • Easy 12-volt operation with PG-2W or PG-3H cable • Compact design: 2-3/16 x 4-5/8 x 1 in. • Built-in DTMF keyboard with monitor



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Kenwood's TM-733A - Faster and Faster!



Features

- Max. 50W output (144MHz), 35W (440MHz)
- "6-in-1" programmable memory
- 72 memory channels
- Time-Operated & Carrier-Operated scan stop modes
- Dual receive on same band (VHF+VHF or UHF+UHF)
- Built-in DTSS selective calling with page
- ASC (Auto Simplex Checker)
- Built-in CTCSS encoder & optional TSU-8 decoder
- Key function display ■ Automatic band change
- AIP (Advanced Intercept Point) ■ Cross-band repeater
- Selectable frequency step (5, 10, 12.5, 15, 20 or 25kHz)
- Wireless clone function ■ Incremental MHz key
- S-meter squelch
- Tone alert system with elapsed time indicator
- Separate speaker terminals for each band (switchable)
- Auto repeater offset (144MHz)
- Repeater reverse switch & offset switch
- 3-position RF output power control
- Dimmer control ■ Auto power-off

TM-733A
FM DUAL BANDER

1200
9600
packet compatible

Theft Deterrent
Faceplate

Kenwood's new FM dual bander, the TM-733A (144MHz/440MHz), is specially tailored for hassle-free mobile communications with a unique "6-in-1" programmable memory. Six entire operating profiles—including everything from frequency range to dimmer level—can be stored, ready for instant recall. So there's virtually no need to adjust your settings. The detachable front panel has a high-visibility LCD with key function display to make on-the-move operation even easier. Of course, this compact transceiver has a full complement of sophisticated features, including 72 memory channels, DTSS selective calling and page functions, ASC (checks whether you can switch from a repeater to simplex communications), AIP (Kenwood's exclusive circuit for enhancing RX performance), and a jack for 1200/9600bps packet use. And as well as receiving simultaneously on VHF and UHF bands, the TM-733A can receive two frequencies on the same band (VHF+VHF or UHF+UHF). There's even an optional quick-release kit as an added anti-theft measure. So check out the TM-733A—a sensation bred from inspiration.

*This device has not been approved by the Federal Communications Commission. This device is not, and may not be, offered for sale or lease, or sold or leased until the approval of the FCC has been obtained.

*An optional accessory kit is required to mount the front panel separately from the main unit.

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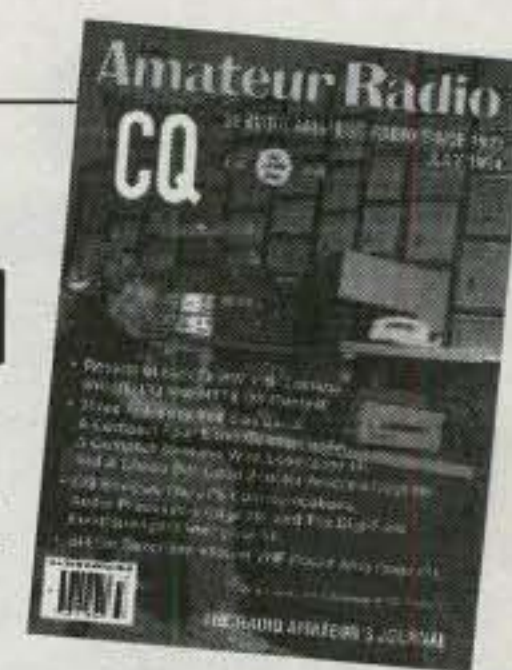
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The Radio Amateur's Journal

ON THE COVER: Down in south Florida—Plantation, to be exact—Mike Raskin, K4KUZ, does his CW DXing and contesting from this handsome setup. (Photo by Larry Mulvehill, WB2ZPI)



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They all were there. What at first looked like an exodus—the carts, wagons, backpacks, and the tell-tale blue canvas IBM bags from years past—proved to be a veritable army of buzzed out bargain hunters. Dayton 1994 was a shopper's paradise. There were even a few good hours on Friday morning to cover as much of the flea market as you could. It did rain, rain, and rain some more. While intrepid flea market vendors huddled under tarps in the cold, wet weather, thousands and thousands of worldwide amateurs crowded four and five deep at commercial exhibitor booths. For amateurs it was the best of all possible worlds (it does not get much better than this), and for the Dayton Fire Marshall, his worst nightmare.

Bad weather and Dayton are synonymous. It's hard to remember distinctly the years when the entire weekend presented good weather, but I'm sure there were a few. If you are a percentage player, there have been more good weather Friday mornings than not, so the real, true flea market aficionados hit that early Friday before the commercial exhibits open at noon. Obviously, that's where you'll find me. As you walk up and down the aisles, it's reassuring to see some of the same stuff you've examined for the last several years show up once again, almost like a museum exhibit. Somehow I have the feeling that I'll see some of that stuff again next year. I still haven't the slightest idea what some of it is or what it ever did, but I'm saved by the fact that I know they won't let me take it on the plane with me when I go home.

It seemed as though there were more new products introduced in the commercial area this year than in years past. The only drawback was getting close enough to the booths to get a really good look. Most of us finally crowded our way in to check out all the new gear and/or to take a final convincing look at a coveted shack addition before heading out to find the best deal. There were some excellent bargains around, as evidenced by the number of people carrying boxes of all sizes out of the arena. I'm sure there were a handful of people who attended this year's Hamvention and resisted all three days of temptation, going home only with some soap, sewing kits, and shampoo from their respective hotels.

Everyone's fear going into this year's Dayton was the lack of public transportation—namely, the lack of buses previously supplied by the convention committee. Some of the hotels and one of the vendors had their own buses at the ready to carry any and all to Nirvana. The local area parking lots quickly filled, and just as quickly had hundreds of cars mired in

mud. Local parking proved somewhat expensive for a number of attendees who had to have their cars extricated from the mud when they wanted to leave. By and large, if you wanted to get there (and who didn't?) you could. The amount of inconvenience you wanted was up to you. There was a general feeling, though, that this year everyone, including exhibitors, paid more for less. However, as sour as the grapes might have been, it was impossible to leave Dayton this year without some new toys and another year's worth of great memories.

This year, as usual, Gail and I attended the DX banquet sponsored by the Southwest Ohio DX Association. The facilities as always were filled (over 500 attended). Even though this annual event sells out early, people still try to buy tickets at the door or hope that someone doesn't show up. The menu for the dinner is always cleverly done with a DX provenance featuring items such as Lord Howe Salad with a choice of Chago's or Orkney dressing. The guest speaker was Ralph Fedor, KØIR, who gave an excellent presentation on the 3YØPI operation. Ralph is a great speaker, and for once this was a banquet speech that held everyone's attention.

One of the 3YØPI operation participants, Bob Schmieder, KK6EK, produced a book on the whole endeavor which as far as I know was introduced at Dayton. Truthfully, I can't figure out how he wrote, produced, and had printed copies in roughly 60 days. Even though most of the amateur press has had or will have articles on the operation, none of us could devote the 225 pages this book is. It's fascinating reading and extremely well done. Profits from the book sales are being used to defray the expenses incurred by the DXpedition. The book is called *3YØPI, Peter I Island, Antarctica* and is available from Bob at a cost of \$20 plus \$2 shipping in the US (\$15 shipping elsewhere). His address is 4295 Walnut Blvd., Walnut, CA 94596. Not only will you be getting a great book, but you'll also be helping to pay the bills for the DXpedition from which we all benefitted.

Of course, everyone wanted to know about the 3YØPI QSL cards and when they could expect to receive them. That question instantly became rather small and superfluous when most of us found out that Joanie Branson, KA6V, had passed away a day or so earlier. Joanie and her husband Jerry, AA6BB, handled cards for a lot of DX operations, and Jerry himself was recuperating from recent open-heart surgery. It was a very sad loss for the Branson family and for amateur radio. Another group volunteered to do the cards and by now they should be in the hands of the lucky

and deserving. All I know is that mine arrived a day or two before John's, and so I did enjoy a miniscule amount of gloating time.

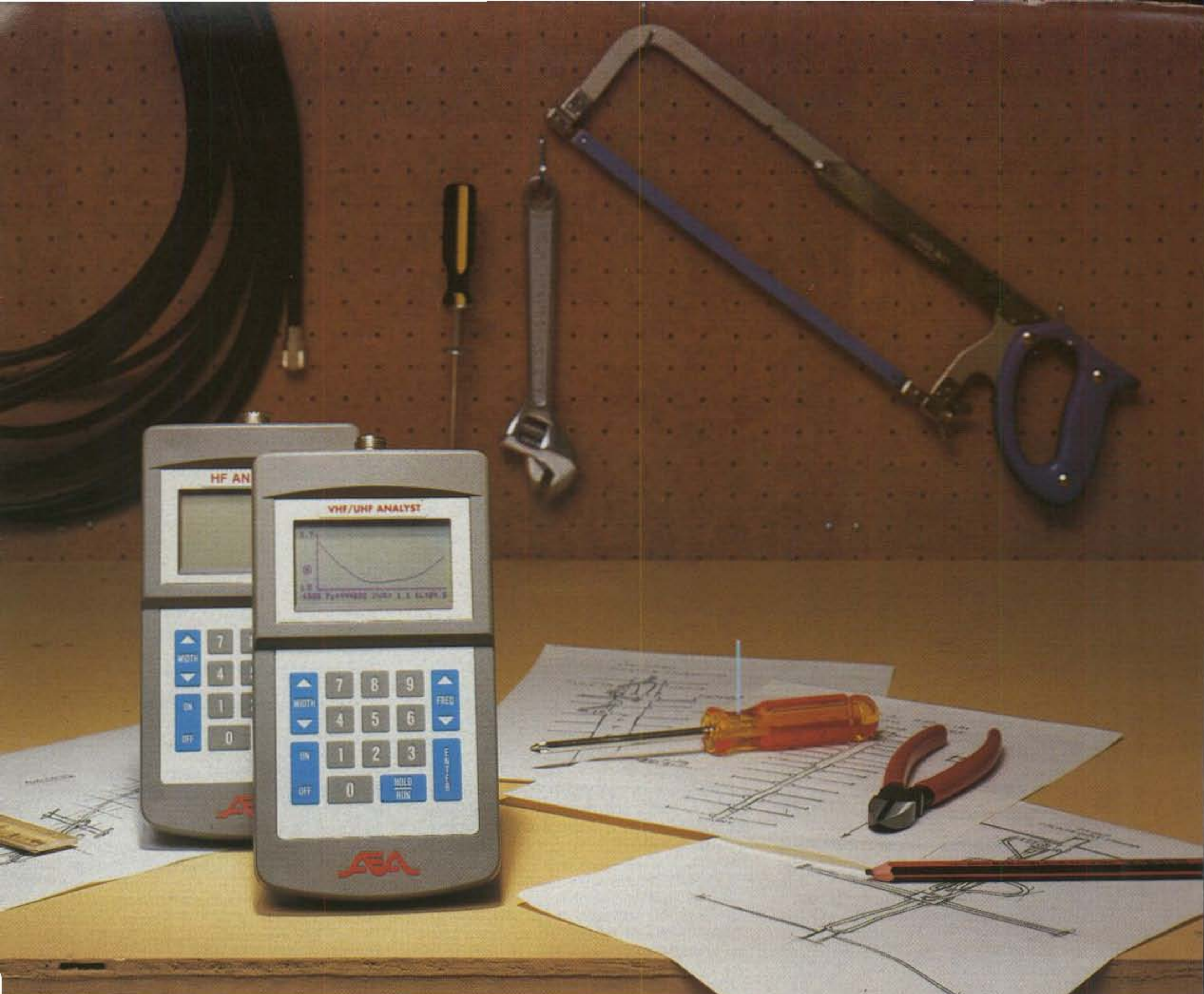
At the dinner I had the pleasure and honor of being able to make a public presentation on behalf of CQ's DX Hall of Fame, inducting Charlie Mellen, W1FH, into this august body. Bruce Marshall, WA1G, accepted for Charlie, who was unable to get to Dayton this year. I had hoped to have a picture of the presentation, but none have shown up as yet.

And what about the Dayton cuisine? Well, if you're finicky, fussy, or health conscious, you are probably the type to ask the food vendor "What's that?" If you care enough to ask, you probably shouldn't or wouldn't eat it anyway. The mystery-meat barbecue topped my list this year, along with the perennial big, salted pretzels lightly toasted to perfection. At Dayton, for three days at least, you can hear the sounds of thousands of miles of arteries snapping shut in unison. While the ploy is to confuse us with the hazards of radiated RF, the insidious villain has always been the hamfest food. That will get us long before the RF has a chance. After all, these people know what it takes to keep us wired for three days—large amounts of chemicals, fats, salt, and caffeine . . . all the major food groups.

The next big question for Dayton veterans is "What did you bring home?" I don't know about you, but I did pretty well. I bought another perfect coax switch, some stainless steel hardware, a 0-75A DC meter (with shunt), a few connectors, the service manual for my rig, and some stuff that's still scrunched up in paper bags. (I can't quite remember at the moment what the stuff in the bags is, but I'm sure it must be good—and cheap.) I always wondered if the people who operate the metal detectors at the Dayton airport get special training on how to handle and recognize the stuff that passes through on Hamvention weekend.

Another Dayton has gone by and by now mostly the good is remembered. While it didn't do much—if anything—toward relieving world tension, paying the mortgage, or curing any of our ailments, it certainly did make us feel better for being there, relaxing, and having a good time with our friends. You know, it's that thing called fun and enjoyment, the real reason we do all this. The Monday after Dayton we can take up everyone's problems again, including our own. There's always enough time for that, but a year has to pass before we get to do Dayton again. See you next year.

73, Alan, K2EEK



Shortcut to Maximum Performance

Take the guesswork out of getting maximum antenna performance—use the SWR-121 VHF/UHF or the SWR-121 HF Antenna Analyst. A graphic display shows what's happening with your antenna's SWR vs. frequency. Rugged design and battery operation let you use these Antenna Analyzers anywhere—at a Field Day site, up the tower, or from your shack!

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ANNOUNCEMENTS

•Russian-Speaking Radio Club International –

A group of amateurs from the former USSR republics who now reside in the west have formed this club to share interests and follow amateur radio happenings in the republics of the CIS. They have more than 33 members from six countries, three continents, and ten states. The members are looking for others who share in their interests and speak the Russian language. For more information or to join, contact RSRCI, c/o Edward Kritsky, NT2X, P.O. Box 715, Brooklyn, NY 11230 USA (SASE), or call 1-718-284-4493 phone and FAX from 1200 to 0300 GMT.

•**1994 Connecticut QSO Party** – The Candlewood ARA will sponsor this event, to take place from 2000Z July 30 to 2000Z July 31 (rest period 0400-1200Z), Phone and CW. Work stations once per band and mode, mobiles as they cross county lines. No repeater QSOs. Single op, fixed/mobile, Novice, QRP (5W), Multi-Single, Multi-Multi classes, plus Connecticut club competition. Connecticut (CT) stations may contact other CT stations for QSO/multiplier credit. CT stations exchange report and county; others exchange report and state/province/DXCC country. CW 40 kHz up from lower band edges; Novices 25 kHz up from low end. Phone 1.860, 3.915, 7.280, 14.280, 21.380, 28.380. VHF 50.150, 144.200, 146.580. Score 1 point per phone QSO; 2 points per CW QSO. QSOs with club station W1QI and ARRL HQ station W1AW count 5 points. CT stations multiply QSO points by states/provinces/CT counties worked (DX only one multiplier); others multiply by CT counties worked. Plaques and certificates (100 point minimum). Special certificate for working all 8 CT counties. Send entry and SASE for results by Sept. 6 to CARA, P.O. Box 3441, Danbury, CT 06813-3441.

•The following special events will take place during July:

NASA Centers' ARCs, from Apollo 11 25th Anniversary Special Event; locations around the country; 1700Z July 19 to 0500Z July 22; 11+ kHz up from bottom edge of General bands (28.411+ MHz on 10 cm), all modes. Send 9 x 12 SASE (two 29 cent stamps or IRC) for certificate to station worked (*Callbook* address).

US/Canada, from American Sunbathing Assn., Naturist Society, and Federation of Canadian Naturists 19th Annual Celebration; July 4-10; operation near 14.265, 21.365, 28.465 ±QRM. For certificate send QSL and 9 x 12 SASE to Bob Redoutey, KF5KF, P.O. Box 200812, Austin, TX 78720.

K1PBO, from 50th anniversary of WWII on Cape Cod and declaration of Cape Cod Airport as a national historic site; Barnstable ARC; 1300-2200Z July 9; SSB 21330, 14300, 7247. QSL via *Callbook* address to KQ3S.

K1NQG, from Yankee Tune Up, New England Wireless and Steam Museum, East Greenwich, Rhode Island; Fidelity ARC; 1300-1800Z July 9; phone lower portion of 20 meter general subband, CW Novice portion of 40 meters. For certificate send QSL and SASE to Bob Ritoli, NE1E, P.O. Box 168, 8 Locust Ct., Fiskeville, RI 02823.

W2ZZJ, from 168th anniversary of birth of Dr. Mahlon Loomis, Stratford, New York; Fulton County Mahlon Loomis Committee; 1300-2000Z July 23 and 24; General class portion of 40, 20, 15 meters and Novice 10 meter phone. For certificate send QSL, contact number, and #10 SASE to W2ZZJ, 5738 STHWY 29A, Stratford, NY 13470.

KY2F, from Spirit of Central New York Hot Air Balloon Festival and Air Show, Oswego County Airport, New York; Oswego County ARES; 1200-2100Z July 9 and 10; middle of General 80, 40, 20,

15, 10 meter phone band and Novice 10 meters and 147.75/15 MHz. For certificate send QSL and large SASE to Fred Swiatkowski, KY2F, P.O. Box 5227, Oswego, NY 13126.

W3OK, from Canal Festival, Easton, Pennsylvania; Delaware-Lehigh ARC; 1200-2400Z July 9; on 3.965, 7.265, 14.265, 21.365, 28.365 MHz. For QSL send QSL, contact number, and SASE to DLARC, RD 4, Greystone Bldg., Nazareth, PA 18064.

WA3BAK, from Society for Preservation & Encouragement of Barber Shop Quartet Singing in America International Convention, Pittsburgh, Pennsylvania; Greater Pittsburgh HF Society; 1300-0300Z July 7-9; 20, 15, 10, 2 meters and 220 and 440 MHz. For QSL send SASE to Barber Shop Singers, 4952 Esther Drive, San Jose, CA 95124.

W3UDX, from Freedom Week, Butler County, Pennsylvania; Butler County ARA; 1600-2100Z July 2 and 3; SSB General 40 and 20 meter subbands, Novice 10 meter subband. For certificate send 9 x 12 SASE to BCARA, P.O. Box 1787, Butler, PA 16001-1787.

W4TMN, from anniversary of signing of Declaration of Independence, Williamsburg, Virginia; Williamsburg Area ARC; 1200Z July 4 to 0100Z July 5; on 146.58, 28.350, 24.950, 21.350, 18.150, 14.270, 7.270, 3.870. For certificate send QSL and 9 x 12 SASE to Hershel Kreis, KE4GWV, 145 Sand Hill Rd., Williamsburg, VA 23188.

4-land, from Lonesome Pine ARS Centennial Special Event, Coeburn, Virginia; 0300-2200Z July 4; General phone portions 10, 20, 40 meters. For certificate send 9 x 12 SASE to Lonesome Pine ARS, P.O. Box 2955, Wise, VA 24293.

K8QYL, from Moon Walk '94, Neil Armstrong Air and Space Museum, Wapakoneta, Ohio; Reservoir and Dayton ARAs; July 16-17; 10 meter Novice band and repeaters in Miami Valley and Lima, Ohio area. For certificate send SASE to N8KTU, P.O. Box 42, New Bremen, OH 45869-0042.

W8AL, from Pro Football Hall of Fame Greatest Weekend; 1400-0200Z July 25-31; SSB 28.350, 24.950, 21.350, 18.150, 14.270, 7.270, 3.870 MHz; CW 28.125, 24.910, 21.125, 18.080, 14.050, 10.120, 7.125, 3.700 ±QRM, plus RTTY, packet, AMTOR, satellite, 2 and 6 meter FM/SSB. SWLs welcome. For certificate send QSL, contact number, and #10 SASE to Randy Phelps, KD8JN, 1226 Delverne Ave. SW, Canton, OH 44710-1306.

K8EPV, from Port Huron to Macinac Island Yacht Race, Port Huron, Michigan; Eastern Michigan ARC; 1400Z July 16 to 0200Z July 17; CW 3.710, 7.110, 21.110; SSB 3.910, 7.272, 14.272, 21.312, 28.393. For certificate send QSL and 9 x 12 SASE to K8EPV, 1640 Henry St., Port Huron, MI 48060.

KD8FJ, from "Heritage of Our Country," Heritage Hill Camp, Thompson, Ohio; beginning at 1400Z July 4; lower General portion of the phone band and 10 meters phone at 28.453 if conditions allow. For certificate send QSL with large SASE to KD8FJ, 386 Cedarbrook Dr., Painesville, OH 44077-2849.

W8UMD, from Annie Oakley Days, Greenville, Ohio; Treaty City ARA; 1400-2100Z July 30 and 31; General SSB portions 80-15 meters, General CW 80-10 meters, Novice 10 meters phone. For certificate send QSL and SASE to W8UMD, P.O. Box 91, Greenville, OH 45331-0091.

W9AWE, from anniversary of Great Flood of '93, Quincy, Illinois; Western Illinois ARC; 0000Z July 1 through 2400Z July 10; 15 kHz up from bottom of all General phone and CW bands and 28.390 MHz. For certificate send QSL and SASE to WIARC, P.O. Box 3132, Quincy, IL 62305.

W9ZL, from Experimental Aircraft Assn. Fly-in

and Convention, Oshkosh, Wisconsin; Fox Cities ARC; July 29-31; General phone portions of HF bands, plus RTTY and CW as ops and conditions permit. For certificate send QSL with 9 x 12 SASE to Wayne Pennings, WD9FLJ, 913 N. Mason, Appleton, WI 54914.

WB0BBN, from closing of St. Louis Gateway to the Gold 1994 Olympic festival, St. Louis, Missouri; Monsanto ARA; 1300-0300Z July 9 and 10; General portion 40, 20, 15 meters, Novice 10 meters, and 147.36+, 224.98-, 443.55+. For special QSL send 9 x 12 SASE to MARA, P.O. Box 1596, Maryland Heights, MO 63043.

CG7G, from XV Commonwealth Games '94, Victoria, BC, Canada; July 1 to Aug. 31; all bands 10-160 meters, VHF, UHF, all modes (CW, SSB, packet, AMTOR, SSTV). For QSL send SASE to VE7RCN (CG7G), Base Amateur Radio Services, Canadian Forces Base Esquimalt, FMO Victoria, BC, Canada V0S 1B0.

VE6KDA, from Klondike Days Exposition, Edmonton, Alberta, Canada; Radio Amateur Educational Society; July 21-30; on 1.870 conditions permitting, 3.750 from 0200-0500Z, 7.200 from 2300-0200Z, 14.165, 21.220, 28.300, 14.050 (CW). For QSL send QSL and SASE to RAES, Ritchie Postal Outlet Box 75038, Edmonton, AB, Canada T6E 6K1.

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

July 4, **Harrisburg, PA Hamfest**, Bressler Picnic Grounds, Harrisburg, Pennsylvania. Contact Steve Gobat, KA3PDQ, 1600 Old Trail Rd., Etters, PA 17319 (717-938-6943).

July 8-9, **Old Style Swapfest**, Texarkana, Texas. Contact Wes, WV5I, 3210 Pleasant Grove Rd., Texarkana, TX 75501 (903-838-0568).

July 8-10, **Gander, Newfoundland Hamfest**, Hotel Gander, Gander, Newfoundland. Contact ARCON, P.O. Box 281, Gander, NF Canada A1V 1W6.

July 9, **South Milwaukee ARC Swapfest**, American Legion Post 434, Oak Creek, Wisconsin. Contact South Milwaukee ARC, P.O. Box 102, South Milwaukee, WI 53172-0102.

July 10, **1994 Batavia Hamfest**, Alexander Firemen's Grounds, Alexander, New York. Contact Knute Carlson, 26 Burke Dr., Batavia, NY 14020 (716-343-5580).

July 10, **North Hills ARC Hamfest**, Northland Public Library, 10 miles north of Pittsburgh, Pennsylvania on Cumberland Road. Contact Don Jackson, N3LAZ, 915 Dale Ave., Bradford Woods, PA 15015 (412-935-3343).

July 10, **Wood County ARC Hamfest & Computer Show**, Wood County Fairgrounds, Bowling Green, Ohio. Contact WCARC, P.O. Box 534, Bowling Green, OH 43402 (419-372-2936). (Exams.)

July 10, **Maryland Hamfest & Computer Fest**, Timonium Fairgrounds, York Road off I-695, I-83. Contact BRATS, P.O. Box 5915, Baltimore, MD 21208 (410-467-4634). (Handicapped accessible; VE exams 10 AM, preregistration required.)

July 10, **North Hills ARC Hamfest**, Northland Public Library, Pittsburgh, Pennsylvania. Contact Don Jackson, N3LAZ, 915 Dale Ave., Bradford Woods, PA 15015 (412-935-3343). (Handicapped accessible.)

July 15, **USF-REC "Last Minute" Hamfest**, University of South Florida Special Events Center, Tampa, Florida. Contact Kevin Cardwell, KD4GMD, 813-933-9473. (Exams.)

July 16, **Cary Mid-Summer Swapfest**, Cary, North Carolina. Contact Herb Lacey, N4UE, 1022 Medlin Drive, Cary, NC 27511 (SASE). (Exams.)

(Continued on page 146)

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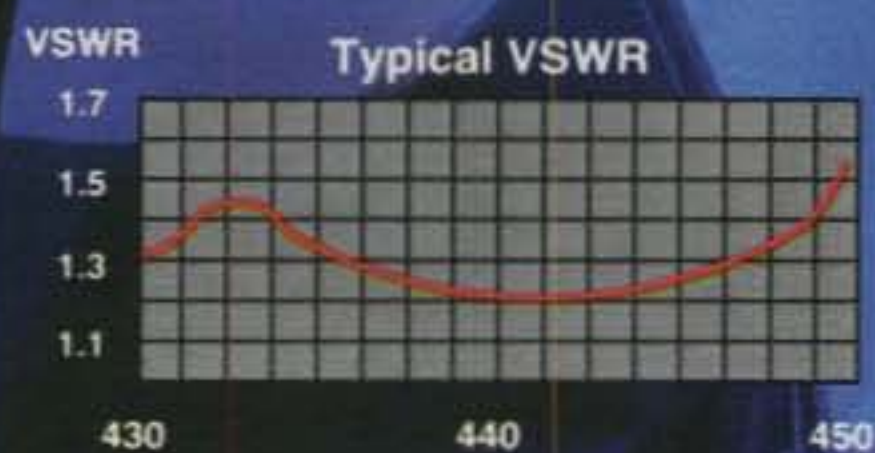
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Results of the 1993 CQ World-Wide VHF WPX Contest

BY JOE LYNCH*, N6CL

Talk of the contest was high just before the contest date. However, it seemed that someone pulled a plug on conditions the day the contest began. The total number of logs received was down from last year's contest, which seems to reflect the poor conditions.

Conditions

As mentioned above, conditions ranged from poor to lousy. Sporadic-E was evident in some of the log entries on both days of the contest. Tropo-enhanced conditions were also evident for those who operated on the higher frequencies.

DX

Thanks to publicity by our sister publication *CQ Radio Amateur*, the Spanish edition of *CQ*, a fair share of log entries were received from Spain and other European countries. In the single operator category DL1ZC was again the European winner. Operating on 144, 432, and 1296 MHz, he accumulated over 50k points. By far the biggest point total came from PA6VHF, a portable multi-op class II entry that amassed over 70k points.

North America

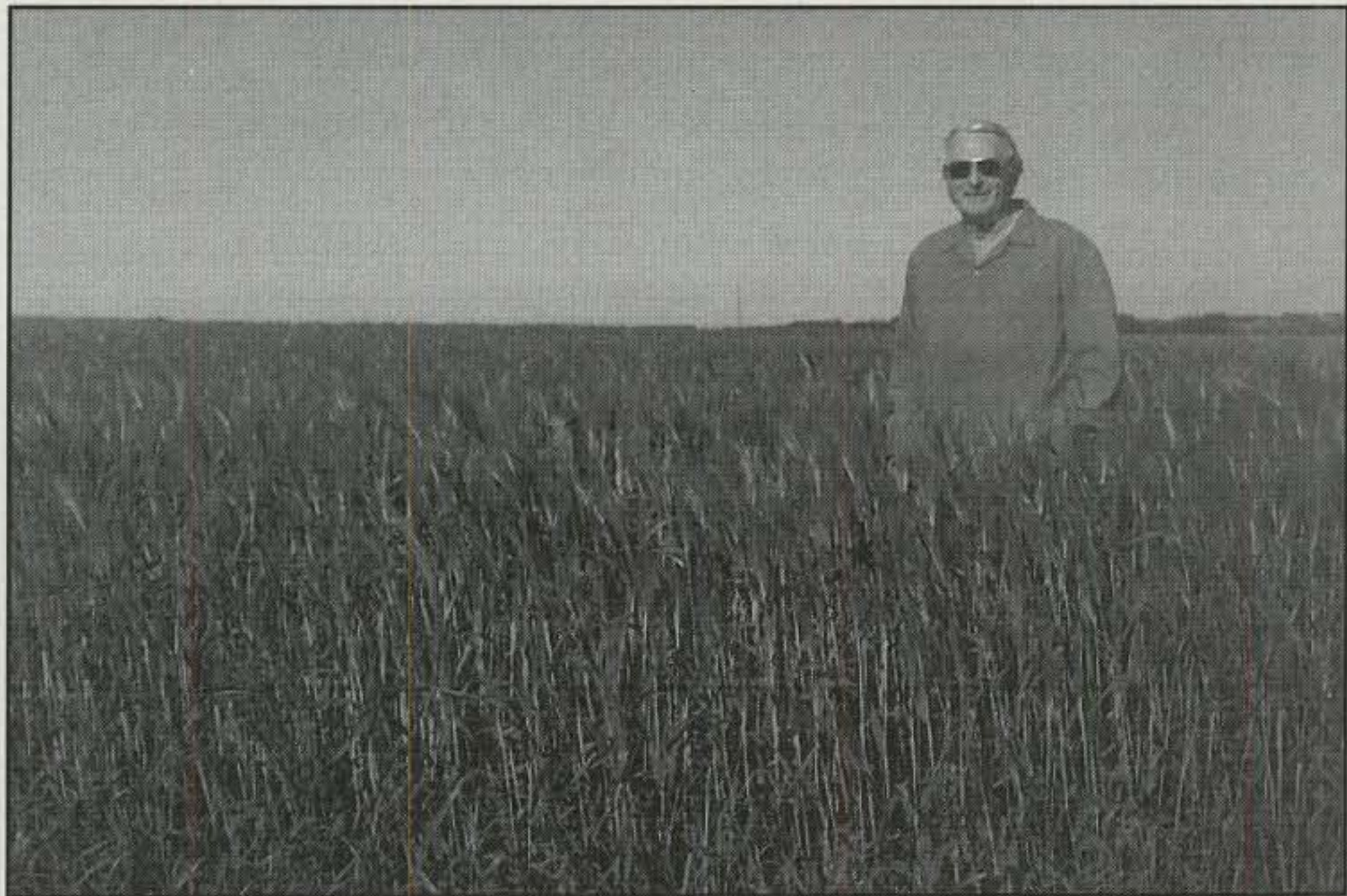
The winner in the single op category was WA8WZG, who totaled in excess of 101k points. The top U.S.A. scorer was KE8FD, who scored in excess of 63k points. In the portable multi-op class I category NW7O scored more than 40k points. In the portable single-op category N6NB again had a respectable showing with over 59k points. Chip Angle, N6CA, and Jack Henry, N6XQ, operating as XE2/N6CA, in the portable multi-op class I category scored in excess of 48k points. The leader in the new QRP category was NM1K with more than 15k points. The top Rover scorer (and overall score leader for the contest) was N8NQS/R, who scored over 118k points.

And . . .

Scoring again seemed to be a problem. Once again I had to recheck everyone's logs. The most common error was multiplying the two multiplier figures together rather than adding them together. Some of you who submitted really high scores will see the correction when you see your scores listed.

Another problem with scoring is the summary sheet itself. It is confusing to bring down

*P.O. Box 73, Oklahoma City, OK 73101



Jack Williams, VE6JW, inspects his "field of dreams." He must be thinking that if he builds a big enough antenna, they (the signals) will come. (Photo courtesy VE6JW)

the totals from each band only to find out that they don't add up to the overall total. Therefore, the summary sheets will be redesigned for the 1994 contest. Just remember that you multiply the total QSO points by the sum of the grid and prefix multipliers that are found at the bottom of the page on the summary sheet. Nevertheless, if you don't get it right, I'll fix it.

The new QRP category seems to have been a hit. More than ten percent of the submissions were in that category. Because of the popularity of the QRP category, it is now a permanent feature of the contest.

This year's contest is this month. If you have not sent for log and summary sheets, do so today. I look forward to hearing you on the air and seeing your log submissions next month.

73, Joe, N6CL

Random Comments

I finally succumbed to 1296 MHz after avoiding it for years. So far it has cost me \$200.00 per contact . . . VE7XF. Biggest thrill—AJØE on my last QSO . . . N9OZM. First contest ever. Spent two hours putting antennas in place. Helps to screw in the coax at the antenna . . . KO4OE/VE3. Low participation in WPX in Spain and Europe in general. Not a popular contest yet . . . EA4LY. Contests are about the only time to work VHF/UHF in the Pacific northwest . . .

N7YAG. Biggest thrill was working CM79. WX like ARRL VHF Contest—cold and rainy . . . W7HAH. Traveled to Mount Davis (highest point in PA) . . . WY3C. A near miss (or near hit, depending on how you look at it). Lightning strike took out a few circuits (5 of 6 breakers), but mercifully did no other damage to antenna or equipment . . . WN3C. I got my set-up routine down to about 3 minutes. Maybe we can do more than 6 grids next time. Lots of fun . . . K7CW/R.

Who turned off the propagation? . . . KDØSU. Not a lot of stations . . . VE2PIJ. Unfortunately little local participation and poor band conditions . . . N2QHS. 1296 conditions were good. Wish there were more contestants . . . KC4YO. Biggest thrill was working K1JJN on 144 and 432 MHz . . . N1FUS. Conditions sure didn't make for a great score. Thunderstorms and no openings. All QSOs were a struggle and the score shows that. I can only hope that *CQ* will keep the contest going until the numbers build up. Any chance of holding it earlier in the Es season? Anyway, keep it going . . . WBØCQO. Too bad 6 meters didn't open for any extended periods . . . WA8QNR. Biggest thrill was working Tim, NC7K, and Bill, AA7NH, on expeditions . . . WB7QBC. I never heard the W6's. Pat, W5OZI, said they were in to his location for 2 hours. Oh well . . . KB5IUA. There was more activity here than last year and 6 meters was better . . . W6PFE.

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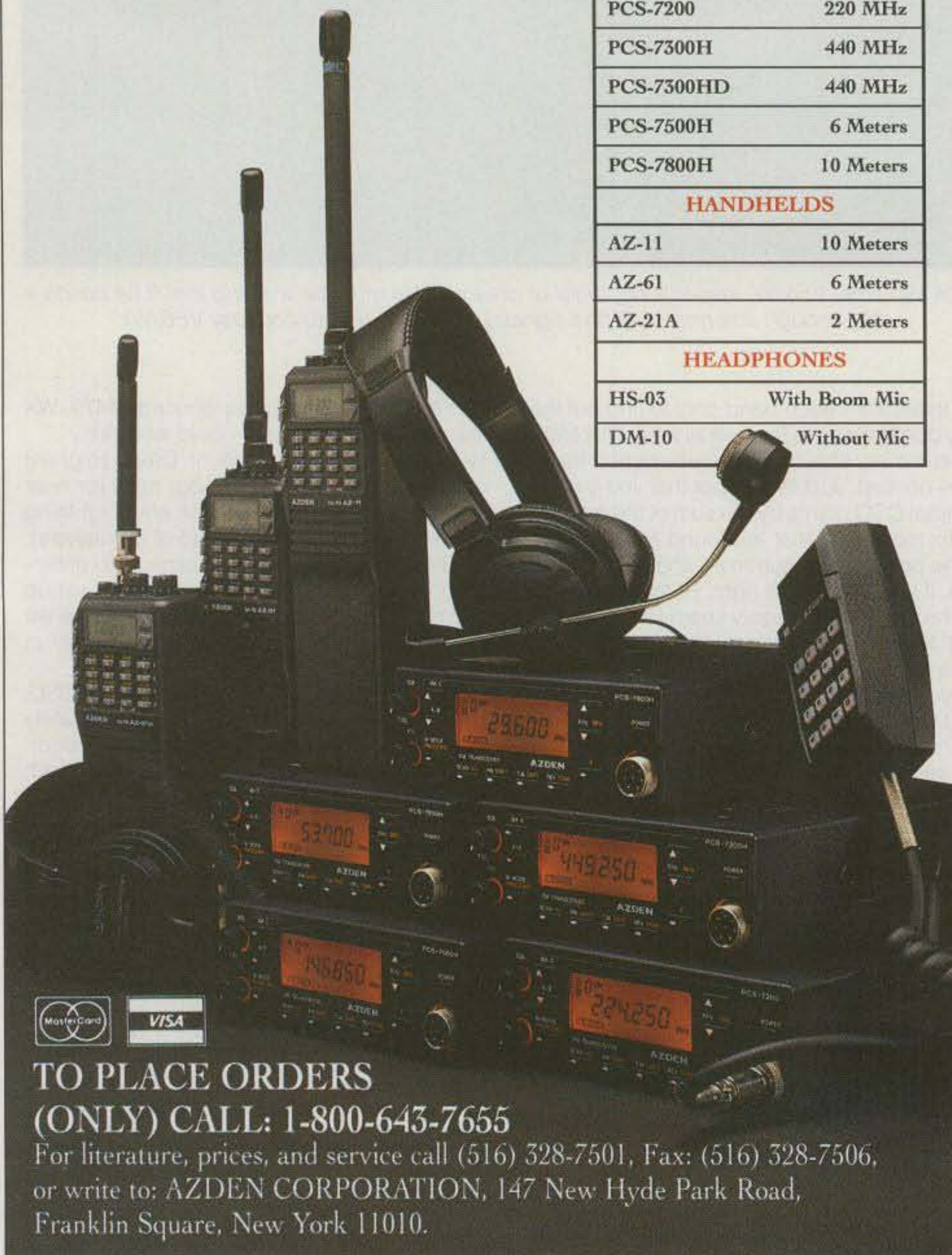
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QRP

Winner: **NM1K** (15,776)
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ROVER STATION

Winner: **N8NQS/R** (118,784)
Sponsored by Rochester VHF Group

Bettered last year's score thanks to increased activity on 144 and 432 MHz, but 6 meters never opened . . . *WA2HFI*. Good conditions, but few stations in Europe. *CQ* contest in Europe not known . . . *DL1ZC*. Casual operation. Looking for QSOs on 1296 MHz . . . *WA6FIT*. Band conditions were lousy. No Es on 6 meters. Interesting MS though. So-so tropo on 2 meters and 70 cm. Oh well. Cu in 1994 . . . *VE7FEI*. Biggest thrill was when 6 meters opened on Sunday morning . . . *WB2QLP*. Conditions were not nearly as good as in 1992 out here. Six meters opened exactly when the contest ended at 2100 UTC Sunday . . . *N6NB*. I enjoyed the return of this contest. Too bad the bands weren't a little better for DX. The opening to the Pacific Northwest on Saturday provided a little excitement for us here . . . *K7NV*.

We had a pretty rough time getting to the operating location, as the heavy rains which occurred earlier this year pretty much damaged nearly every road on the way down. In one case, the road was completely washed away and it took awhile to find out exactly where we were. But being the super VHFers that we are, we made it . . . *XE2/N6CA* (plus *XE2/N6XQ*). I wish conditions had been better for me during the contest. Only 2 QSOs on 6 meters . . . *NT0V*. No one knows the rules in Japan without me . . . *J13BFG*. Even though it took a lot of time to scrounge up the 18 QSOs, I enjoyed the effort. Organizing and accounting for such a contest requires plenty of time and effort. Yet I think that these contests, which provide many of us with the time and place and the chance to test our gear, are vital to radio amateur lifestyles . . . *VE6JW*.

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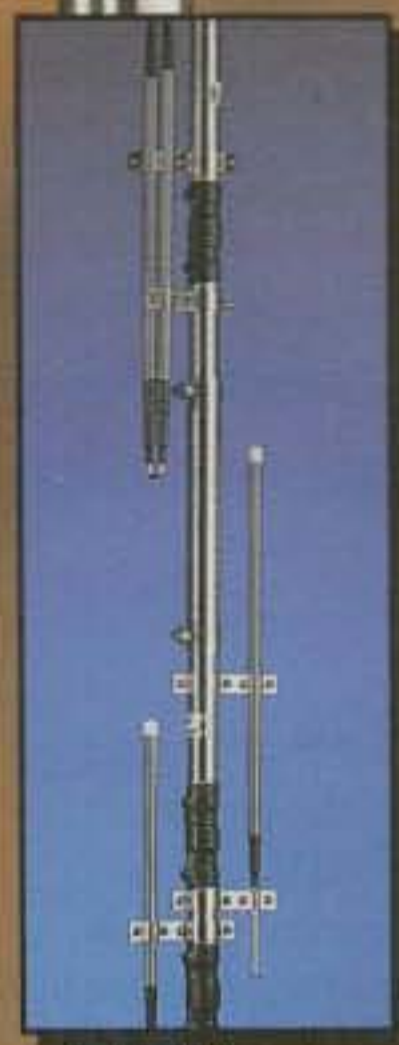
"My first QSO was ZA1A in Albania with my R7." NE8Z / HC1MD

"Metalwork, machining and traps well made . . . Assembly was straight forward and easy." WX6W

SPECIFICATIONS

Frequency, MHz	28, 24, 21, 18, 14, 10, 7
Gain, dBi	3
Electrical Wavelength	Half-wave
SWR 2:1 Bandwidth	10m-2 MHz / 12m-100 KHz 15m-450 KHz / 17m-100 KHz 20m-250 KHz / 30m-25 KHz 40m-75 KHz
Power Rating, Watts PEP	1800
Radiation Angle, degrees	16
Frequency Selection	Automatic
Horizontal Radiation Pattern, degrees	360
Height, ft (m)	22.5 (6.9)
Mast Size Range, in (cm)	1.5-1.75 (3.8-4.4)
Wind Load, ft ² (m ²)	2.25 (.21)
Weight, lb (kg)	12.3 (5.6)
Counterpoise Radials Supplied	7
Wind Survival, mph (kph)	80 (128)

Heavy wall seamless aluminum tubing for maximum strength and neat appearance.



Pretuned hi-efficiency traps provide automatic frequency selection.

Matching network provides optimum bandwidth without moving parts.

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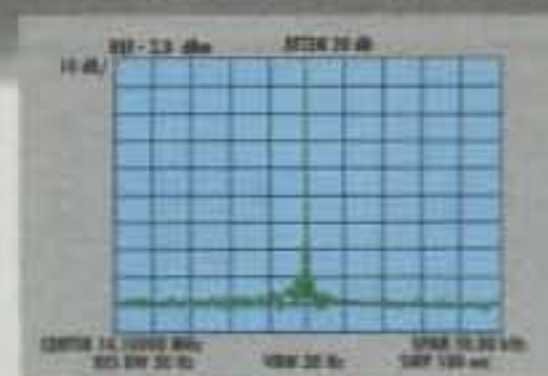
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- Double Cooling Fan
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- RIT, ΔTx, ΔRx
- 10 Key Pad
- VOX
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- 101 Memory Channels
- Passband Tuning
- AF-type Speech Compressor
- CW Full Break-In
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- Large Display



Transmitter C/N Ratio

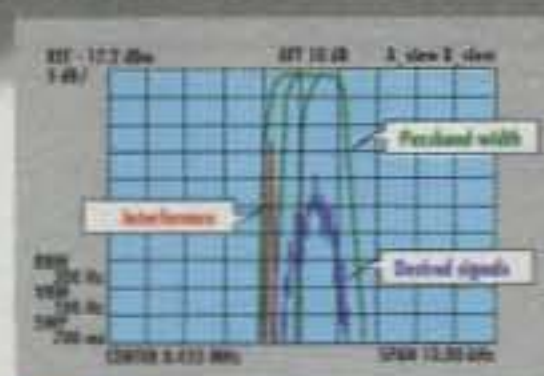
Now you can work all of the HF bands AND have access to one of the most exciting amateur bands – 6 M! The IC-736 is an all band, all mode transceiver with a general coverage receiver. Only an antenna, coaxial cable and AC outlet are necessary to get up-and-running with this rig. Cutting edge features and "plug 'n play" operation make the IC-736 a "complete station in a box!"

The IC-736's compact and cleverly designed **Automatic Antenna Tuner** has preset memories for each 100 kHz step, thereby providing very high speed tuning. Tunes all ham bands plus 6 M!

Equipped with **2 Antenna Connectors**, the IC-736 includes an **Automatic Antenna Selector**. In each band, the band memory memorizes the selected antenna so you don't need to change an antenna manually each time you change the operating band.

The IC-736 employs power **MOS-FET's** in the driver and final amplifier stages, providing a clean, 100 W of output power over all of the ham bands as well as the 50 MHz band.

An **Aluminum Die-Cast Frame** and **2 Large Cooling Fans** help stabilize the



PBT Characteristics

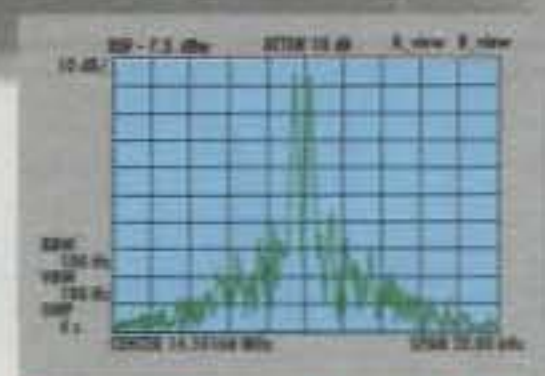
IC-736's PA circuit to obtain 100% full duty cycle operation. Performance you can count on under the most demanding of conditions.

CW fans will love the IC-736. The **Full Break-In Function** (QSK) allows you to receive signals between transmitted keying pulses (semi break-in is also available). **Separately Designed CW Key Jacks** allow you to connect both a memory keyer and a paddle – great for contest operation!

The **Double Band Stacking Register** memorizes 2 frequencies along with modes in each band so it can be used like 2 VFO's in one band.

Up to 10 **Electronic "Memo Pads"** are available. This is especially useful during contests or while DX hunting. When catching a station you would like to temporarily store, simply push the memo pad-write button. The frequency and mode is automatically stored in a memo pad so you can continue band searching.

For interference rejection, the IC-736 has **Passband Tuning** and a **Notch Filter**. During crowded band conditions, these two functions can be used in combination, providing an extremely effective method of reducing most types of interference.



Dynamic Range Characteristics

The **RIT** and **ΔTx** functions independently change the receive or transmit frequencies, respectively. Great for split frequency operation or for compensating for the frequency drift of another station.

The IC-736's offset frequency for **Quick Split** Function can be pre-programmed. A **Split Lock** function prevents you from mistakenly changing the receive frequency while changing the transmit frequency.

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- 250MHz direct count
- Digital Communications Port permits data logging with optional converter & software

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- Digital Filter greatly reduces random noise & oscillation
- Digital Auto Capture locks counter display on first reading to pass filter
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Charles Bishop, KA0OWT/R, roved through four grids before the Great Des Moines floods got to him. Maybe he could have put a sail on the antenna and kept going as maritime mobile. (Photo courtesy KA0OWT)



Denise Hagedorn, AJ0E, portable in EN20 with Tom Bishop, K0TLM. (Photo courtesy K0TLM)

This was my first contest from Arizona. The activity was pretty sparse, but I still had a lot of fun from the Catalina mountains, NE of Tucson. I hope to work everyone again next year . . . KX7V. By the log sheet you can tell when I was parked and when I was mobile. Hi . . . K6AAW. Biggest thrill—final score! Did I win the unofficial CW-only category? . . . K9AKS. (Hands, or key, down, Curt—ed.) Saturday night was fun and then the Great Des Moines flood came. Sunday I was bailing drinking water . . . KA0OWT. Realized Friday night that since I had taken down my 1269 helix (since mode L crashed), I was without a 903 antenna. I calculated, modelled, and built a wood-boom 15-element 903 Yagi, and it

worked great . . . WB2VVV. The number of stations on 144 MHz and above was up quite a bit from last year . . . KE8FD. Not information for this WW contest in Italy. Not activity. Sorry . . . I4JED.

It was a lot of fun, but alas, Murphy struck again. Thunderstorms, very little propagation, loss of electricity for 6 hours (luckily at night), and a 432 MHz rig that would only operate on one frequency and one mode (SSB). Wouldn't you know it? Six meters opened up 13 minutes after the contest ended . . . AJ0E. Biggest thrill was the nice visit by a land owner who graciously allowed us to park temporarily on her property . . . N8NQS/R. Biggest thrill was working N2CEI on 1296 MHz, FM08 to FN20. Need

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CIRCLE 92 ON READER SERVICE CARD



Dave Bostedor, N8NQS, and Dave Hogston, KB8MXX, install the 6 meter antenna at one of their Rover stops. (Photo courtesy N8NQS)

more people to get on and help out, . . . N4KWX. Biggest thrill was working HA8ET (1215 km) via a one-burst meteor scatter for 27 seconds! . . . PA6VHF.

Two hours prior to start of the contest I was out trying to buy, beg, borrow, or steal a 6 meter amp. When I got home, 15 minutes prior to the

contest, my friend, who had been installing the 1296 MHz beams, amp, and preamp, informed me that we did not have the DC line to run to the amplifier at the mast and the local building supply store wanted 97 cents/foot for No. 8 wire. Who says contesting isn't fun? Oh, well. I will be ready for the next contest. But first, I

will enjoy my stay at the psychiatric ward in the local rest home . . . KG7FV. Our trip to rare grid DN03 was interesting and fun. Highway construction made the trip out very long and hot, with stops all the way. Conditions were lousy on 6 meters until the contest ended and we were driving home. It was a kick working WQ7HAH on 144 and 432 MHz. It was a new one for him! . . . AA7NH.

Strongest in station's in Vancouver area. When weather changed high pressure to low pressure, noticed opening of band in "DN" grids . . . VE7ZZX. I worked many new grids and got to see my antenna efforts on the mountaintop pay off. Now I hate to go home in the valley! . . . WB4CTW. My first 2304 contact was 52 miles, while running only 10 mw. Finished VUCC on 144 and 432 MHz . . . WA8WZG.

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Portable Station Multi-Operator Class II: KC6WLC & KD6OUB. AA7NH & N0XX. AJ0E & K0TLM. VE7ZZX & VE7's HKZ, MJA, MDM. ED9WPX/P: EA9's AD, AI; EB9OL. I4JED/4 & IW4BET. PA6VHF: PA3's DQJ, FBN, FUH; PE1LAU.

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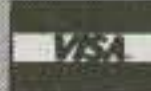
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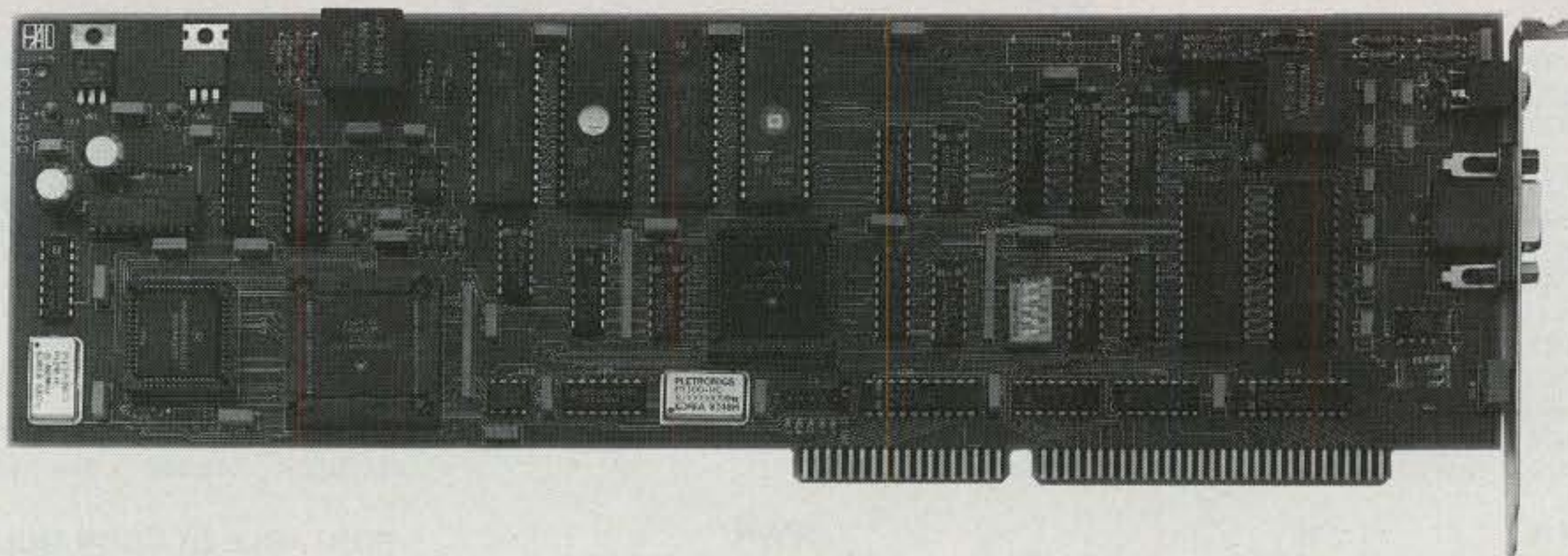
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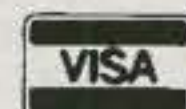
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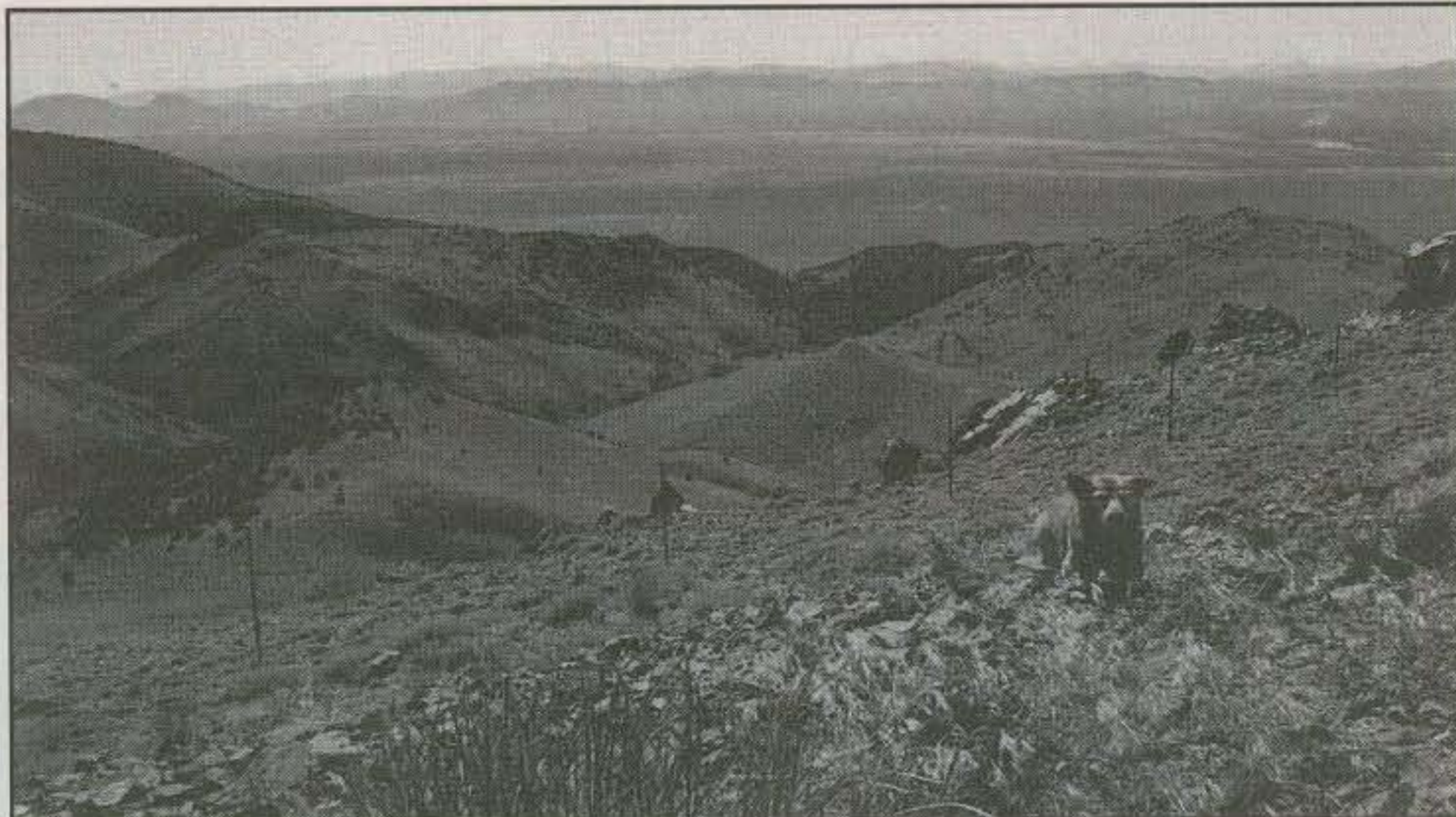
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With a view like this, how can you concentrate on a contest? Tim Marek, NC7K, operated from here, Austin Summit, in DM19 during the contest. (Photo courtesy NC7K)

FIXED STATION SINGLE OPERATOR

**NORTH AMERICA
UNITED STATES**

N1FUS	930	31	30	BD
NY1U	806	26	31	BD
WB2VVV	12,920	136	95	ABCD9E
WG2I	1,680	44	35	B
N2QHS	300	15	20	ABD

KC4YO	13,570	115	118	ABDE
WB2QLP/4	7,396	86	86	AB
KM4XW	627	19	33	ABD
KS4S	40	5	8	A

WD5EWD	24,021	157	153	ABD
KB5IUA	15,162	133	114	ABCDE
WD5K	11,984	107	112	A
W5OZI	8,624	88	98	AB
W5NZZ	2,173	41	53	ABCD

WB9AJZ/6	3,819	67	57	AB
WA6RAY	3,216	68	48	ABCD
W6PFE	3,000	60	50	AB
WA6FIT	1,204	43	28	BE
KC6TJV	961	31	31	ABCDE
KA6ING	504	18	28	A
K1FJM/6	496	31	16	AB
W6RCW	128	7	16	A

KE7CX	20,905	185	113	ABCDE
KG7FV	6,678	106	63	ABD
W7HAH	3,080	56	55	ABD
KT7G	3,021	53	57	B
WB7QBC	1,610	35	46	AB
KX7V	1,332	37	36	AB
N7YAG	1,155	55	21	ABD
K7NV	957	29	33	AB

WA8WZG	101,504	416	244	ABCD9EF
KE8FD	63,344	296	214	ABCDE
WA8QNR	8,294	97	92	AB

N9OZM	160	10	16	B
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N8LL	2,679	47	57	ABCDE
WB0CQO	2,565	45	57	ABD
KD0SU	986	29	34	A
NT0V	676	26	26	ABDE

CANADA

VE7XF	9,450	126	75	ABDE
KO4OE/VE3	1,224	36	34	A
VE6HDO	567	21	27	A
VE1SLM	483	23	21	ABD
VE6JW	432	18	24	A

MEXICO

XE2HWB	88	8	11	A
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**AFRICA
CEUTA & MELILLA**

EA9UG	12	3	4	B
EB9JM	2	1	2	A

ASIA

J13BFG	644	28	23	ABE
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**EUROPE
GERMANY**

DL1ZC	50,058	309	162	BDE
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HUNGARY

HA8KAX	841	29	29	B
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SLOVAK REPUBLIC

OM3OM	165	15	11	A
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SPAIN

EA4LY	2,200	50	44	BDE
				(Opr. EA2LY)
EA7ERP	224	14	16	B
EA7BHO	150	10	15	B

PORTABLE STATION SINGLE OPERATOR

**NORTH AMERICA
UNITED STATES**

WA2HFI	4,823	91	53	ABD
WN3C	924	29	45	BD
WB4CTW	40,406	227	178	ABCD
N6NB	59,475	305	195	ABCDE
WA7JTM	16,500	132	125	AB
K9AKS	1,296	48	27	AB

ASIA

J12UNR	396	33	12	ADE
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**EUROPE
HUNGARY**

HA6VV/P	9,424	124	76	B
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SPAIN

EA1FBF/P	1,110	37	30	B
EB5GHL/P	418	19	22	B

FIXED STATION MULTI-OPERATOR

CLASS I

**NORTH AMERICA
UNITED STATES**

KB0ZQ	7,021	119	59	ABCDE
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FIXED STATION MULTI-OPERATOR

CLASS II

**NORTH AMERICA
CANADA**

VE7FEI	3,542	77	46	ABD
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**EUROPE
SPAIN**

EA3CQQ	464	41	24	BDE
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PORTABLE STATION MULTI-OPERATOR

CLASS I

**NORTH AMERICA
UNITED STATES**

N4KWX	11,115	117	95	ABCDE
NW7O	40,341	339	119	ABCDE

MEXICO

XE2/N6CA	48,348	306	158	ABCD9EFGHI
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**PORTABLE STATION MULTI-OPERATOR
CLASS II**

**NORTH AMERICA
UNITED STATES**

KC6WLC	55,275	335	165	ABCD
AA7NH	32,670	210	156	ABD
AJ0E	12,720	106	120	ABD

CANADA

VE7ZZX	1,624	58	28	B
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AFRICA

ED9WPX/P	210	15	14	B
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EUROPE

I4JED/4	21,294	169	126	ABDE
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THE NETHERLANDS

PA6VHF	70,668	453	156	B
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QRP

**NORTH AMERICA
UNITED STATES**

NM1K	15,776	272	94	ABCD9E
AA2EM	28	4	7	A
WY3C	5,220	87	60	BCD
K3VGX	2,530	55	46	B
KB5SUR	60	6	10	AB
NJ6J	19,673	191	103	ABCD9E
K6LMN	1,170	30	39	ABC
N8AXA	2,236	43	52	ABCD

CANADA

VE2PIJ	297	27	11	BD
VE7XO	180	12	15	AB

EUROPE

EA/EH1DVY/P	1,512	36	42	AB
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CZECH REPUBLIC

OK1MBR/P	784	49	16	B
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ROVER

NORTH AMERICA

K6AAW/R	4,672	64	73	B	5
K7CW/R	10,476	97	108	BD	6
NC7K/R	3,654	63	58	BD	5
N8NQS/R	118,784	464	256	ABD	5
KA0OWT/R	690	23	30	B	4

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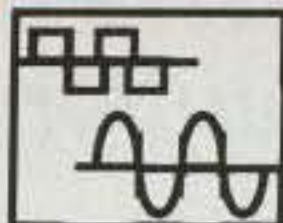
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SG-7 Complete kit.....\$99.95

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CSSD matching case set.....\$14.95
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When you have thoughts of moving up to the big time, the primary consideration should be your antenna. Most of us don't have the room or whatever to put up what our fantasies dictate. KØSR has worked out more than a happy-medium solution to that problem in more than journeyman fashion.

A Compact, Four-Band Quad Array

BY STEVE ROOT*, KØSR

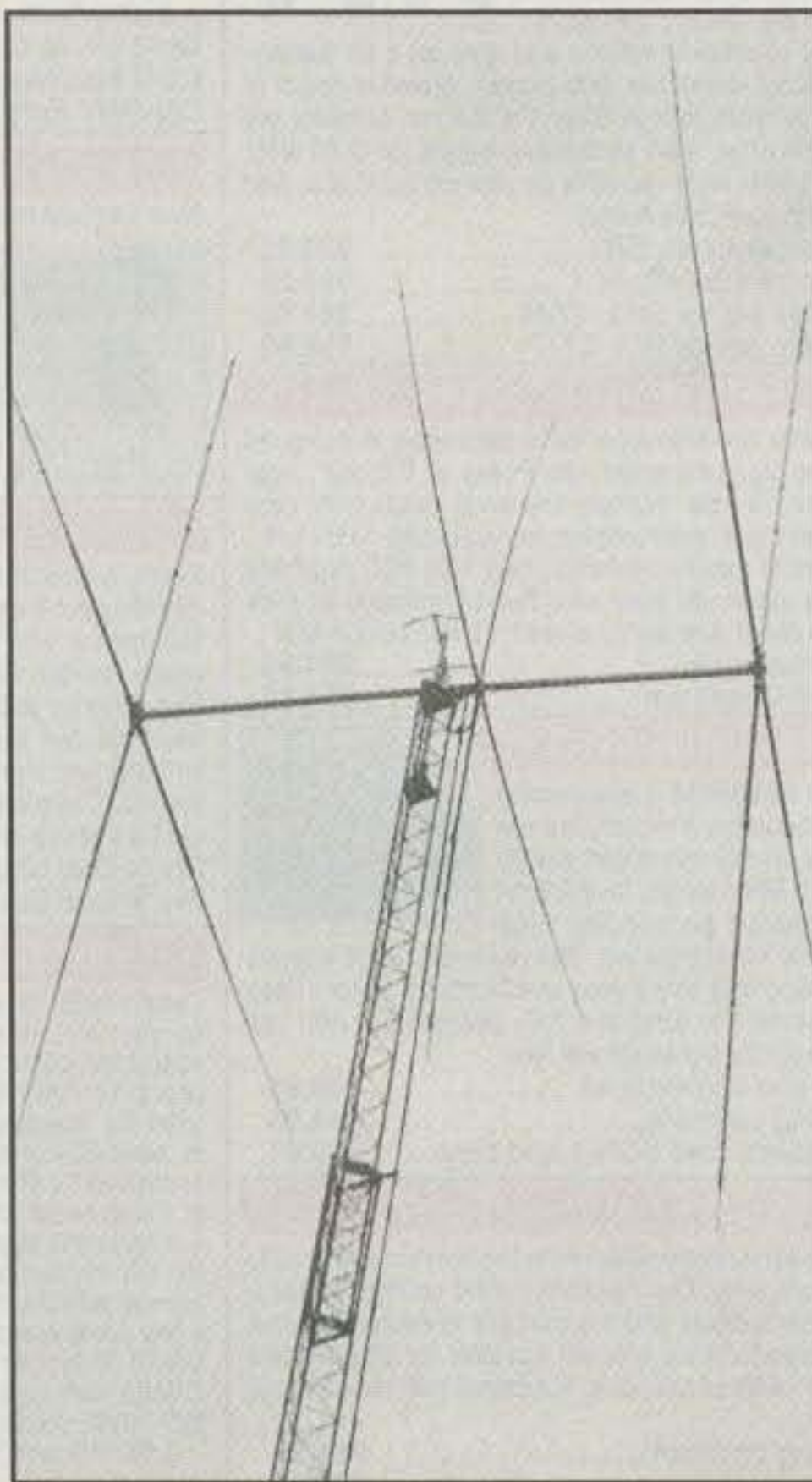
Every once in a while someone who has built a better mouse trap comes along. Steve Root, KØSR, has done just that. Over 300 countries worked and confirmed on 40 is no small achievement. It requires a really good signal to accomplish such a feat from the north central part of the U.S.A. (plus top-notch operating!). Not only is there the 40 meter antenna, but the system lent itself to the addition of a 20, 15, and 10 meter quad. Here is Steve's antenna system, and it's a good one.
Lew McCoy, W1ICP

One of my favorite bands is 40 meters, and while wire antennas are sometimes suitable, they really are not my cup of tea. I wanted a beam, and after much thinking and searching, I decided that a quad was the answer.

My goal was to design an antenna that had gain and directivity on 40 without severely compromising the higher bands. Also, most important, the antenna had to fit my space. After much study, the answer became apparent—a 2-element quad on 40 meters. However, a full-size 40 meter quad was just not practical. But a quad, even if it was electrically short, would provide at least 5 dB of gain, plus good front-to-back ratio.

From my studies on quads, I found that with careful attention paid to symmetry, a good, clean pattern would result. Not to be ignored was the fact that if I had the 2-element 40, I also had room for at least 3 more bands—3 elements each on 20, 15, and 10. These additional antennas could push 9 to 10 dB gain each, all fitting on the same boom.

The antenna had to be compatible with my existing tower and rotor, and have a total wind area of less than 15 square feet. Also in my design criteria was the antenna could be assembled by one or two people, making the project even more feasible. If an army equipped with a boom



The KØSR quad. The driven element (center) is near the tower and approximately 8 feet from the director end. Note the double-truss wires at the center of the boom, one on each side of the mast. This double truss gives much more strength to the system. (Photos courtesy Ramona Root)

truck was required, then it was simply not practical for the average installation. The final consideration was cost. If the project exceeded the cost of a 40 meter Yagi, a tribander, and the associated rotor, then again the project would not be practical.

Configuration

Because of the proximity of my tower to the house, a boom length of 18 feet was chosen. This allowed me to use the roof as a platform from which to work. I also

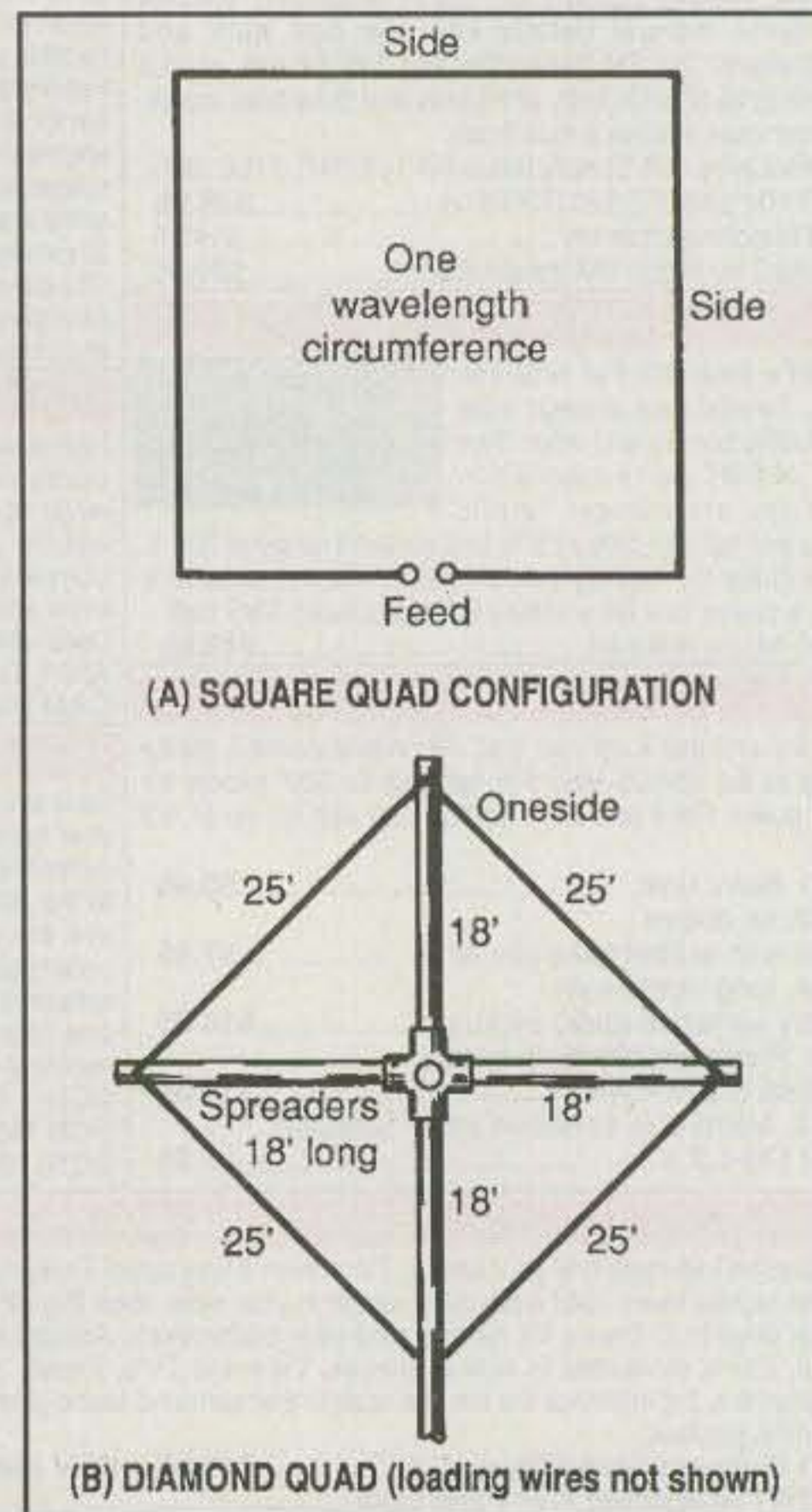
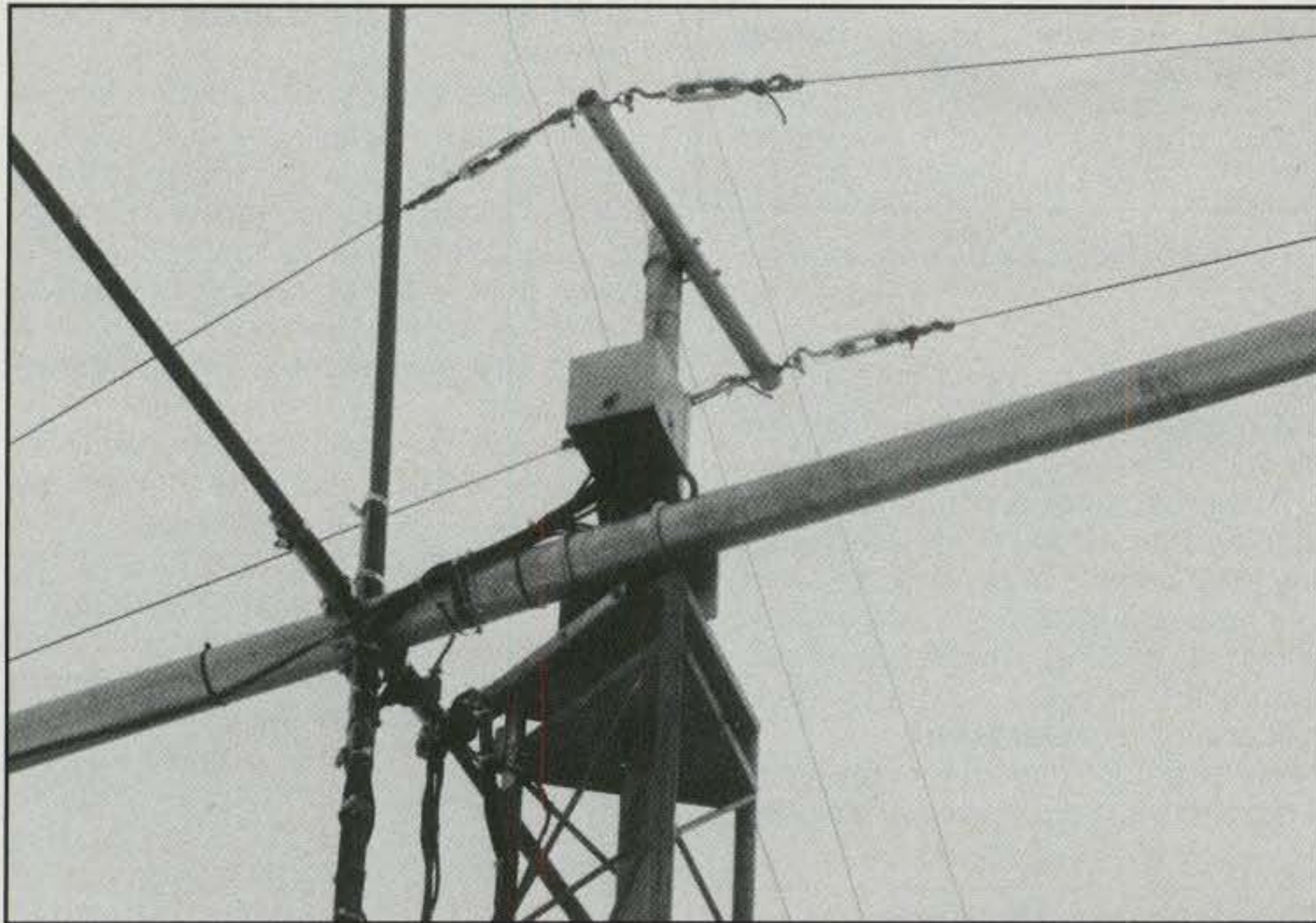


Fig. 1—There are two quad configurations that can be used—the square at (A) and the diamond shape at (B). In my case I used the diamond configuration. As you can see, for the 40 meter quad my sides are 25 feet and the vaulting pole spreaders are 18 feet from the boom to the outside. The actual wire dimensions are given in Table I. At (B) I have only shown the wires for the 40 meter loop. The other bands would fit inside this loop.

favor shorter booms for mechanical reasons; wind loading isn't as severe, so it is easier on the rotor. The 18 foot boom length also works out well for the 3-element arrays on the other bands. Therefore, my first consideration was boom length. Because element spacing for 40 meters isn't critical with two elements, spacing with a 40 meter driven element

*243 Fourteenth Ave. So., South St. Paul, MN 55075



Close-up of the double-truss arrangement. The remote antenna switch (in the box) is also visible.

and reflector could be anywhere from 16 to 24 feet.

As I said, a full-size 40 meter quad would have been rather large, so the 40 meter elements are not full size. The spreaders required for a full-size element 40 meter quad would have been 26 feet long, plus each side at 30 feet plus, and that was simply too big. Techniques for shortening an element have proven successful in other applications, with a lower practical limit being about 70 percent of full size.

For the reader who doesn't understand quads, let me give a little explanation. A regular-size quad uses elements that are approximately one full wavelength in circumference. Also, a quad has four equal-length sides. In addition, a quad can be put up in a "square" configuration or a "diamond" shape (the sides are always equal in length in either configuration; see fig. 1).

In my case, reducing the size of the 40 meter quad meant that each of the four sides would be 25 feet in length. Thus, 25 feet on a side, with 18 foot spreaders, is what I used. The shortened element is tuned to resonance by adding capacitance at the side corners of the element using additional lengths of wire (fig. 2).

This method has the advantages of being easier to adjust than linear loading, and the loading isn't in the high-current part of the loop. The high-current points are where most of the radiation from the element occurs.

Element lengths for the higher bands were developed empirically, based on what I've used in the past. Resonance in my case is biased toward the CW end of

the band. Other published dimensions would probably work as well (see *The ARRL Antenna Handbook* and Bill Orr, W6SAI's *All About Cubical Quad Antennas* book).

A quad loop is a lower Q device than a dipole, so its length isn't as critical. The parasitic elements are tuned closer to the driven element for the same reason, typically being only 3 or 4 percent different in length.

As mentioned above, there are two possible configurations for the quad—the "square" and the "diamond." The square doesn't hang down the tower as far as a diamond shape, but from a mechanical standpoint the diamond is superior. It lets freezing rain water run off the wires instead of accumulating. With the 40 meter elements it also allows for longer tuning wires. Also, the current points of the loop are farther apart, increasing gain (gain from stacking).

Most of the wind load is in the big elements at the ends of the boom. A mast to boom truss removes the bending movement from the boom and makes the whole array much more rigid. A double truss was used to provide lateral support—one truss on each side of the mast, because a single truss would have the center up-right spreader in the way.

Choice of Materials

The boom is a piece of 3 inch diameter aluminum irrigation pipe. This material is readily available, and going to the larger diameter makes for a stronger design.

The spreaders were fabricated from vaulting poles and commercial 13 foot

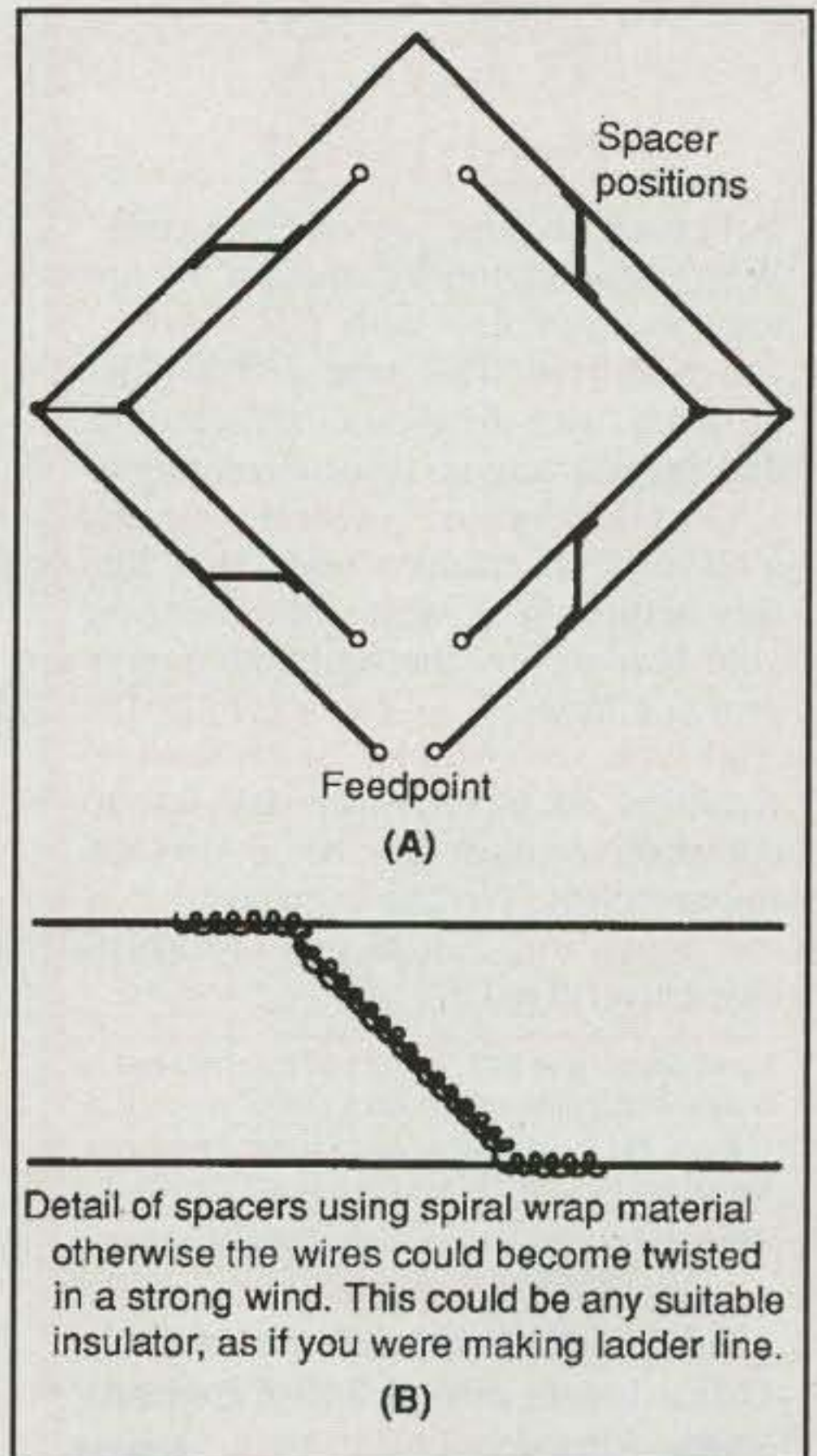


Fig. 2— At (A) is the system for loading/shortening quad elements. The method originated with G3FPQ and has proven to be very successful. The loading wire is 12 inches from the quad element. Side dimensions are 25 feet. Tuning wires are about 16 feet long for the driven element, and 19 feet long for the reflector. Spacing between element and tuning wire is 12 inches. Spreaders are each 18 feet long. At (B) is the method for holding the loading wire in place. The material is spiral wrap, which is used for bundling wires. A piece of wooden dowel is used in the center of the spiral to hold the piece steady. I have used this system for a couple of years through wind, snow, etc., and it has proven to be trouble free.

fiberglass spreaders. Fiberglass holds up well to weather and is quite strong. Vaulting poles are readily available and are extremely strong (for source, see the notes at the end of this article). It might be possible to extend standard spreaders with aluminum tubing, but the introduction of other conductors in the near field of the antenna would be undesirable.

The wire in a quad is obviously the actual antenna, but remember that it also is an important structural member as well. When the wind blows, the wire sees considerable flexing and straining. Because of this, stranded No. 14 copperweld was used for the element wires on all quads. I also have had success with a single strand of No. 18 copperweld, which is

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Band	Reflector	Driven	Director
40	100	100	
20	73	71	68.375
15	49.083	47.5	26.251
10	36.542	35.19	34.417

Table I—KØSR's element lengths.

very inexpensive and light. Do not use soft drawn copper wire because it will stretch forever.

The spreader to boom clamps are commercial units. I don't know if there is any way to fabricate a clamp that is as strong, light, and straightforward as a one-piece aluminum casting. These clamps have been used for years on various quads I built and have never failed.

The boom to mast plate is a piece of scrap aluminum and some muffler clamps.

Construction Methods

Three different-size spreaders are used. The middle element in the array uses standard 13 foot commercial spreaders. The end elements use 18 foot spreaders made from standard 13 foot spreaders and vaulting poles. The upright spreaders in the diamond configuration hold up most of the weight of the wire, so they have to be stronger than the others.

This antenna uses 15 foot long vaulting poles with a 3 foot extension, cut from a standard spreader. The side and downward spreaders are standard 13 foot spreaders extended with a 6 foot piece of vaulting pole. It broke my heart to take a saw to those beautiful 15 foot vaulting poles, but it is less expensive to use standard spreaders to make up the length, and you really don't need the full diameter out at the end with the light-duty spreaders. This minimizes wind load.

To join the standard spreader to the vaulting pole, a shim was made from a section of black rubber hose found in the local hardware store. Although close to the proper wall thickness, etc., it required some sanding to achieve a snug fit to the inside diameter of the vaulting pole. A 6 inch long slit was cut lengthwise in the end of the vaulting pole, and a stainless-steel hose clamp was used to make a

compression fit. No slippage has been observed.

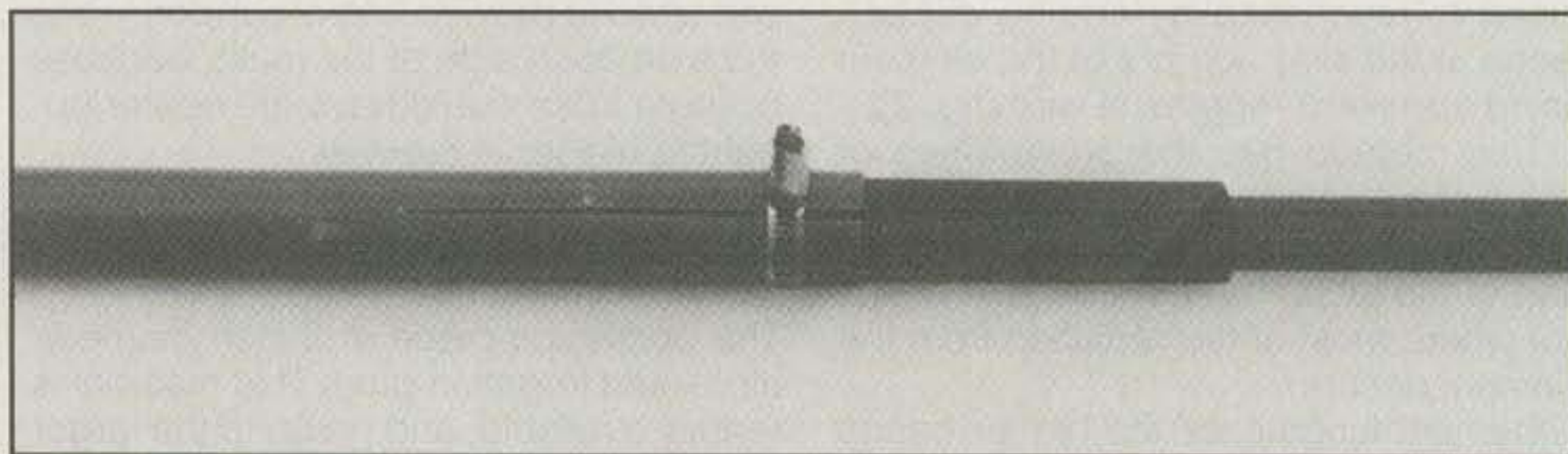
The wires were cut to length using a 100 foot tape. A one inch allowance was made on both ends for splicing. If the splice in the wire lands on top of a spreader, considerable flexing may occur at the solder joint. For this reason, the splice should be offset. Then it will see only a pulling stress when the spreaders move in the wind.

To attach the wire to the spreader, I prefer the method first described by Landskov.¹ The wire is first tied to the spreader using string in a criss-cross fashion. This is followed by fiberglass filament tape and then regular electrical tape. The filament tape will deteriorate due to ultraviolet radiation, but the electrical tape will shield it. A cable tie over the tape will keep it from unraveling into little banners flapping in the breeze. This method allows for some adjustment of tension, and also eliminates the need to drill holes through the spreader. The traditional method, using holes, will weaken the spreader and may result in breakage. Remember that my antenna has been up for a few years in severe Minnesota winters, so I know the techniques prove out.

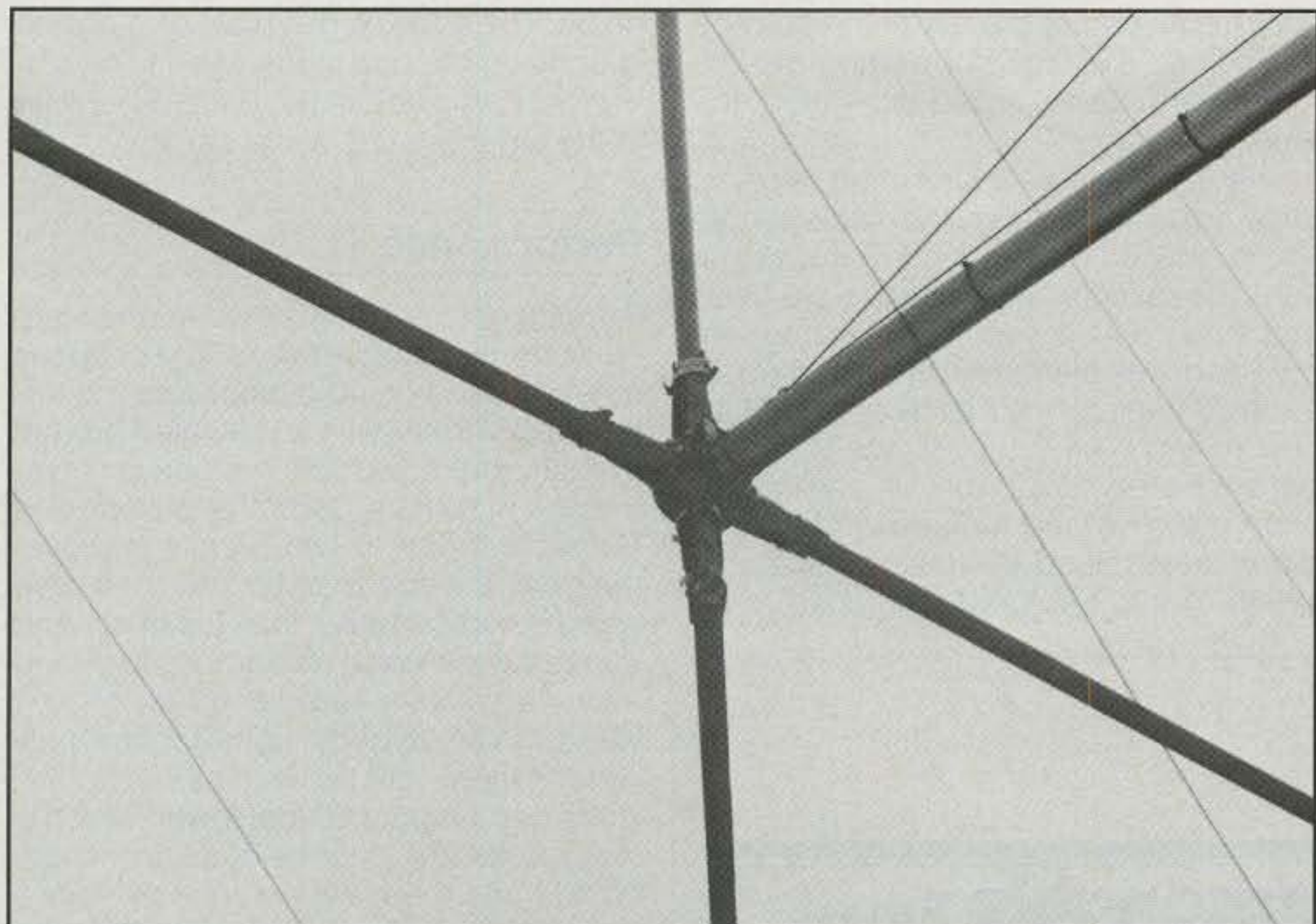
To maintain proper current distribution in the element, it is a good idea to keep the assembly as square as possible. To do this, the wire is marked off with pieces of tape at each "corner" position. The attachment points out on each spreader were marked with a pen. The two points should intersect; if they don't, something isn't square. The dimensions I used can be found in the Table I. Start with the smallest loop (10 meters) and work outward. When the 40 meter elements are built, the tuning wires should be made as long as possible, since they will be trimmed later to tune the element to the proper resonant frequency.

It isn't necessary to string the element like a violin! Even though this may appear pleasing, the extra tension will promote wire breakage. Just enough tension should be used to hold the element in shape. The spreaders should flex. Think about the abuse a fiberglass fishing rod can handle!

The feed point of each driven element deserves special consideration. Small



Here is a detail of the 40 meter spreader. The large diameter is the vaulting pole, then the rubber shim, and the smallest diameter is the end section.



Detail of the spreader clamps at the boom.

loops are formed at each end of the wire, and a piece of string is run through these loops and around the spreader to make the attachment. The filament tape and electrical tape are applied over the string to complete the mechanical attachment. Next the coax is soldered in place, and the whole thing is weatherproofed with a product such as Coax-seal®. It is very important to keep moisture out of the end of the coax. With the diamond configuration, the downward spreader provides a solid position for the feed point, and the feed line can be dressed along the spreader and back to the boom. This will minimize movement at the solder connections.

The spreaders are held to the boom clamps with stainless-steel hose clamps. It isn't necessary to "crunch down" on the spreader, just hold it firmly in place. Otherwise a broken spreader can result.

Each element is assembled on the ground, and brought up to the boom one at a time. I have a crank-up tower, and when it is nested, I can reach the end of the boom from the roof of my house. Alternatively, a tall step ladder could be used. With a free-standing tower, the boom could be placed at an appropriate height for assembly and then the completed antenna hoisted up to the top.

Tuning and Feeding

Proper current distribution is necessary for a good antenna pattern. This is achieved with element geometry and with a good balun at the feed point. The current-type balun works well and is compact. It consists of a number of ferrite beads placed over the outside of the feed

line, near the feed point. The amount of inductive reactance is proportional to the number of beads and frequency. I used "Super Beads," available from Radiokit, Amidon, and The Wireman. Radiokit also sells a balun kit that uses 5 beads and is rated down to 160 meters. I used 5 beads on 40 meters, 4 beads on 20 meters, and 3 beads on 15 and 10 meters. The beads were taped up and sealed against moisture; otherwise they could crack in the winter.

There are two alternatives to the beads. One is to use a linear sleeve balun. This device is made from a quarter-wave length of braid placed over the feed line and electrically attached to the feed-line braid at the end away from the feed point. It is inexpensive and simple to construct.

Another simple method of keeping the feed coax shield "cold" for RF is to grid dip the shield with the antenna attached. If a dip shows up in the band, simply add a few feet of coax to get the dip out of the band, and the shield will be cold, preventing feed-line radiation.

A separate feed line for each band is run to a remote antenna switch placed on the mast. Even though tying all the feed points together has been a standard practice, I know that common feed will cause interaction problems, both on 40 and 15 and 20 and 10, complicating impedance matching. There are commercial units available, or one could be constructed using relays.

The loaded 40 meter elements are tuned to resonance by introducing capacitance at the side corners (see fig. 2). This method was developed by G3FPQ, and described by Devoldere in his book.² The technique has been applied differ-

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ently here due to the diamond shape of the element. Longer wires are possible this way.

The spacers seen in the drawing keep the tuning wires from twisting around the element during windy conditions. Any light-insulating material would work. I used pieces of "spiral wrap" material (used to bundle up wires) with a stick slid down the middle. The ends simply were wrapped around the wires.

The four-band reflector was built first and placed on the tower. The lower corner of the 40 meter element was made like a feed point. This permitted a small loop to be placed in the loop so that the reso-

nant frequency of the element could be measured. This was done using two different instruments, a grid-dip meter, and a noise bridge.

The length of all four tuning wires is trimmed to keep them the same length and to maintain proper current distribution. The reflector was tuned to 6.8 MHz, or 3.5 percent below the design frequency. The driven element was then tuned for the best impedance match at 7.05 MHz. This may not be the best way to tune a parasitic array, but it worked! The impedance match of the higher bands is primarily determined by reflector spacing, which in this case is fairly close to 50

ohms. The addition of a matching device is undesirable due to the need to weatherproof it, and adjustments are difficult up in the air. It really is unnecessary.

Performance

It is difficult to estimate how well an antenna works in absolute terms. The previous antenna used on 40 meters was a quarter-wave vertical with an elevated ground system, and it was left in place for comparison purposes. On both stateside and DX signals one to two S-units improvement with the quad was typical. In no case was the vertical better than the quad, and due to the low noise characteristic of loop antennas, it was surprising how often it was possible to copy signals that simply weren't there with the vertical.

My quad is on a 50 foot tower, which is really quite low in terms of a wavelength on 40 meters, yet the antenna exhibits a reasonable pattern. It has been observed that in DX pile-ups this array will outperform vertical or wire arrays, and hold its own with Yagis at 70 to 100 feet.

An antenna that doesn't stay up isn't worth much, so most of the design centered on mechanical considerations. This quad has been up since August 1990 and has survived Minnesota winters and nasty thunderstorms without a problem. How good is this shortened quad on 40? I have over 300 countries confirmed on 40, no small feat for this area of the U.S.

If you have any questions or would like more information, you can write to me at the address at the beginning of this article (please include an SASE).

Appendix

Suggested additional reading: *All About Cubical Quads*, by Bill Orr, W6SAI, 2nd edition, p. 46; *ARRL Antenna Anthology*, 1st edition, p. 56; *ARRL Antenna Handbook*, 15th edition, p. 12-2.

For vaulting poles contact Peterson Co., P.O. Box 25536, Salt Lake City, UT 84125 (801-972-3328).

For quad components contact the following:

Cubex Company, P.O. Box 732, Altadena, CA 91001.

Antenna Mart, P.O. Box 699, Logansville, GA 30249 (404-466-4353).

Lightning Bolt Antennas, RD #2, RT 19, Dept. Q, Volante, PA 16156 (415-530-7396).

Footnotes

1. H. Landskov, "Evolution of a Quad Array," *QST*, March 1977, p. 32.

2. Devoldere, J., *Antennas and Techniques for Low Band DXing*, ARRL, Newington, CT.

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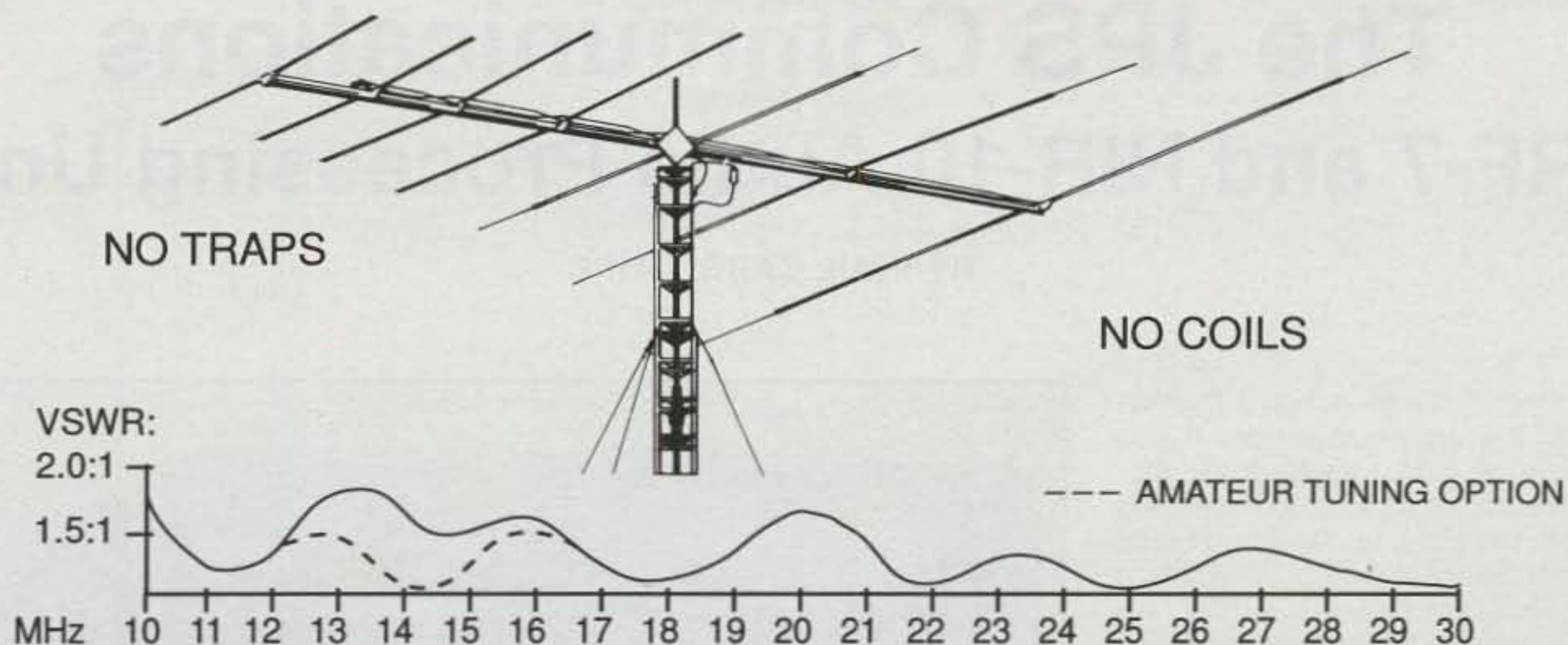
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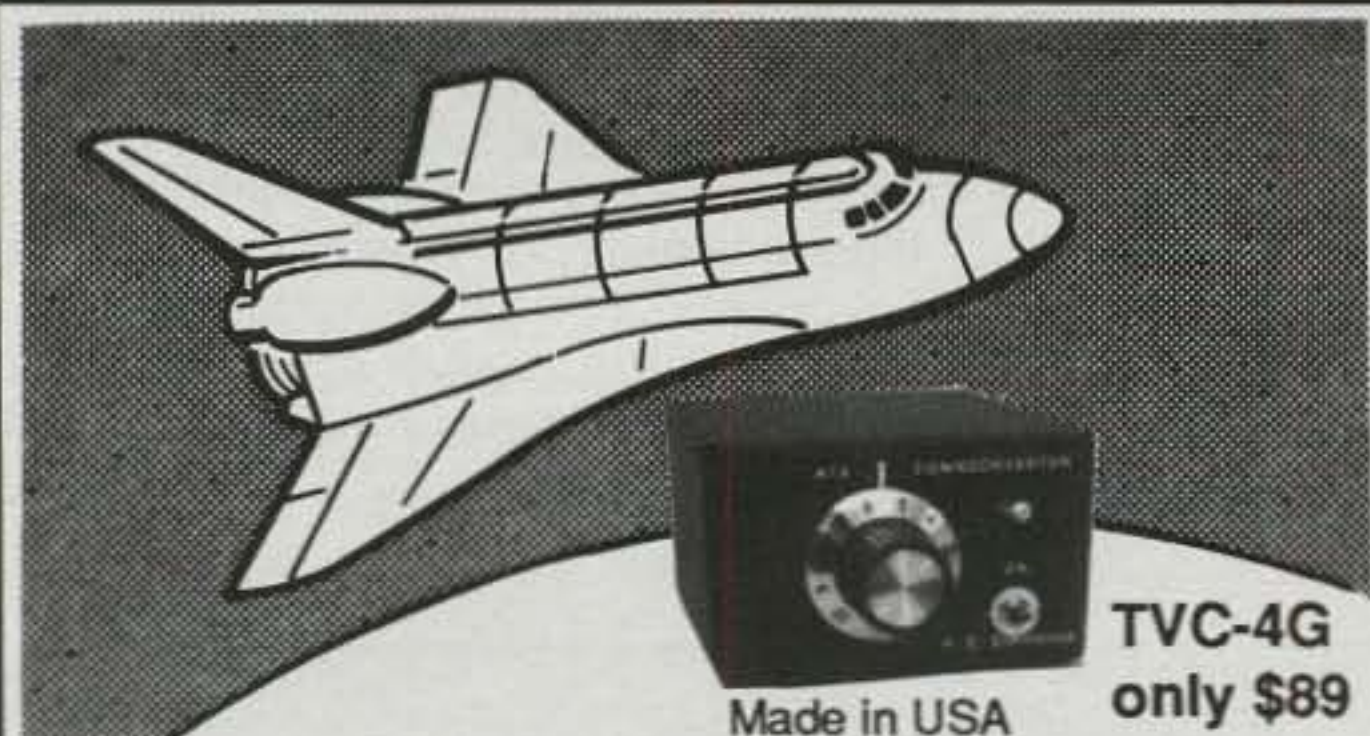
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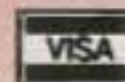
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CIRCLE 40 ON READER SERVICE CARD

CQ Reviews:

The JPS Communications NRF-7 and NIR-10 Audio Processing Units

BY PAUL CARR*, N4PC

We are waging a war—a war with interference on the amateur bands. If you don't believe it, just tune across your favorite band on the weekend. There they are—all the "big guns" in the world blasting interference at each other. Well, there are a couple of new pieces of artillery we can add to our shacks that will make life more pleasant during these battles.

The NRF-7 Noise Remover And Filter Unit

The NRF-7 is a general-purpose audio processing unit that provides a number of functions which improve receiving conditions on the amateur bands. The unit reduces the effect of atmospheric noise and multiple heterodynes. It can be installed between the headphone jack and a speaker or headphones, and can be powered by 12 volts from your rig or a separate power supply. The modes of operation are switch-selectable from the front of the unit, and there are enough choices to combat just about any conditions you may encounter. Let's take a step-by-step walk through the unit.

One very impressive feature of the NRF-7 is its ability to handle multiple heterodynes automatically. To test this feature, I injected three heterodynes of different frequencies simultaneously and viewed the results on an oscilloscope coupled across the headphones. There was practically nothing to be seen or heard. Next I varied the level of the signals, with the same results—the interference was gone. This was very impressive. I don't remember ever encountering more than three heterodynes on a single signal, so I think this shows that the unit will handle heterodynes on the air.

The NRF-7 also provides very sharp, steep-skirted audio filters for voice, CW, and Data applications. The voice filters may be used in conjunction with the notch filter to reduce heterodynes while providing additional selectivity within the audio passband. There are two voice bandwidths provided: 1500 Hz and 2100 Hz. Each has a shape factor of 1.15:1.

*97 West Point Road, Jacksonville, AL 36265

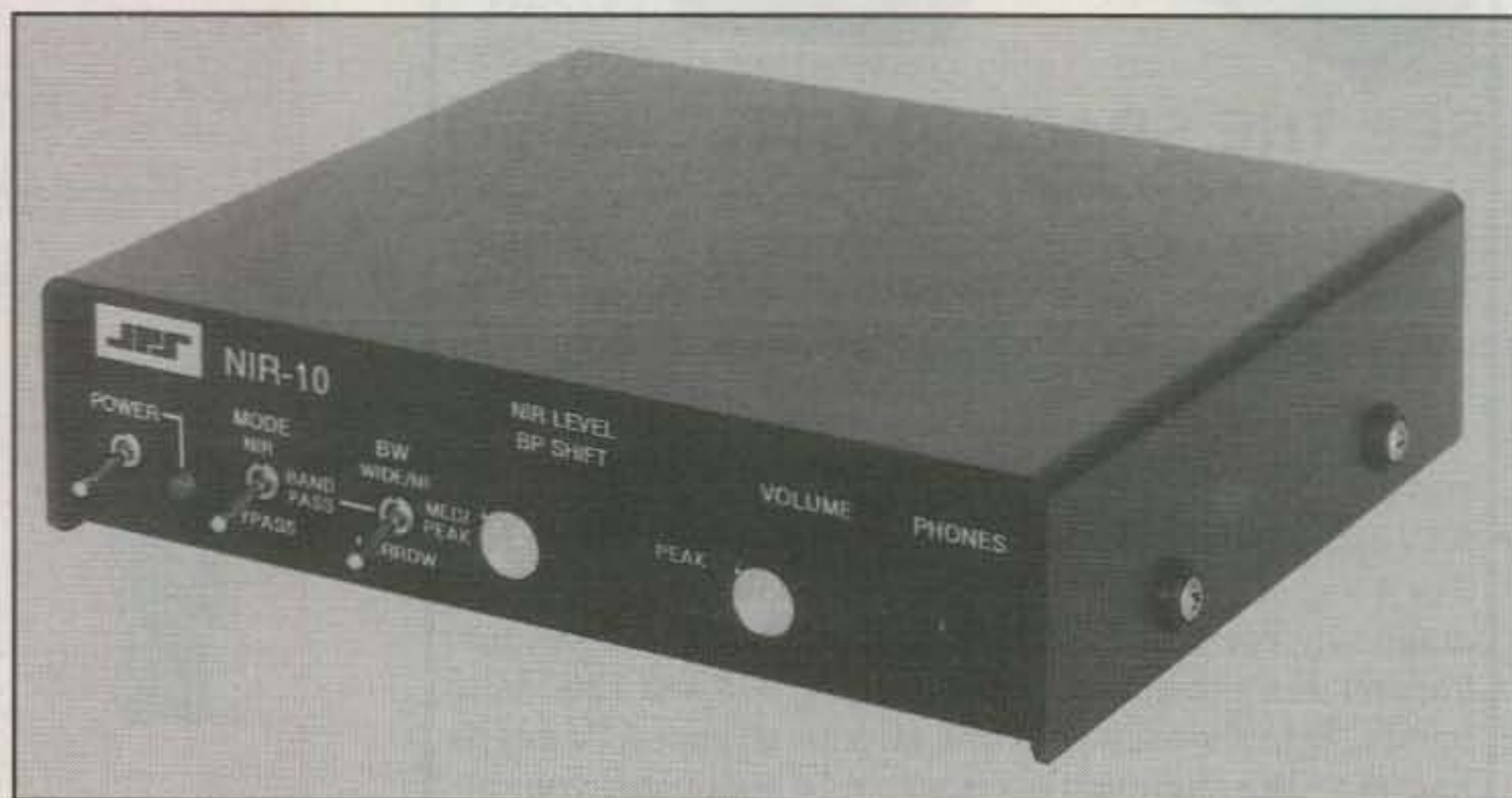


The JPS NRF-7 general-purpose audio processing unit.

There are two bandwidths provided for CW operation. The narrow (250 Hz) and wide (500 Hz) filters have internally selectable frequencies of 400 Hz, 800 Hz, or 1000 Hz. These filters are also very steep-sided, and they have a shape factor of 1.15:1. Additionally, there is a data filter with a bandwidth of 500 Hz centered at 2200 Hz for use on the digital modes. The shape factor on this filter is 1.4:1.

I have saved the peak mode for last because it is a very interesting function in its own right. From the JPS documentation:

"The PEAK mode is useful in reducing white or pink (thermally generated) noise from received signals. It works by providing a dynamic peak around all coherent signals, voice or otherwise. This, in essence, provides noise reduction by reducing the effective audio bandwidth to the minimum required. With CW signals, the tones existing in the audio passband are peaked, so if a CW signal can be separated with the receiver filter, it can be further peaked and noise-reduced using the PEAK function."



The NIR-10 noise/interference reduction unit from JPS Communications.

What this really means is that you hear no more bandwidth than necessary for the retrieval of the intelligence. This feature greatly reduces operator fatigue during long operating sessions. Should a heterodyne suddenly appear, switch to the **Notch + Peak** and eliminate the unwanted tone.

The NIR-10 Noise/Interference Reduction Unit

The NIR-10 is designed for use at the audio output of a communication receiver to enhance the quality of voice and CW signals. Two methods of noise reduction are provided in the DSP: spectral subtraction (NIR Mode), where the DSP recognizes the speech and reduces the amplitude of non-speech signals, and dynamic peaking, where the DSP forms dynamic, constantly changing bandpass filters around coherent parts of desired audio and reduces the bandwidth to the minimum required to pass the information. The reduction level in the NIR mode is continuously variable by a front-panel control. The unit also features an automatic notch filter (NF) mode. The NF mode will remove multiple heterodynes quickly, independent of the NIR control setting.

The unit has four operating modes: the **NIR** (Noise and Interference Reduction) mode; the **PK** (Peak) mode, which is helpful in reducing white noise; the **NF** (Notch Filter) mode, which removes multiple heterodynes; and the **Bandpass** mode, in which the unit operates as a digital audio filter with switch-selectable bandwidths. Either the PK or NF mode may be used in the Bypass or NIR mode. In the Bandpass mode the audio bandpass may be moved anywhere in the 300 to 3400 Hz range via a front-panel control. There are three bandwidths available. The two narrow bandwidths are useful for CW and Data, while the wide bandwidth is especially useful in reducing adjacent channel interference. The manual gives instructions for using the unit on transmit, but that feature was not evaluated.

A Bypass mode removes all processing delay, but allows the Peak and Notch functions to be used in real time. Connections on the rear panel allow the unit to be bypassed when the transmitter is keyed.

Overall Impression

Both units are small (2" x 7" x 6", or slightly less), and they are "built like a battleship." They have one purpose: to wage war against our old foe, QRM. These units can make your time at the rig more enjoyable.

The NRF-7 (priced at \$250) and the NIR-10 (\$350) are available from JPS Communications, Inc., P.O. Box 97757, Raleigh, NC, 27624-7757 (phone 919-790-1011; FAX 919-790-1456).

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CIRCLE 97 ON READER SERVICE CARD

29

Results of the 1993 CQ WW RTTY DX Contest

BY ROY GOULD*, KT1N

I guess we will have to live with alternating years as far as conditions for this contest are concerned. One year the propagation is outstanding; the next it's terrible. Ten meters was practically nonexistent in most entries. However, Chris, ZS6EZ, hung in there on 10 and made 392 QSOs and worked 64 countries!

Just over 400 logs from 85 countries were received this year, with some new calls rising to the winner's circle. The 1994 contest has a new rule: There are **no more** mandatory time-off periods; **all entries** may now operate the entire 48-hour period if they so desire. The time-off rule is the subject about which I receive the most complaints. Now it's gone. Also remember that we have High Power and Low Power categories, and please roll the States and Canadian multipliers in as country multipliers on your summary sheets, and check the rules.

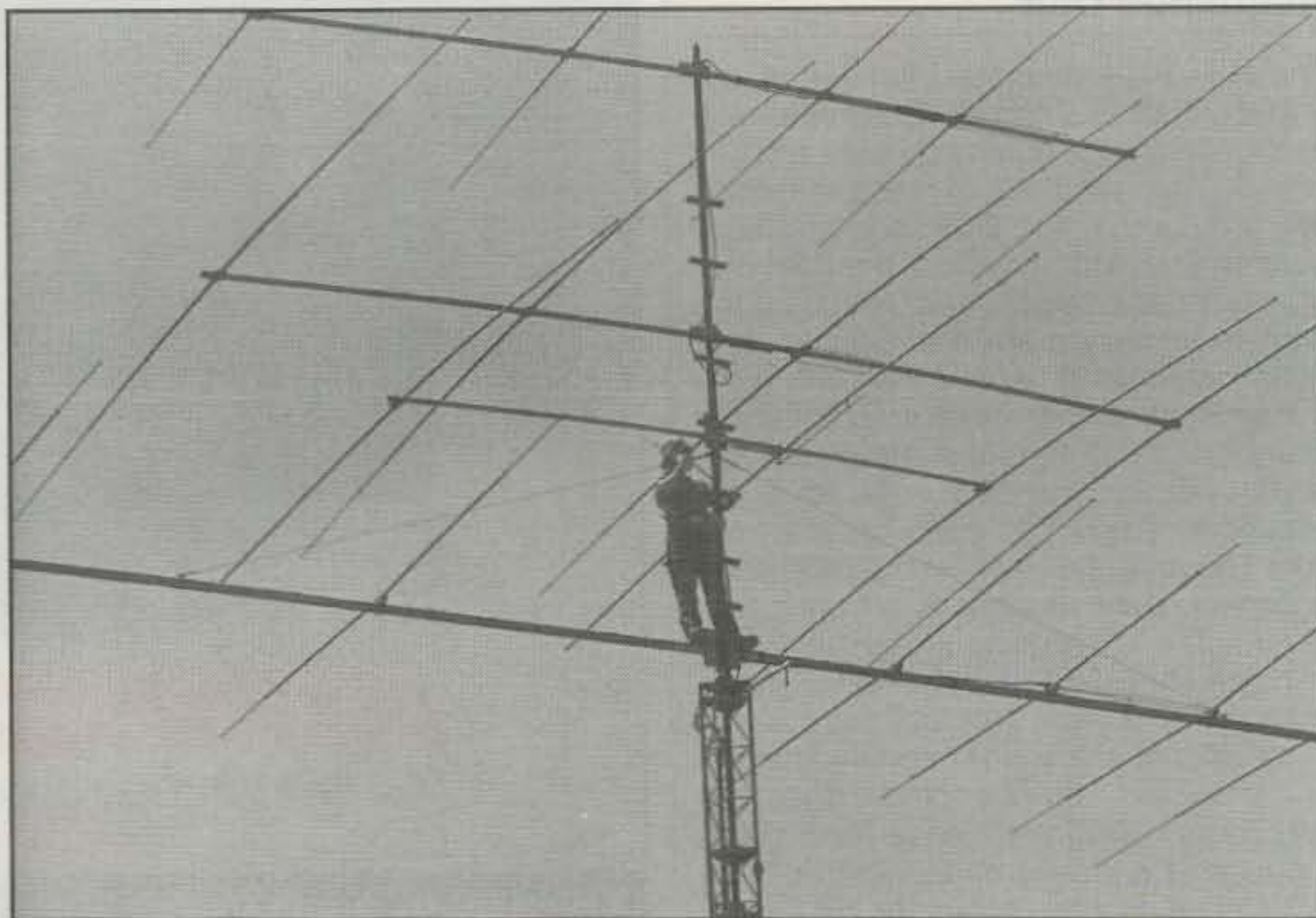
Single Operator Class

Hernani, CT3BX, operating as CR3Y from Maderia Islands, made 973 QSOs and a score of 1,031,894 points—not a new record, but enough to take the honors for World Single Operator in the High Power class. Patrick, HH2PK, made 814 contacts for a score of 702,512 points to claim the World Single Operator Low Power plaque. Victor, UH8EA, did not have a copy of the rules and turned in a log of over 30 hours of operating time, so I had to remove from the log the contacts that he made past the 30 hours. This was approximately 8 hours of contacts. As a result, his score of 911,180 points and 1166 QSOs was still good for second place in the World, and he was still the winner of the Asia plaque.

Europe went to Tommy, SMØHTO, with 732,700 points and 705 contacts. Barry, W3FV, took the North American plaque, making 778 QSOs for 664,258 points. South America went to Pasquale, YV5KAJ, operating as 4M5RY. Pasquale has been in every CQ WW RTTY Contest, and this year he made 687 contacts for 688,509 points using Low Power. Akihiro operating 7Q7XX won the Africa plaque, and CR3Y captured the World plaque. There were only two other Single Operator entries from Africa. Akihiro made 146 contacts for 29,784 points, and also made 146 people happy with a new multiplier.

In Hawaii Shido, AH6JF, made 559 contacts for 324,184 points, thus claiming the Oceania plaque. The United States plaque went to Greg, NV1G, from Maine, with a score of 659,890 points from 825 QSOs—more contacts and points than Barry, but Barry had those few extra multipliers.

In the Assisted class Roland, DK3GI, oper-



Tom, KT6V, looking for multipliers the hard way!

ating as DLØWW, was again the plaque winner with 969 QSOs and 1,135,575 points—more points than the previous year and the overall Single Operator high score. I2UIY was second, and Neal, AE6E, operating K4JPD, was third. Greg, N4CC, also broke the half-million point mark.

Single Band Class

For the 1993 contest we had sponsors for 14, 21, and 28 MHz awards. For 1994 we have all except 7 MHz sponsored. For 14 MHz Robby, VY2SS, turned in 374,550 points and also the high score for Canada. On 21 MHz 9A5Y operated by 9A3NM took the top spot with 199,251, and 28 MHz went once again to Chris, ZS6EZ, with 121,264 points. Jeff, K1IU, took leave of the Assisted class and made 273 contacts in 37 countries on 3.5 MHz to claim an impressive score of 39,710 points. Barry, W2UP, repeated as the 7 MHz top scorer with 489 QSOs and 68 countries for 125,656 points.

Multi-Operator Class

The number of entries again was up in this class. The group from club station UZ9CWA turned in a score very close to their score of last year, but this time it was good enough for first place (and not third) in the High Power category. They made 1716 contacts for 2,580,660 points. The TM7C group had 1,889,859 points for second place, followed by I2EOW, NH6T,

and the group from PI4COM all breaking the million point mark for third through fifth place.

In the Low Power class the group operating as US7I from the Ukraine made 823 contacts for 601,474 points to win the plaque. Close behind was the F6EKX group, 9A5D from Croatia, and 3D2YS from the other side of the world in Fiji with less than a thousand points separating the latter two.

In the Multi-Multi class it was W3LPL once again with 2,984,817 points, down from the previous year due to the conditions, I'm sure. Still they made 2078 contacts, which is one busy weekend. The VE7ZZZ group came in second with 708,414 points, followed by JJ3YBB with 586,249. Overall there were 48 Multi-Op entries. (This category is a good way to have fun with a group of friends or introduce RTTY to some newcomers over a weekend.)

Summary

We are always trying to obtain more plaque sponsors. If you are interested, drop me a note. Hopefully, my computer troubles are behind me, and as you read this you should all have your certificates and plaques. The rules for the 1994 contest, September 24–25, are in this issue. Note the only change is there are **no off periods**. All other rules remain the same. Of course, note the High and Low Power classes.

The letters and comments that accompany the logs are fun to read, and I'd like to share a few with you:

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WF7B	527,562
SM5FU	503,557
VS6BG	469,476

SINGLE OPERATOR LOW POWER ALL BAND

HH2PK	702,512
4M5RY (YV5KAJ)	688,509
K8UNP/C6A	479,577
OH3LIM	338,823
AB4MJ	300,960
I2TQU	275,892
W1BYH	244,608
AA5AU	243,858
YU7AM	240,120
KK4DK	222,762

SINGLE OP, ALL BAND, ASSISTED

DLØWW	1,135,575
I2UIY	854,496
K4JPD (AE6E)	688,347

MULTI-OP, SINGLE TRANSMITTER HIGH POWER

UZ9CWA	2,580,660
TM7C	1,889,859
I2EOW	1,309,756
NH6T	1,138,070
PI4COM	1,099,875

LOW POWER

US7I	601,474
F6EKX	582,417
9A5D	374,115
3D2YS	373,354
IV3FSG	260,568

MULTI-OP, MULTI-TRANSMITTER

W3LPL	2,984,817
VE7ZZZ	708,414

SINGLE OP SINGLE BAND 3.5 MHz

K1IU	39,710
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7.0 MHz

W2UP	125,656
WS7I	91,500
PJ2MI	79,928
YW1A (YV1AVO)	65,835
XQ8ABF (CE8ABF)	64,584

14 MHz

VY2SS	374,550
S51DX	293,433
LZ1BJ	229,536
WA7EGA	174,290
NN2G	160,876

21 MHz

9A5Y (9A3NM)	199,251
ZV2BW	147,972
LU8EKC	129,500
S53MJ	101,280
PU2LSR	81,300

28 MHz

ZS6EZ	121,264
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PLAQUE WINNERS

World Single Operator, High Power: Hernani M.F. Correia, CR3Y (CT3BX). Advanced Electronic Applications, Inc. (AEA) Award.

World Single Operator, Low Power: Patrick Cardozo, HH2PK. Eastern Washington Amateur Radio Group Award.

World Multi-Operator, Single Transmitter, High Power: Club Station UZ9CWA (UA9CGA, UA9CR, RW9CF & Igor). Advanced Electronic Applications (AEA) Award.

World Multi-Operator, Single Transmitter, Low Power: Club Station US7I (UB3IO, UB3IM, RB4IZ). HAL Communications Corp. Award.

World Multi-Operator, Multi-Transmitter: Station W3LPL (W3EKT, K4GMH, KF3P, N3UN, N3II & WR3E). CQ Magazine Award.

North America, Multi-Operator Single Transmitter: Robert Stolberg, KS9W. The GØAZT Award.

World Single Operator Assisted: Roland Mensch, DLØWW (DK3GI). CQ Magazine Award.

Continents, Single Operator, All Band

North America: Barry Gardner, W3FV. The TG9VT Memorial Award.

South America: Pasquale Casale, 4M5RY (YV5KAJ). The Contest Committee.

Europe: Tommy Oderman, SMØHTO. HAL Communications Corp. Award.

Oceania: Shido Takahashi, AH6JF. The RTTY Digital Journal Award.

Asia: Victor P. Pechorkin, UH8EA. The N5JJ Memorial Award.

Africa: Akihiro Sakai, 7Q7XX. The Contest Committee.

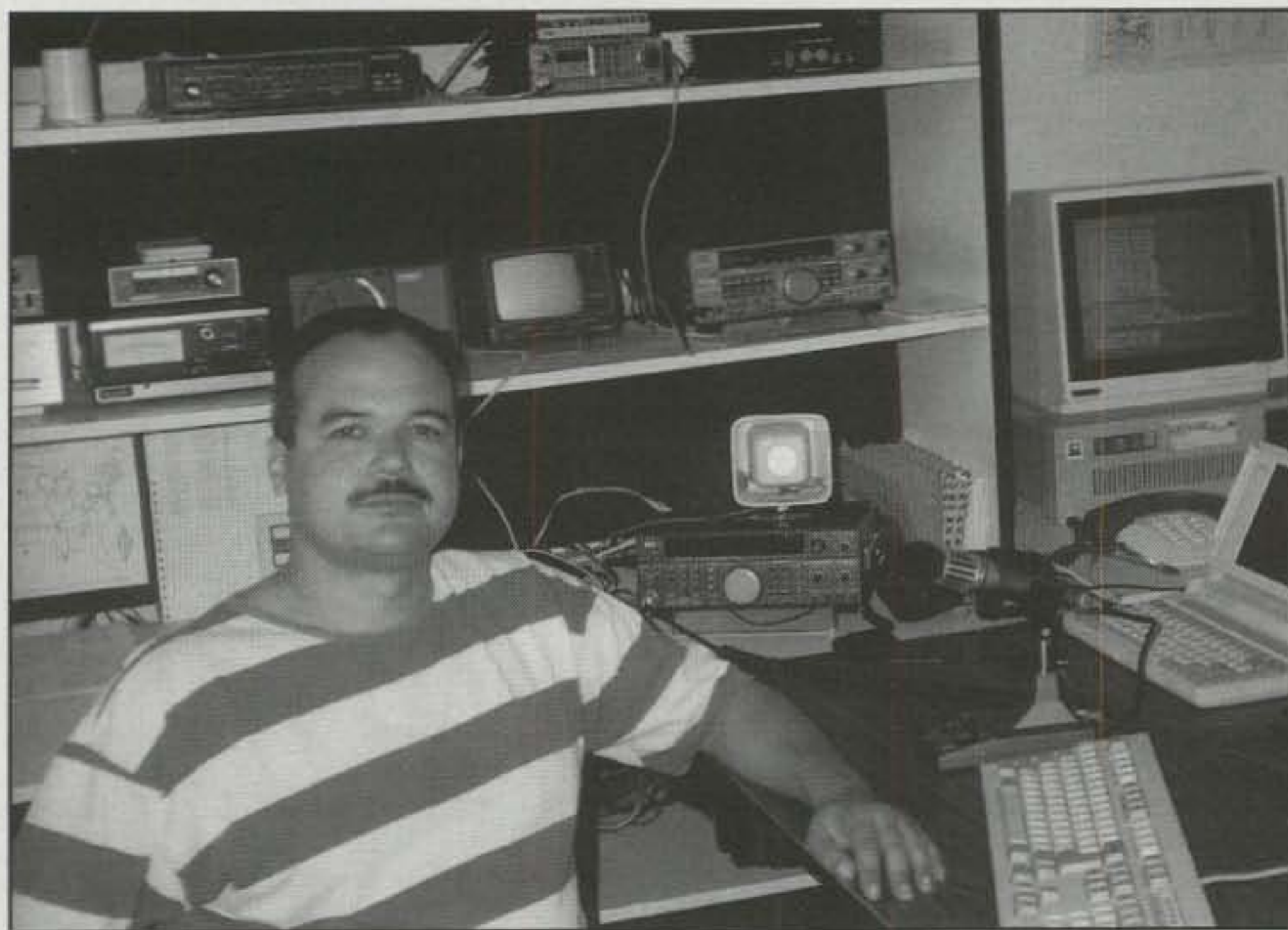
United States: Greg Finch, NV1G. RTTY by WF1B Award.

World Single Operator, 14 MHz: Robby Robertson, VY2SS. Kunihiko Fujii, JH1QDB Award.

World Single Operator, 21 MHz: 9A5Y (9A3NM). Denis, WD4KXB & Mike, KA4RRU Award.

World Single Operator, 28 MHz: Chris Burger, ZS6EZ. The Contest Committee.

Novice/Technician High Score: No Entry. N2HOQ Award.



Patrick, HH2PK, World High score, Single Op, Low Power.

"I hope my log is not lost like last year, because I looked in August QST and did not see my call."

"Get rid of the stupid three hour off period." (I did—ed.)

"I was trying to hook up my PK232 and make a RTTY contact, and suddenly I was in a BIG contest."

My thanks to the many RTTY operators around the world for participating. Special thanks to Gail at CQ for putting up with me, and also to my assistants, Roland, N1FTD; George, KB2VO; and Dale, W6IWO, editor of the RTTY Digital Journal. 73, Roy, KT1N

Comments From NA

This is definitely a "Gentlemen's Contest" . . . AAØGY. Condx from Colorado were the pits . . . AAØKA. What's with ops sending the exchange before they know if they are being copied? . . . AA4M/6. Pleased to see a Low Power class, but this was tough with the condx . . . AA5AU. I don't think I have ever gone that long without talking . . . AA5VN. Tremendous contest! . . . AB4MJ. I knew it was going to be a tough contest when my neighbor called to tell me that his garage door was going up and

down on my transmissions! . . . **AB8K**. Great idea to include a Low Power category . . . **HH2PK**. Had date with gorgeous blond Friday night; she said, "Next time NO contests!" I am going to miss her . . . **K4SB**. First time with software; still on learning curve . . . **K5KLA**. Great contest! . . . **K7WUW**.

Tell the stateside gang I know my call; I need theirs! Good contest, but I don't know about the 3 hour rule . . . **K8UNP/C6A**. Thanks, guys; great test . . . **KA3JFI**. Please send your correct two-letter state abbreviation; MO is not Montana . . . **KD1GG**. My first RTTY contest—GREAT! See you next year . . . **KP2BH**. First RTTY contest; raised my DXCC from 47 to 80 . . . **KT6V**. The CQ WW RTTY is the best contest of the year . . . **N2DL**. My goal was to make 600K points; didn't quite make it . . . **N2FF**. Get rid of the 3 hour off rule . . . **N4CC**. (OK, OK, I did—ed.) Had to be out of my mind to operate 80 meters at low power . . . **N5NMX**. Biggest thrill was working **VK6HD** off a dipole . . . **NM7N**. I am always pleased with the sportsmanship of the RTTY crowd . . . **NO1J**. Good test, but no condx . . . **NQ6C**.

Marathon software worked great; condx really stunk . . . **VE6JAV**. Addition of Low Power good move; anxious to see who the competitors are in this class . . . **VE6KRR**. Put my feet up on the desk and let **WF1B** do all the work . . . **VE7IRA**. How abt a club competition to stimulate activity? . . . **W2UP**. The best of all the RTTY contests . . . **W9KDX**. Murphy really screwed me up this year . . . **WB8YJF**. My second RTTY contest. How can a contest be relaxing? . . . **WF7B**. I recommend that all contesters try this contest. I had so much fun . . . **WX0B**.

Comments From DX

Lost the linear Saturday; ran 50 watts the rest of the time and no 80 meter antenna . . . **4X0A**. Heard and called my US and VE stations, but only three worked. Listen more, gang . . . **9V1ZM**. My 50 watts cannot compete with the QRM by the high power stations . . . **A45ZO** (Low power stations compete only with other low power stations.—ed.). Too cramped of spectrum; 20 kHz is just not enough . . . **A45ZW**. Delighted to have taken part in 93 CQ WW RTTY . . . **BY1QH** (Opr. **BZ1QL**). Eighteen hours is too much time off. Can't we find a better solution? . . . **DF3CB** (We did. See new rules—NO off periods.—ed.). My first RTTY contest. Thank you, CQ, for nice contest . . . **DU7AFT**. Took Sunday as day off due to my girlfriend . . . **EA3GCV**. (Get a new girlfriend!—ed.)

Fine contest, but much QRM . . . **ES7FQ**. More than treble my score. Not bad for a low power station on a vertical in the centre of London . . . **G4XDD**. Great contest. It allows us small fish to swim with the big fish without being eaten . . . **GW0ANA**. Many visitors, so no time to work contest . . . **HB0/HB9NL**. My first QSO with China was a dream . . . **IN3XUG**. My first RTTY contest; see you next year . . . **JA4RTX**. Only 106 minutes of operating time due to Typhon Cecil . . . **KN4DG/KH2**. Aurora caused periodic strong distortion on the signals . . . **LA4LN**. I think 36 hours is better for single op . . . **LZ1BJ**. I'll be back next year maybe from **OH0** or **OJ0** . . . **OH3TY**. My first RTTY contest. **VK9MM** was my 200th country. What a thrill! . . . **PA0XPQ**. Tried something different this year—40 meters only. SA SSB QRM was rough, but still did OK . . . **PJ3MI**.

Lousy condx on high bands, but low bands



Multi-Op, High Power entry **IK2QEI**. Left to right are **IK2QEI**, **JA3DLE**, **IK2NCJ**, and **I2OKW**.



PA3EWP hunting for new ones at Multi-Op, High Power entry **PI4COM**.

were good. More QSOs but less multipliers . . . **SM5FUG**. Lots of problems—2 operators got sick, equipment crashed, 10 was dead, but we worked 5 new ones . . . **T91EMS**. Big surprise was QSOs on 80 stateside with my 30 watts . . . **UB5TAU**. My first CQ RTTY Contest; good pileup all the time . . . **UH8EA**. Another year and still I wait for South Dakota and Wyoming on RTTY WAS. Maybe 94? . . . **VK3EBP**. Increased activity made up for the poor condx . . . **VS6BG**. My first RTTY QSO ever, then I find out it's a contest! . . . **YB3OSE**. My first RTTY contest. Great fun. High point working a fluttery **ZS6** over the North Pole . . . **ZL2AMI**. Work and study forced me to enter the dead-band category—28 MHz. Still managed to drag a few sigs out . . . **ZS6EZ**. Nice to meet old friends; real nice fun . . . **ZV2BW**.

Station Operators Multi-Op Single & Multi-Transmitter

3D3YS: K. Sato, Mi Senda, H. Ogaki, Y. Sujita & T. Isobe. **4O9S** & ops. **9A5D**: 9A2FK, 9A2TL, 9A3AM, 9A3VM, 9A4DU, Nik, Niksa & Vido. **AB5KD**: WA9YLB, N0DH, KA5WSS, KB5OEL, NA4M, WD5N, KV5V & WB5HOI. **EA6MR** & **EA6MQ**. **EA7GXX** & **EA7GXD**. **F6EKX**: F5NPE & F11AAT. **GW5NF** & **GW4JBQ**. **HB0/DL0GK**: DL9YAJ, DL2DBS, DL6ET, DC9KZ & D11EMH. **HZ1AB** & ops. **I2EOW**: I2VXJ, IK2CFH & IK2EGL. **IK1HSR** & **IK1HXN**. **IK1TWC** &

IK1TZO. **IK2QEI**: **IK2NCJ**, **JA3DLE** & **I2OKW**. **IV3FSG** & **IV3LH**. **JA9YAV**: JA9-3017, JR9GYQ, JF0WW & JS2EGP. **JJ3YBB**: JA3FHL, JA3LHL, JA3PJJ, JH3FBS, JH3FQF, JE3TXA, JI3ERV & JQ3QFA. **JL1ZCG**: JO1BMV, JO1RUR, JH0NZN & JR0JFM. **KA3DSX** & **KA3HNM**. **KB8ECG**: K8AQM, WD9INF, KG8CO, KG8CW, KB8PBT, KA8POW & N8QZO. **KF4KL** & **KQ4QM**.

KS9W & **N9ITX**. **K0LIR** & ops. **N7UJJ** & **KB7TSY**. **NH6T**: KN6J, N6OXR & W6OTC. **NL7VJ** & ops. **OM3KFF**: OM3TRG, OM3TPG, OM3TLU, OM3TCW & LZ3XV. **OM3RJB**: OM3TCL & OM3CPG. **PI4COM**: PA3BBP, PA3ERC, PA3EWP & PA3DMH. **PJ8X**: WA7LNW & AA7FM. **PT5W**: PY5LY & PU5WKS. **PU2VJJ** & **PU2SUL**. **SP3PLD**: SP3IBM & SP3HBF. **SP6YFU**: SP6NVK & SP6OPE. **SV1SV**: SV1AMY, SV1AHV & SV1BDO. **T91EMS**: Elvis & Boris. **TM7C**: F6CTT, F6FGZ, F5NBU, F5NLY & FB1MUX. **UP5A**: UN7FW, UN7AAQ & UN7AV. **UZ3PWJ** & ops. **US7I**: UB3IO, UB3IM & RB4IZ. **UZ9CWA**: UA9CGA, RW9CF, UA9CR & Igor. **VE3FJB**: VE3EKF, VE3THR, VE3ABG, VE3MKX, VE3UVP, VE3TUJ & VE3NDA. **VE3UR**: VE3IW, VE3EX & VE3NIT. **VE7ZZZ**: VE7AV, VE7AQN, VE7EQZ, VE7EME, VE7BKO, VE7DRS, VE7GGG, VE7JMN, VE7PHA, VE7WJA, VE7RBL, VE7SSS & VE7SK. **W3LPL**: W3EKT, K4GMH, KF3P, N3UN, N3II & WR3E. **Y00A**: YO6JN, YO6CFB, YO3APG & YO6ODN. ■

MFJ WINDOWS SOFTWARE

MFJ station automation software finds DX, tunes your rig and does your logging

With a few "point and clicks" of your mouse, this powerful MFJ WINDOWS software helps you... find and identify on-the-air DX you need from PacketCluster networks... search your log to see if you've worked him before... automatically set up and tune your transceiver... and work him with pre-stored messages.

And while you're working him, you can... log him... print his QSL card... search and update your awards and contest files.

Logview Windows™, Packet Windows™ and Rig Windows™ are powerful ham radio automation software programs that makes operating fun, DXing competitive and not-so-fun details effortless.

You can use them together as a fully integrated package that unifies your transceiver, packet TNC and logging functions into a fully automated station.

Or you can use them individually as stand alone programs and add other modules as you need them.

Logview Windows™
MFJ-1681
\$69⁹⁵

Packet Windows™
MFJ-1682
\$29⁹⁵

Rig Windows™
MFJ-1683K/Y/I
\$29⁹⁵ each

SAVE \$20
Complete Package
includes all 3
programs above

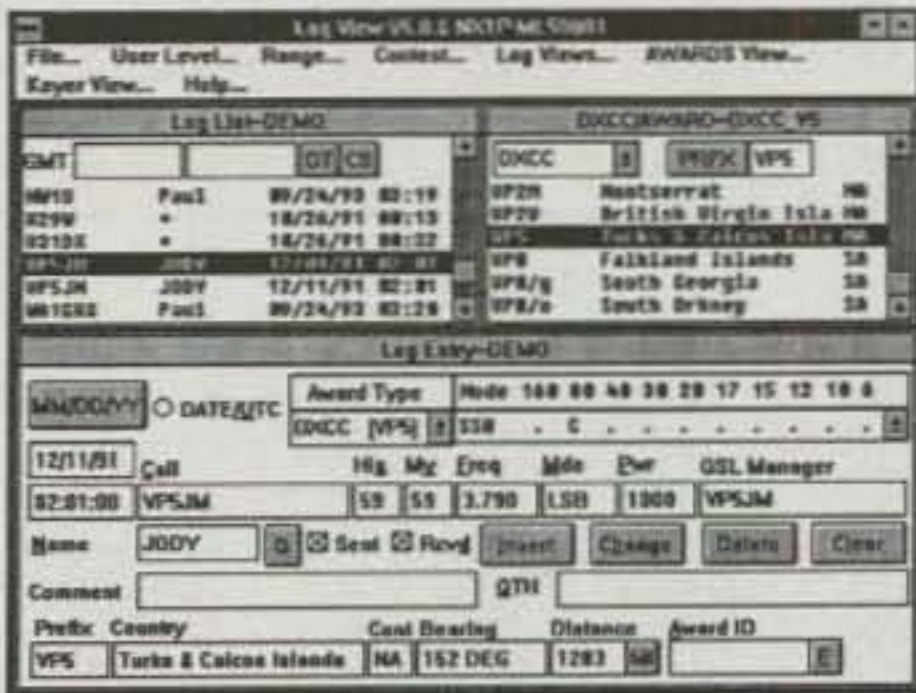
MFJ-1680K/Y/I
\$109⁹⁵ each



Typical real time logging, packet and rig control windows

Here's an overview of each program...

Logview Windows™



Logview Windows™ screen

Logview Windows™ is a live real time computerized logbook that gives you instant access to your data.

When you enter a call sign, Logview Windows™ automatically checks to see if you've worked him... if you need him for DXCC or an award... calculates distance and bearing so you know where to point your beam... for contests it checks for dupes, tells you where you need to make a QSO and its score.

You can scroll through your log in familiar logbook format in either call sign order or date and time order.

For each contact you make, Logview Windows™ lets you simultaneously update and keep up with dozens of awards such as DXCC, WAZ, OBLAST and WPX. You can attach award identifiers to QSOs for tracking awards.

The Contest Mode gives you fast dup checking and automatic time/serial number stamp. It tells you how many contacts per hour you're making, time past since your last QSO, point score, multiplier score and total score.

Even as you're making your contact, you can be printing a QSL card.

You can choose who to send QSL cards to based on QSOs not confirmed or not sent.

You can print cards or labels in standard format or customized them to suit you. You can print in time or bureau order.

Hundreds of QSO and award reports can be generated. Data from CT and other popular logging programs can be imported.

You can "click on" the built-in keyboard keyer and let Logview Windows™ help you make QSOs with 8 pre-stored CW messages.

You can set weight and speed and adjust element, character and word spacing. You get a convenient keyboard buffer with on-screen text display for sending perfect CW.

You can automatically add the active call to selected messages -- such as a routine exchange of RST, QTH and name.

You can use beginner levels to get going quickly. When you're ready for more advanced features you can use the expert levels.

MFJ-1681 Logview Windows™, \$69.95.

Packet Windows™



Packet Windows™ screen

Using Packet Windows™ and your TNC to access DX PacketCluster™, you can display a list of current on-the-air DX stations.

You can scroll through these DX stations and select one with your mouse. Your rig is automatically tuned through Rig Windows™ and your logbook is automatically set up through Logview Windows™ to log your rare DX -- all you have to do is work'em.

You can select only the DX you need. When they occur, an alarm sounds or you can have their call sent in CW -- you'll know about band openings even if you're in the next room.

For true "hands off" operation, turn on AutoSpot™. When DX you need appears, your rig automatically tunes to his frequency and your logbook automatically sets up to log.

Operating your TNC or PacketCluster™ can be as easy as "point and click" when you use Macro buttons for commonly used commands.

MFJ-1682 Packet Windows™, \$29.95.

Rig Windows™



Rig Windows™ screen

Rig Windows™ gives you full computerized control of your transceiver. Data from Packet Windows™ automatically tunes your transceiver to the DX station you want. Frequency and mode is sent to Logview Windows™ for automatic logging. Unique mouse operated tuning

knobs make tuning as natural as your real tuning knob. You get fine and coarse tuning, separate knobs for VFO A and VFO B plus, frequency and rig status displays.

With 48 command macro buttons, you can define and chain them to create complex transceiver control by clicking your mouse.

Separate Rig Windows™ programs are available for Kenwood, Yaesu and ICOM radios. Each program is customized to make use of features unique to that manufacturer.

For Rig Windows™, order MFJ-1683K for Kenwood, MFJ-1683Y for Yaesu and MFJ-1683I for ICOM, \$29.95 each.

Requires MFJ-5383K/Y/I transceiver-to-computer interface cable below.

Transceiver-to-Computer Interface Cable has RS-232 serial interface built-in!



MFJ-5383K (Kenwood)
MFJ-5383Y (Yaesu)
MFJ-5383I (Icom)

\$49⁹⁵ each

Convenient pre-wired Transceiver-to-Computer interface

cable has RS-232 serial interface built-in! Each cable has connectors wired for your transceiver and IBM compatible computer.

Just plug a pre-wired cable into your transceiver and computer serial ports and you're ready for computerized control of your rig through Rig Windows™.

MFJ-5383K for Kenwood, MFJ-5383Y for Yaesu, MFJ-5383I for ICOM, \$49.95 each.

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CIRCLE 143 ON READER SERVICE CARD

Alpha/numeric groups after call letters denote the following: Classification (SOH = Single Op High Power All Band, SOL = Single Op Low Power All Band, SOA = Single Op Assisted All Band, MOH = Multi-Op High Power, MOL = Multi-Op Low Power, MOM = Multi-Op Multi-Transmitter or Single Band Entry by Frequency), Final Score, QSOs, Points, Zones, Countries, State, and Canadian Provinces. Winners are listed in boldface.

SINGLE OPERATOR NORTH AMERICA															
ALASKA															
Call	CL	Score	QSOs	Pts	Zones	Ctries	US/VE								
NL7DU	SOL	59,280	244	570	25	27	52								
BAHAMAS															
K8UNP/C6A	SOL	479,577	724	1671	52	105	130								
BERMUDA															
VP9MZ	SOL	45,493	200	469	36	61	0								
CANADA															
VY2SS	14	374,550	913	2270	27	90	48								
VE7SAY	SOH	270,900	516	1204	48	72	105								
VE6KRR	SOL	176,448	442	919	34	45	113								
VE7IRA	SOL	108,965	318	703	29	41	85								
VE6JAV	SOL	82,820	231	505	36	51	0								
VE2AXO	SOL	64,080	200	445	27	48	69								
VE2JR	SOL	51,816	248	408	29	49	49								
VY9QR	SOH	40,656	162	336	22	29	70								
								(Opr. VE5SF)							
VE2BOB	SOL	27,615	113	263	25	45	35								
VE7BDQ	SOH	7,973	51	119	22	19	26								
VE4COZ	14	4,620	53	105	10	10	24								
VE2FFE	14	3,393	39	87	10	17	12								
VE4GN	14	1,620	29	60	7	6	14								
DOMINICA															
J73WA	SOH	220,148	505	1171	35	64	89								
HAITI															
HH2PK	SOL	702,512	814	1909	64	149	155								
MEXICO															
XE1/JA1QXY	21	45,441	270	561	14	23	44								
PANAMA															
HP1AC	SOL	184,697	425	967	35	66	90								
PUERTO RICO															
KP4DDB	SOL	57,412	225	463	22	46	56								
UNITED STATES															
K4JPD	SOA	688,347	901	1683	86	181	142								
								(Opr. AE6E)							
W3FV	SOH	664,284	778	1686	71	186	137								
NV1G	SOH	659,890	825	1714	66	181	138								
N4CC	SOA	645,540	793	1590	83	176	147								
K1NG	SOH	606,350	840	1675	62	171	129								
								(Opr. WF1B)							
WF7B	SOH	527,562	743	1659	63	136	119								
NO2T	SOA	497,835	668	1443	67	158	120								
N2DL	SOH	438,894	617	1318	61	155	117								
W9KDX	SOH	423,645	703	1389	57	132	116								
N2FF	SOA	374,030	577	1130	64	151	116								
WB7AVD	SOA	356,631	699	1177	60	115	128								
KG5EG	SOH	350,328	845	1327	49	82	131								
K0RC	SOH	347,602	711	1151	60	111	131								
WF5T	SOH	325,728	643	1044	63	116	133								
WX0B	SOH	320,501	665	1109	59	110	120								
AB4MJ	SOL	300,960	515	1045	56	132	100								
N6GG	SOH	277,339	542	1031	57	93	119								
AA0KA	SOH	273,783	676	1041	52	88	123								
W1BYH	SOL	244,608	461	832	58	122	114								
AA5AU	SOL	243,858	582	838	56	103	132								
WB3D	SOA	224,143	399	893	50	131	70								
KK4DK	SOL	222,762	503	813	49	110	115								
KT6V	SOH	212,121	503	819	52	89	118								
NA2M	SOH	191,574	415	734	50	104	107								
WA7EGA	14	174,290	670	1202	27	69	49								
K4SB	SOL	169,128	435	696	52	87	104								
AA4M/6	SOA	165,910	506	706	54	81	100								
NN2G	14	160,876	500	1087	23	80	45								
NX7K	SOH	159,300	443	708	43	76	106								
WB8MTT	SOL	151,844	397	638	44	86	108								
KA4RRU	SOL	150,732	381	636	45	91	101								
K4IBP	SOH	145,125	339	675	44	95	76								
NN5T	SOL	144,536	363	623	53	86	93								
W9NGA	SOL	133,792	319	592	42	98	86								
N1OAZ	SOL	132,655	367	617	32	79	104								
W1BIH	SOH	128,956	285	626	47	109	50								
K2PS	SOH	128,316	269	629	47	109	48								
WA6SDM	SOH	126,072	373	612	47	68	91								
KD1GG	SOH	125,832	347	642	38	77	81								
W2UP	7	125,656	489	904	22	68	49								
AA1BX	SOL	119,280	318	560	44	97	72								
K7WUW	SOH	118,917	367	543	43	68	108								
N9NCX	SOL	110,210	384	535	42	65	99								
K0BX	SOL	105,288	293	492	50	79	85								
AI7B	SOH	104,220	356	540	37	51	105								
KA3JFI	14	99,580	384	766	22	62	46								
WS7I	7	91,500	450	732	28	48	49								
N3GSC	SOH	88,740	228	435	48	82	74								
AI0Y	SOL	86,344	392	502	32	40	100								
WA0PUJ	SOH	85,500	230	500	40	87	44								
K5KLA	SOL	83,027	221	409	52	69	82								
N0FMR	SOA	82,877	310	463	39	63	77								
KL7DN/1	SOL	81,606	234	469	37	81	56								
W2KHQ	SOL	81,597	202	461	38	89	50								
W3KV	SOL	80,920	176	476	43	100	27								
W3GG	SOH	80,550	230	537	32	71	47								
KI4MI	SOL	80,179	235	407	42	74	81								
WF5E	14	78,771	394	651	20	53	48								
WB8YJF	SOL	76,987	245	461	39	71	57								
WW1Y	SOL	74,336	224	404	40	67	77								
K4KIY	SOL	73,260	254	407	41	64	75								
WA6UFY	SOH	68,145	286	413	35	38	92								
W6YJG	SOH	67,473	230	357	44	48	97								
N1JAC	SOL	64,548	224	396	31	65	67								
KM6HB	SOH	63,984	266	372	43	37	92								
NR1J	SOH	61,650	186	411	37	69	44								
W2JGR/0	SOH	58,984	264	404	35	44	67								
W6JOX	SOL	57,702	213	326	42	54	81								
N1FIO	SOL	57,558	73	362	37	67	55								
AB8K	21	56,389	227	527	25	61	21								
N2QCA	SOL	54,646	186	307	41	64	73								
KL7TF	7	53,331	289	613	14	26	47								
NY2U	SOL	52,548	220	348	28	47	76								
W4IF	SOH	50,570	147	389	36	78	16								
WA5JWU	SOL	50,050	244	325	30	42	82								
N6MW	SOL	48,160	173	301	36	64	60								

MFJ *super* DSP filter

. . . Tunable "brick wall" bandpass, lowpass, highpass, notch filters . . . programmable pre-set filters . . . automatic multiple notch filter eliminates heterodynes . . . adaptive noise reduction reduces noise and QRN . . . for Voice, CW, Data . . .



MFJ-784

\$219⁹⁵



MFJ's *super* DSP filter automatically eliminates heterodynes, reduces noise and interference *simultaneously* on SSB, AM, CW, packet, AMTOR, PACTOR, RTTY, SSTV, WeFAX, FAX, weak signal VHF, EME, satellite -- nearly any mode you'll ever encounter.

You get MFJ's *tunable* FIR linear phase filters that minimize ringing, prevent data errors and have "brick wall" filter response with up to 60 dB attenuation just 75 Hz away.

Only MFJ gives you *tunable* DSP filters. You can tune each lowpass, highpass, notch and bandpass filters and vary bandwidth to pinpoint and eliminate interference. The last *tunable* filter setting is saved -- it's ready to use when you switch back to it again.

Only MFJ gives you 6 *factory pre-set* filters and 10 *programmable pre-set* filters that you can customize. Instantly remove QRM with a turn of a switch!

You get MFJ's *automatic notch filter* that searches for and eliminates *multiple* heterodynes.

You also get MFJ's advanced *adaptive noise reduction*. It silences background noise and QRN so much SSB signals sound like a local FM repeater.

The *automatic notch filter* and *adaptive noise reduction* can be used with *all tunable* and *pre-set* filters.

Automatic notch filter

MFJ's *automatic* notch filter searches for and eliminates *multiple* heterodynes in *all* filter modes -- it's so fast interfering CW and RTTY signals are also eliminated.

If you leave the *automatic* notch filter on during a phone contest, you'll never be worn down by the heterodynes of tuner-uppers.

Voice signals aren't degraded. The *narrow* automatic notch is silently working in the background destroying unwanted tones when they appear.

With up to 50 dB attenuation, you'll copy stations that would otherwise be masked by heterodynes. You'll miss fewer calls and be less exhausted when the contest is over.

When you need to *selectively* remove tones -- like when you're enjoying a CW ragchew and a couple of annoying CW stations appear nearby -- you can use the *two* MFJ *tunable* notch filters to completely knock them out.

Adaptive noise reduction

Pressing the "ON" button silences background noise. Some SSB signals sound like a local repeater! It makes noisy FM and AM signals readable and works with CW, Data and other signals.

It works in all filter modes and on all types of random noise including -- white noise, impulse noise, static, ignition noise, power line noise, hiss and atmospheric noise.

The LMS algorithm gives you up to 20 dB of noise reduction depending on the type of noise. You can adjust the amount of noise reduction to prevent distorting some signals.

Reducing random noise reduces fatigue and makes QSOs more fun -- especially, when the band is full of tiring noise.

Tunable highpass/lowpass filters

For Voice and Data nothing beats MFJ's exclusive *tunable* highpass/lowpass FIR linear phase "brick wall" filters.

You can *tune* the lower cutoff frequency 200 to 2200 Hz and the upper cutoff frequency 1600 to 3400 Hz.

Signals just 75 Hz away literally disappear -- they are reduced a *thousand* times, 60 dB!

Unlike other filters, speech clarity is not reduced by envelope distortion caused by unequal time delay.

By adjusting the highpass and lowpass filters you can create *custom* filters for Voice, Data and other modes.

When signals are weak, you can improve copy by removing high and low speech frequencies. They contain little information but are full of noise that reduce readability.

On crowded HF bands, overlapping SSB signals make copying difficult. You can improve copy by slicing off some overlap with razor sharp "brick wall" responses.

You can also highpass filter out hum, pulses, rasp and other irritating low frequency noise.

Tunable bandpass filters

Narrow band signals like CW and RTTY jump out of QRM when you switch in one of MFJ's three *tunable* FIR bandpass filters.

You can *tune* the center frequency from 300 to 3400 Hz. And vary the bandwidth from 50 Hz to 680 Hz -- from super tight CW filters to wide razor-sharp Data filters.

As you narrow the bandwidth, interfering signals just drop out because, just 60 Hz away, they're down by over 50 dB.

You can use *narrower* bandwidths to fight tough QRM because these linear phase filters

don't distort signals with unequal time delays.

Even with the narrowest 50 Hz bandwidth, you'll never have a problem with ringing.

One position gives you *two* tunable filters you can use together on one signal. For example, on RTTY, tune one filter to mark, the other to space and set each bandwidth tight for an incredibly sharp RTTY filter.

16 pre-set filters -- use factory set or program your own

With a turn of a switch you can select from *sixteen* convenient *pre-set* filters. You can use them for SSB, AM, CW, packet, AMTOR, PACTOR, RTTY, SSTV, WeFAX, FAX or any other mode you can think of.

If you don't like our *pre-set* filters, you can define your own filter by programming bandpass center frequency and bandwidth, lowpass and highpass cutoffs. *An MFJ exclusive!*

Only MFJ gives you the best of both worlds -- *tunable* filters to eliminate nearly any QRM and fast convenient *pre-set* filters customized for any mode.

Plus more . . .

A push-button quickly bypasses your filter so you can hear the *entire* unfiltered signal and see if anyone is calling you.

Built-in two watt amplifier. Has volume control, input level control, speaker jack, headphone jack, accessory jack, PTT line and PTT sense and line level output. 9x2 1/2x6 in.

It plugs between your transceiver or receiver and external speaker or headphones. Use 12 VDC or 110 VAC with MFJ-1315, \$14.95.

No Matter What™ guarantee

You get MFJ's famous one year No Matter What™ *unconditional* guarantee. That means we will repair or replace (at our option) your MFJ-784 *no matter what* for a full year.

Call your dealer for your best price

Automatically eliminate heterodynes, reduce noise and QRM on Voice, CW and Data. Call your favorite dealer for your *best* price and order your MFJ *super* DSP filter today!

Free MFJ Catalog

Write or call toll-free . . . 800-647-1800

Nearest Dealer/Orders: 800-647-1800
Technical Help: 800-647-TECH (8324)

• 1 year *unconditional* guarantee • 30 day money back guarantee (less s/h) on orders from MFJ • **Free** catalog

MFJ MFJ ENTERPRISES, INC.
Box 494, Miss. State, MS 39762
(601) 323-5869; 8-4:30 CST, Mon-Fri
FAX: (601) 323-6551; Add \$8 s/h

MFJ . . . making quality affordable

Prices and specifications subject to change © 1994 MFJ Enterprises, Inc.

MFJ Super CW Keyboard with Perpetual Memory™

... two line LCD display ... includes RFI suppressed keyboard ... eight 250 character nonvolatile message memories ... 200 character type-ahead buffer ... iambic keyer ... powerful Morse Code Trainer ...

MFJ-452

\$129⁹⁵

Includes Keyboard!

Send effortless CW as soon as you turn on this MFJ Super CW Keyboard -- there's no computer to boot up, no program to load -- just start typing.

You get a standalone MFJ CW Keyboard that includes an RFI suppressed keyboard, a two line 16 character LCD display, eight 250 character nonvolatile message memories, a 200 character type-ahead buffer, iambic keyer, plus a powerful Morse Code Trainer and much more for an incredibly low \$129.95!

Big 200 Character type-ahead Buffer

Even "hunt and peck" typists can send perfect sounding CW because a large 200 character type-ahead buffer smooths out your typing and gives you time to compose.

MFJ Perpetual Memory™

Eight 250 character message memories let you store often used messages.

MFJ's unique nonvolatile Perpetual Memory™ saves your messages and settings up to 20 years without power or batteries.

Unlike short term memory, you won't lose your messages and settings every time you turn power off.

LCD Display

Only MFJ gives you an easy-to-read LCD display that simultaneously shows what you're typing in on one line and what you're sending out on another line.

You can review stored messages, keyboard settings and spot typing errors that you can quickly correct by backspacing.

LCD display is mounted on a sloped front panel and has a contrast control.

MFJ AutoCommand™

MFJ AutoCommand™ lets you execute

The world's most powerful CW Keyboard

Want the world's most powerful CW keyboard with all the features of the MFJ-452 Super CW Keyboard, 32K of lithium battery backed up message memory, plus much, much more?

Choose the MFJ-498 and you'll also get . . . an FCC Exam Simulator™ that sends random QSOs exactly like FCC exams -- when you can copy these random QSOs, you're ready to pass your exam and upgrade . . . MFJ's QSO Simulator™ simulates on-the-air contacts -- answer a CQ, call a station, enjoy a QSO and get operating experience while boosting your code speed . . . MFJ's new WordRecognition™ mode gives you hundreds of commonly used words -- learn to copy entire words in your head without writing it down, just like the pros. 6 1/2 x 2 1/2 x 6 3/4.

MFJ's exclusive AnalogSet™ speed control lets you customize your speed range.

MFJ-498X, \$159.95, same as MFJ-498 without keyboard.



commands stored within a message.

For example, you can insert pauses and incrementing serial numbers, play messages continuously or call other messages.

Includes RFI Suppressed Keyboard

Keyboard included -- you won't have to supply your own keyboard.

It has excellent RFI suppression -- it won't lockup or send characters you don't want because of RF and you won't hear digital hash in your receiver.

SingleTouch™ Function Keys

No complex keystrokes! MFJ's SingleTouch™ function keys make it simple to store and recall messages, set speed, weight and tone, setup serial numbering, turn on/off transmitter tune, keying and handkey mode.

Prosigns

Commonly used prosigns are assigned keys for easy use. You can also create any prosign by pressing Alt and any characters.

Full Featured Iambic Keyer

For fast break-in, plug in an iambic paddle and use it as a full featured keyer.

You can pause your playing buffer or message, insert your comments with your paddle and then resume playing.

Powerful Morse Code Trainer

You can practice or teach Morse code in Farnsworth or normal mode.

Select letters, numbers, punctuations or prosigns or any combination for practice. Use standard 5, random 1 to 8 character

groups or select specific six character sets.

Plus much more

Has speaker, sidetone, volume control and jack for external speaker or earphones.

You can vary speed from 5 to 100 WPM, weight from 5 to 95%, sidetone from 300 to 3300 Hz and serial number from 0 to 9999.

Has buffer and memory full audible indicators. Keys solid state and tube rigs.

AT101 compatible keyboard plugs into compact 3 1/2 x 2 1/2 x 3 1/2 inch interface. Use 12 VDC or 110 VAC with MFJ-1312B, \$12.95.

MFJ-452X, \$99.95, same as MFJ-452 without keyboard.

Free Instruction Manual

Want a closer look? Write or call toll-free 800-647-1800 for a free manual.

MFJ CW Keyboard

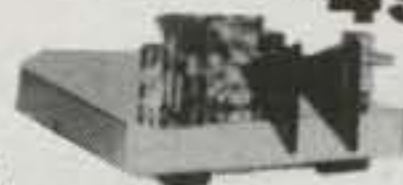


MFJ-451 Don't need an LCD display or Morse Code Trainer but want all the features of the MFJ-452 Super CW Keyboard? Choose the MFJ-451. It has two 100 character message memories instead of eight 250 characters message memories. **MFJ-451X, \$79.95, same as MFJ-451 without keyboard.** 3 1/2 x 1 1/4 x 3 1/2.

MFJ Iambic Keyer Paddle

MFJ Deluxe Iambic Paddle feature a full range of adjustments in tension and contact spacing, self-adjusting nylon and steel needle bearings, contact points that almost never need cleaning, precision machined frame and non-skid feet on heavy chrome base. For all electronic CW keyers.

MFJ-564
\$49⁹⁵



Free MFJ Catalog

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MFJ . . . making quality affordable

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MFJ's world famous 3 KW Antenna Tuner

If you won't settle for less... here is the finest 3 KW tuner money can buy!

The MFJ-989C is not for everyone. However, if you make the investment, you'll get the finest 3 KW antenna tuner money can buy. Here's why...

Massive Transmitting Capacitors

You get two massive 250 pf transmitting variable capacitors with detailed logging scales. They can handle amps of RF current and withstand 6000 RF volts because the plates are smoothed and polished and have extra wide spacing.

Precision Roller Inductor

A precision roller inductor lets you tune your SWR down to the absolute minimum. A 3-digit turns counter plus a spinner knob gives you exact inductance control.

Ball bearings on front and back shafts give you a velvet smooth vernier feel. Steel end plates and shafts give you lifetime durability.

You won't have arcing problems with this roller inductor. That's



MFJ-989C **\$349⁹⁵**

Cross-Needle Meter

You get a lighted peak and average reading Cross-Needle SWR/Wattmeter with 200 and 2000 watt ranges. Its new directional coupler gives you accurate SWR and power readings over the entire 1.8 to 30 MHz range.

because firm springs put considerable pressure on a plated contact wheel for excellent electrical contact.

Wide, low inductance straps are used for high current connections and a new core gives you excellent RF properties for minimum loss.

Super Heavy Duty Balun
You get a super heavy duty current balun for balanced lines. It's made with two giant 2 1/2 inch powder iron toroid cores and wound with Teflon® wire connected to high voltage ceramic feedthru insulators. It lets you operate high power into balanced feedlines without core saturation or voltage breakdown.

Ceramic Antenna Switch
You get a two wafer 6 position ceramic antenna switch with extra large contacts for trouble free switching.

Plus much, much more
You also get a built-in 300 watt dummy load, full one year unconditional guarantee, flip stand, all aluminum cabinet, tough baked on paint, locking compound on all nuts and bolts. 3 KW PEP. Meter lamp needs 12 volts. Compact 10 3/4 x 4 1/2 x 15 in. Made in the USA. Add \$13 s/h. Don't settle for less--get yours today!

MFJ's deluxe 300 Watt Tuner



MFJ-949E More hams use the MFJ-949E than \$149⁹⁵ any other antenna tuner in the world! Why? Because you get proven reliability, the ability to match just about anything and a one year unconditional guarantee.

You get a lighted peak and average reading Cross-Needle SWR/wattmeter, antenna switch, 4:1 balun for balanced lines, 1.8-30 MHz coverage and a full size dummy load that easily handles 300 watts of abusive tune-up power.

New 8 position antenna switch lets you pre-tune into dummy load to minimize QRM. The inductor switch is designed to withstand extreme voltages and currents--it's not an underrated off-the-shelf switch that can put you off-the-air.

Each MFJ-949E aluminum cabinet is chemically etched to strongly bond MFJ's tough baked-on paint. You won't find a tougher, longer lasting finish anywhere.

MFJ's new 300 Watt Tuner



MFJ-948 If you don't need a dummy load but \$129⁹⁵ want all the other features of the MFJ-949E, choose the MFJ-948 for \$129.95. The MFJ-948 features a peak reading lighted Cross-Needle meter with a built-in lamp switch, one year unconditional guarantee and is made here in the USA.

MFJ's smallest Versa Tuner

The MFJ-901B is our smallest --5x2x6 inches --(and most affordable) 200 watt PEP tuner -- when both your space and your budget is limited. Great for matching solid state rigs to linear amps.

MFJ-901B

\$59⁹⁵



MFJ's artificial RF Ground

Creates artificial RF ground. Eliminates or reduces RF hot spots, RF feedback, TVI/RFI, weak signals caused by poor RF grounding. Also electrically places a far away RF ground directly at your rig by tuning out reactance of connecting wire.

MFJ-931

\$79⁹⁵



MFJ's super value Tuner



MFJ-941E The new MFJ-941E gives you a \$109⁹⁵ 300 watt PEP tuner that covers everything from 1.8-30 MHz -- plus you get a lighted cross-needle meter, antenna switch and balun... for an incredible \$109.95.

Antenna switch selects 2 coax lines (direct or through tuner), random wire, balanced line or external dummy load. 4:1 balun. 1000 volt capacitors. Measures 10 5/8 x 2 7/8 x 7 inches.

2 Knob Differential-T™ Tuner



MFJ-986 The MFJ-986 Differential-T™ \$289⁹⁵ 2 knob tuner uses a differential capacitor to make tuning foolproof and easier than ever. It ends constant re-tuning with broadband coverage and gives you minimum SWR at only one best setting. Handles 3 KW PEP. Roller inductor makes tuning smooth and easy. Turns counter lets you quickly re-tune to frequency.

MFJ's lighted peak and average reading Cross-Needle meter reads forward and reflected power in 2 ranges. Current balun reduces feedline radiation and forces equal currents into antenna halves that are not perfectly balanced. Covers 1.8-30 MHz. \$13 s/h.

MFJ's random wire Tuner

Operate all bands anywhere with any transceiver with the MFJ-16010. It lets you turn a random wire into a transmitting antenna. 1.8-30 MHz. 200 watts PEP. Ultra small 2x3x4 inches.

MFJ-16010

\$39⁹⁵



Antenna Tuner/Artificial Ground

New!

MFJ-934

\$169⁹⁵



Artificial ground and full feature 300 watt 1.8-30 MHz antenna tuner. Has lighted Cross-Needle Meter, 4:1 balun for balanced lines. An artificial ground can turn a random wire into an effective antenna that really works.

MFJ's mobile Tuner



MFJ-945D

\$89⁹⁵

Don't leave home without this mobile tuner! Have an uninterrupted trip as the MFJ-945D extends your antenna bandwidth so you don't have to stop, go outside and adjust your mobile whip.

Small 8x2x6 inches uses little room. Lighted Cross-Needle SWR/Wattmeter makes tuning easy while in motion. Has lamp switch. 1.8-30 MHz. 300 watts PEP. Mobile mount, MFJ-20, \$4.95.

MFJ's versatile 1.5 KW Tuner



MFJ-962C MFJ-962C lets you use your \$229⁹⁵ barefoot rig now and have the capacity to add a 1.5 KW PEP amplifier later.

You get MFJ's lighted peak and average reading Cross-Needle SWR/Wattmeter. It reads forward and reflected power in 2 ranges. Covers 1.8-30 MHz.

Plus... 6-position antenna switch and Teflon® wound balun with ceramic feedthru insulators for balanced lines. 10 3/4 x 4 1/2 x 14 7/8 in. Add \$13 s/h.

MFJ's portable/QRP Tuner

Tunes coax, MFJ-971 balanced lines, MFJ-971 random wire \$89⁹⁵ 1.8-30 MHz. Cross-Needle SWR/Wattmeter has two switchable ranges: 30 and 300 or 6 watt QRP range. 6x6 1/2 x 2 1/2 in.

MFJ's VHF or UHF Tuners

MFJ-921 or MFJ-924 \$69⁹⁵

MFJ-921 covers 2 Meters/ 220 MHz. MFJ-924 covers 440 MHz. SWR/Wattmeter. 8x2 1/2 x 3 in. Simple 2-knob tuning for mobile or base.

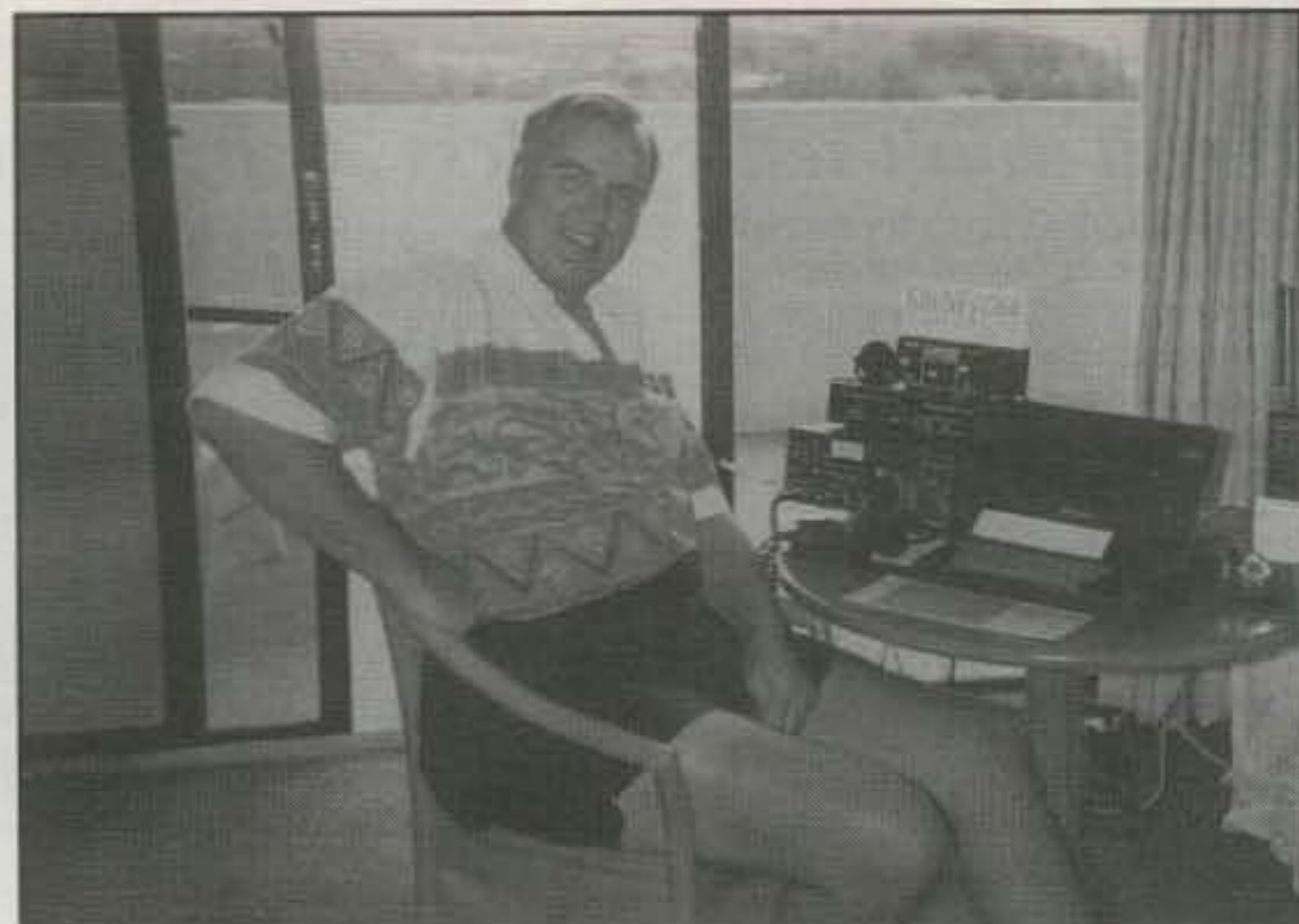
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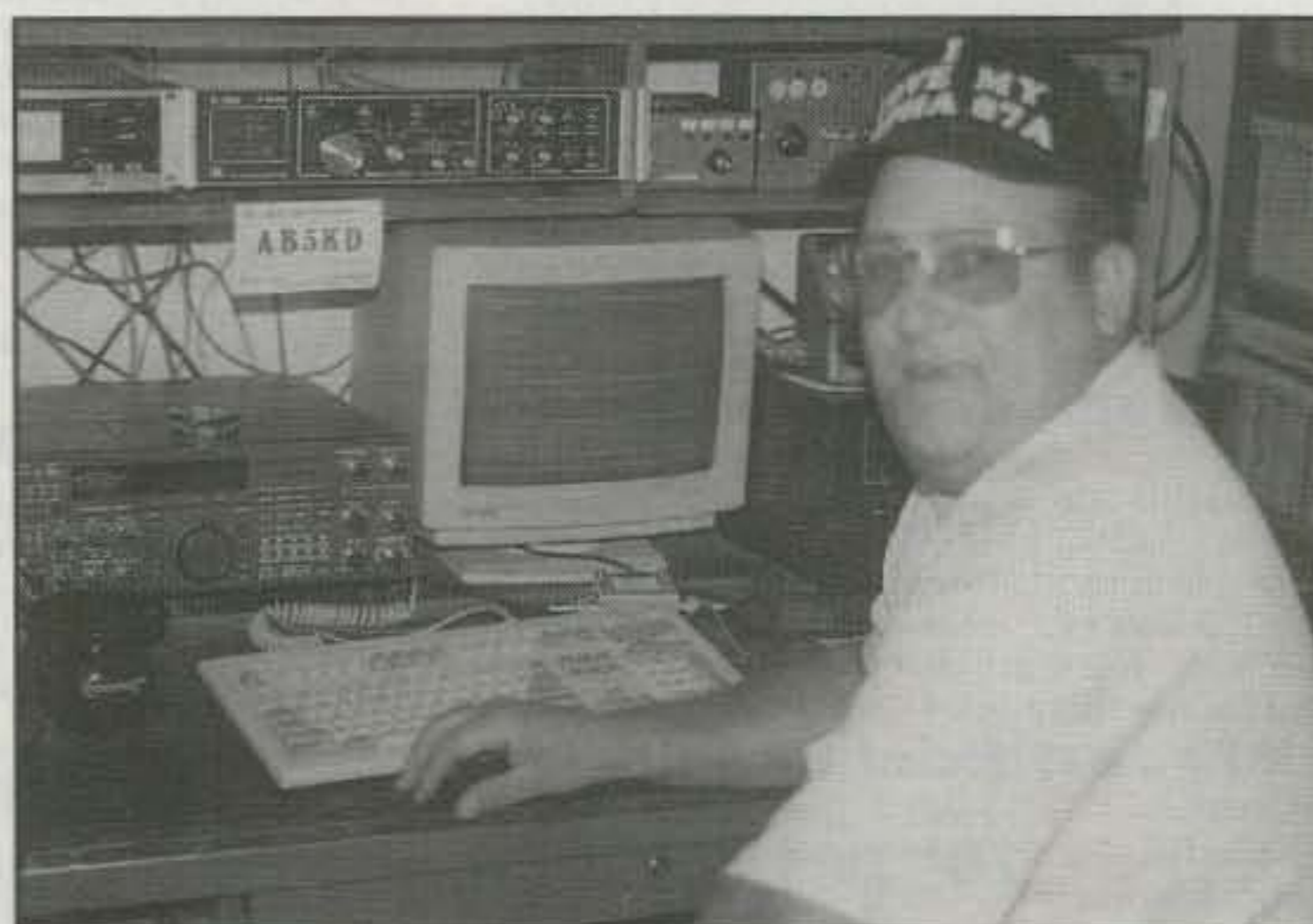
OA4ANR	SOL	3,114	PERU 59	173	9	9	0
4M5RY	SOL	688,509	VENEZUELA 687	2031	64	141	134
YW1A	7	65,835		693	18	34	43
						(Opr. YV5KAJ)	
						(Opr. YV1AVO)	
MULTI-OPERATOR ASIA							
ASIATIC RUSSIA							
UZ9CWA	MOH	2,580,660	1716	4779	120	333	87
JAPAN							
JL1ZCG	MOH	614,713	685	1927	80	182	57
JJ3YBB	MOM	586,249	684	1873	79	187	47
JA9YAV	MOM	133,770	278	735	59	106	17
KAZAKHSTAN							
UP5A	MOH	19,096	95	248	24	53	0
SAUDI ARABIA							
HZ1AB	MOH	859,216	943	2588	70	203	59
EUROPE							
BALEARIC ISLANDS							
EA6MR	MOH	403,550	573	1425	52	158	73
BOSNIA-HERZEGOVINA							
T91ENS	MOL	5,616	76	104	14	40	0
CROATIA							
9A5D	MOL	374,115	620	1527	50	131	64
EUROPEAN RUSSIA							
UZ3PWJ	MOH	128,700	312	715	41	118	21
FRANCE							
TM7C	MOH	1,889,859	1423	3849	91	265	135
F6EKX	MOL	582,417	704	1749	63	181	89
GREECE							
SV1SV	MOL	193,338	413	934	45	131	31
ITALY							
I2EOW	MOH	1,309,756	1192	3226	78	209	119
IK2QEI	MOH	787,035	844	2217	72	185	98
IK1HSR	MOH	376,596	473	1188	71	178	68
IV3FSG	MOL	260,568	393	987	57	153	54
IK1TWC	MOL	94,640	209	520	46	97	39
LIECHTENSTEIN							
HBØ/DLØGK	MOH	905,135	910	2351	80	210	95
MACEDONIA							
4O9S	MOL	21,000	132	300	16	47	7
NETHERLANDS							
PI4COM	MOH	1,099,875	998	2625	83	232	104
POLAND							
SP3PLD	MOL	151,822	300	737	51	116	39
SP6YFU	MOL	49,022	166	386	29	82	16
ROMANIA							
YP8A	MOL	246,243	449	1039	53	151	33
SLOVAK REPUBLIC							
OM3KFF	MOH	939,028	995	2594	77	190	95
OM3RJB	MOH	80,367	259	623	37	92	0
SPAIN							
EA7GXX	MOL	226,781	375	941	46	128	67
UKRAINE							
US7I	MOL	601,474	823	1934	69	195	47
WALES							
GW5NF	MOH	665,575	794	1975	65	202	70
NORTH AMERICA							
ALASKA							
NL7VJ	MOH	140,940	400	972	41	55	49



Pete, K8UNP/C6A, in the penthouse making one of his 724 contacts for third place in the World Single Op, Low Power.

CANADA							
VE7ZZZ	MOM	708,414	1058	2338	52	89	162
VE3FJB	MOH	430,416	609	1464	62	139	93
VE3UR	MOL	53,935	165	469	24	52	39
ST. MAARTEN							
PJ8X	MOL	235,545	534	1149	30	55	120
UNITED STATES							
W3LPL	MOM	2,984,817	2078	4983	107	288	204
KS9W	MOH	628,630	972	1699	70	156	144
AB5KD	MOH	575,212	952	1538	71	145	158
KB8ECG	MOM	201,966	436	821	53	110	83
KE7GH	MOL	177,184	544	791	45	55	124
KF4KL	MOL	164,994	342	642	57	113	87
N7UJJ	MOL	52,152	244	318	32	34	98
KA3DSX	MOL	37,752	215	312	29	43	49
KØLIR	MOH	25,707	134	209	32	40	51
OCEANIA							
FIJI							
3D2YS	MOL	373,354	798	2363	48	57	53
HAWAII							
NH6T	MOH	1,138,070	1042	3118	83	130	152
SOUTH AMERICA							
BRAZIL							
PT5W	MOL	3,344	37	88	14	24	0
PU2VJJ	MOL	1,104	19	46	12	12	0

CHECK LOGS: N2HTT, F-10726, F-10370, SP2HIC, CX7BF, SM6APB, YB6INU, CE3BFZ, RA9JB, SP4CHY, LA9FFA, VE6ZX & SP2EIW.



Ron, AB5KD, Multi-Op, making one of their 952 QSOs.

NEW OPTOSCAN 456

Computer Interface for the PRO-2005/6 Scanner



Why spend \$1300* to get a scanner with a computer interface? For only \$299 make the outstanding PRO-2005/6 from Radio Shack the top performer under computer control.

A new standard for scanning is here now!

Features:

- High Speed 25 Channels per Second Scanning!
- CTCSS & DCS Controlled Scanning and Logging
- DTMF Decode & Log with Channel and Time
- PC Software for Computer Log, Scan & Search
- RS-232C CI-V Interface with Multi-Radio Capability
- No Drill or Solder Installation Video

It's a well known fact that the microprocessor made it possible to develop the programmable scanner in 1974. Virtually all programmable scanners could have had (many feel should have had) a computer interface. It's as if the scanner manufacturers had a secret meeting on some deserted island and agreed to put computer interfaces on only a few of the most expensive radios. Why are they trying to limit the number of computer controlled scanners? What don't they want you to listen to or to find?

Well they didn't invite Optoelectronics to the big secret meeting. We don't agree to keep computer scanning expensive! The OptoScan 456 makes computer controlled scanning available at half the price with unbeatable performance and features.

The OptoScan 456 includes every thing you need to easily convert the superb Realistic PRO 2005/6 scanners into computer controlled scanners. Hardware, cables and software for the PC is included for the introductory price of \$299. Step by step video instructions show installation details without drilling, cutting or soldering. Simple hand tools are all you need. Features such as CTCSS, DCS, and DTMF decode give the OS456 superior performance.

Why Computer Controlled Scanning?

The computer makes the scanner *really* perform, simply and effortlessly. Even when you are not around the computer can continue to search out those frequencies you want to listen to and record them into virtually unlimited numbers of memory channels. The OptoScan 456 becomes a relentless monitor of the VHF/UHF frequency spectrum searching out illusive signals. The OptoScan software makes using the PRO-2005/6 easier and much less confusing than using the front panel controls. Complex store, search, and scan features are more easily accessible through software menus.

Why Decode CTCSS Tones and DCS Codes?

Virtually all non-trunked VHF/UHF two way radio uses squelch tones or codes for privacy and efficiency. These sub audible tones and codes are identifying signatures that can aid in following transmissions across channels. The OS456 decodes tones, codes and touch-tone characters to provide the Radio Monitoring Enthusiast with a powerful new tool in sorting out who is talking, accessing a repeater and in general what is going on. Like the computer interface, tone decode should have been built into the radio but wasn't. Optoelectronics has produced the OptoScan 456 to make the PRO-2006 family radios perform to a new standard that no one else can match for any price!

Complete Installation Kit, Model OS456, includes the assembled and tested controller board, mounting hardware, cables, OptoScan 456 software for the PC and the installation video

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The distributed capacity twisted loop antenna returns to duty on 80 meters with theories, formulas, and charts.

Roll Your Own Compact 80 Meter Wire Loop

BY JIM McLELLAND*, WA6QBU

If you live, like I do, in one of those "planned" communities that "forgot" to allow amateur antennas in the CC&Rs (Covenants, Conditions, and Restrictions), then this article may just be for you. When I first started hamming at my present QTH, 10 meters was hot and a wire in the attic with a QRP rig was fine. Lately, however, I've found my need for lower HF antennas increasing in inverse proportion to the sunspot cycle (which is going down, in case you haven't noticed).

Unfortunately, no outside antennas of any sort are allowed in my community. This prompted me to develop the DCTL (Distributed Capacity Twisted Loop). It has already proven itself on 40 and 160

meters, and this 80 meter version completes my lower HF antenna system. The loop hangs on the *inside* wall of my shack. It is cheap, portable, and easy to set up. If you don't have room for 80 meters, or just like to build antennas, try the DCTL, and you too can add another band to your station.

Description

The DCTL is a 28 foot delta loop fed at the bottom apex. The impedance is matched with a shorted hairpin stub, and the resonant frequency is tuned with an open stub. The whole antenna system, including the feedline, is made from 300 ohm twin lead. To complete your understanding of the DCTL, however, you'll probably need to look at fig. 1. Notice the

"twist." That's the tricky part that gives it so much distributed capacitance, and what makes such a small antenna work at low frequencies.

Construction

If you refer to fig. 1 and follow these simple steps, you'll have an antenna in about an hour. Use Radio Shack 15-1153 twin lead or the Antennas West Kit listed at the end of the article to make each section.

1. Cut the loop (LL) exactly 28 feet long.
2. Cut the shorted hairpin stub (LZ) exactly 4 ft. 6 in. long.
3. Cut the open stub (LC) exactly 30 in. long.
4. Cut the feed line to any desired length.

*935 East Cotati Ave., Cotati, CA 94931



The author's 80 meter DCTL enhances the decor of his shack. Notice, however, that his XYL is still smiling.

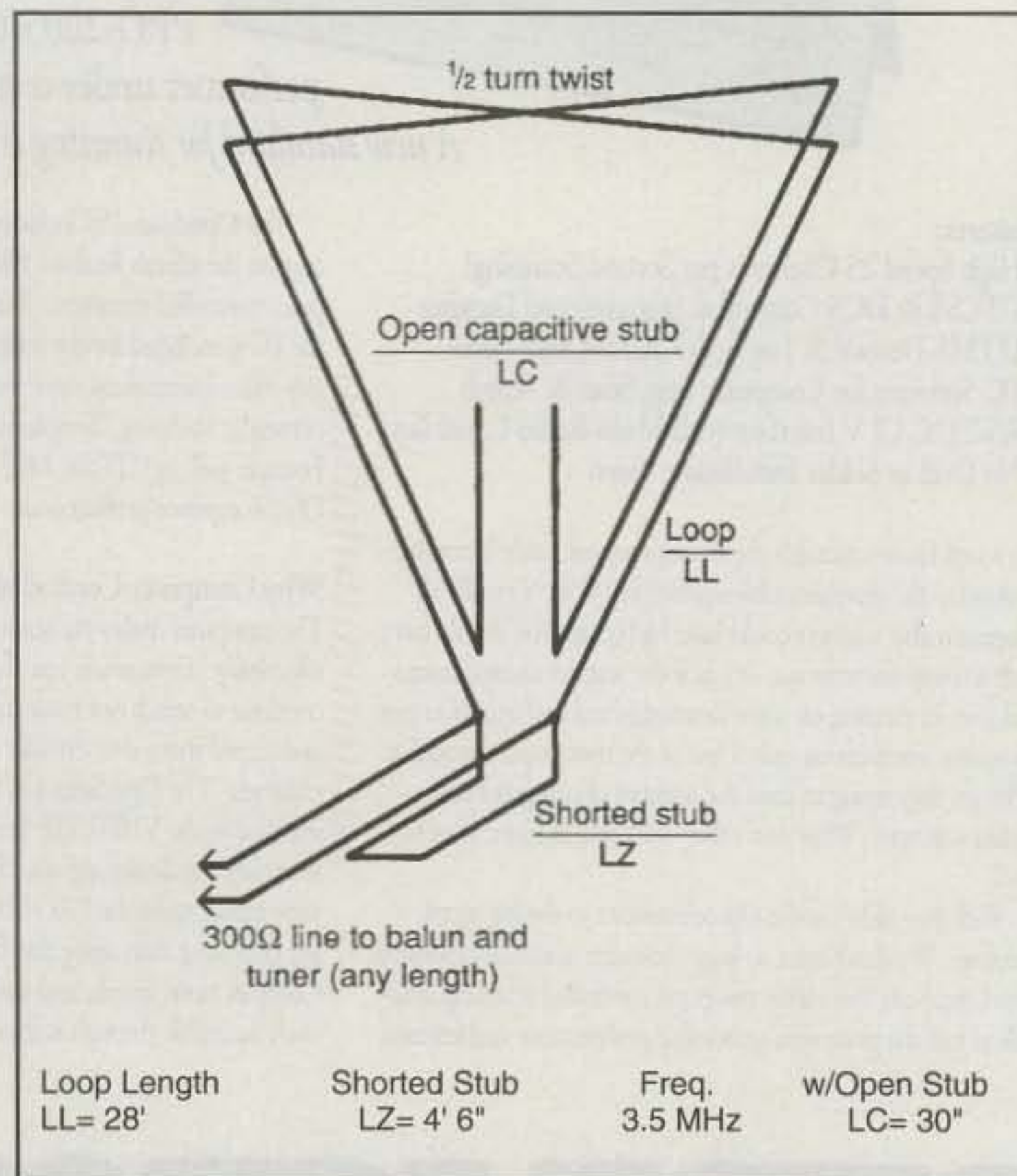


Fig. 1—The 80 meter DCTL dimensions.

5. With a sharp knife, split the end of each section, except for the capacitive stub, two inches down the middle. The capacitive stub only needs to be split on one end.

6. Then strip 1/2 in. of insulation from every pair of wires formed by splitting the section ends.

7. Now, with the 28 ft. loop (LL), locate the wires on opposite ends of the twin lead that **DO NOT** connect to each other. This is critical and is best done with an ohmmeter looking for an open circuit (see fig. 1). Then label as **lead-in**. The other two opposing loop wires connect to the capacitive stub (LC).

8. With the 4 ft. 6 in. hairpin (LZ), short the two wires at one end together, solder, and cover with 1/4 in. shrink tubing.

9. Attach banana plugs to one end of the lead-in section.

10. Slip 1 1/2 in. long pieces of 1/4 in. shrink tubing on every wire end of the 28 ft. loop piece.

11. Solder and heat shrink each connection per fig. 1. **DO NOT** put any two connections close together by taping or by using another piece of shrink tubing. This will cause excessive heating.

Installation

After the construction is completed, all that's left is literally to hang it up. Naturally, all the "normal" antenna rules—such as way up high and away from everything—apply, but if you could do all that, you'd have a beam at 100 ft. and probably wouldn't be reading this anyway. So let's consider the worst case—hanging an antenna inside the QTH.

With the feedpoint angle between 60 and 90 degrees, the antenna easily fits on the inside wall of a normal house. I find that a 10 ft. top side and 9 ft. sides down to the feedline work great, and you only need two hooks to make the whole thing work. Find an appropriate wall or other location and hang it up with the feedpoint angle down. The open stub should be away from the other antenna parts, and the shorted stub can hang loose or be twisted loosely around the feedline. Be careful to avoid all metal, especially with-in or on the outside of the wall, where you might not otherwise think about it. Then connect the antenna through a 4-1 balun to the tuner and rig and you're ready to try it out.

Tuning

Without a tuner, you can find resonance (near 3.5 MHz) by tuning for the lowest SWR or by using a noise or antenna bridge, if you have one. Adjust the resonant frequency by starting with an open stub longer than necessary and trimming

I.	Total length in feet	LT =	$\frac{130}{\text{Frequency MHz}}$
II.	Shorted stub hairpin impedance match	LZ' =	$\frac{27}{(2 \times \text{Freq. MHz}) - 2}$
III.	Loop length	LL' =	LT - LZ
IV.	Capacity tuning stub length in inches for a 100 kHz change in frequency	LC'' =	$24 \times \frac{1}{(\text{Freq. MHz}/2)^2}$
V.	Bandwidth in kHz (2-1 SWR points)	BW =	$\frac{\text{Frequency MHz}}{100}$

Table I—DCTL formulas (for Radio Shack 15-1153 twin lead).

Band	LT	LZ	LL	LC (for 100 kHz) (lower freq.)
2.0	65' 0"	13' 6"	51' 6"	24"
4.0	32' 6"	4' 6"	28' 0"	6"
7.3	17' 10"	2' 2"	15' 8"	1 3/8"
*10.15	12' 10"	1' 6"	11' 4"	1"
*14.44	9' 0"	1' 0"	8' 0"	1/2"
18.14	7' 2"	0' 10"	6' 4"	NA
*21.37	6' 1"	0' 8"	5' 5"	NA
*24.96	5' 2 1/2"	0' 6 1/2"	4' 8"	NA
*28.36	4' 7"	0' 6"	4' 1"	NA

**Please note that data for the starred bands has not been tried, but the formulas worked quite well for all antennas built so far.*

Table II—DCTL band chart.

it to the desired point. Remember that cutting 6 in. off raises the resonant frequency approximately 100 kHz. I prefer to tune the antenna to the middle of the band on which I want to operate and use my tuner to swing across the band. However, you could just build the antenna for the middle of the band, knowing that it probably will resonate somewhere near where you want it, and use your tuner to do the rest of the work without trimming anything at all. My model, hung from the living room balcony plants, tuned to 3800 kHz with a 6 in. open stub. This was about 100 kHz lower than the formula predicted. The exact frequency depends upon the angle at the feedline and how much capacitive coupling the antenna has to other objects.

I have also built two different remote resonating systems. One uses relays to switch in different lengths of capacitive stub (LC), and the other has two pieces of coax braid taped to opposite outside walls of a piece of 3/4" PVC tubing. They are connected to the LC terminals, and a piece of 1/2 in. copper pipe slides in and out to raise and lower the effective capacitance. All this was done, of course, after the XYL retired for the evening. She did

mention, though, that one of her plants is looking poorly! Hmmm . . .

Theory

To understand how the DCTL works, one must first start with some general dipole concepts. Halfwave dipoles in free space resonate with a balanced impedance of about 75 ohms. It is interesting to note that a dipole's resonant frequency lowers when the ends are placed close to a ground plane so that their actual length is a little less than halfwave. Another interesting point is that the impedance also lowers to about 50 ohms (like an inverted Vee). Instead of placing the ends near ground, they can be bent around into a loop (more or less) and placed near each other. Either way, the effect is to cause capacitive coupling between the endpoints. If the loop ends have a high enough capacitor (with a very high voltage rating) between them, then the resonant frequency length will be much less than halfwave and the impedance much lower than 75 ohms. The bandwidth will also be very narrow in comparison to a standard dipole.

The DCTL uses the insulation between

the two conductors in twin lead as dielectric for its capacitor. Furthermore, this capacitor is evenly distributed along the whole length of the loop. At the open ends of the loop a small additional capacitance is added in the form of an open stub to tune the antenna across the band. Without any impedance matching, the basic DCTL resonates at about $1/8$ wavelength. Impedance matching adds some inductance and lowers the resonant frequency

even further, so the final loop length ends up at about $1/10$ wavelength, which is as small as a loop should be while still having enough efficiency to put out any kind of a signal at all.

Matching is necessary because the loop only has about 5 ohms of impedance. This is accomplished with a "hair-pin" impedance matching transformer. This is a short-stub device that transforms very low impedances into higher impedances

(such as 5 ohms to 300 ohms) by adding some inductance at the antenna feedpoint.

The Final Result

The final DCTL version resonates at $1/10$ wavelength, has an impedance of 300 ohms, and has a 2:1 SWR bandwidth $1/100$ of the resonant frequency. Also, the radiation pattern is a figure-eight in the plane of the antenna (the opposite of a dipole) with a front-to-side ratio of about 30 dB and an angle of radiation that goes from very low to very high. Also, while checking the pattern with a field strength meter, I was surprised to find that there is a small area on the side with no detectable radiation at all. I actually could follow this dead spot right into the loop's center with no meter indication. Additionally, the feedpoint can be mounted at ground level, which puts the peak at about 0.03 wavelength. Try doing that with a dipole and see what happens. You'll warm the worms in the ground below, but you won't put out much signal.

In comparison, I've had all my models, including the 160 meter version, hanging in the living room for testing with good results. Finally, the noise level is way down. In QSOs signal reports are usually similar on both ends, but my noise level is sometimes six S-units lower than the noise level at the other station. On 80 meters signals are strong with little or no QSB, and I easily can copy all of North America. The station I've worked gave me good reports, and I was surprised that I could also copy Hawaii and New Zealand, although I haven't tried to work stations that far away yet.

So get with it! Try a DCTL on 80 meters or any other favorite band (see Tables I and II for formulas and band chart) and enjoy compact, low-noise operation where you otherwise might not have room to operate at all.

Parts List

Note: All parts needed to build this antenna can be obtained by ordering the Compact Loop Experimenter's Kit. The parts list includes:

- Twinlead $5/16$ in.—100 ft.
- Shrink tubing $3/8$ in.—1 ft.
- Shrink tubing $3/16$ in.—1 ft.
- Banana plugs—2
- Dacron line—50 ft.
- Double split twinlead insulator with hardware—4

Introductory price with shipping is \$24. The kit is available from Antennas West, 1500 N. 150 W., Provo, UT 84604 (801-373-8425).

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	50:25-OHMS		2:1-HB100	100:50-OHMS	\$59.95
2.25:1-HU112.5	112.5:50-OHMS	\$34.95	4:1-HBM200	200:50-OHMS	\$39.95
2:1-HU100	100:50-OHMS	\$34.95	4:1-HB/U200	200:50-OHMS	\$59.95
2:1-HDU100	112.5:50-OHMS	\$49.95	4:1-HBHT200	200:50-OHMS	\$59.95
	100:50-OHMS		6:1-HB300	300:50-OHMS	\$59.95
1.78:1-HU50	50:28-OHMS	\$34.95	6:1-HB/U300	300:50-OHMS	\$119.95
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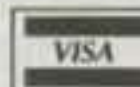
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Announcing:

The 1994 CQ World-Wide RTTY DX Contest

**Starts 0000 UTC Saturday
Ends 2400 UTC Sunday
September 24-25, 1994**

I. **Announcing:** The seventh annual CQ WW RTTY DX Contest, co-sponsored by *The RTTY Digital Journal*.

II. **Objective:** For amateurs around the world to contact other amateurs in as many CQ Zones and countries as possible using the digital modes.

III. **Contest Period:** 0000 UTC September 24 to 2400 UTC September 25, 1994.

Note New Rule: The total contest period is 48 hours. **All stations** may operate the entire 48-hour period; there are **no required off time periods** for any entries.

(a) All stations and operator classes may operate the entire 48-hour period.

Note the following operator classes.

IV. **Operator Classes:** There is a **High Power** category (greater than 150 watts) and a **Low Power** category (less than 150 watts). **Only** Single Operator **All Band** and **Multi-Op** Single Transmitter entries are eligible to enter the **High** or **Low Power** category. Enter one or the other, and so note on your log. Single Band entries, Single Operator Assisted, and Multi-Multi entries are **not** eligible to enter the High or Low Power category.

1. **Single Operator, All Band and Single Band.** One person performs all operating and logging functions. Use of spotting nets, DX Alert Packet Systems, telephone, etc., is *not* permitted.

2. **Single Operator Assisted, All Band Only.** One person performs all operating and logging functions. However, the use of DX spotting nets or any other form of DX alerting assistance *is* allowed. The operator can change bands at any time. Single operator stations are allowed only one transmitted signal at any given time.

3. **Multi-Operator, Single Transmitter.** All band entry only. More than one person operates, logs, checks for duplicates, use of a spotting net, etc.

(a) Only one (1) transmitter and one (1) band permitted during the same time period (defined as ten [10] minutes). Once the station has begun operation on a given band, it *must* remain on that band for 10 minutes; listening time counts as operating time.

Exception: One—and only one—other band may be used during the same time period if—and only if—the station worked is a new multiplier. Logs found in violation of the 10 minute rule will automatically be reclassified as multi-multi to reflect their actual status.

4. **Multi-Operator, Multi-Transmitter.** All band entry only. No limit to the number of transmitters, but only one (1) signal per band permitted.

(a) All transmitters must be located within a 500 meter diameter or within the property limits of the station licensee's address, whichever is greater. The antennas must physically be connected by wires to the transmitter.

V. **Entry Categories:** Single Operator entries may enter as (a) All Band High Power or Low Power; (b) Single Band; or (c) Single Operator Assisted All Band.

Multi-Operators may enter as (a) Multi-Op Single Transmitter, High Power or Low Power, All Band; or (b) Multi-Op Multi-Transmitter, All Band.

VI. **Modes:** Contacts may be made using Baudot, ASCII, AMTOR (FEC & ARQ), Packet. (Unattended operation or contacts through gateways or digipeaters are not permitted.)

VII. **Bands:** 80, 40, 20, 15, and 10 meters.

VIII. **Valid Contacts:** A given station may be contacted only **once** per band regardless of the digital *mode* employed. Additional contacts are allowed with the same station on each of the other bands as well.

IX. **Exchange:** Stations within the 48 continental United States and the 13 Canadian areas must transmit RST, State or VE area, and CQ Zone number. All other stations must transmit RST and CQ Zone number.

X. **Countries:** The ARRL and WAE country lists will be used.

Note: The USA and Canada count as country multipliers. Example: The first US State and Canadian area you work not only count as a multiplier for the state or area, but also count as a country multiplier for each band.

XI. **QSO Points:** One (1) QSO point for contacts within your own country. Two (2) QSO points for contacts outside your own country but within your own continent. Three (3) QSO points for contacts outside your own continent.

XII. **Multiplier Points:** One (1) multiplier point for each US state (48) and each Canadian area (13) on each band. One (1) multiplier point for each DX country in the ARRL and/or WAE lists on each band. **Note:** KL7 and KH6 are country multipliers only and not state multipliers. One (1) multiplier point for each CQ Zone worked on each band. A maximum of 40 Zones per band.

Note: Canadian areas are VO1, VO2, VE1 NB, VE1 NS, VE1 PEI, VE2, VE3, VE4, VE5, VE6, VE7, VE8 NWT, and VY Yukon.

XIII. **Final Score:** Total QSO points times the total multipliers equals the total claimed score.

XIV. **Contest entries and logging instructions:** CQ WW RTTY DX logs and forms should be used to facilitate scoring and checking. **Please do not** roll the US States and Canadian Provinces together on the Summary Sheet as Country Multipliers; break them out separately.

All logs **must** show:

1. Times in UTC.
2. All sent and received exchanges are to be logged (call-sign, RST, Zone, country, State/VE, points claimed).
3. Indicate State/VE area, Zone, and Country Multiplier only the *first* time they are worked on *each* band.
4. Use a separate log sheet for each band.

5. A check list of duplicate contacts for each band (dupe sheet).
6. A *multiplier* check sheet for each band.
7. An overall *summary sheet* showing total QSOs, Points, Zones, Countries and States/VE areas worked.
8. Each entry must be accompanied by a signed declaration that all contest rules and regulations for amateur radio in the country of operation have been observed.

Contest forms are available from *CQ*, *The Digital RTTY Journal*, and the Contest Director. Please include a large SASE with two units of US first class postage or IRCs.

XV. Disqualifications: Operating in an unsportsmanlike manner, manipulating scores or times to achieve a score advantage, or failure to omit duplicate contacts which would reduce the overall score more than 2% are grounds for disqualification. The use of non-amateur means such as telephones, telegrams, etc., to elicit contacts or multipliers during the contest is unsportsmanlike, and the entry is subject to disqualification. Actions and decisions of the Contest Committee are official and final.

XVI. Awards: Plaques will be awarded to the first-place finishers in each of the operator classes. Certificates will be awarded to second and third places. Certificates will be awarded to the first-place finishers in each DX country. To be eligible for awards, a Single Operator must operate a minimum of 12 hours, and a Multi-Operator entry must operate a minimum of 18 hours.

XVII. Deadline: All entries must be postmarked **no later** than December 1, 1994. An extension may be given if requested. Logs should be mailed to: Roy Gould, KT1N, CQ WW RTTY DX Contest Director, P.O. Box DX, Stow, MA 01775 USA.

XVIII. Plaques (Donors): Single Operator All Band plaques are awarded to the high scorer either High Power or Low Power, whichever is highest, unless noted.

Single Operator, All Band

World—AEA, Advanced Electronic Applications, Inc.

World, Low Power—Eastern Washington Amateur Radio Group
 North America—TG9VT Memorial
 North America, Low Power—American Digital Radio Society
 South America—The Contest Committee
 Europe—HAL Communications Corp.
 Oceania—*The RTTY Digital Journal*
 Asia—N5JJ Memorial
 Africa—The Contest Committee
 United States—RTTY by WF1B
 United States, Low Power—Geoff Malta, N2HOQ

Single Operator, Single Band

3.5 MHz—Reggie Corey, KA1UQU
 7.0 MHz—Open
 14 MHz—Kunihiko Fujii, JH1QDB
 21 MHz—Denis WD4KXB & Mike KA4RRU
 28 MHz—The Contest Committee

Single Operator Assisted

World—*CQ* magazine
 North America—Terri Bouvier, N1DTG
 Continents—Open

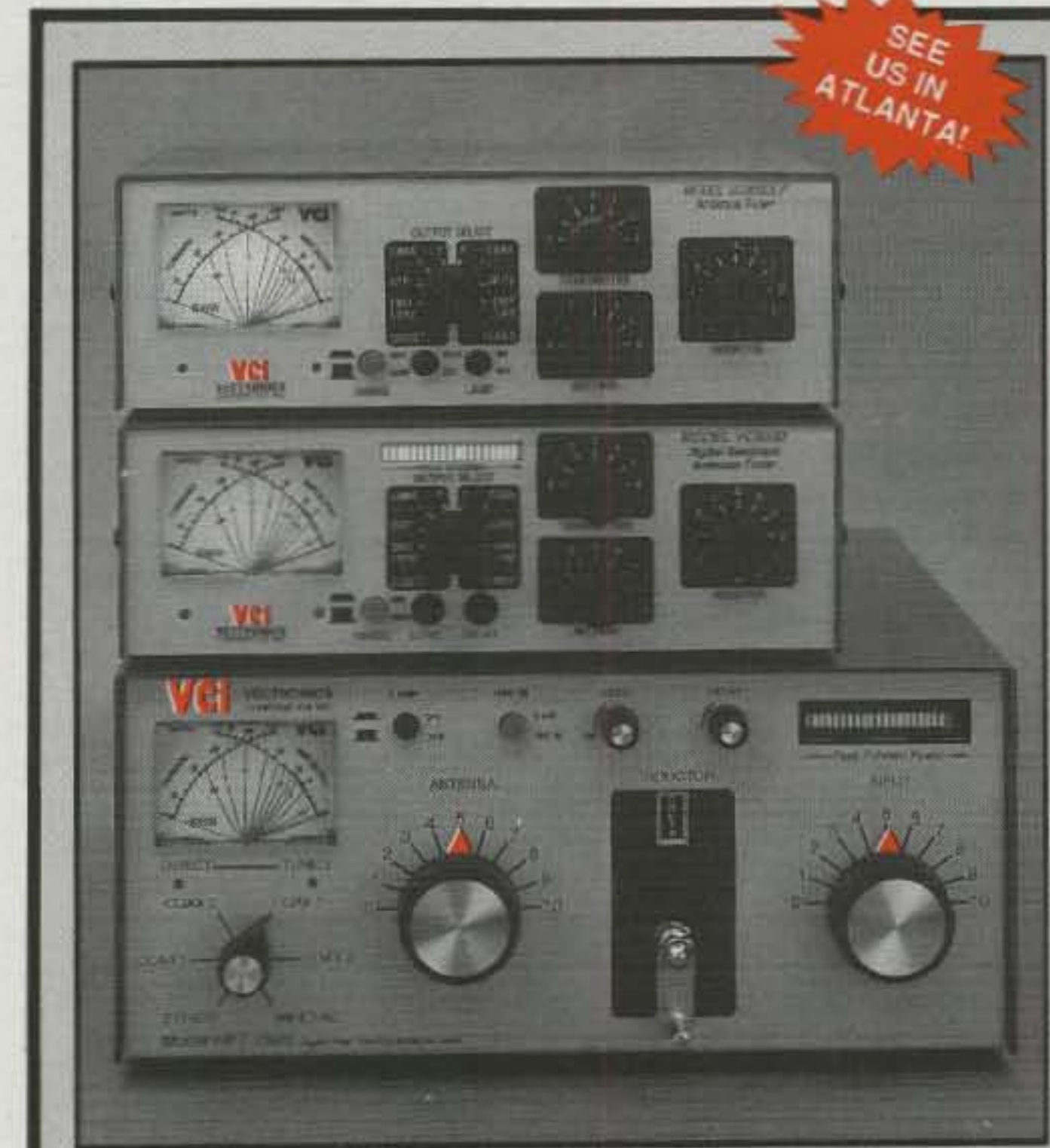
Multi-Operator, Single Transmitter

World—AEA, Advanced Electronic Applications, Inc.
 World, Low Power—HAL Communication Corp.
 North America—GØAZT Award
 Continents—Open

Multi-Operator, Multi-Transmitter

World—*CQ* magazine
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There are many plaques looking for sponsors: High Power, Low Power, Single Band, a specific country, Multi-Op by continent, etc. If you are interested, contact the Contest Director.



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More Bang For The Buck

How To Build A Really Cheap But Good Antenna For 2 Meters

BY LEW McCOY*, W1ICP

I have the reputation of being able to squeeze a buck until George Washington looks like a young boy. I have followed this technique into amateur radio and have striven to make inexpensive but good pieces of equipment. I thought I would apply my antenna knowledge to a really cheap (a better word is frugal) 2 meter antenna. The following is the result.

A J-Pole

For some time I have been experimenting with various configurations of J-pole antennas. This antenna has proven its worth many times over. Essentially, the J-pole is a vertical antenna that is $3/4$ wavelength long (or rather high) overall (see fig. 1). The bottom portion is a quarter wavelength (approximately) long, consisting of two conductors. Atop one of these conductors is another half-wavelength antenna. The antenna is fed with 50 ohm coax near the bottom.

Because the antenna looks like the letter J, it was called the J-pole. I always like to give credit, but in this case I was unable to find out who originally came up with this very fine antenna. If you know, please let me know. The antenna is vertically polarized, making it well suited to 2 meter repeater work. Additionally, the ELNEC computer program shows the antenna to have a 3 dB gain compared to a dipole.

Usually the antenna is made from aluminum tubing. While such lengths of tubing are relatively cheap, however, there is a less expensive way of making the antenna. And therein lies a short story.

I recently attended a Quarter Century Wireless Association social affair in Palm Springs as the new president elect of QCWA (applause). While camping in my trailer, I set up for 2 meters and operated on the local repeater. I worked a whole bunch of new amateurs, but even more important was a discussion I overheard one morning.

Maureen Hiemstra, KD6BSC, and Denny Trunelle, KE6AMT, had a project

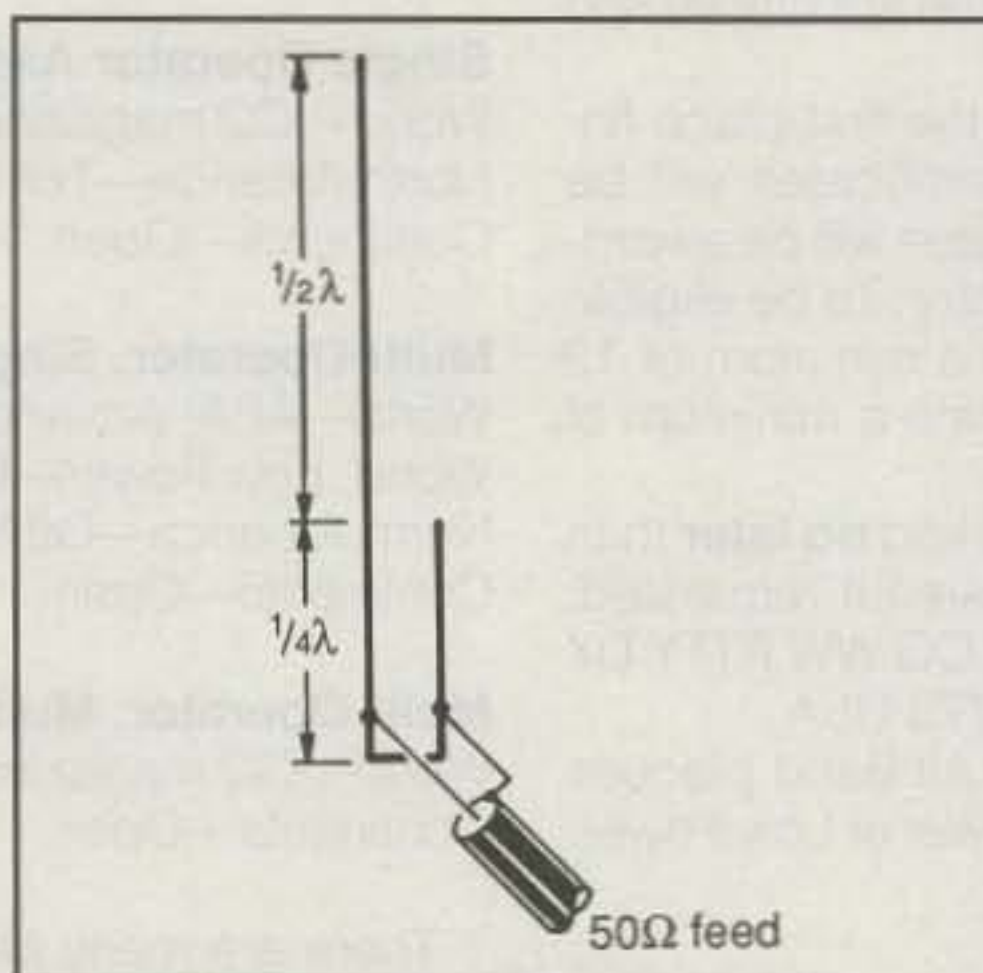


Fig. 1—The J-pole antenna gets its name from the letter "J" configuration. The long wire is $3/4$ wavelength, with a quarter-wave antenna at the bottom which serves to feed or couple the half dipole, which is end fed—or high-impedance feed.

going in which they were building J-pole antennas for 2 meters. What surprised me, however, was their method. I later met both of them at a luncheon, and they were quick to admit that the idea didn't originate with them. They had had very good luck with the antenna, as did other local builders.

In my mind, the novelty of the method of these amateurs was that they made the J-pole from ordinary 300 ohm twin lead. You only need about 60 inches, or 5 feet, of the line, and usually that amount is found in any junk box. I am providing their dimensions, but I have to admit, I found these dimensions a little tricky in trying to get a match for 50 ohms. Their suggestion was to wrap a small piece of aluminum foil around the twin lead and then slide it up and down to achieve a match.

I ran the ELNEC computer program using the dimensions given and made several 300 ohm twin-lead J-poles. Even here my results were less than satisfying, so I resorted to an amateur's strong suit: I went empirical and started making J-poles on my own. My object was to come up with an antenna that was easily duplicated—and I think I found it.

I first decided that 300 ohm twin lead was too erratic. I had some 450 ohm ladder line which I had gotten from The Wireman, and I thought this would be little more rugged but still flexible. The line I had was $3/4$ inch between conductors, and the wire itself was solid No. 18 or No. 20 copper. I used the ELNEC program for wire lengths for the project. The very first antenna ended up almost perfect. I used an MFJ-249 antenna analyzer to check the antenna, and as it turned out, my first version showed less than 1.3 to 1 across the entire 2 meter band. I then switched my measuring to a Bird wattmeter to double-check the analyzer figures, and they agreed—exactly.

Next, to be sure, I made three more J-poles from the ladder line using the dimensions of the first. Sure enough, all the rest checked out exactly like the first. Surprisingly, the antenna was very flat across most of the band—less than 1.5 to 1 SWR.

The cost of the ladder line is less than 20 cents a foot, and you need about 5 feet. That makes the cost of the antenna slightly less than that steel engraving of George Washington, or one buck.

The antenna undoubtedly has good gain as compared to a quarter-wave ground plane and immeasurably more gain than a rubber duckie. It is simple to hang one end of the antenna up on a support as high as possible. Also, it would be a good traveler's antenna because it can be coiled up and easily stored in luggage. Also, the antenna connections could be coated with waterproofing material and installed outside—forever. Still another method would be to slip the antenna inside a length of 1 inch PVC and mount the PVC up in the air. There are scores of possibilities.

Next on to actual construction. It is simple. Cut a length of the ladder line to 54 inches. Remove the insulation for 1 inch on each of the wires at one end. Twist the wires together and then solder them. To be exact, and duplicate what I had, each of these ends comes out to $1/2$ inch to the soldered point (see the drawing).

Next the feedpoint for the coax is $2 1/4$ inches up from the joined end (again, see

*Technical Editor, CQ, 1500 W. Idaho St., Silver City, NM 88061

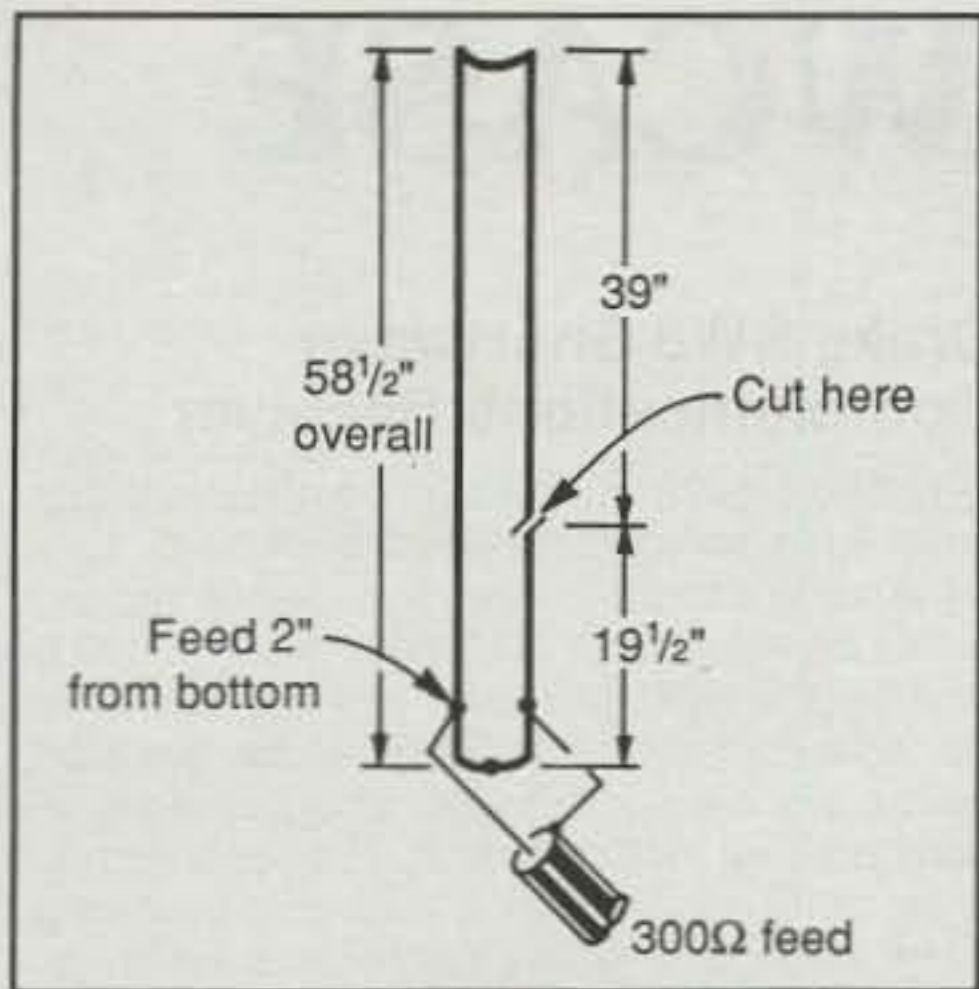


Fig. 2—The 300 ohm twin-lead J-pole antenna. As I mentioned in the text, I wasn't too successful in duplicating the antenna shown. My problem was primarily getting resonance on 2 meters.

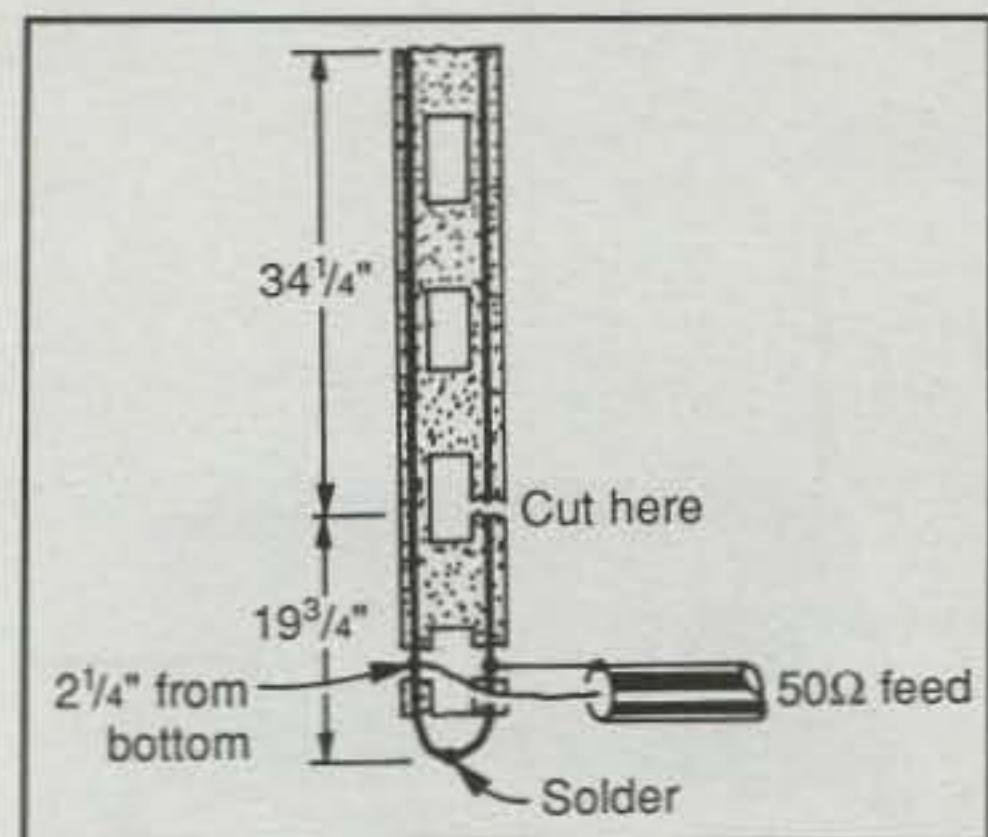


Fig. 3—The J-pole made from open wire (ladder line). This antenna was flat—less than 1.5 to 1 across the entire 2 meter band. It is also an excellent performer.

the drawing). Remove the insulation from this point and tin both the wires.

Cut one of the wires 19 3/4 inches up from the feed end. This now gives you two conductors in a "J" configuration. True, there is the one wire in the ladder line above the cut, but it is just "floating." I found that it did not disturb the pattern in the computer plot, so I just left the wire to add strength to the antenna.

I used a piece of RG-58/U for feed, simply because it was light weight. However, I wouldn't recommend this line for 2 meter work, particularly with runs over 10 or 15 feet. It is very lossy at 2 meters—nearly 6 dB for 100 feet. For long runs, say 100 feet, use a good grade of low-loss cable. In any case, strip back the coax to make any antenna connections. Try to keep the center conductor and outer shield leads just as short as needed to make the connections and dress the line directly off the bottom of the J-pole (or straight down).

I accomplished my goal of making an inexpensive but good (in fact, very good) antenna. Now if I could just figure out a

way to make low-loss but cheap coax. Which reminds me: Years ago I built a 4-element beam for 2 meters using coat-hanger wires. Would anyone like to revive that one?

That's it. I think it's pretty hard to beat one dollar or less for a fine-performing antenna. The beauty of this antenna is that it is so much better than the rubber duckie used on handhelds. I'm guessing, because I don't know exactly how much better, but it would be safe to say at least ten times better.

The J-pole as described can be rolled

up and stuck in your pocket. If that repeater is "marginal" for you, this antenna will make you full quieting. I recently had to go to a social affair where I stayed at a motel. There was a local repeater, but I couldn't get into the machine unless I very carefully oriented my handheld. I hung the J-pole from a drape hook and wham!

Needless say, I was solid. Not only that, I found I could work into two other more distant repeaters. If you are into search and rescue—this antenna could save you a lot of headaches. Have fun! ■

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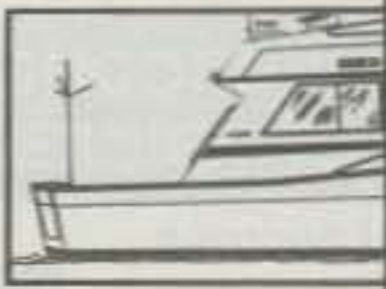
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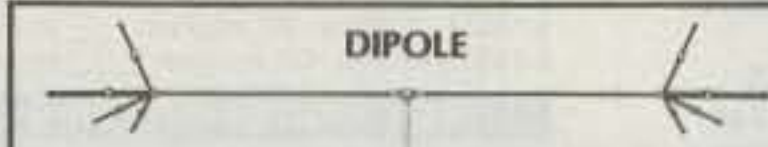
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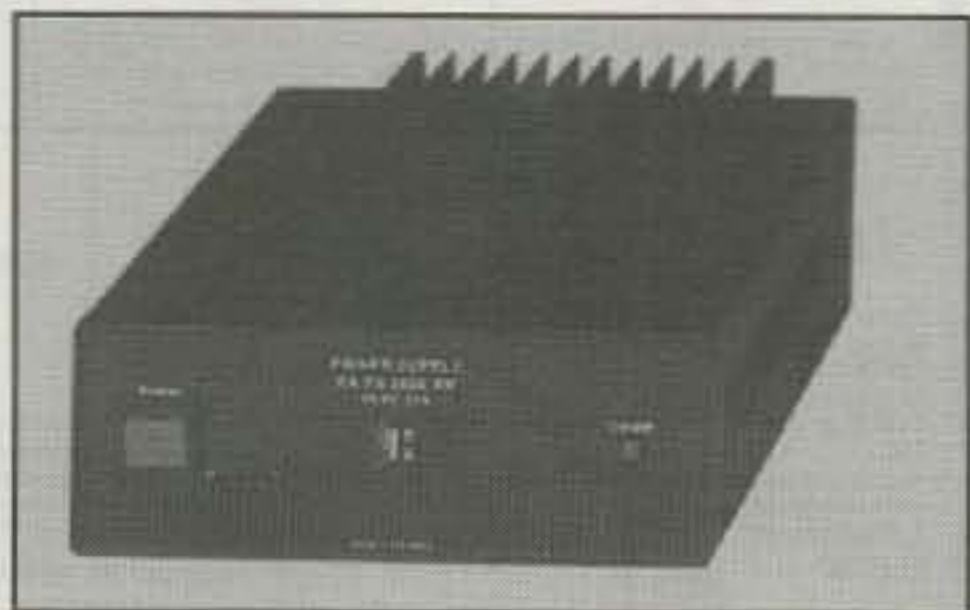


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MHz (FM BCB), and 118-137 MHz (aircraft). Wavelength selection designator allows the receiver to automatically tune to the low frequency end of the corresponding meter band.

The SW8 is priced under \$600. For more information, contact R. L. Drake Company, P.O. Box 3006, Miamisburg, OH 45343 (513-866-2421; FAX 513-866-0806), or circle number 104 on the reader service card.

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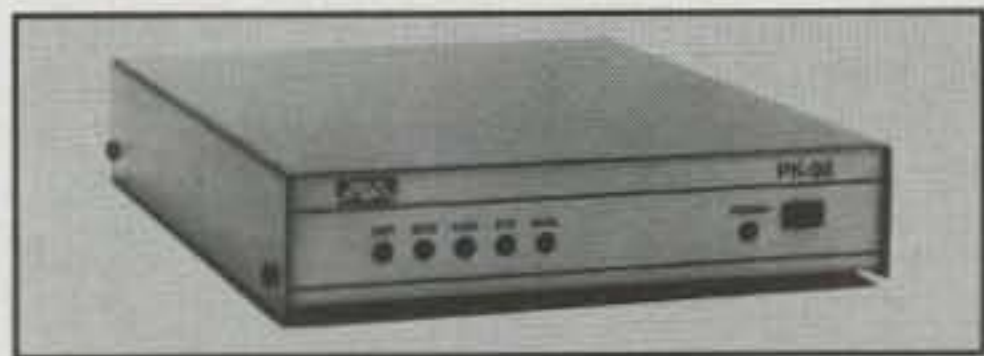
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For more information, contact Advanced Electronic Applications, Inc., P.O. Box C2160, Lynnwood, WA 98036 (206-774-5554; FAX: 206-775-2340), or circle number 105 on the reader service card.

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AmSoft's January 1994 edition of "The World of Ham Radio" CD-ROM features new for '94 the FCC amateur radio license database. CALLSIGN will search over 700,000 new and previous callsigns and find a licensed operator in seconds. Users can view CALLSIGN on-line or save to disk. Also new for 1994 is a front-end menu system called CDVIEW which will operate the disk with simple on-screen commands, on-line help files, and instant information files from anywhere within the CD-ROM. Over 7000 program files cover many of the latest software releases, and subjects include antennas, CAT, CW, engineering, exams, formulas, logging programs, MUF, multimode, controllers, packet, RTTY, satellites, SWL, weather tracking programs, and Windows ham software. Over 1000 radio modification files, plus thousands of shortwave frequencies, are readable on-line.

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CIRCLE 116 ON READER SERVICE CARD

CQ REVIEWS:

The Digi-Field FS Meter

BY DOUG DeMAW*, W1FB

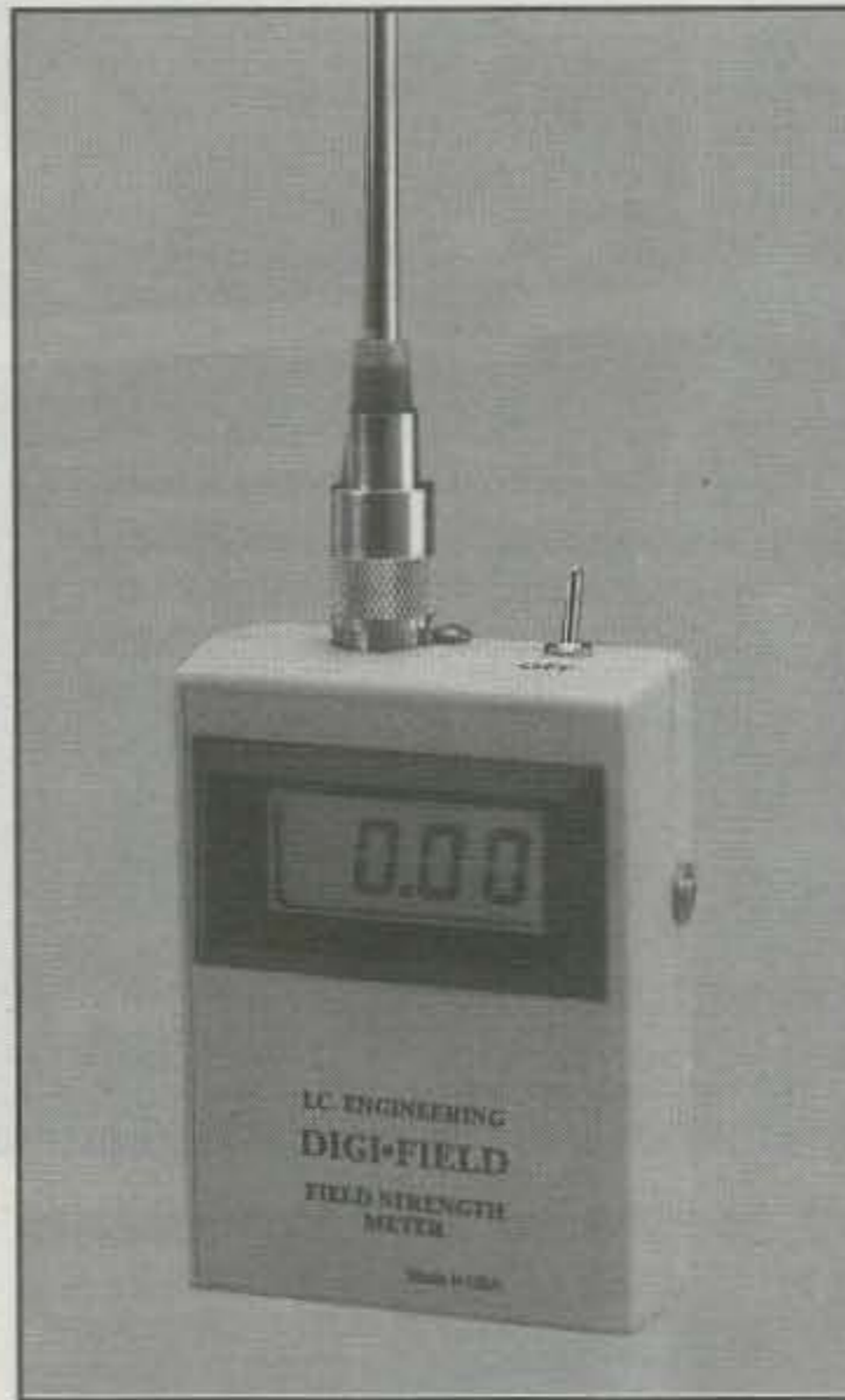
Homemade analog field-strength meters were the rule until recently, when digital technology became a part of amateur radio and also took its rightful place in industrial electronics. I.C. Engineering (Encino, California) made its entry into the amateur digital market with two nearly identical instruments called the Models A and B field-strength meters. These compact, self-contained, battery-operated devices offer the same functions as our older analog meters, which were generally without active devices to increase the meter sensitivity. The sensitivity of the I.C. Engineering instruments borders on the incredible, and the relative RF levels during tests are displayed by means of an LCD type of digital readout block.

Perhaps the most significant amateur use for these meters is the measurement of antenna field strength while plotting antenna patterns in the field. Those who have computers with MININEC or ELNEC software may prefer to analyze antenna performance by that means, but the hands-on, real-world analysis can be carried out while using an FS meter that has been calibrated in dB and logging the FS intensity by laying out a grid of radials and taking readings at one-, two-, or three-wavelength distances from the antenna. For example, the radiation patterns for mobile antennas yield some interesting results with respect to directivity. An omnidirectional radiation pattern is seldom available, and a major lobe is often found off one quarter of the vehicle.

The Digi-Field meters are useful for a variety of applications such as measuring coaxial cable leakage and checking the effectiveness of amateur-station ground leads between the operating position and the primary earth ground. In other words, the instrument with its telescoping whip antenna can be used as an RF sniffer for a variety of applications.

The frequency range for the two units is from DC to 12 GHz. There are no tuning adjustments or sensitivity controls. The user simply turns on the power and uses the FS meter. The length of the whip can be varied to increase or reduce the overall meter sensitivity.

RF "hot spots" in the shack can be



The compact I.C. Engineering Digi-Field field strength meter.

located quickly with these instruments. This can be especially helpful in situations where stray RF energy is affecting the audio circuit in a transceiver or is causing accessory gear (such as a keyer) to malfunction.

Applications other than those for amateur use include checking for excessive radiation from microwave ovens or checking a room for electronic "bugs."

The sensitivity of the Model A FS meter is 150 nanowatts to 3.5 milliwatts at 100 MHz. It is rated at 400 nanowatts to 9 milliwatts at 500 MHz. The Model B is the more sensitive of the two meters. It is rated at 2 nanowatts to 60 microwatts at 100 MHz, and 15 nanowatts to 150 microwatts at 500 MHz. These detectable power ranges were determined by the manufacturer while injecting calibrated signals into the SO-239 connectors on the tops of the instruments.

Readout is provided by means of a large 3½ digit LCD display. A battery low-voltage indicator activates at 7.2 volts

or less. Power dissipation is less than 20 MW. The operating temperature range is 0 to 50 degrees C.

It is important for amateurs to understand that because of the extreme sensitivity of these instruments they will lock up in the over-range mode (no further increase in meter reading) when using normal amateur power levels during antenna tests. Therefore, it is essential to use a QRP transmitter with a power-level control, or a signal generator with a small amplifier, when evaluating antenna field patterns. An alternative approach is to open the instrument case and install a small screwdriver-adjust potentiometer between the antenna jack and the PC-board socket. The potentiometer should be located at the PC socket in order to prevent the associated wiring from acting as an antenna. I installed a 5K ohm trim-pot in one of my units to permit using 50 watts of RF power while checking the pattern of a 40 meter antenna. It may be helpful to replace the lead between the antenna jack and the PC-board socket with RG-174 miniature coax. This would prevent the factory-installed internal antenna lead from being an overall part of the circuit, as it is when it leaves the assembly line.

Note: These modifications will spoil the calibration of the instruments as referenced to the calibration sheets provided with the equipment. Included with the meters are voltage-to-dB and power-to-dB charts. The amateur can develop his own calibration charts by varying the transmitter power in 3 dB steps and logging the digital meter readings on the FS meter. There will be a 3 dB change each time the transmitter power is doubled or halved.

The Digi-Field meters come with a headphone jack on the side of the case. This permits monitoring AM signals and is especially useful when tracking 60 or 120 Hz hum.

The instruments are housed in gray plastic cases that measure 4¼"H x 3"W x 1½"D. The antenna is adjustable from 3 to 18 inches. The price class for either model of Digi-Field meter is \$140 plus shipping and handling. These products are available from I.C. Engineering, 16350 Ventura Blvd., Suite 125, Encino, CA 91436 (phone 800-343-5358, or FAX 818-345-0517). ■

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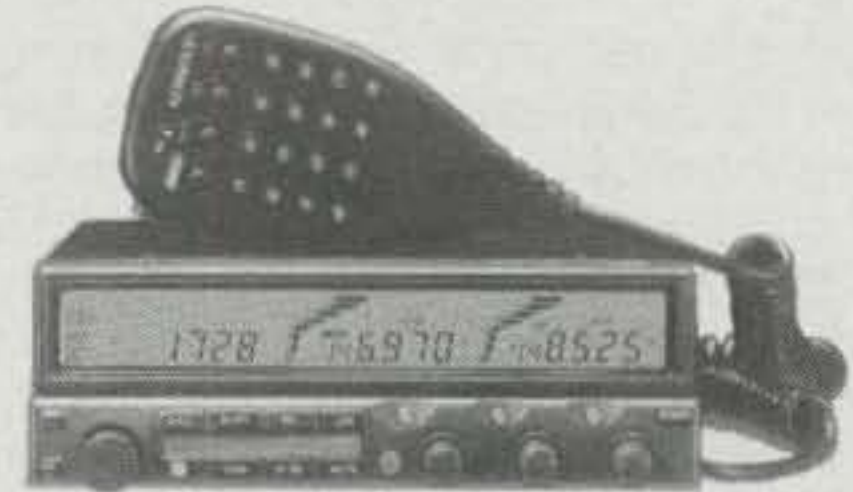
TS-50S



TH-78A



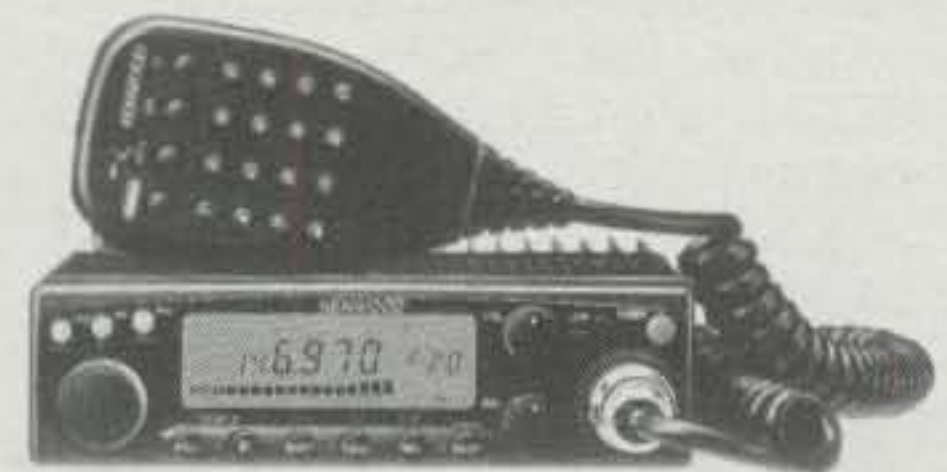
TH-28A



TM-742A



TM-732A



TM-241A



TR-751A

PACKET USER'S NOTEBOOK

CONNECTING YOU AND PACKET RADIO IN THE REAL WORLD

BY BUCK ROGERS, K4ABT

Packet Past, New Networks, Overcoming Interface Obstacles, And Hamvention History!

Ever think about the early days of packet? A few days ago I was in a QSO with Tom, W1EOH, in Tallahassee, Florida. Tom is almost a thousand miles south of my QTH here in central Virginia.

After we had completed our Sunday morning VHF QSO, I began to think about how we used to have keyboard contacts like the one I had just finished. In 1983 and 1984 we had to use brute power and super high-gain antennas to make the trek across a hundred miles, and that was sometimes by using our nearest packet neighbor as a "digipeater."

On this particular Sunday morning I used the Southeastern Emergency Digital Association Networks (SEDAN) nodes to connect to Tom. I was using an ICOM IC-281H running 55 watts to reach the first node. From there I used a total of 11 nodes to reach Tom.

On the 145.770 MHz network there are over 60 nodes that are operating in 7 states. All 60 of these nodes are running the latest X1J-2 (TheNET April 1994 release). All are coordinated within the state where they are located for keyboard and emergency communications use.

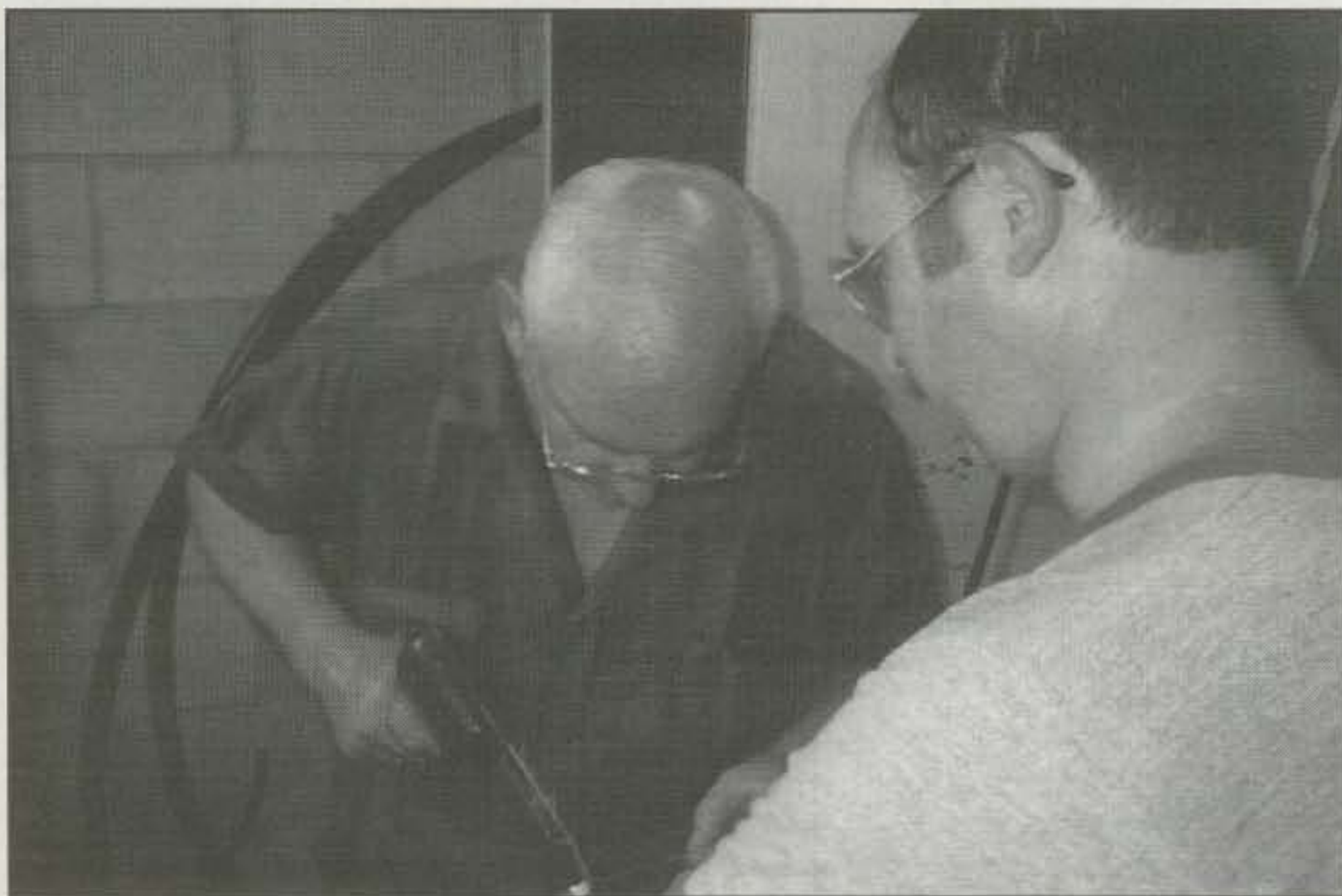
When the network is not being used for emergency communications, it may be used to keyboard between stations across many miles. This enables us to know how the system is working should it be called into emergency use anywhere along the network.

A lot of time, money, and effort went into putting a keyboard network such as this one together. The SYSOPs and users of the SEDAN are certainly proud of this achievement.

Some nodes are being constructed for the backbone and trunks of the SEDAN to deliver many kinds of text and data at rates between 9600 and 38,400 baud. The aim of this network is to have a keyboard-to-keyboard and emergency communications network which is accessed via 145.770 and which may be used by any locale along the network to help save lives, or in an emergency, may be used to assist with whatever disaster needs arise.

There are plenty of frequencies that support BBS, BBS forwarding, and DX spotting, but few true emergency and

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Frank Hough, K4ICT, putting the finishing touches on the hard-line connector for K4ICT-7/MCN at Macon, Georgia. Frank is one of the "movers and shakers" and an early pioneer of packet nodes in Georgia. He is another holder of the Packeteer Of The Year (POTY) award. The POTY award is given to packeteers who make things happen in packet radio.



Somewhere up there about 300 ft. at the left of the tower is the G-7 antenna for K4ICT-7.

keyboard-to-keyboard frequencies exist.

The SYSOPs of the SEDAN are eager to see more states with the same goals in mind join the network. It's time for true emergency applications for packet radio to be put in place. A part of the Southeastern Emergency Digital Association Networks is shown in the map (fig. 1).

In this month's column we have photos of some of the SEDAN node and antenna installations. In some of these photos you may see a face that matches a call-sign to which you may have connected at one time or another. In coming months I'll feature more node photos, and I may even print more pictures of the SEDAN SYSOPs.

If you have a node installation or node stack you would like to display in this column, send a photo and a short description of its use and location to my home address, and we'll try to put it into one of the upcoming "Packet User's Notebook" columns.

A "Gotcha"

Recently, Fred, WB4QOC, one of the SEDAN SYSOPs, asked me if I would

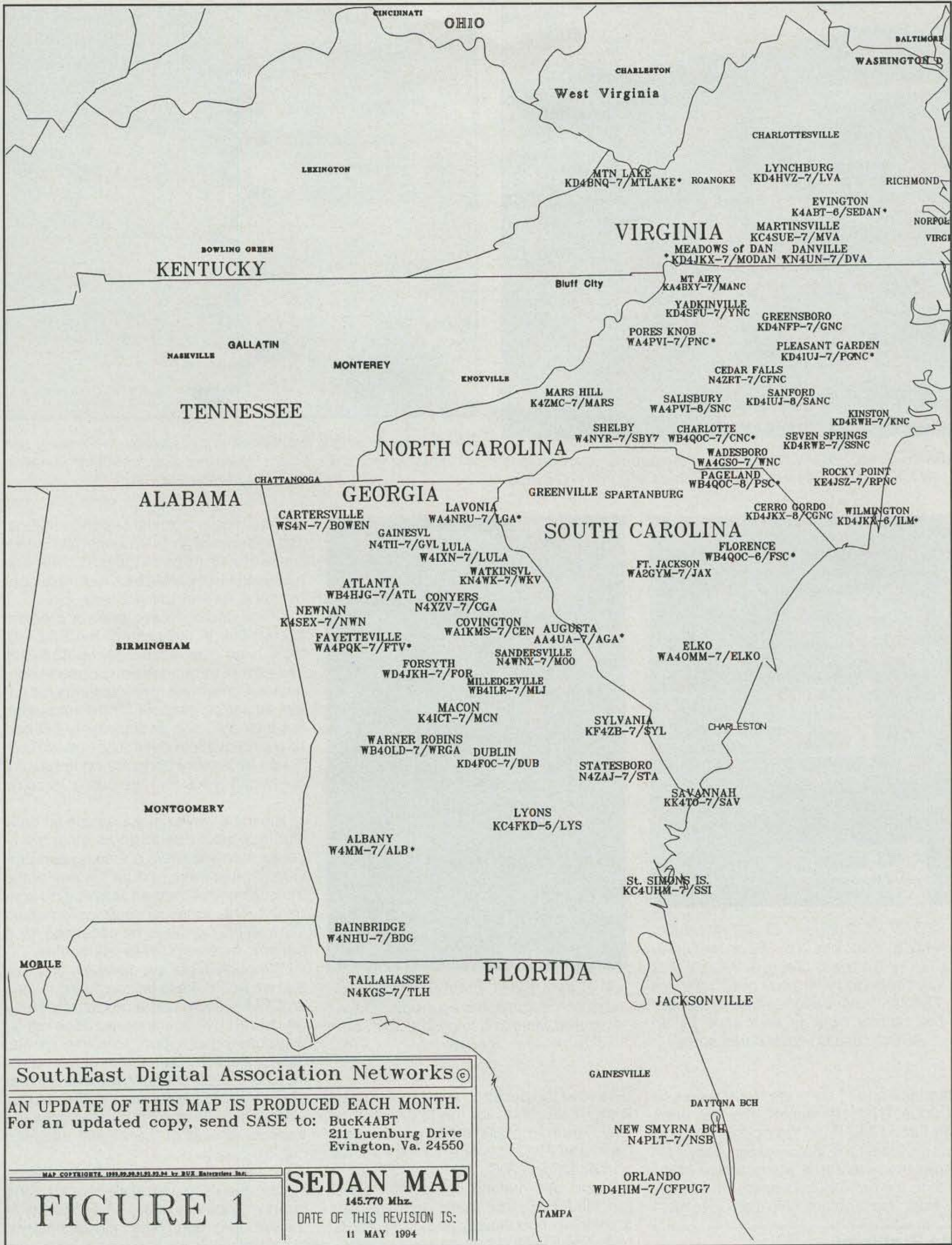
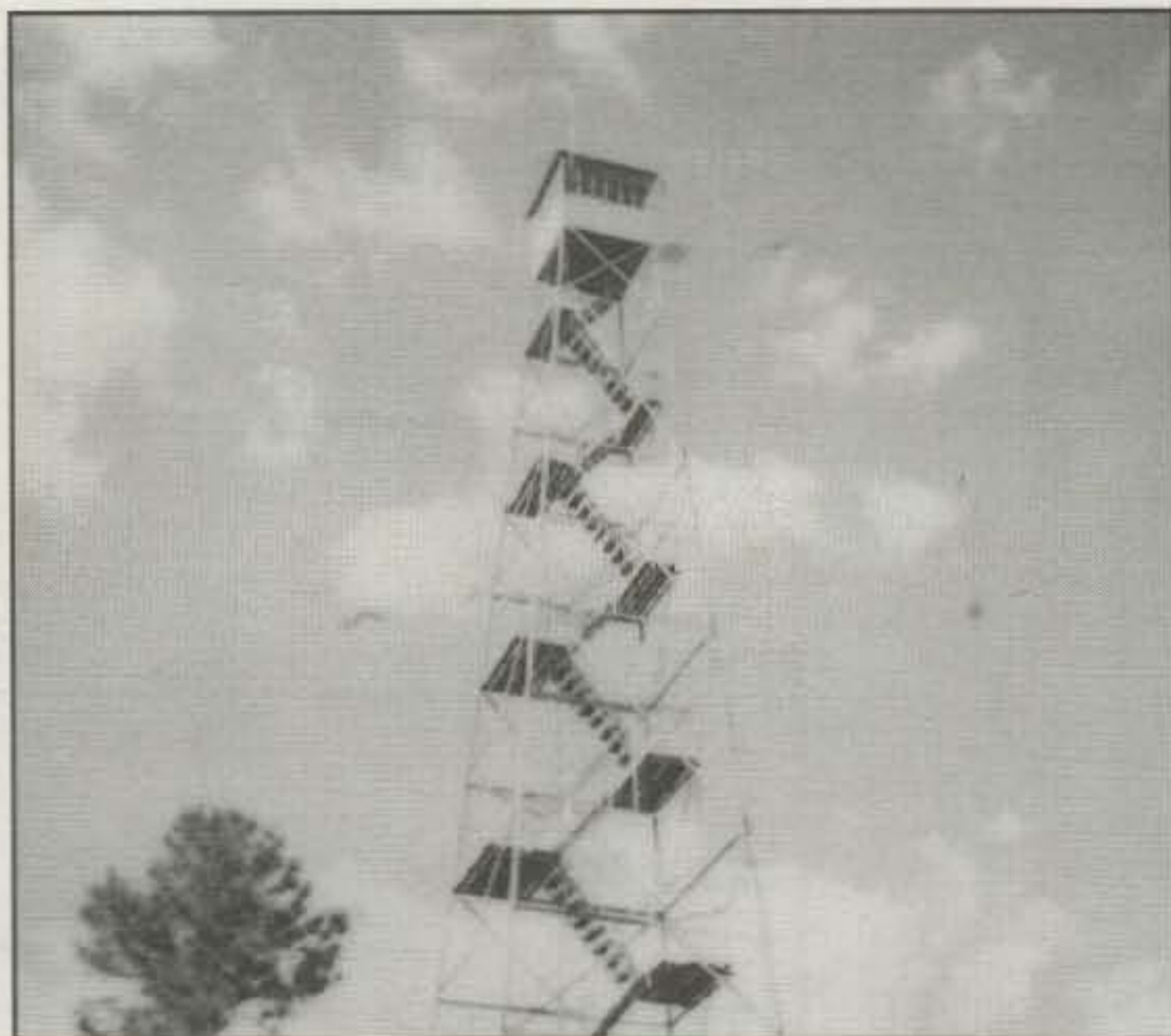


Fig. 1- Part of the Southeastern Emergency Digital Association Networks.



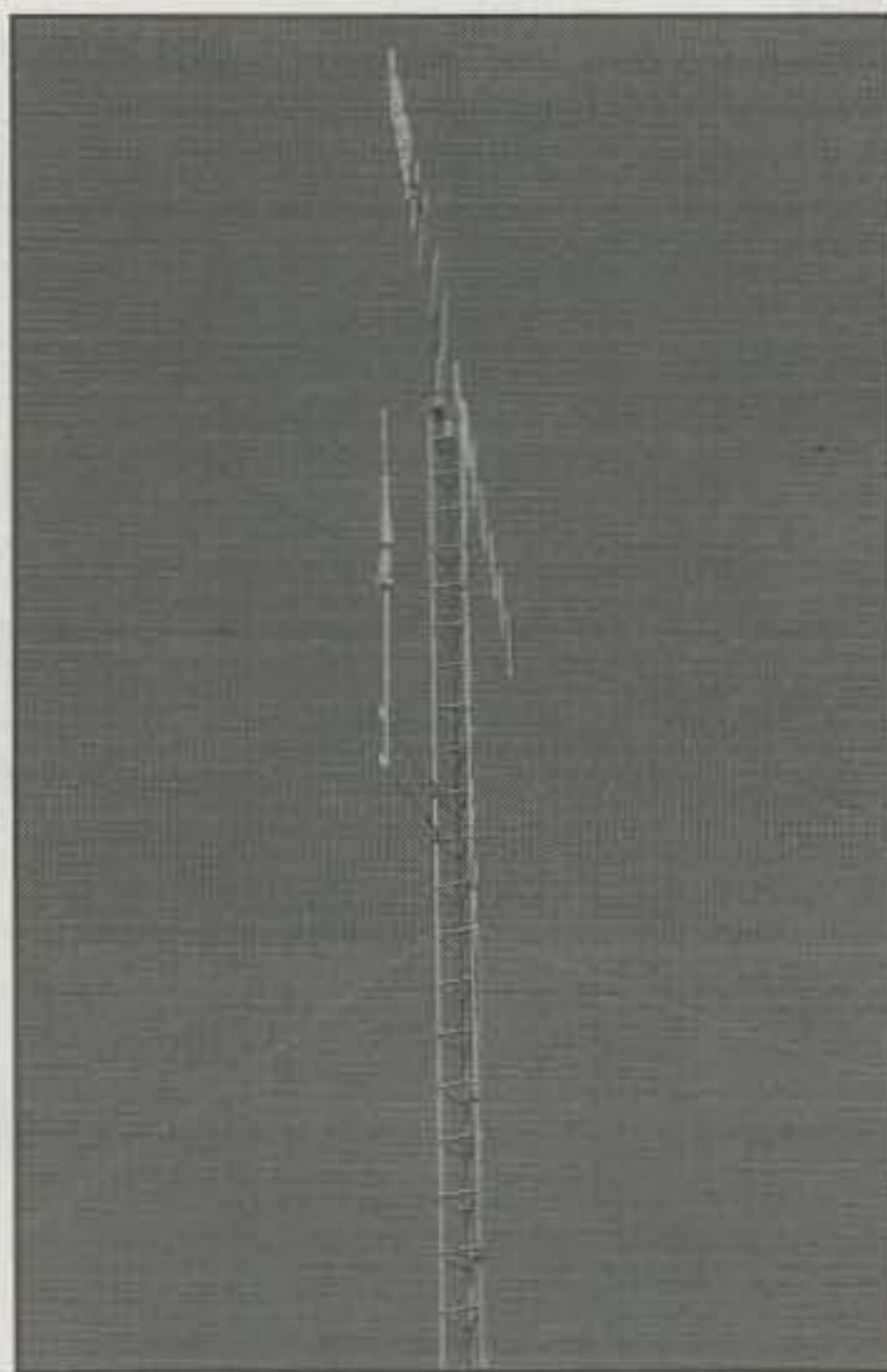
Bruce Dean, WB4OLD, displaying the cabinet that contains WB4OLD-7/WRGA near Warner Robins and Perry, Georgia.



The fire tower where the WRGA node antenna is located. Not clearly visible is a 5-element beam that was "carefully" installed by Bruce, and Frank, K4ICT.



SEDAN X1J2 node of Chuck Beckham, N4XZV. Chuck is SYSOP of N4XZV-7/CGA at Conyers, Georgia. N4XZV-7 is fully supported with a pair of 100 ampere "Dynasty" maintenance-free batteries. The battery bank is kept alive by an ARCO 16-2000 solar panel array.



Up in the breeze, the CGA X1J2 node links the solar-powered node "LULA" atop Skitt Mountain to central and south Georgia.

interface one of his node transceivers to a node TNC. He wanted the two units interfaced ASAP, as the node was to be put on the air the following Saturday. Always ready to assist where a new addition to the network is concerned, I readily said, "No problem; ship it on up to me."

No Problem!

Famous last words: "No problem!" UPS

delivered the package the following day. It didn't take long for me to understand why Fred had asked me to interface the radio and TNC. It was a Yaesu FT-2400 and an MFJ-1270C.

There was nothing uncommon about the MFJ TNC, but there certainly was something uncommon about the Yaesu unit. The FT-2400 has an RJ-45 type 8-pin microphone connector. This is a connector similar to the RJ-11 types used with

the late-model modular telephone plugs. The difference in this connector is that instead of 4 pins as on the RJ-11, this one has 8 pins—or better, let's call them connections, as they are not really pins.

There wouldn't have been a problem except that in the case of the FT-2400, there is no other accessory or I/O to this unit except through the microphone connector. Some other manufacturers are using similar connectors for the mic input, but they also add an accessory I/O port so a packet controller may be interfaced. These accessory ports are comprised of connector types that are easier to come by.

The ideal way to make enable an easy interface would be to do as other transceiver manufacturers are doing and provide another input port on the rear of the transceiver that uses an easy-to-find connector. This accessory connection would allow all I/O signals to be accessed, plus transmit/receive push-to-talk control.

We packeteers are many in numbers, and we would like to be considered when an OEM is designing a product that may be utilized by someone who does not always use a microphone to communicate. Maybe the next generation of radios will include a separate connector at the rear of the transceiver for packet TNC I/O, or at best, include an extra connector for the transceiver end of the packet interface cable.

I checked all the local Radio Shack stores, and even a local electronics parts supplier. Nothing doing. I have plenty of the standard round 8-pin mic connectors, but suddenly I was confronted with a different beast. Nowhere was this non-standard microphone connector to be found.

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● **Instant bandswitching, no tuning, no warm up** -- just turn on and operate -- makes mobile QSOs safer

● **Very Compact** -- just 3 1/2 x 9 x 15 inches -- fits in nearly any mobile installation; weighs only 7 pounds, that's less than some mobile HF transceivers

● **Extremely quiet** -- quiet low speed, low volume fan stays off and silent until temperature rises

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Exact power output of amplifiers may vary on each band.

amplifier if temperature is excessively high; automatically resets when temperature drops to safe level; has Thermal Overload LED indicator

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● **Exciter Drive** -- less than 100 watts input gives full output

● **Power Supply Requirements** -- requires 13.8 VDC at 80 amperes peak current for PA transistors and separate line for 12-15 VDC at 4 amperes for control and bias circuits

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CIRCLE 142 ON READER SERVICE CARD



I had to somehow slip this one into this photo session. That's me on the right of the living legend (left), Lew McCoy, W1ICP. When talking to a group about which antenna to use with packet, it certainly helps to have the authority alongside to provide expert information on the subject. Lew is also a seasoned user of both HF and VHF packet radio.

In addition, I needed some of the new 2.5 mm (sub-mini) stereo connectors. I trekked to five different Radio Shack stores. Same story! Radio Shack has the 3.5 mm to 2.5 mm adapter listed in their catalog, but none of the stores I checked in both Roanoke and Lynchburg, Virginia

stocked either of the plugs I've discussed here.

As I later related to Fred, I'm very sorry I hacked off the connector from the microphone that came with the Yaesu unit just to make the interface.

Now that I had the connector (hacked off the mic), the rest of the interface job should have gone smoothly. Not on your life! The fun had just begun. The connector was sealed and could not be opened without damaging the plastic. I chopped off some of the cable along with the connector so I would have a short end of wire from the connector to solder to.

Surprise!

The wire in the Yaesu cable was the super-fine, foil-type copper. It will curl up like a bed spring when you put the heat to it. Go for the tiny soldering iron (controlled heat), or do as I did and tightly wrap the joint where the two wires join with a short piece of number 24 or 26 AWG solid, bare copper wire. After you have made the mechanical connection, the joint will solder much more easily, and the solder will "weep" into the connection without a "tempered" break.

Although the Yaesu manual mentions that receive audio is available from pin 2 of the connector, there is *no* wire attached to pin 2 inside their mic cable. If you chopped the connector off the mic cable as I did, you have another problem!

Just be sure you have a 3.5 mm plug to take receive audio from the external speaker jack.

After I completed this hurry-up and wait rush-job interface for Fred, I shipped it back to him.

To Make Things Interesting

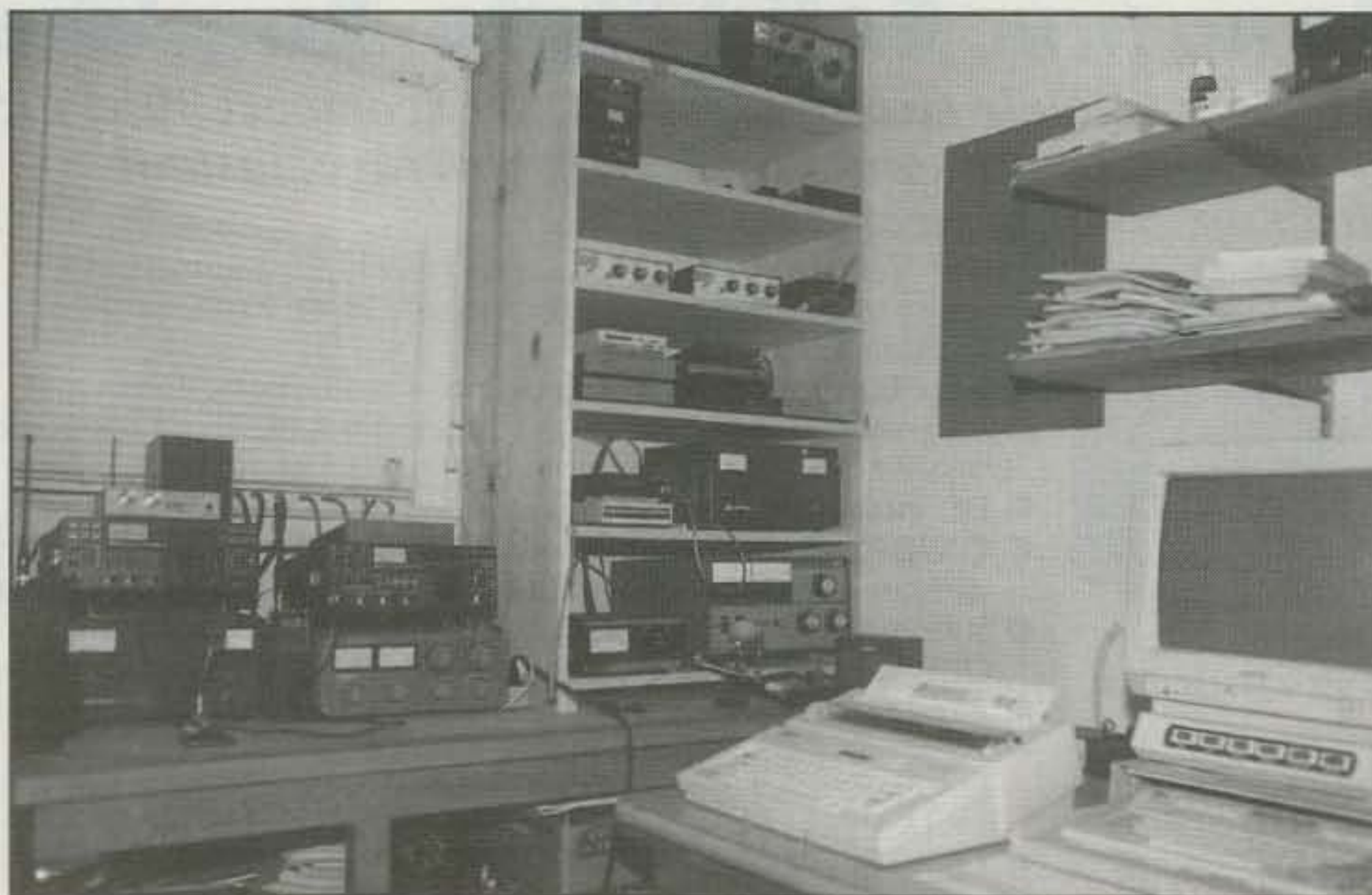
I decided to shop around and buy a couple of these new mic connectors to have on hand in case I came upon another one of these problems. This is when things really got interesting.

After browsing through several catalogs, I finally found the connector. I ordered the connector using the catalog number. The connector I received had T&B© stamped into the plastic along with the number 700A8 on it.

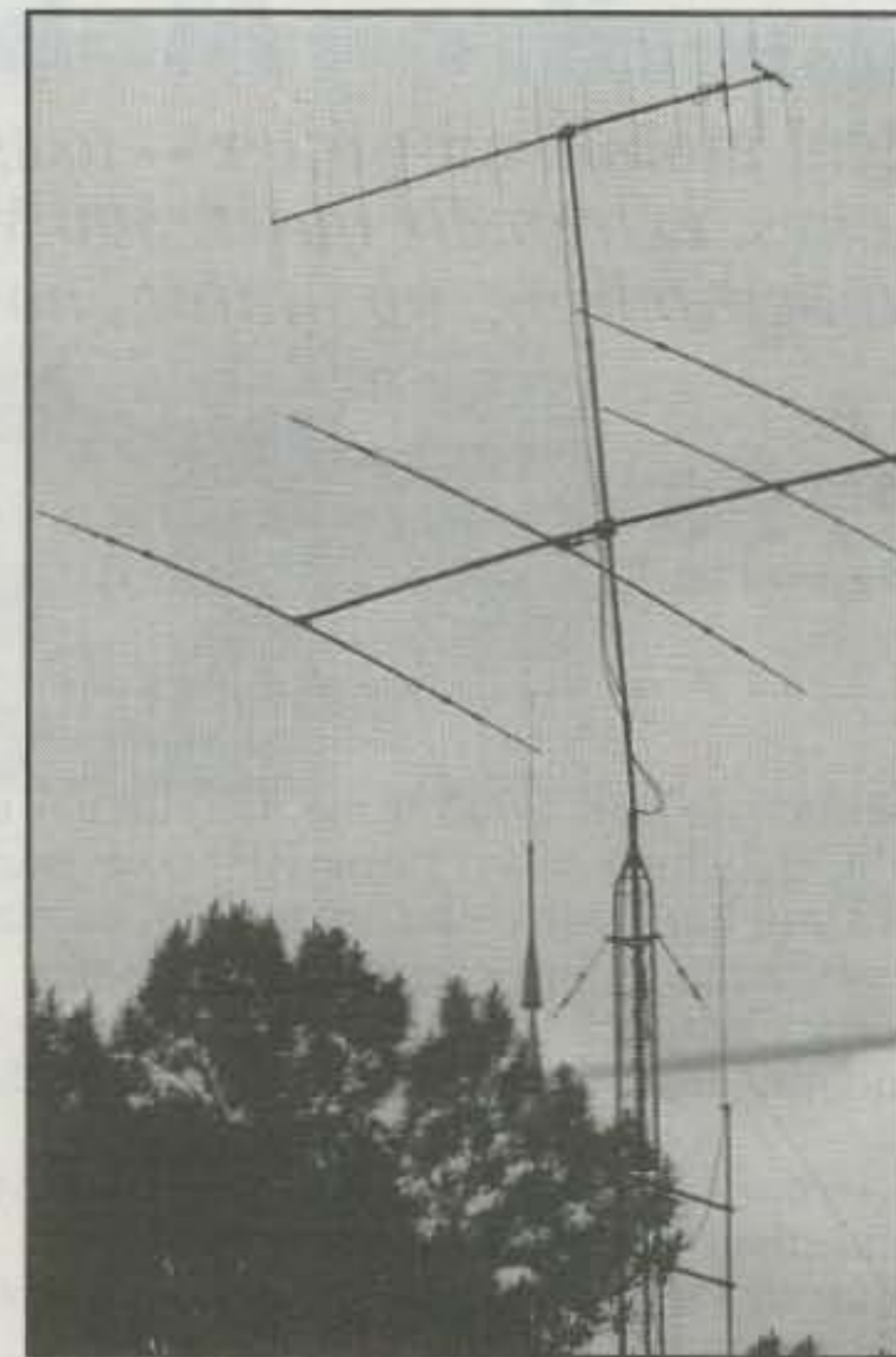
The bottom line is, look for the RJ-45, 8-pin modular connector. Mendelson's (MECI) stocks the RJ-45 (6 cents each). However, there is a \$20 minimum order. Anyone need about 300 RJ-45's? A visual description of the I/O connections to it is shown in fig. 2.

Hamvention History

Once again Dayton was the pits, or maybe there's another name for the mud hole I stepped into as I exited the Towncar. The parking lot resembled a "swamp-buggy" raceway. For the last four or five years at Dayton I've seen rain, rain, and more rain. On Friday and Saturday we generally see rain. Then maybe Sunday morning we get a glimmer of real daylight and some drying off takes place, just in time for the bone-yarders to pack up and



Where's the node? Fourth shelf from the top, left side. Davis Carter, WA4PQK, has a right to be proud of this station (and node). During the many years I've known Dave, he has maintained a neat installation. Dave is a past president of Georgia Amateur Radio Digital Systems (GARDS). Davis is also a holder of the coveted POTY award (Packeteer Of The Year), which is given to a deserving packet operator or SYSOP each year (June) at the SouthNet Packet Conference in Albany, Georgia.



Somewhere up there in that array is the antenna for WA4PQK-7/FTV at Fayetteville, Georgia.

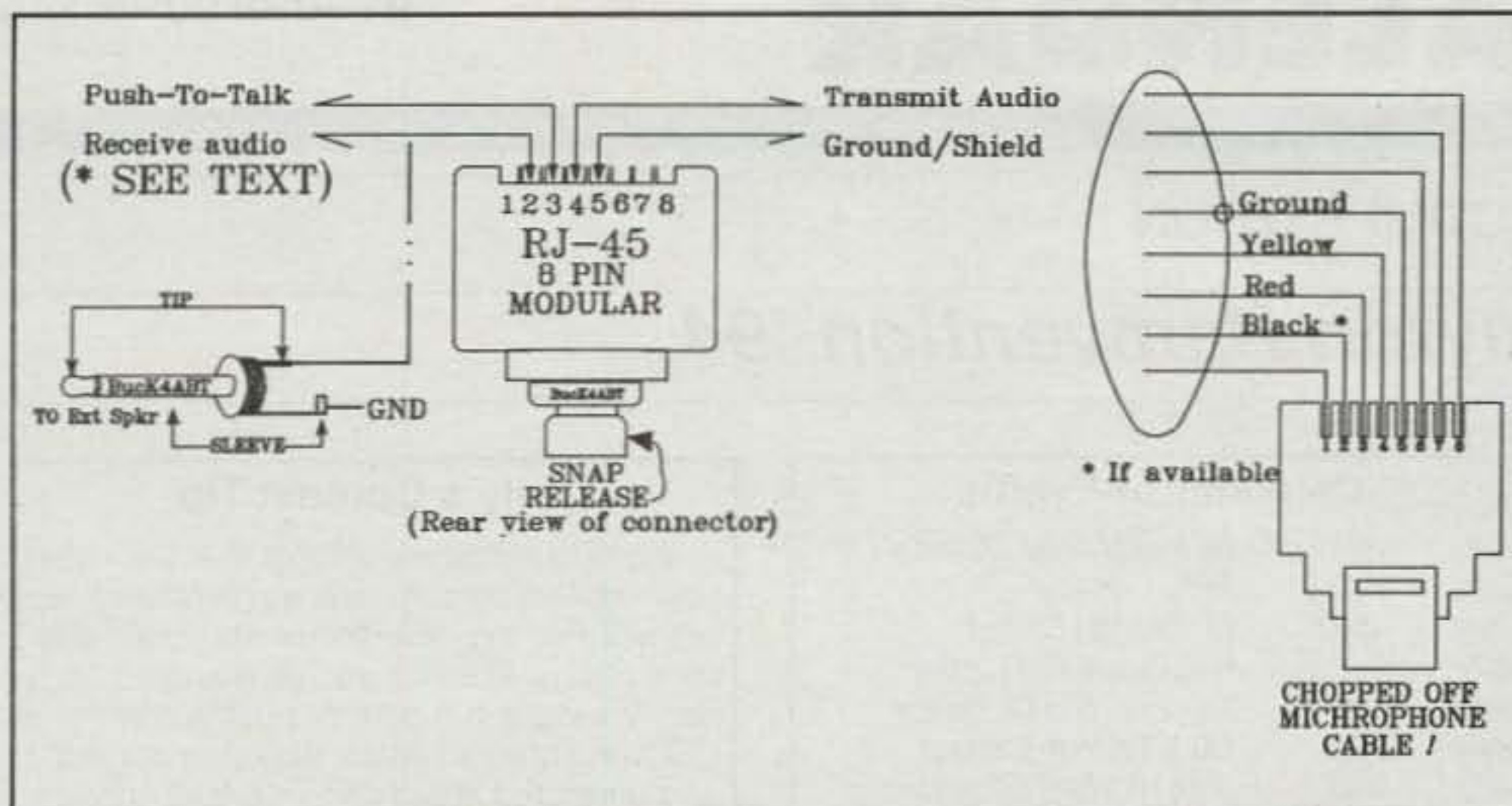
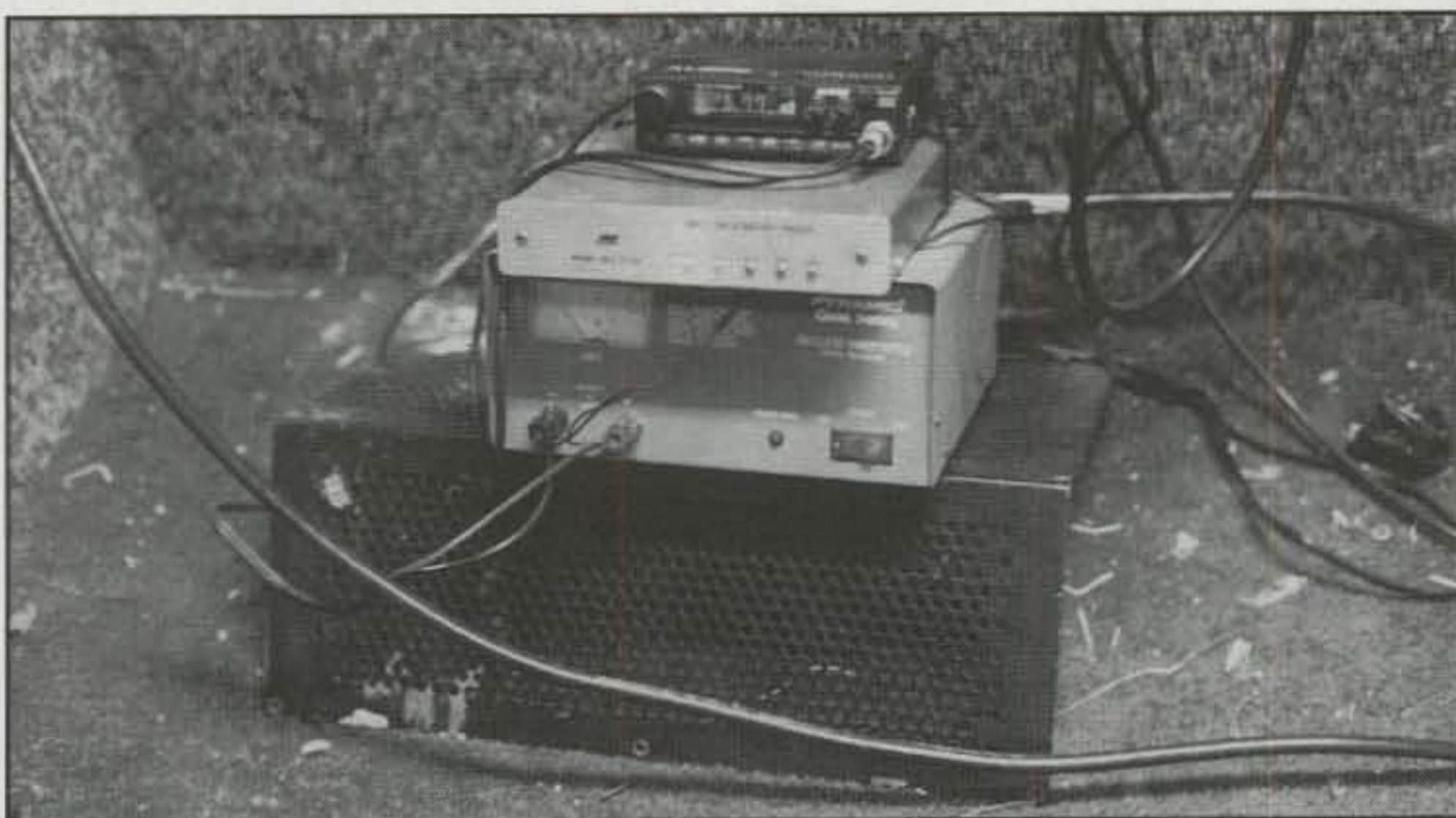


Fig. 2—A troublesome connector to find, the RJ-45 is the connector used on some late-model transceivers. If this trend spreads, it may be a good idea to keep a few spares around.



Fred Roberts, WB4QOC, is a "mover and shaker" when it comes to helping build an emergency communications and keyboard network. Fred is on the front lines "making it happen." He and Billy, WA4PVI, spend a lot of time in the "shop" and at the radio parts house (in that order) either building or buying more parts. Shown here, the WB4QOC-7/CNC node provides keyboard and emergency packet communications for the Charlotte, NC area. (Photo via WB4QOC)

trek several hundred miles back to their home QTHs.

To add insult to many who were already injured, someone decided on Sunday morning that all the large nearby parking fields should be closed—for what reason I don't really know. They were already so much of a bog that only pickup trucks and 4-wheel drive vehicles even considered entering them. Oh, joy—we parked at a church over a mile away and walked to the Hamvention site in near freezing temperatures.

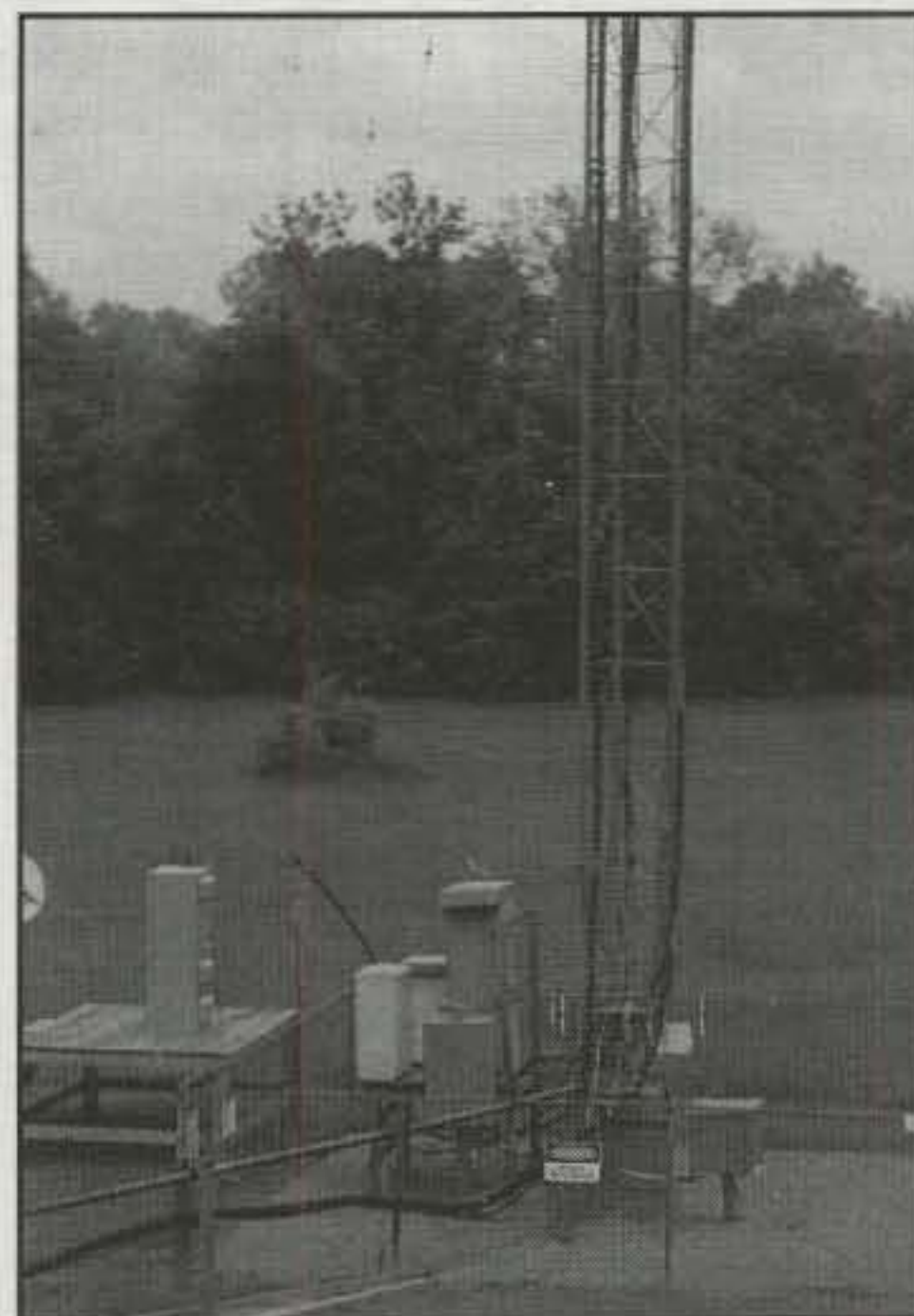
Either Dayton is jinxed, or there is a dark cloud that lurks close by waiting for the gathering of 30,000 amateurs, ready to pounce on them as if to give them some kind of "active" cleansing.

Come what may, we did have some semblance of fun. Glynn, WB4RHO, and

I bought all the goodies we could afford (and maybe a few we couldn't). Our next obstacle was just how to get all the gear back to central Virginia and south Alabama. I, for one, am sure glad Delta Freight was there to provide some relief to a few of us. A lot of problems were circumvented by being able to ship the larger boxes via air. Here's a notion for next year: Maybe UPS can set up a post for the few days and save us all a bundle while making one for themselves.

For the most part Dayton was okay. The weather curse is no longer the "unexpected"; it is the norm. We had fun after we got inside. The flea-marketers didn't have a lot of fun outside, however, as they were soaked most of the time, which made for a lot of togetherness *inside*.

By April/May next year we'll probably



WB4QOC-7/CNC antenna shares a bit of space on a local FM radio station tower. (Photo via WB4QOC)

have forgotten any of the bad points, and will be looking forward to another Hamvention. However, for 1994 the Hamvention is history.

Happy Packeting!

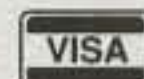
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CIRCLE 94 ON READER SERVICE CARD

NEWS/VIEWS OF ON-THE-AIR COMPETITION

Dayton Hamvention '94

There is simply nothing like it—The Dayton Hamvention. As has been the case in the past few years, rain was the choice of the skies. And as always, it did little to quell the excitement of over 30,000+ attendees.

During the past 20 years I think I've only missed four or five Hamventions. Now that I work for *CQ*, there will be very few that I will ever miss again—one of the many perks of this job! The Dayton Hamvention is a contesteer's dream. There has never been a year in which I have not met a new person "face to face." This year was no exception. In addition to my list of old friends swelling well into the triple figures, I had the pleasure of meeting newcomers N6KT, I6NOA, TL8NG, ON6TT, and many, many others.

Although I received condolences from some as they saw me in our booth wearing my Sunday best, there is no better venue for a contesteer to "run them" than from the "frequency" I was using. Thanks to everyone for stopping by and saying hello.

The contesting highlight in Dayton this year was a close race between the hospitality rooms (including 2 AM pizza deliveries), the contest forum, and of course the Contest Banquet. I think the hospitality and forums speak for themselves with one exception—they just keep getting better and better. Hats off to everyone involved in organizing these events. I'd like to add to the special recognition Tim Duffy, K3LR, received after passing the contest forum leadership torch to K1DG/WZ1R following 10 years of faithful service.

The Contest Banquet was a special highlight for many of us. This being the second of hopefully many more to come, its popularity continues to grow. A few photos of the banquet, which were taken by Joe Pearlstein, NU3Y, and are included in this month's column, show some of the highlights of the banquet. With roughly 300 active contesters in one room, it became obvious that this would be an excellent venue for inducting new members into *CQ*'s Contest Hall of Fame. An inspirational talk by Frank Donovan, W3LPL, added even more to the event.

This year we had the pleasure of proudly inducting John Thompson, W1BIH, Atilano de Oms, PY5EG, and Herb Becker, W6QD, into the *CQ* Contest Hall of Fame. Let's review just a few of the accomplishments that make them such worthy candidates.

John Thompson, W1BIH

Over the past 60 years W1BIH has rarely missed a major contest, whether operating from his own station in Torrington, CT, the Connecticut Wireless Association Field Day site or from one of the PJ Caribbean islands.

c/o *CQ* magazine
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Calendar of Events

June	18-19	All Asian CW DX Contest
June	25-26	ARRL Field Day
June	25-26	SP-QRP Int'l Contest
July	1	RAC Canada Day Contest
July	2-3	Venezuela SSB DX Contest
July	9-10	CQ WPX VHF Contest
July	9-10	IARU HF World Championship
July	16-17	Colombian Indepen. Day Contest
July	23-24	Venezuela CW DX Contest
July	23-24	SEANET CW Contest
July	30-31	RSGB IOTA Contest
July	30-31	Connecticut QSO Party
Aug.	6-7	YO DX Contest
Aug.	20-21	SEANET SSB Contest
Aug.	20-22	New Jersey QSO Party
Sept.	3-4	Bulgarian DX Contest
Sept.	3-4	All Asian SSB DX Contest
Sept.	5	Michigan QRP Club Sprint
Sept.	10-11	Worked All Europe SSB Contest
Sept.	10-11	ARRL VHF QSO Party
Sept.	24-25	CQ WW RTTY Contest
Oct.	29-30	CQ WW DX SSB Contest

John's enthusiasm and dedication to the sport of contesting are as strong today as they were over 60 years ago when the bug first struck.

During the contest banquet I asked the audience to raise their hands if they had ever worked W1BIH. To no one's surprise, nearly every hand went up. They only started to fall after I asked who had worked John in the 1990s, 80s, 70s, 60s, and so on until there was one lonely hand representing a QSO in the 1930s. Yes, John's staying power has made him one of the most incredible operators we'll ever see. Now in his 70s, John is still cranking out contest QSOs (well in excess of 350,000 at

July's Contest Tip

Want to know something that can help your contest score nearly as much as a big signal? For me, it is focus and utter concentration. Whether you're trying to lift a heavy weight in a gym or push a few more QSOs out of your station, the key is diligence and unabated attention to the task at hand. Consider another pastime you enjoy that requires intense concentration. If you apply the same techniques to contesting that you do in your other endeavor, your scores will climb—and without a single dB of added signal strength.

1993 CQ WW WPX Contest Results Errata

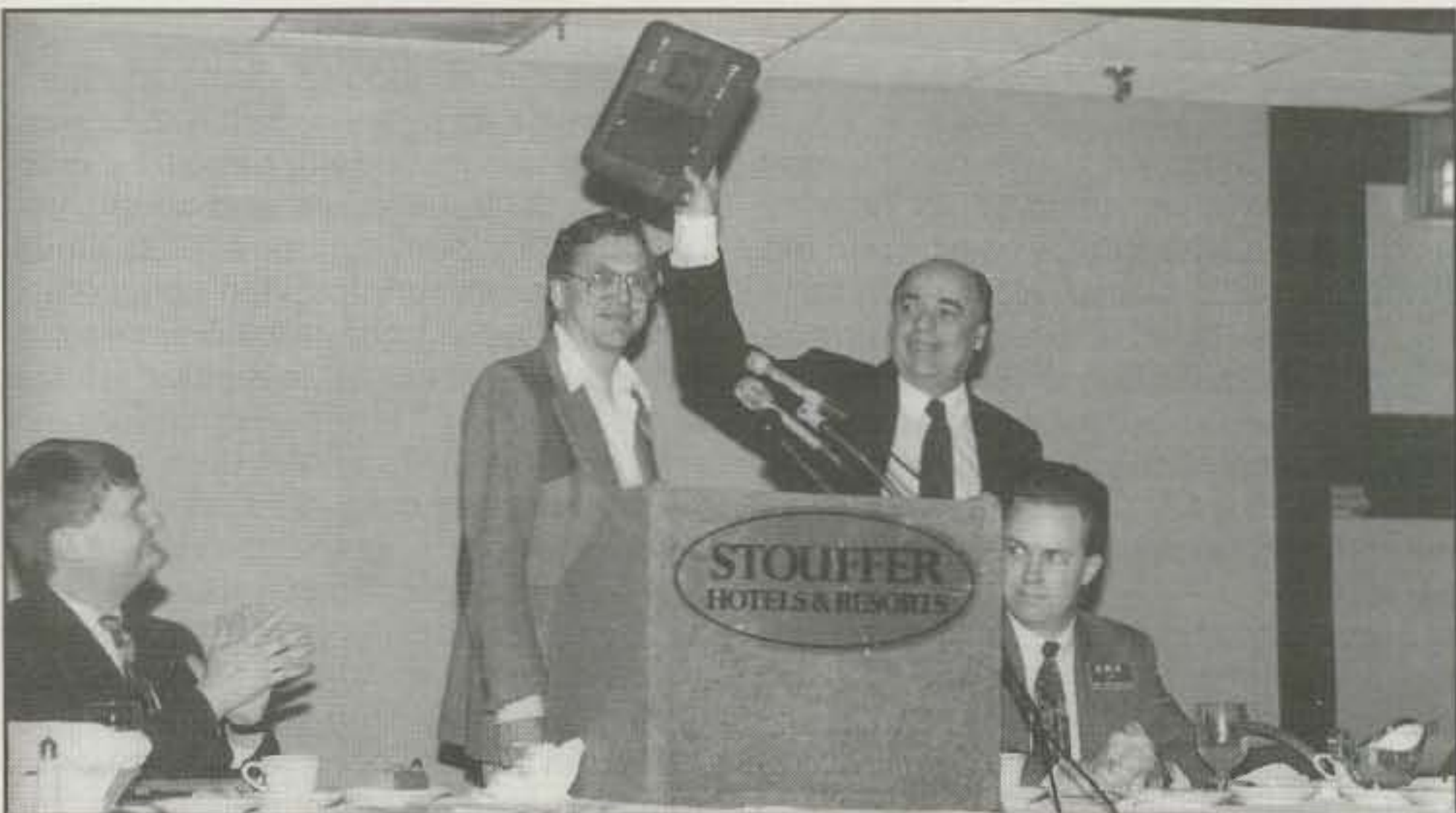
The club score of 210,500 points submitted by the Great South Bay ARC was erroneously omitted from the 1993 results.

best count). Congratulations for such a fine lifetime achievement!

Atilano de Oms, PY5EG

It is generally known that radio amateurs from South America experience great difficulty in establishing stations large enough to be competitive in the world stage of amateur contesting. One of these dedicated radio amateurs who made contesting possible and encouraged scores of South American amateurs into our ranks was PY5EG.

In addition to his extraordinary commitment



Atilano de Oms, PY5EG, proudly accepting his *CQ* Contest Hall of Fame trophy from Bob, K3EST, *CQ*'s Contest Director.

CQ Contest Hall of Fame

1. Hazzard "Buzz" Reeves, K2GL
2. Katashi Nose, KH6IJ
3. Al Slater, G3FXB
4. Martti Laine, OH2BH
5. Bernie Welch, W8IMZ
6. Leonard Chertok, W3GRF
7. W. Gerry Mathis, W3GM
8. Frank Anzalone, W1WY
9. Jim Lawson, W2PV
10. Ed Bissell, W3AU
11. Fred Laun, K3ZO
12. Vic Clark, W4KFC
13. Rush Drake, W7RM
14. **John Thompson, W1BIH***
15. **Atilano de Oms, PY5EG***
16. **Herb Becker, W6QD***

Table 1- CQ Contest Hall of Fame members (an asterisk * indicates 1994 inductees).

to the growth of contesting in Brazil and surrounding countries. Oms has an impressive track record by his own right. As CQ WW trophy manager, I have lost count of the number of plaques I have sent to the station of PY5EG—so many in fact that I no longer have to find his address in the Callbook! Oms has won literally dozens of world-class categories in many major contests as well as providing the venue for many, many others to succeed.

I first met PY5EG in Seattle at the 1990 World Radio Team Championship. His humble demeanor and friendliness told me that this was a very special person. There are very few obvious choices to receive the honor of induction into CQ's Contest Hall of Fame. As far as PY5EG goes, the decision was easy!

Herb Becker, W6QD

Herb is an individual with whom many of you are not familiar. To be honest, I never met Herb myself. However, the very origins of the CQ World-Wide Contest grew out of the mind of W6QD. As DX editor for *Radio* magazine in 1939, Herb wanted to satisfy the growing interest in DX operating by creating an operating event that was truly worldwide in nature. And in the October 1939 issue the very first World-Wide Contest was announced.

The results of this experiment were nothing short of spectacular. Clearly Herb had uncovered something that was going to last a very long time. Ironically, that very first World-Wide



Here are two of the best CQ ops around: (left) Sig, N3RS, and (right) Frank, W3LPL.

Contest was won by Katashi Nose, KH6IJ!

The World-Wide's success continued, after a brief break during the war, under Herb's leadership. However, as the thrust of *Radio* magazine shifted more and more towards the engineering side of radio, CQ was founded in 1945 to address the specific needs of amateurs. Herb successfully moved the contest under the wing of CQ during this period, with the 1950 results containing over 1600 entries.

These were critical years for the World-Wide as Herb single-handedly managed the contest for a period of time. His commitment to the contest can probably be defined as the major reason why we still have the privilege of operating in it today. Amazingly, while some aspects have changed, the contest is still fundamentally the same as it was over 50 years ago!

Congratulations and thanks to Herb Becker, W6QD. Contesters from around the world recognize you for your contributions to our sport.

CQ WW Log Checking Analysis Available

If you are interested in receiving a personalized report of your CQ WW log, you're in luck! Bob Cox, K3EST, has offered to provide a detailed summary of your log showing your unique stats, averages by category, continental statistics, breakdown/rate averages, and charts that compare your log's accuracy to that of your category's average. It's a fascinating collection of data that any competitor should have as a reference.

To obtain your copy, send \$8.00 (to cover production and mailing costs) to: Bob Cox, K3EST, 1816 Poplar Lane, Davis, CA 95616. You can also FAX your request to Bob at 916-758-9062, or send an Internet E-mail request to cmschonewaldcox@ucdavis.edu.

Final Comments

If you skipped this year's Hamvention, you really missed a great event. It may seem far off, but believe it or not Dayton '95 is only 9 months away!

During the past few weeks I've spent a great deal of time analyzing the USA Single Operator Assisted and Unassisted categories in the CQ WW Contest. The idea is to look for trends and comparisons between the categories in an attempt to see how much of an advantage (if any) the "assisted" operator has over his "unassisted" counterpart. Unfortunately, I ran out of room this month to give the topic justice. Plan on reading a full report next month.

As always, please remember that the deadline for the October issue is August 1st.

73, John, K1AR

Canada Day Contest

0000-2359Z Thurs., July 1

Each year on July 1st, the anniversary of Canada's confederation, the Radio Amateurs of Canada organization sponsors the Canada Day Contest. Amateurs from around the world are invited to Canada's birthday party on the air.

Classes: Single Operator—All Band (high power and QRP), Single Band and Multi-operator.

Exchange: Canadians sent RS(T) and province/territory. Foreign entries send RS(T) and serial number beginning with 001.

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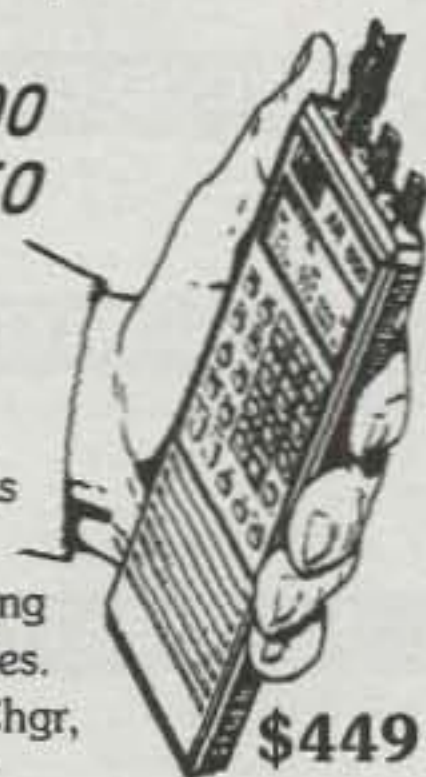
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BP-22	8.4v	270mah	\$21.00
BP-23	8.4v	600mah	\$17.00
BP-24	10.8v	600mah	\$19.00

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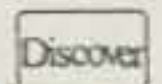
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PB-25/26	8.4v	600mah	\$21.50

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Some pre-Contest Banquet fun being had by (left to right) N6ZZ, G4BKI, N3RS, WA2UDT, VE3YBH, and G4BUO.

Points: Any station may work any other station for credit. A QSO with a Canadian station is worth 10 points. Canadian stations with an RAC, VCA, or QST suffix are worth 20 points. Stations outside of Canada are worth 2 points.

Multipliers: Credit 1 multiplier per band and mode worked for Canadian provinces and territories (12 maximum). Final score is total QSO points times your multiplier.

Entries must submit a summary sheet showing score calculation as well as a dupe sheet, multiplier checklist, and logs. Send entries to: RAC, P.O. Box 356, Kingston, Ontario, K7L 4W2, Canada by July 31st. Results will be published in the Canadian *TCA Journal* (contact RAC for further information) and will be sent to all certificate winners.

Venezuelan Contest

SSB: July 2-3 CW: July 23-24
0000Z Sat. to 2400Z Sun.

This is the 32rd annual contest celebrating Venezuela's independence. It's a worldwide-type contest, so do not confine your activity to working YVs only. Working other DX is encouraged. Use all bands, 80-10 meters (no WARC bands).

Classes: Single operator, single and all band, and multi-operator, single and multi-transmitter. (No limit to transmitters, but only one signal per band.)

Exchange: RS(T) and QSO number (e.g., 59001).

Points: Contacts between stations in the same country count as 1 point. QSOs between stations in different countries but the same continent are 3 points. QSOs between stations on different continents are 5 points.

Multiplier: One for each YV call area, and one for each different country worked on each band (including your own).

Final Score: The total QSO points from all bands times the sum of the multiplier from each band.

Awards: A plaque will be awarded to the highest scorer in each operating class. Certificates will be distributed to stations making more than 10% of the next highest score.

Use a separate log sheet for each band. Each YV call area (9) and each country (DXCC list) should be indicated in a separate column

only the first time they are worked on each band.

Include a summary sheet showing the scoring, your name and address in block letters, and the usual signed declaration that all contest rules and regulations for amateur radio in the country of the contestant have been observed.

Include 2 IRCs or the equivalent to cover cost of mailing and processing of any awards. Mailing deadline is September 30th for SSB entries and October 31st for CW. They go to: Radio Club Venezolano, Concurso Independencia, P.O. Box 2285, Caracas, 1010-A, Venezuela.

CQ WW VHF WPX Contest

1800Z Sat. to 2100Z Sun., July 9-10

The popularity of this contest continues to grow. Be sure to review the full set of rules in the May issue. Unlike CQ's other contests, mail your logs directly to the Contest Director: Joe Lynch, N6CL, VHF WPX Contest Chairman, P.O. Box 73, Oklahoma City, OK 73101. Please be sure to mark VHF Contest Logs on the envelope.

IARU HF Championship

1200Z Sat. to 1200Z Sun., July 9-10

This is the 9th annual IARU World HF Championship. All six bands, 10 through 160 meters and the full 24 hours may be used by both single and multiple-operator stations (no WARC bands).

Categories: Single operator, CW only, phone only and mixed modes. Multi-operator, single transmitter, mixed mode only. Stations must remain on a band for at least 10 minutes. (Exception: Only IARU member-society HQ stations may operate simultaneously on more than one band with one transmitter on each band/mode.)

Exchange: RS(T) and ITU zone. HQ stations: RS(T) and official society abbreviation.

Points: Contacts within own zone or with an HQ station count as 1 point. Contacts within own continent but different zone are 3 points and 5 points with different continents.

Multiplier: Total number of ITU zones plus IARU HQ stations worked on each band.



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Final Score: Total QSO points from all bands times the total multiplier.

Awards: Certificates will be awarded to the top scorer in each category, state, ITU zone, and DXCC country. In addition, achievement awards will be issued to those making at least 250 QSOs or having a multiplier of 50 or more.

Entries with more than 500 QSOs are required to include a dupe sheet with log. A three QSO reduction will be assessed for each duplicate QSO for which credit has been taken. Disqualification may occur if the overall score is reduced by 2% or more.

It is recommended that you check *QST* (April 1993 issue) for more detailed information. A large SASE with 2 IRCs (or equivalent) will get you official forms and an ITU zone/prefix/continent map. Mailing deadline for entries is August 10th to: IARU HQ, Box 310905, Newington, CT 06131-0905.

Colombian Independence Contest

0000-2400Z Sat., July 16

This is a worldwide-type contest. Use all bands, 3.5-28 MHz, phone or CW.

Classes: Single operator, single and all band; multi-operator, single transmitter, multi-operator, multi-transmitter.

Exchange: RS(T) plus serial number (e.g., 59001).

Scoring: For non-HKs—QSOs with HKs 5 points, with other countries 3 points, and with own country 1 point. For HKs—QSOs with other continents 5 points, in same continent 3 points, HKs 1 point. QSOs with official LCRA stations are worth 10 points for all entrants.

Multiplier: Number of different countries and HK call areas worked on each band.

Final Score: Total QSO points times the sum of the multiplier from each band.

Awards: Certificates are available for each station showing a minimum of 100 contacts. Plaques to the overall winning HK and non-HK in each class and each mode; for HKs in each call area and continental winners.

Use a separate log sheet for each band. Indicate the multiplier in a separate column only the first time it is worked on each band. A



Imagine these ops in your next multi-op contest: (left to right) N7ZZ, N3RD, W3UM, and WA3LRO.

summary sheet showing the scoring and other essential information and the usual signed declaration are also requested. Disqualification rules regarding taking credit for duplicate contacts, violation of rules and regulations, etc., will be strictly enforced.

Mailing deadline is August 31st to: The Colombian Independence Day Contest, Apartado 584, Santafe de Bogota, Colombia.

SEANET Contest

CW: 0000Z Sat. to 2400Z Sun., July 23-24
SSB: 0000Z Sat. to 2400Z Sun., Aug 20-21

This is an annual event sponsored this year by the Malaysian ARTS. The objective is for amateurs worldwide to work stations in Southeast Asia.

Bands: 160-10 meters (no WARC bands).

Classes: Single operator (single band and all bands) and multi-single.

Exchanges: RS(T) and serial number (e.g., 59001).

Multipliers: Multipliers are SEANET country prefixes: A4, A5, A6, A7, A9, AP, BV, BY/BZ, DU/DV/DX, EP, HL, HS, JA, JD1, JY, KH2, P29,

S79, VK1-9, VQ9, VS6, VU, V85, XU, XV, XW, XX9, YB/YC/YE, ZK, ZL, ZM1-4, ZL6/ZM6, ZL9, 3B6/3B7, 3B8, 3B9, 4S7, 4X/4Z, 8Q7, 9K2, 9M2, 9M6/9M8, 9N1, 9V. Multipliers are calculated by total number of SEANET countries times three (times two for SEANET-SEANET contacts).

Scoring: QSOs with SEANET countries count 2 points on 20/15/10 meters, 5 points on 40/80 meters, and 10 points on 160 meters. (SEANET-SEANET QSOs count 1, 3, 6 points, respectively.) Double the QSO points for contact in DU, HS, YB, 9M2, 9M6/9M8, 9V, and V85. QSOs in your own SEANET country do not count. Final score is total multiplier times QSO points.

No update was received by press time. I recommend you send your results to last year's contest manager. Entries must be received by October 31st and sent to: SEANET '94, Eshee Razak, 9M2FK, P.O. Box 13, 10700 Penang, Malaysia. Include 3 IRCs for a copy of the final results.

RSGB Islands On The Air Contest

1200Z to 1200Z Sat. to Sun., July 30-31

Following the great success of its 1993 inaugural edition, this event is a fantastic opportunity to work IOTA contacts around the world.

Classes: Single Operator CW, SSB, or mixed modes; Single Operator Limited (only 12 hours of operation); and Multi-Single.

Exchange: RS(T) and serial number (e.g., 599001) plus IOTA if applicable.

Frequencies: Contest operation is on 80-10 meters (no WARC activity). Avoid operation in the high portions of band segments (e.g., 14300-14350 kHz).

Scoring: Each contact with an IOTA island counts 15 points. Other contacts count 5 points except those within your own country, which are worth 2 points. Multipliers are the total of different IOTA references contacted on each band per mode. The final score is the total of QSO points on all bands added together, multiplied by the total of multipliers.

Awards: There are a number of trophies and certificates available for this one. If you're looking to add to your shack's wallpaper, this one is for you.

Entries must be postmarked by August 26th and mailed to: RSGB IOTA Contest, c/o S. Knowles, G3UFY, 77 Bensham Manor Road, Thornton Heath, Surrey, CR7 7AF, England.

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ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

BY KARL T. THURBER, JR., W8FX

From The Bookshop

Do I have a tall stack of books, magazines, and catalogs this month! This time we'll depart somewhat from our usual "antennas, accessories, and software" format to first cover some of these interesting new amateur radio, electronics, and computer books and catalogs. Let's begin sorting the stack.

From The Bookshop

Power Up! It's well-known that military radios generally are rugged, versatile, and well-designed, and some are even easy to operate. Eventually they enter the surplus market and are used by amateurs and other radio hobbyists. The problem is almost every type of military portable and mobile set requires a hard-to-find, costly, or unavailable military battery.

Dave Strom's book *Power Up!* is an illustrated, 96-page book that helps solve the problem of conveniently using military surplus equipment with its special batteries. The book shows how to make battery adapters for many popular units, allowing the use of readily available commercial batteries that may be as close as your local Radio Shack outlet, hardware store, or supermarket.

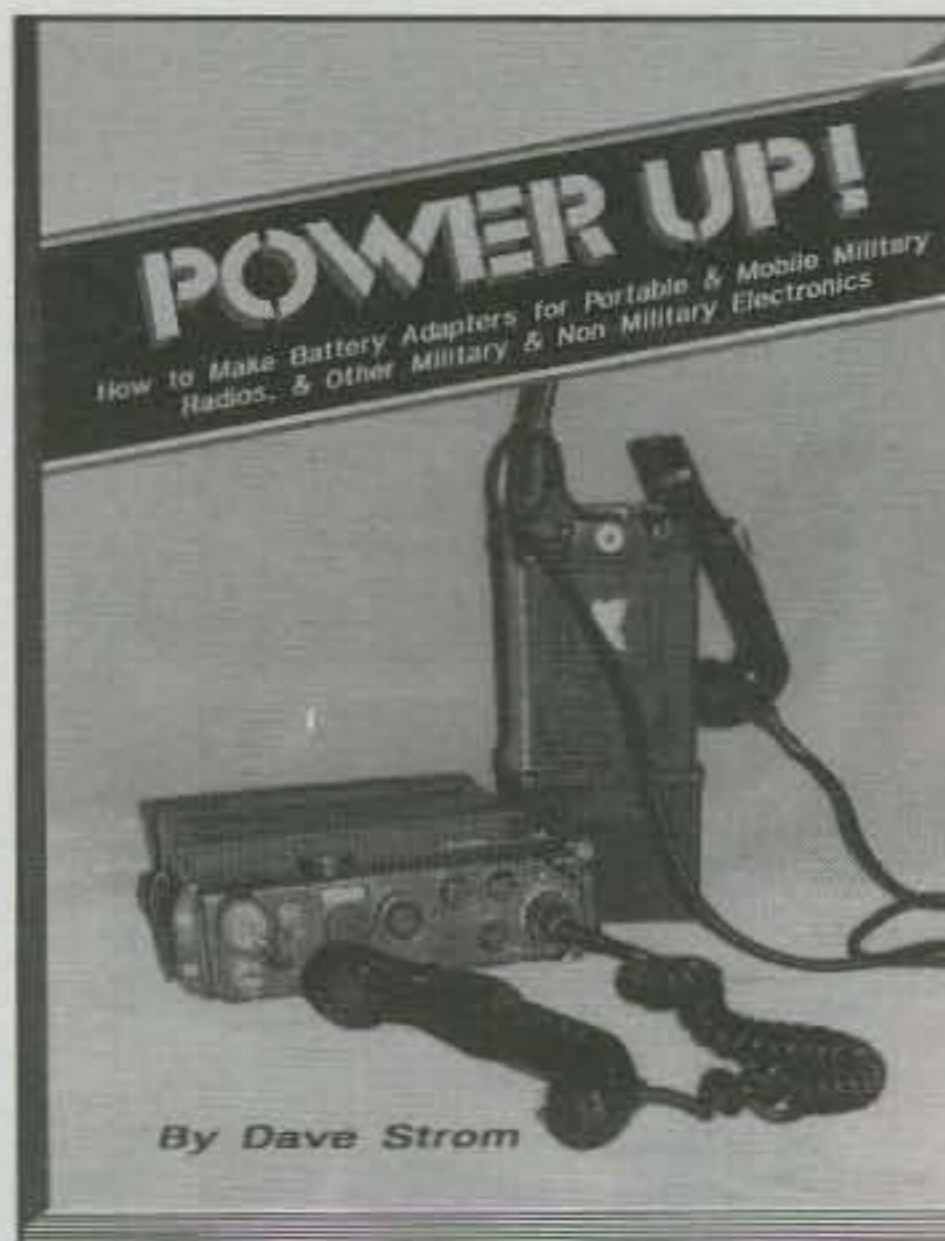
Charts included in the book explain the Joint Electronics Type Designation System, direct commercial battery replacement equivalents, and basic specifications and battery requirements for many military radios. There's also an extensive listing of military surplus and other electronics sources.

The book is \$13.95 plus \$4 s/h from CRB Research Books, Inc., P.O. Box 56, Commack, NY 11725 (1-800-656-0056).

Nikola Tesla and Niagara Falls. A great deal has been written about Nikola Tesla, much of it conflicting. Dr. Marc Seifer thoroughly researched Tesla's life for his doctoral dissertation in psychology, "Nikola Tesla: Psychohistory of a Forgotten Inventor," which may become available later as a full-length biography on Tesla.

In the meantime Dr. Seifer has extracted a portion of the biography as a concise history of the turn-of-the-century battle between Tesla's AC (alternating current) polyphase system and the DC (direct current) power transmission system favored by other electrical pioneers. Entitled *Nikola Tesla: The Man Who Harnessed Niagara Falls*, the 56-page book describes the inventor's youth in the former Yugoslavia, electrical inventors and competitors such as Thomas Edison and George Westinghouse, the lengthy battle between AC and DC current transmission proponents, the successful generation and transmission of AC power from Niagara Falls, the 1915 Nobel Prize in Physics imbroglio involving Thomas Edison, Tesla's later life, and his death in 1943.

289 Poplar Drive, Millbrook, AL 36054



Dave Strom's Power Up! helps solve the problem of using military surplus equipment with its special batteries. It shows how to make battery adapters for many popular units, allowing the use of readily available commercial batteries that may be as close as your local Radio Shack, hardware store, or supermarket. (Photo courtesy CRB Research Books, Inc.)

The Tesla book is \$9.95 postpaid from Dr. Marc Seifer, Box 32, Kingston, RI 02881 (401-294-2414).

Two from Osborne McGraw-Hill. First up this month from this publisher is *Modems Made Easy* by David Hakala. A recognized modem expert, Hakala offers solid suggestions and ideas for everything from purchasing modem hardware and software to accessing online services and the Internet. The book includes tips for buying the right modem, fine-tuning and troubleshooting your modem and FAX board, using your modem under Windows, and online operations.

I'm convinced: Hakala's book, although a "mere" 324 pages, has some of the most straightforward yet detailed and authoritative advice on modems and modem software that I have seen. The book answers many modem questions I have not seen answered in nearly ten years of owning a modem! *Modems Made Easy* is \$16.95.

A second book from the same publisher is Herbert Schildt's *Mostly Windows with Just Enough DOS*. Schildt's 421-page book has as its central thesis that to run Microsoft Windows™ efficiently and to fully utilize your PC's capabilities, you need a working knowledge of both Windows and DOS. As such, it's oriented primarily to beginners and intermediate computer users.

Offered as an "integrator" of Windows and DOS, the book provides an overview of Windows and DOS, a discussion of Windows' main components, using Windows to run your applications, the most common DOS commands, using DOS from within Windows, and the role of DOS in the Windows environment. The book is \$24.95.

Both books are available in bookstores, or contact Osborne McGraw-Hill, 2600 Tenth St., Berkeley, CA 94710 (1-800-227-0900).

Two from New Riders Publishing. Two books from this subsidiary of Prentice-Hall are on tap this month. First is Richard Wagner's *Inside CompuServe*; the 549-page book is a good supplement to CompuServe's own user's guides and online documentation. The book shows you how to access online information at the lowest cost, a very practical consideration when using commercial online services. The book also covers WinCIM, CompuServe's Windows-based graphical interface designed to make navigating and using CompuServe easy. It also introduces new CompuServe tools for advanced users who wish to do much of their work offline to save online costs. The book is \$16.95.

A second New Riders book is an authoritative DOS reference manual. It's *Inside MS-DOS 6.2, Second Edition*, by Marc Minasi and a team of four other authors. I suppose the book needed five authors, because it's a whopping 1557 pages, packed with solid information on maximizing the latest version of Microsoft MS-DOS.

Minasi's opus shows you the best ways to manage your hard disk, fine-tune your system's memory, defeat viruses, use DOS 6.2's multiboot options, and work with this DOS version's new utilities and advanced capabilities. Special focus is on mastering Microsoft's DoubleSpace utility. The book also includes a disk with several DOS utility programs. It is priced at \$34.95.

Contact New Riders Publishing, 201 West 103rd Street, Indianapolis, IN 46290 (1-800-858-7674).

Heath Nostalgia, Second Printing. In the August 1993 column we noted *Heath Nostalgia*, by Terry Perdue, K8TP. Terry assembled a 124-page brief history and scrapbook that covers Heath's half-century of building Heathkits. The book was divided into three sections: "Heath History," "Picture Potpourri," and "Memory Miscellany." The latter contained stories and anecdotes submitted by contributors, many of whom were former Heath employees.

While not a definitive history, the 1992 book (fig. 1) included a tabulation of major product introductions. These range from the 1947 oscilloscope and vacuum tube voltmeter (VTVM) to the last Heath amateur radio product, the 1991 "Intellirotor" intelligent antenna rotator.

The well-received book now is in its second printing. It's from Heath Nostalgia, 4320-196th

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YAESU FT-2400H • 50w 2m mobile. 140-174MHz receive. 31 memories, CTCSS encoder, scan, backlit DTMF mic. 6" w x 1 1/2" h x 7" d, 1 1/2 lbs... **CLOSEOUT** \$349⁹⁵

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FT-23R-12 • as above but 2meters, 5w..... ☎

FT-33R • 5w 220 MHz FM HT..... ☎

FT-530 • 2m/440 FM HT w/TTP..... **SPECIAL** ☎

FT-11R • 2 meter FM HT..... ☎

FT-41R • 440MHz FM HT..... ☎



FRG-100B • Shortwave receiver..... ☎

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G-5400B • Light/med, 11 sq. ft. az/el combo..... ☎

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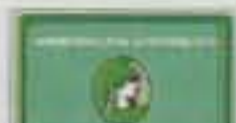
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Heathkits ranged from the 1947 oscilloscope and vacuum tube voltmeter (VTVM) to the last Heath amateur radio product, the 1991 intelligent antenna rotator. Shown in this classic photo are some of the war surplus 6H6 vacuum tubes (used in thousands of VTVM kits) being aged in racks to assure stable performance in the completed kits. (Photo courtesy Terry Perdue, K8TP)

S.W., Suite B-111, Lynnwood, WA 98036-6754, and is priced at \$9.95 postpaid, or \$10.71 in Washington.

Communications Receivers, 3rd Edition.

In previous columns we reviewed *Communications Receivers*, by Ray Moore, ex-K1DBR, in

both the 1st and 2nd editions. Ray's book is an authoritative guide to American communications receivers from 1932 to 1981—the vacuum tube era. It covers all the major manufacturers, including RME, Hallicrafters, National, Hammarlund, Collins, Morrow, and others.



Do you remember the little brown bags that contained all the hardware for your Heathkit-to-be? And how you worried whether there would be exactly enough of each screw, nut, and washer to complete the kit? Here a worker ever so carefully counts the parts to go into each bag. (Photo courtesy Terry Perdue, K8TP)



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CIRCLE 48 ON READER SERVICE CARD

About 400 receivers (over 700 if you count variations) from some 68 companies are profiled in the latest edition.

Some refinements I noticed in the 3rd edition include improved reproduction of photographs, including some new ones; many new receivers; and several pages of information on military surplus receivers such as the BC-312, BC-348, BC-454, and others. The book also has a new west coast manufacturing history section.

The 3rd edition has grown to 125 pages. It's \$19.95 plus \$2.50 s/h from RSM Communications, P.O. Box 1046, Key Largo, FL 33037-1046 (305-853-0379).

CQ Almanac and Other Goodies. In case you haven't noticed, CQ Communications' books, buyer's guides, videos, and other amateur radio accoutrements are proliferating rapidly. You can't help but notice if you flip through each issue's half-dozen pages of CQ's in-house advertising. Not just books and videos are offered; there are calendars, T-shirts, and other "fun" equipage.

Besides my interest in CQ antenna-oriented classics such as *The Quad Antenna*, by Bob Haviland, W4MB; *The Vertical Antenna Handbook*, by Paul H. Lee, N6PL; and *The Shortwave Propagation Handbook*, by George Jacobs, W3ASK, and Ted Cohen, N4XX, another publication piqued my interest. It's *The CQ 1994 Amateur Radio Almanac*, edited by Doug Grant, K1DG, and a team of three CQ hands. The 5½" x 8" format CQ Almanac, with its 484 pages, is similar in format to the several "world almanac" fact books you can buy at most bookstores and supermarkets. The resemblance ends there, however.

The CQ Almanac is about amateur radio, not "the world in general." It contains thousands of facts and figures, and many maps, graphs, photos, and more. Included are handy references such as the FCC Part 97 regulations, operating tutorials, DX records, propagation data, contest awards, QSL bureaus, and the like. There is some especially neat information between its covers, such as the number of amateurs in each U.S. ZipCode, historical sunspot numbers, major amateur radio events in 1993, silent keys, postal regulations, and on and on—more information, perhaps, than you ever wanted to know about amateur radio.

My only serious criticisms focus on the small typeface (put your bifocals on, folks) as well as the need to better organize the table of contents and offer a more thoroughly detailed index. Notwithstanding these critiques, it's a bargain at \$19.95 plus \$4 s/h. The CQ Almanac is available from CQ Communications, Inc., 76 N. Broadway, Hicksville, NY 11801 (1-800-853-9797).

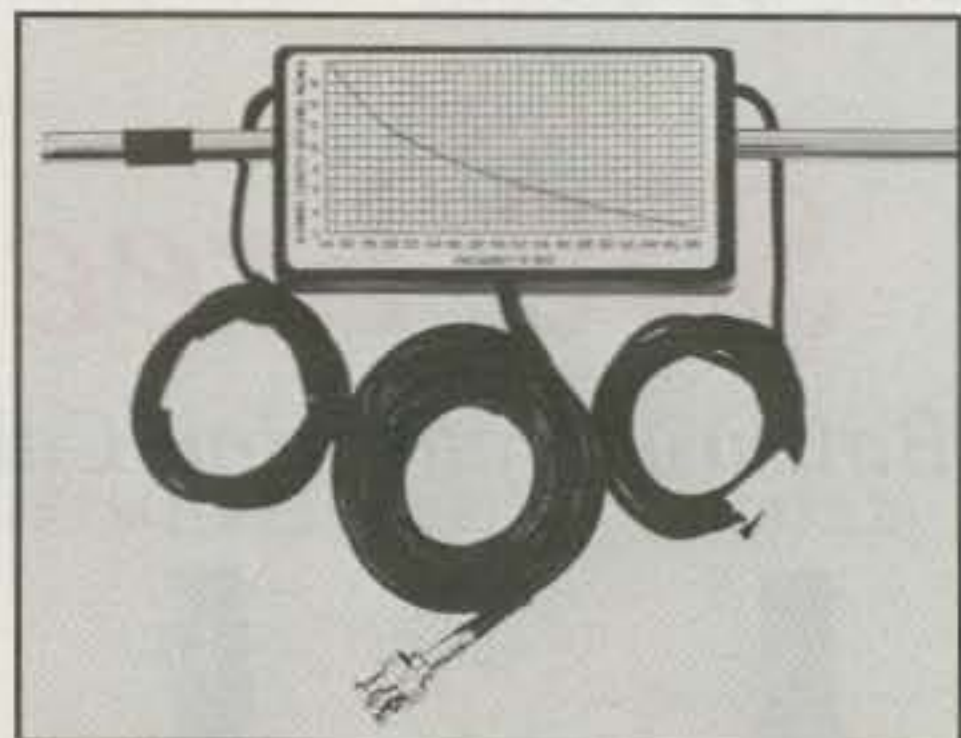
KILO-TEC Catalog. KILO-TEC sells a variety of antenna parts and accessories, some of which are rather hard to find. They offer at least four HF dipoles, including a new 160-10 meter multibander. Accessories include center connectors, weather boot kits, pulleys, Dacron rope, lightning arrestors, stainless eyebolts, baluns, antenna wire, openwire feedline, transmitting twinlead, antenna tuners, and RFI filters. They also offer high-voltage variable capacitors, roller inductors, turns counters, and other often scarce parts.

A new 10-page catalog is free of charge from KILO-TEC, P.O. Box 10, Oakview, CA 93022 (805-646-9645).

1994 Ramsey Catalog. The 20-page 1994



Fig. 1—Heath Nostalgia, by Terry Perdue, K8TP, is a brief history and scrapbook that covers the firm's half-century of building Heathkits. This nostalgic book, now in its second printing, is from Heath Nostalgia, 4320-196th S.W., Suite B-111, Lynnwood, WA 98036-6754. It's \$9.95 (\$10.71 in Washington).



Over short distances, "rubber ducky" or "pull-up" antennas are adequate. However, increasing range calls for a more efficient antenna. One is the Falcon F121A Portantenna, a portable half-wave dipole usable over the range 140-480 MHz at power levels up to 150 watts. Less than 9 inches long when collapsed, and weighing less than one-half pound, the F121A easily fits in a pack or jacket pocket. (Photo courtesy Falcon Communications, Inc.)

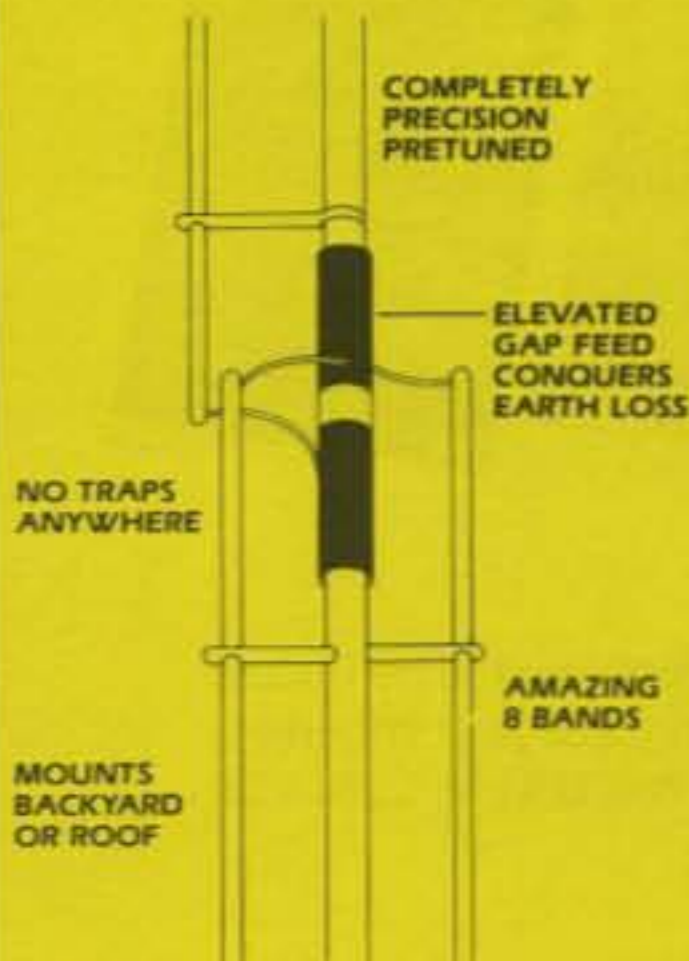
Ramsey Electronics catalog describes many inexpensive, fun to build, and well-documented amateur radio and electronics hobby kits—a combination that's hard to find since Heathkit exited the field.

The "radio kit industry" is now fragmented and made up mostly of small firms. Predictably, kit quality varies greatly, although firms such as Ramsey Electronics are working to emulate the kit documentation and service standards set by Heath and its competitors. Ramsey puts extra effort into producing clear and easy-to-follow construction manuals. Its catchy slogan

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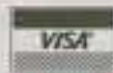
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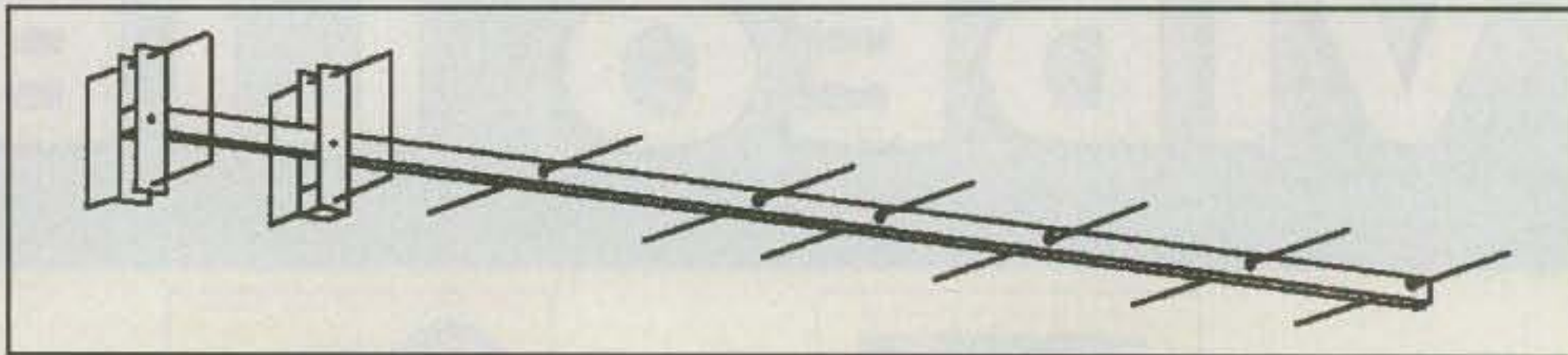


Fig. 2—Sentech offers single-band, 8-element Quagis for 144, 222, and 432 MHz operation. These hybrid antennas can be stacked, and stacking frames and power dividers are available. The claimed gain of the 8-element Quagi is 13.3 dBi. A 50 MHz version is on the way.

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New kits include a radio direction finder, 800-950 MHz scanner converter, low-power AM broadcast band transmitter, LED peak-hold bargraph meter, 6 meter FM transceiver, 20 watt QRP linear amplifier, microprocessor-controlled fox-hunt transmitter, and several others.

For a catalog heavy on kits, contact Ramsey Electronics, Inc., 793 Canning Parkway, Victor, NY 14564 (1-800-446-2295).

Antenna Notes

Falcon F121A Portantenna. Over short distances relatively inefficient "rubber ducky" or "pull-up" antennas, commonly used with handheld transceivers, are adequate. However, increasing range calls for more efficient antennas. One promising device is the F121A Portantenna, a portable half-wave dipole usable over the range 140-480 MHz at power levels up to 150 watts.

The F121A is adjustable to dipole length anywhere in this range. Less than 9 inches long when collapsed, and weighing less than one-half pound, the F121A fits in a pack or jacket pocket. Fully extended for 140 MHz, the length is 41 inches; a BNC-terminated RG-58 feed-line is 6 feet long. The antenna may be polarized vertically or horizontally, and hang-up cords are included. It comes with a heavy plastic-laminated instruction sheet and length vs. operating frequency graph. For most applications, setting the antenna by the graph should be adequate, but the antenna may be fine-tuned using an SWR bridge.

The F121A is \$29 from Falcon Communications, Box 8979, Newport Beach, CA 92658 (714-645-8155).

Sentech Quagis. A Quagi is a strange duck, so to speak, being a combination of Quad and Yagi antennas. The driven element and reflector of the Quagi are Quad or loop-style elements, while the directors are straight Yagi elements.

Quagi fans consider it to combine the best features of the Quad and Yagi to obtain outstanding performance. Quagi proponents suggest that the Quagi uses Yagi-type directors to yield more gain per director than Quad directors, and that Quagis are desirable because of their lighter weight and lesser wind load.

The Quagi uses a Quad-type driven element and reflector because of the reportedly superior front-to-side and front-to-back ratios over the straight Yagi, better matching and bandwidth characteristics, and lesser sensitivity to the effects of surrounding objects. Quagis are popular at VHF and UHF since Yagis using dipole-driven elements become increasingly dif-

ficult to feed at higher frequencies. On the other hand, Quad loops are not as convenient to assemble and tune as are straight elements.

Lowell L. Malo, WBØMGS, at Sentech offers single-band, 8-element Quagis for 144, 222, and 432 MHz, with boom lengths of 14, 9.2, and 4.8 feet, respectively. They can be stacked, and stacking frames and power dividers are available. Claimed gain is 13.3 dBi. Prices range from \$59.95 to \$99.95, depending on band.

The Sentech Quagis (fig. 2) use square aluminum booms for strength; all elements are $\frac{3}{16}$ inch diameter aluminum and are insulated from the boom. The Yagi elements pass through the boom and are insulated from it by Delrin insulating washers. The Quad elements are of $\frac{3}{16}$ inch aluminum rod and are held in place by ultraviolet-resistant plastic spreaders. The spreaders are bolted to the aluminum boom with stainless steel hardware.

Sentech also plans to offer a 160 meter active antenna, an antenna field strength meter, and VHF transverters. A 50 MHz Quagi should be available soon. For more info contact Sentech, Inc., P.O. Box 2136, Riverview, FL 33569 (813-677-4410).

Spider Multi-Band Antennas. Fred Shmitka, K6AQI, offers the Spider™ series of HF multi-band mobile, maritime, and residential antennas. According to Fred, he saw a real need for no-tune mobile antennas to complement the no-tune solid-state transceivers that became increasingly popular around 1979.

At the time the main mobile antennas in vogue were the efficient but inconvenient single-resonator, center-loaded, whip type that required you to stop the vehicle, change the resonator or coil, and retune the antenna whenever you changed bands. Instead of a single resonator and whip combination, the Spider uses four resonators (although up to seven can actually be used), one for each frequency band, with adjustable patented tuning sleeves. The resonator size and configuration minimize interaction between the resonators. As a result, the antennas are fully and automatically band-switching.

While it can be argued that a single, large center-loading coil for each band would be more efficient, the Spider reportedly yields good overall performance on multiple bands as noted in *Worldradio* and *73 Amateur Radio* product reviews (reprints are available from Sentech). The Spider is particularly suitable for installation on vans, campers, motor homes, and freshwater boats. A special "salt-water" version is offered for sea-going vessels.

While the antennas were designed originally for mobile work, they also have proved suitable for use in mobile home parks, apartments, and condominiums, with balcony-railing and vent-pipe mounting being popular. The anten-



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13 COMPUTER INTERFACE • Built-in RS-232C interface for advanced computer applications.

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B. Kantronics KPC-3 Packet TNC \$117

The KPC-3 is a small-sized, low power, full featured packet TNC designed with the new user in mind while providing all the power required by experienced packet radio operators. The KPC-3 incorporates the Kantronics full-featured PBBS, including reverse forwarding to a BBS, mail waiting LED, and remote sysop access. It comes complete with version 5.0 firmware, DB-9 connector, 2.1mm power connector, and two manuals: one a quick-start manual, the other a complete reference manual. Measures 0.8" x 5.2" x 5.2" and requires 6-25 VDC at only 40 mA max.

C. AOR AR3000A HF/VHF/UHF Communications Receiver \$1099 *Order now while supplies last!*

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D. ANLI AL800 Dual Band High Gain Antenna \$37

This Dual Band 2M/70cm antenna gives you the best of both worlds. A telescoping 31" (when fully extended) high gain antenna for those terrain and distance calls, and a small rubber ducky for comfort and convenience. The AL800, great for all around communication! Gain of 3 dB/5.2 dB.

E. Icom IC-2GXAT 2m Handheld \$299

The new IC-2GXAT offers surprisingly simple operation with the features and performance amateurs have come to expect from Icom products. 7 W of output power make hitting those repeaters a breeze. The display can be set to indicate memory channel numbers only. This keeps frequencies secret, restricts operating frequencies or simplifies operation for an unfamiliar user. The auto repeater operation automatically activates the correct duplex direction when the receiver frequency tuned is within the repeater output frequency range. 40 memory channels, 5 DTMF auto dial memories, power saver features and a die-cast aluminum rear case with a splash-resistant body round out this outstanding new offering.

F. Icom IC-736 HF/50 MHz Base Station Transceiver \$1899

The Icom IC-736 is a dynamic Transceiver that's loaded with features that you've asked for including internal antenna tuner for both HF and 50 MHz bands, internal power supply, quick split function with pre-programming offset, and a "Split lock" function. This unit boasts 100 watt output for both HF and 50 MHz bands, 100% duty cycle (MOS FET's in the driver and final amplifier stage), and newly developed DDS circuit for 1 Hz resolution. Also includes dual antenna selector, 4 function meter (power, SWR, ALC, S), separate CW jacks for keyer and paddle, memo pad memories, PBT with notch, RF gain, VOX, Selectable filters, 101 Memories, full/semi break-in, speech compressor, noise blanker, attenuator direct keyboard entry.

H. Icom IC-W21AT Mini Dual Band HT \$519 *Coupon Special '65 Off, Final Price \$454*

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The IC-W21AT includes innovative features not found on any other handhelds. The V/V and U/U feature allows you to receive 2 signals simultaneously on the same band as well as normal cross-band repeat and duplex. In the innovative whisper-mode, the W21AT transmits constantly on one band while receiving constantly on the other. A microphone in the battery pack gives you true telephone-style full duplex for the first time in a handheld! Your most often used functions are automatically assigned to the Ai key in priority of use-another Icom exclusive! All of this plus "standard" dual-band features such as 70 memory channels, 4 DTMF memories, numerous scanning modes and much, much more combine to make this the ultimate choice in a dual band HT. Get yours today!

G. Alinco DR130T High Power 2m FM Mobile \$329 *Coupon Special '20 Off, Final Price \$309*

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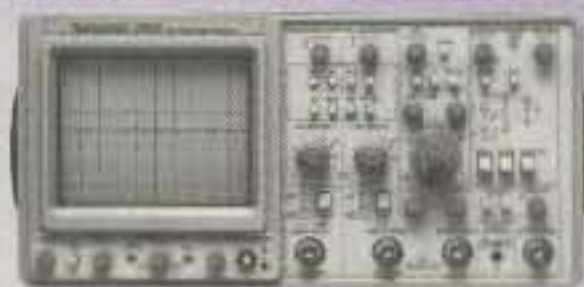
The DR130T is a powerful 2-meter mobile boasting 50 watts in high power transmit. Now, reaching those distant repeaters is no problem, and its compact size is ideal for even the tightest mobile installation applications. The DR-130T is loaded with great features like 20 memory channels (expandable to 100 memory channels w/ optional E3-19U memory expansion unit), user programmable transmitter time out timer, CTCSS encoder standard (optional E3-20U tone squelch unit is also available), priority scan, memory scan & VFO scan, and much, much more.

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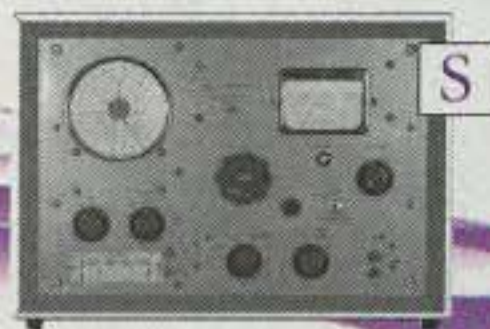
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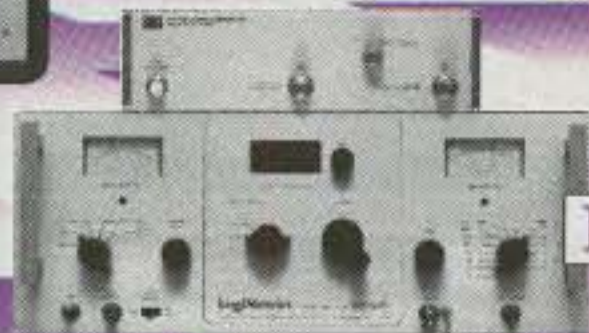
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K. General Radio 1568A Wave Analyzer \$395

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L. Hewlett Packard 5245L/5253B Frequency Counter System \$199

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M. Hewlett Packard 8555A RF Section \$895

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N. Hewlett-Packard 302A Wave Analyzer \$250

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P. Logimetrics 920-S101 With HP 11710B Signal Generator and Down Converter \$595

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R. Hewlett Packard 608F/8708A Signal Generator With Synchronizer \$500

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S. Marconi TF791D Carrier Deviation Meter \$199

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T. Cushman CE-21 Frequency Selective Levelmeter \$495

The CE-21 is an easy to use frequency selective levelmeter that is specifically made to measure level and noise on FDM microwave and coaxial carrier systems with up to 1800 channels. Covers the frequency range from 0.01 MHz to 9.1 MHz. Impedances are 75, 124, 135, and 600 Ω . Overall level accuracy is typically ± 0.5 dB. It can make measurements down to -110 dBm. Another feature is the equivalent C-message or psophometric weighted filter for noise measurements. The CE-21 has both normal and expanded scale meters built-in.

U. Hewlett Packard 140T/8552B/8553B Spectrum Analyzer \$1995

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V. Hewlett Packard 3555B Transmission & Noise Measuring Set \$195

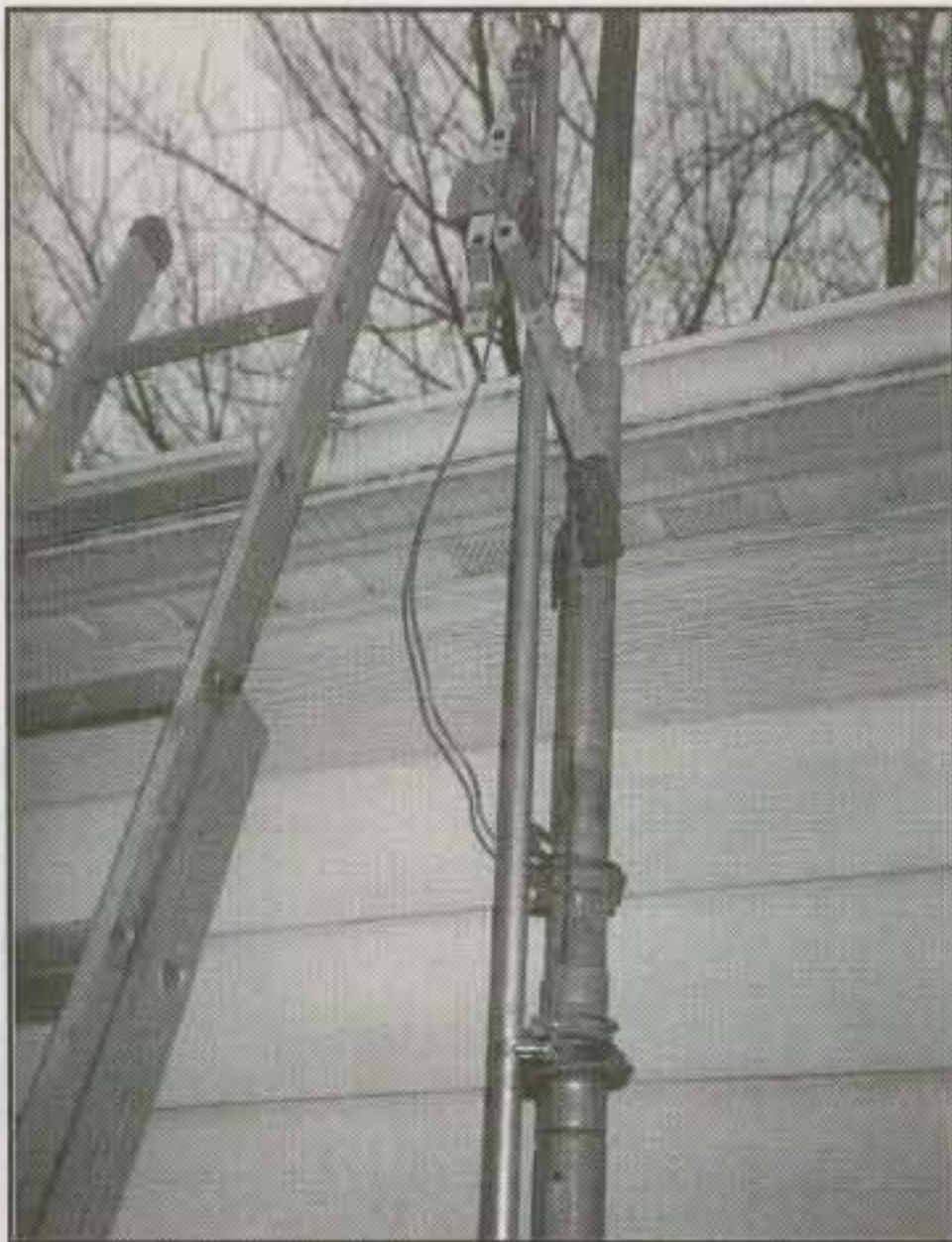
Conforms with Bell System requirements and makes noise measurements from -1 dBm to +121 dBm. Terminated input impedance of 75, 135, 150, 600, or 900 Ω , balanced. Will accept WE 241, 309, 310, 358, spade lugs, phone tips and bare wire inputs, has Dial/AC monitor jacks which will accept WE1011B lineman's handset or 52 type headset. This is an excellent unit and when used with a HP 236A, makes a complete transmission test set.



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The WAØKKC poor man's ginpole. Richard Mollentine, WAØKKC, notes that not all so-called "slip-up" telescoping masts are that easy to slip up, particularly if the antenna at the top is heavy. To help lift his slip-up mast he built a ginpole out of steel pipe using 5 foot sections coupled together; another mast also would work. Using the device shown here, it went up easily. (WAØKKC photo)

nas provide good operating bandwidth, ample power-handling capability (200 watts), and low SWR at resonance. A special dipole version is also available.

The basic four-band Spider costs about \$150, and the maritime version is about \$200. The multi-band dipoles are more expensive. A wide variety of mix-and-match resonators, mounts, and installation accessories are also available.

Contact Multi-Band Antennas, 7131 Owensboro Avenue, Suite 63C, Canoga Park, CA 91303 (818-341-5460).

Van Gorden WARC Band Dipole. Ed Rozic, WA8LEJ, offers a number of antenna and accessory products. These include two dipole antennas, antenna and transmission line insulators, high-power 72 and 300 ohm balanced twinlead, and coaxial cable.

In a previous column we discussed a new product, the ribbed Hi-Q antenna end insulators. These multi-purpose insulators are 6³/₈ inches in length and are sold in pairs for \$3.95. They may be used as guy-wire strain insulators, as antenna end or center insulators, to construct antenna loading coils and traps, and for building rotary inductors.

Ed offers a new antenna for 1994—the triband, 33 foot WARC Band Dipole Antenna for 30, 17, and 12 meters. The new antenna, priced at \$49.95 plus \$5 shipping, features four heavy-duty covered traps, No. 14 stranded hard-drawn copper antenna wire, stainless-steel hardware, custom-molded "dog bone" insulators, and 100 feet of Nylon support rope. The WARC band antenna handles full legal power without the use of an antenna tuner.

For more information, contact Van Gorden Engineering, P.O. Box 21305, S. Euclid, OH 44121 (216-481-6590).

Antenna Supermarket SWL Antennas.

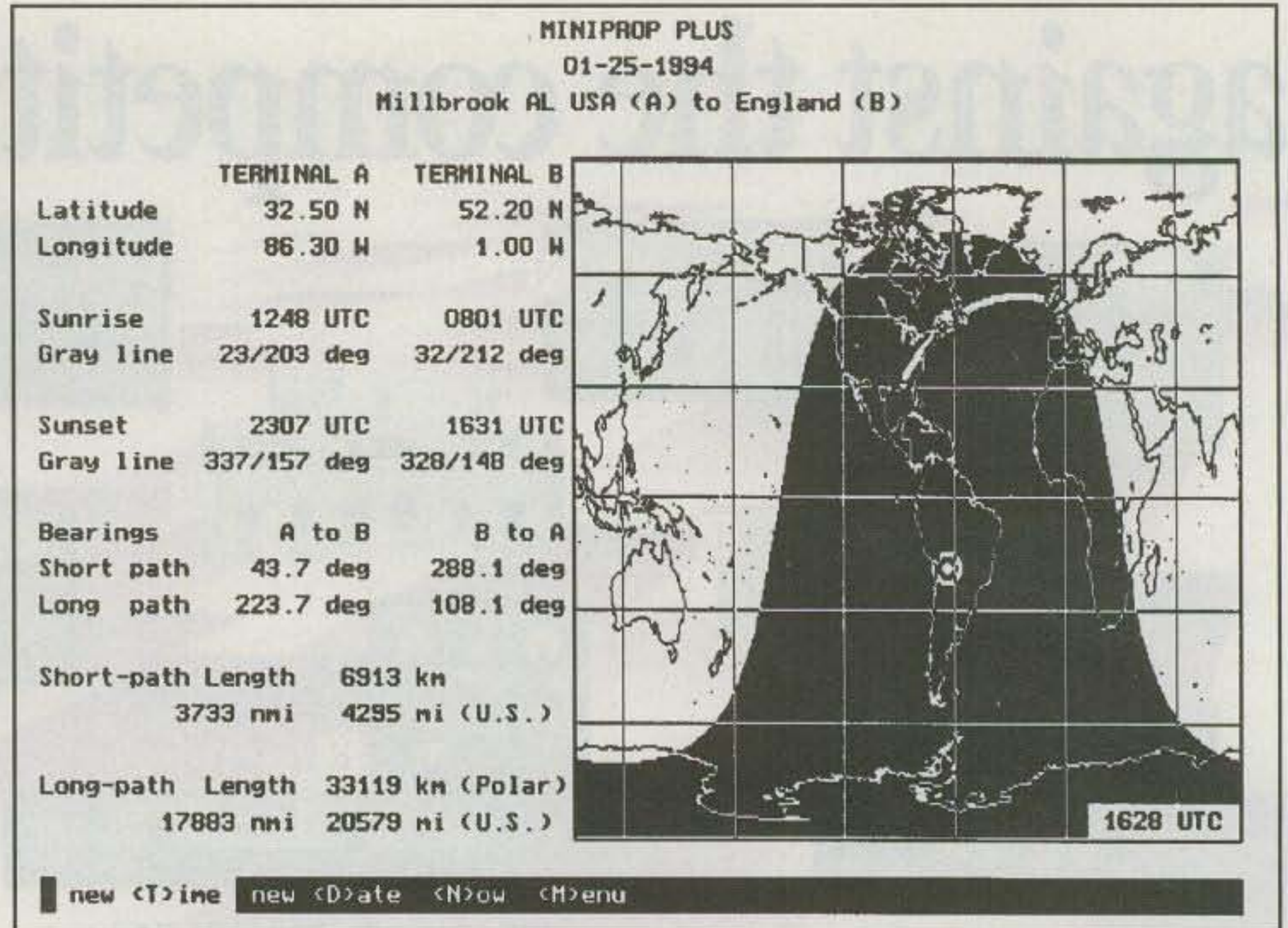


Fig. 3—MINIPROP PLUS 2.0 map (path and terminator function). Using a computer you can produce timely predictions of HF skywave conditions between any two points on the globe, along with path, sunrise/sunset, and grayline information. That's what HF propagation forecasting programs are all about, and many have added bells and whistles. Among these programs, MINIPROP 2.0 is one of the best. (See text for details.)

Jim Meadow, WD9JBV, is an SWL at heart, and operates the Antenna Supermarket in Palatine, Illinois. His product line features three HF receiving antennas, several gas-tube lightning arrestors, and SWL accessories.

A nice feature of his product information sheet is a short but useful beginner's tutorial on receiving antenna selection, installation, lightning protection, and weather protection, all aimed at the SWL. Special stress is placed on the need to protect the sensitive front ends of solid-state receivers from voltage build-ups and static discharges on long antennas and feedlines.

The antennas offered include two "Eavesdropper" 8-trap, 42 foot long dipoles that cover all of the major international shortwave broadcast bands from 11 to 75 meters with one feedline; twinlead and coax feedline versions are offered. A third antenna is a 67 foot, coax ended, coil-loaded sloper covering the AM broadcast band and 120 through 13 meters. Each antenna is \$79.95, and each one comes with the appropriate (twinlead or coax) gas-tube lightning arrestor. Several varieties of lightning arrestors are available for receiving and transmitting purposes for either parallel-conductor or coax feedlines.

For more information, contact Antenna Supermarket, P.O. Box 563, Palatine, IL 60078 (708-359-7092).

Poor Man's Ginpole de WAØKKC. Rarely do we see ginpoles offered for sale by the major amateur equipment dealers and distributors. This is surprising since the ginpole is an important safety device—and the primary consideration when doing tower and antenna work is personal safety. The ginpole, a "raising fixture," fosters safety by giving the tower climber the heavy lifting ability the ground person provides. Two people using a ginpole can

make tower and antenna assembly and disassembly a simple, fast, and safe procedure.

Richard Mollentine, WAØKKC, has a ginpole antenna tip. He notes that not all so-called "slip-up" telescoping masts are that easy to slip up, if the antenna at the top is heavy. The used 50 foot tower that was given to him was heavy, too.

To help lift his slip-up mast he built a gin pole out of steel pipe using 5 foot sections coupled together; another mast also would work. Using his device (see photo), it went up easily.

Note: Commercial ginpoles are available from several sources. These include Antenna Mart, P.O. Box 699, #8 Shiloh Drive, Loganville, GA 30249 (404-466-4353). Another source is IIX Equipment, Ltd., P.O. Box 9, Oak Lawn, IL 60454 (708-423-0605).

Software Topix

MINIPROP PLUS V2.0. Predicting whether radio conditions are likely to be good enough to "work" various areas of the world is important to the DXer. Using a computer, you can produce timely predictions of HF skywave conditions between any two points, along with path, sunrise/sunset, and grayline information. That's what propagation forecasting programs are all about. Among these, MINIPROP is one of the best.

In several columns since 1987 we've observed the steady progress of MINIPROP and its successor, MINIPROP PLUS, a comprehensive propagation prediction program by Sheldon Shallon, W6EL. Recently Shel sent us Version 2.0 (see fig. 3).

On any path you specify, and for any date, MINIPROP PLUS predicts the received signal levels for every half hour of the day on each of seven user-specified frequencies between 3

Kenwood's TS-50S: Awesome HF Versatility



TS-50S HF TRANSCEIVER

For the Amateur Radio enthusiast, going "beyond bounds" is what it's all about. That's why Kenwood created the TS-50S, the world's smallest and smartest HF transceiver. The choice is yours: you can mount it in a vehicle, take it on a DX-pedition, or even install it permanently as a base station transceiver. Yet despite its size, the TS-50S provides a maximum output of 100W and the sort of sophisticated features normally found only inside a shack. Take for example the 100 memory channels for independent storage of transmit/receive parameters, the microprocessor-controlled DDS with innovative "fuzzy" control, and Kenwood's own AIP for superior dynamic range. There's also a powerful menu system, IF shift and CW reverse mode for interference reduction, TF-SET, and a noise blanker--plus everything you need for split-frequency operations. So, if you want HF operation beyond bounds, check out the TS-50S at your favorite authorized Kenwood Amateur Radio Dealer today!

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- DDS (Direct Digital Synthesizer) with fuzzy logic control
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- Auto-mode capability
- Menu system
- AIP (Advanced Intercept Point)
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- All-mode squelch
- CW reverse mode
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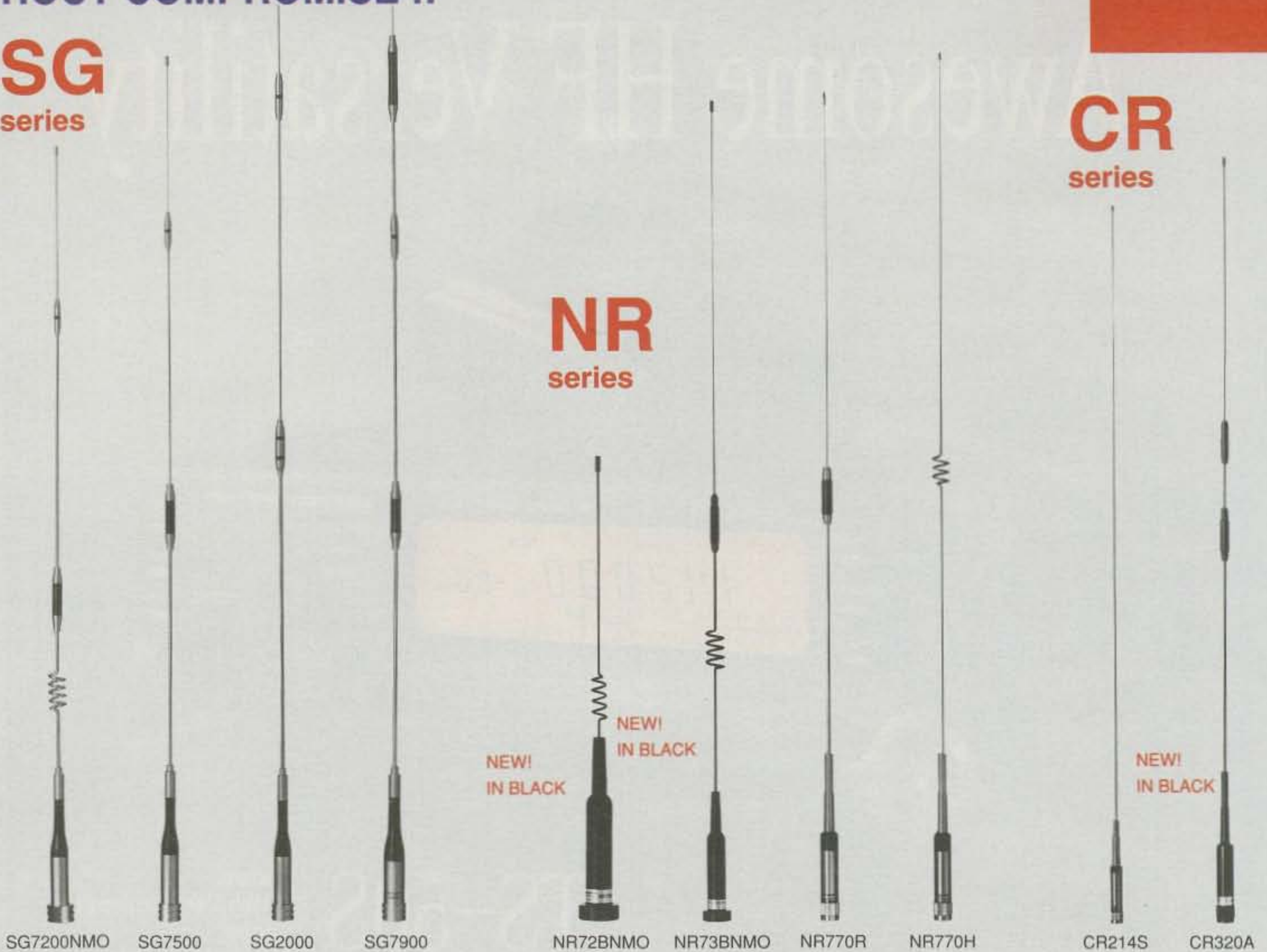
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MODEL	BAND	GAIN(dBd)	POWER (w)	MOUNT	HT (IN)	ELEMENT PHASING
NR-72BNMO	2m/70cm	2.15	100	NMO	13.8	1/4 λ, 1/2 λ
NR-73BNMO	2m/70cm	2.15/5.3	100	NMO	33.5	1/2 λ, 2-5/8 λ
NR-770SA	2m/70cm	2.15/2.15	100	UHF	16.9	1/4 λ, 1/2 λ
NR-770HA	2m/70cm	3.0/5.5	200	UHF	40.2	1/2 λ, 2-5/8 λ
NR-770HNMO	2m/70cm	3.0/5.5	200	NMO	38.2	1/2 λ, 2-5/8 λ
NR-770RA	2m/70cm	3.0/5.5	200	UHF	38.6	1/2 λ, 2-5/8 λ
NR-790A	2m/70cm	4.5/7.2	120	UHF	57.5	6/8 λ, 3-5/8 λ
SG-7000	2m/70cm	2.15/3.8	100	UHF	18.5	1/4 λ, 6/8 λ
SG-7200NMO	2m/70cm	3.2/5.7	150	NMO	36.6	1/2 λ, 2-5/8 λ
SG-7500A	2m/70cm	3.5/6.0	150	UHF	40.6	1/2 λ, 2-5/8 λ

MODEL	BAND	GAIN(dBd)	POWER (w)	MOUNT	HT (IN)	ELEMENT PHASING
SG-7900	2m/70cm	5.0/7.6	150	UHF	62.2	7/8 λ, 3-5/8 λ
SG-2000	2m	5.2	150	UHF	62.6	7/8 λ
NR-140A	1-1/4m	3.8	100	UHF	36.2	5/8 λ
NR-124	23cm	8.4	100	N	25	4-5/8 λ
CR-214S	2m/1-1/4m	2.15/3.4	120	UHF	37	1/2 λ, 5/8 λ
CR-224A	2m/1-1/4m	5.0/6.0	150	UHF	68.5	7/8 λ, 2-5/8 λ
CR-320A	2m/1-1/4m/70cm	2.15/3.8/5.5	200/200/100	UHF	37.4	1/4 λ, 1/2 λ, 2-5/8 λ
NR-2000NA	2m/70cm/23cm	3.15/6.3/9.7	100	N	39	1/2 λ, 2-5/8 λ, 5-5/8 λ

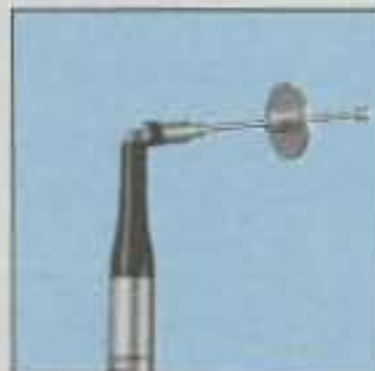
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FOLD-OVER

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and 30 MHz. Maximum Usable Frequencies (MUFs), radiation angles, beam headings, path lengths, sunrise and sunset times, and other useful information are reported. A new feature is the optional adjustment of MUF predictions for the geomagnetic K index.

Another nice feature is the new world map display or "frequency map" that shows the frequency suggested for use between any QTH and each of 57 areas of the world at any time and date. This is in addition to the world map display showing the great circle path between any two stations and the location of the solar terminator (gray line). The maps and the program's menus, dialog boxes, and data displays are in full color.

Other features unique to this version are automatic updating of the map displays to the current time every five minutes, and a batch mode that makes it easy to run multiple predictions without keyboard interaction. An on-disk atlas provides the latitudes and longitudes of more than 370 locations; the atlas includes all DXCC countries, and you can edit it. The program also prints a table of beam headings from your QTH to all atlas locations.

MINIPROP PLUS 2.0 for the IBM PC is \$60 postpaid in the U.S. and Canada, and \$65 U.S. elsewhere. It's from W6EL Software, 11058 Queensland St., Los Angeles, CA 90034-3029.

Eclipse FIND. Radio amateurs are like most other computer users: they find it impossible to remember hosts of cryptic file names. With hundreds or even thousands of files stored on a hard disk that may be 500 MB or more in size, you don't have the time or the tools to search for needed files. You can search for filenames and text with various DOS and Windows utilities, but such searches tend to be slow, tedious, and cumbersome. Just try to find that 1991 contest log data somewhere on your hard disk!

Several years ago there was a DOS-based program called Lotus Magellan that let you electronically index your whole hard disk for rapid file searching and retrieval. Unfortunately, Magellan has been discontinued. Now Phoenix Technologies offers the Windows-based Eclipse FIND (fig. 4). It gives you a remarkably fast way to locate, retrieve, and manage your word processing, database, E-mail, FAX, and other files.

Using Eclipse FIND's sophisticated yet easy to use search tools you can save much time. As you work in your normal ways, Eclipse FIND can run in the background creating an index that contains a reference to every word in every file on your hard drive. This electronic index lets you find instantly documents based on contents (the words in your documents) rather than file name or location. This capability eliminates time spent manually searching through directories for files.

Eclipse FIND lets you instantly search, locate, retrieve, view, organize, print, launch, and archive files from within any Windows application; it locates documents by word, phrase, or date in three seconds or less. It also lets you view documents in dozens of different formats; copy text; organize files in special folders; manage files; sweep the hard drive to find files you should get rid of; and archive to save disk space.

Eclipse FIND is \$89 from Phoenix Technologies, Ltd., 846 University Ave., Norwood, MA 02062-3950 (1-800-452-0120).

QEdit TSR. We have reviewed several ex-

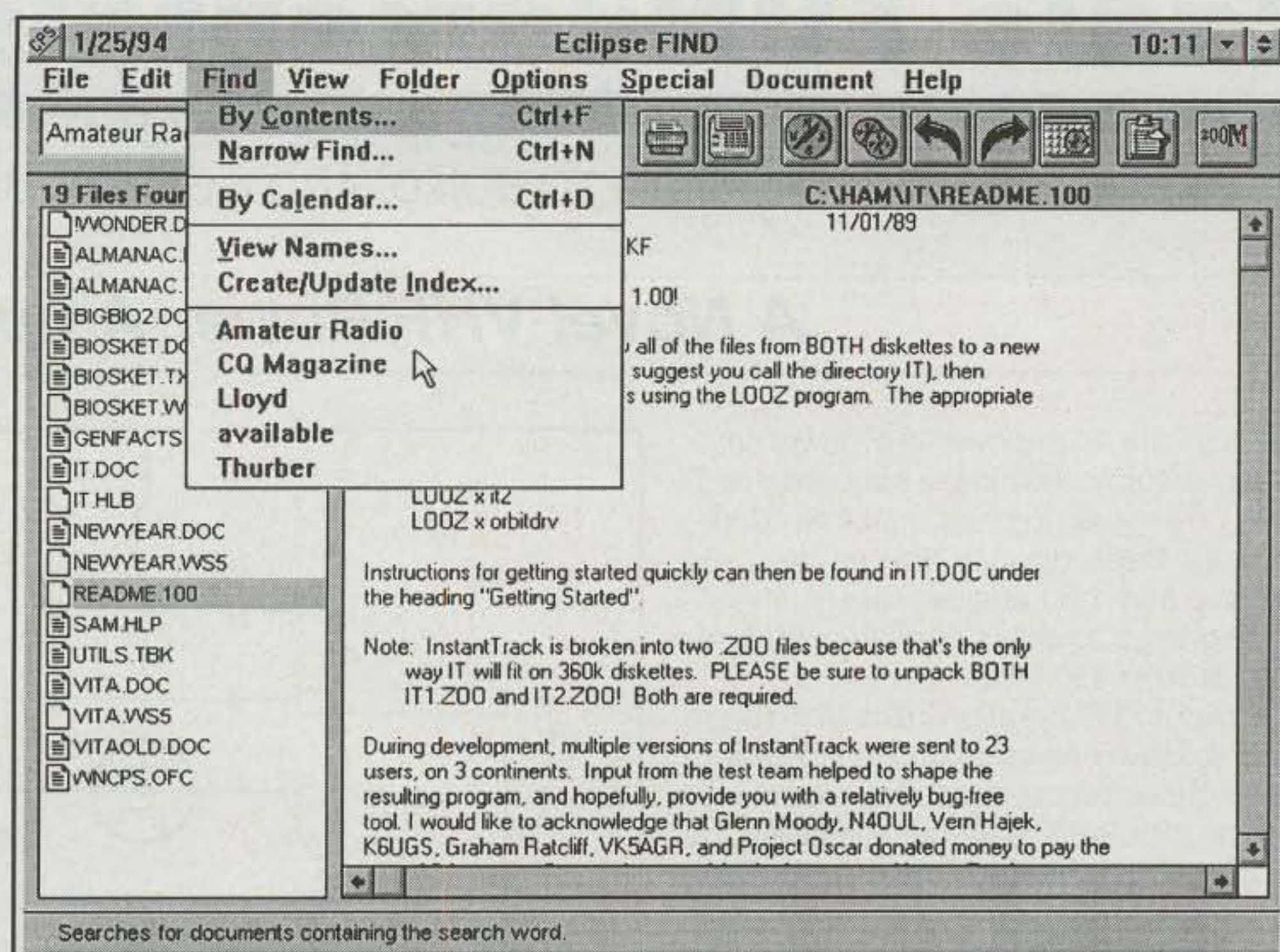


Fig. 4—Eclipse FIND, by Phoenix Technologies, Ltd., lets you search, locate, retrieve, view, organize, print, launch, and archive files from within any Windows application; it locates documents by word, phrase, or date. It also lets you view documents in dozens of different formats; copy text; organize files quickly in folders; manage files; sweep the hard drive to find files you can delete; and archive files.

cellent SemWare "Quick Editor" products. In May 1991 we discussed SemWare's two DOS-based text editors, QEdit Advanced and QEdit TSR. As we noted, QEdit Advanced was (and still is) one of the most full-featured text editors for entering simple documents, letters, and program code. I also found QEdit TSR to be handy: it's a memory resident (TSR) version of QEdit Advanced with all its features. Later, in the January 1994 column, we checked out a new product, The SemWare Editor, or TSE, in its V1.0 prerelease form.

Recently, we tried out SemWare V3.0 of QEdit Advanced and QEdit TSR, and both are slick products. The revised programs have been enhanced significantly to offer greater file editing power. Both now include helpful features such as more sophisticated printing options (including printing line numbers), increased line length (to 1000 characters), better macro handling, and even a fully integrated spelling checker. QEdit Advanced is \$59, while QEdit for OS/2 and QEdit TSR are \$79 and \$99, respectively. QEdit TSR and QEdit for OS/2 now each include QEdit Advanced at no extra charge. Contact SemWare Corporation, 4343 Shallowford Road, Suite C3A, Marietta, GA 30062-5022 (404-641-9002). SemWare's Matthew Giles says 25 percent discounts are offered to licensed amateurs.

UnInstaller 2™. In the February column we examined UnInstaller from MicroHelp. As we said then, there often is a big problem should you want to remove, or uninstall, an unneeded Windows application from your PC. Under DOS this wasn't much of a problem. Not so under Windows, where applications can leave their unwanted electronic fingerprints all over your hard disk.

MicroHelp's UnInstaller makes the task of safely and completely removing a Windows application much easier. The program analyzes your system and offers to delete everything necessary to completely remove an application. Version 1 helped with the problem a great deal, but still left some loose ends that largely have been sewn up with UnInstaller 2, which has matured into a first-class Windows utility.

Some of the enhanced features in Version 2 include the ability to find and remove "orphaned" files left over from a manual uninstallation; a new system cleanup option that removes fonts, video drivers, and unneeded Windows components; an optional status bar, button bar, and 3-D effects; an undo option that restores an uninstalled application; the ability to find and remove duplicate files (thus saving hard disk space); a built-in file viewer to display most popular file formats; an INI editor to assist with Windows information file (.INI) maintenance; and improved support for tracking entries in the various .INI files, as well as in the AUTOEXEC.BAT and CONFIG.SYS files.

UnInstaller 2 is \$69 from MicroHelp, Inc., 4359 Shallowford Industrial Parkway, Marietta, GA 30066 (1-800-922-3383).

Wrap-Up

That's all for this time, gang. Next time more antennas, accessories, and software topics of interest. See you then.

Overheard: If that latest electronic project doesn't work, first check the part that you didn't think was important.

73, Karl, W8FX

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

A Novel VHF Power Amplifier

Electrically, high-power VHF power amplifiers resemble their lower frequency cousins. I am speaking of vacuum-tube amplifiers, as these devices are the least expensive and most efficient means of generating large amounts of power in the region of 50 to 450 MHz.

Power-tube operation in the VHF range is inhibited by electron transit time, electrode capacitance, and lead inductance. These problems can be alleviated by proper circuit design, choice of tubes, and electrode voltages.

In the VHF spectrum, because the wavelength is small, the components of an amplifier approach an appreciable portion of a wavelength. Various novel design techniques, uncommon to HF amplifiers, are commonplace in the VHF world. As far as the plate circuit goes, the popular HF coil and capacitor combination is impractical, as plate circuit components are measured in nanoHenries and small values of picoFarads. Tank circuit Q usually runs very high in VHF power amplifiers since the output capacitance of the tube becomes a large proportion of the tuning capacitance. As a result of the high Q (values of 50 to 100 are not uncommon), circulating currents are extremely high and components must be designed to safely conduct these currents.

Plate Circuit Design

Stripline circuits are commonly used in the plate circuit of many VHF power amplifiers in the 144–450 MHz region (fig. 1). The impedance of these circuits is quite low, typically below a few hundred ohms. The higher the impedance of this part of the circuit, the less will be the Q (stored energy) in the line, and the greater the bandwidth. This is desirable if the amplifier is to be moved about in frequency without the necessity of retuning. In addition, a large amount of heat from the tube must be dissipated by the plate tank circuit, and if the Q is low, the tank circuit will not be detuned by expansion as rapidly as it would be by a high-Q circuit. There is a practical limit as to how

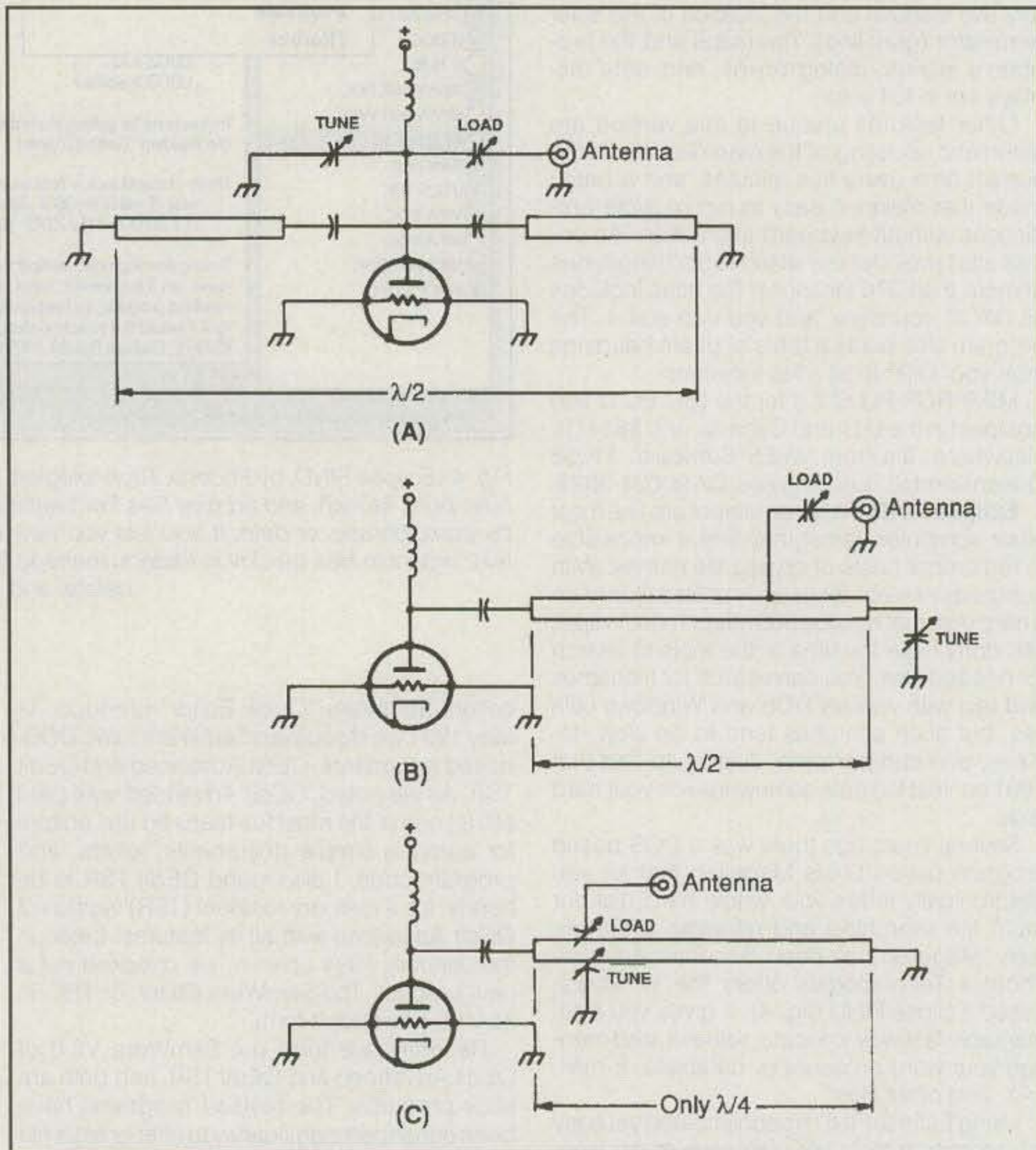


Fig. 1— (A) A popular VHF plate circuit places the tube in the middle of a half-wavelength stripline. (B) In this design the tube is placed at one end of a half-wavelength line, and tuning and loading adjustments are at the opposite end. (C) A quarter-wavelength line is shown, with tuning and loading controls at the plate end of the line. All three configurations are shunt-fed with no DC on the line.

high the plate line impedance may be made. Tube output capacitance, plus stray capacitance, will limit the impedance and length of a stripline circuit.

Using proper circuit design, many modern power tubes of up to 1 kilowatt anode dissipation will work well up to 450 MHz. Shown in fig. 1(A) is a plate circuit consisting of a half-wave stripline with the tube placed at the center, which is a high impedance point. The circuit is shunt-fed (no DC on the line) and the ends of the line are at ground potential. Loading and

tuning are accomplished by means of flat aluminum plates (flippers) which may be moved in relation to the tube anode by means of a threaded drive.¹

Fig. 1(B) illustrates a second type of stripline amplifier using a single half-wavelength line, with the tube at one end and the tuning capacitor at the opposite end. The antenna is tapped on the line at a point which provides proper loading for the amplifier.²

Fig. 1(C) shows the use of a quarter-wave stripline. It is shunt-fed, and ground-

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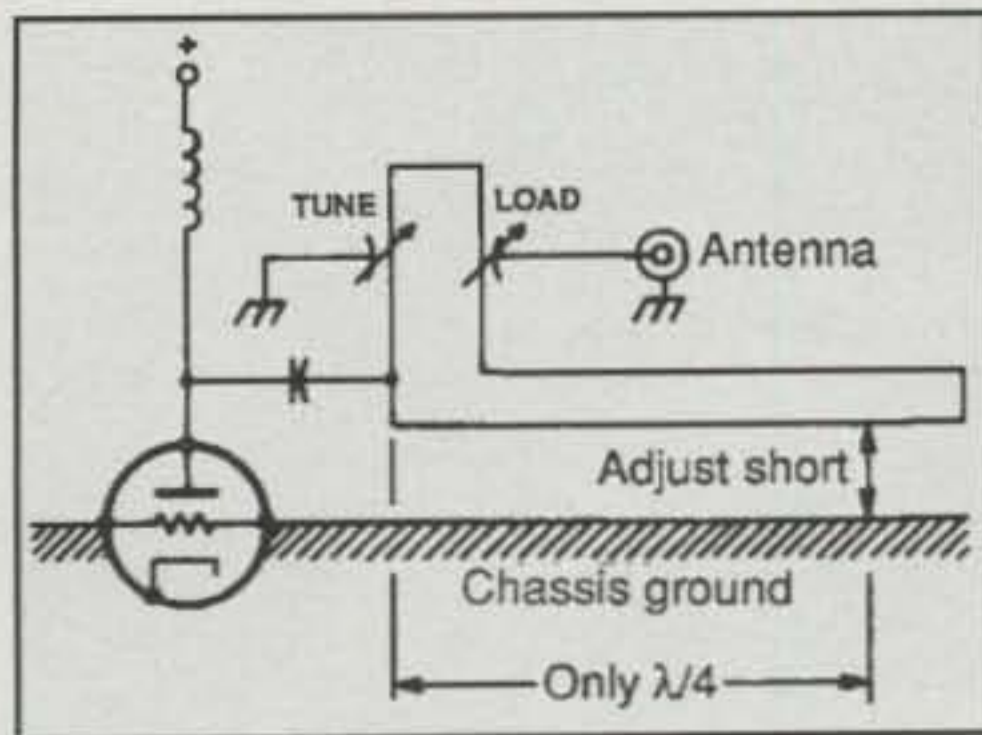


Fig. 2- Representation of the amplifier discussed in the text. It is a version of fig. 1(C). The plate end of the line is bent at right angles to the line to provide sufficient space for the tuning and loading flipper capacitors.

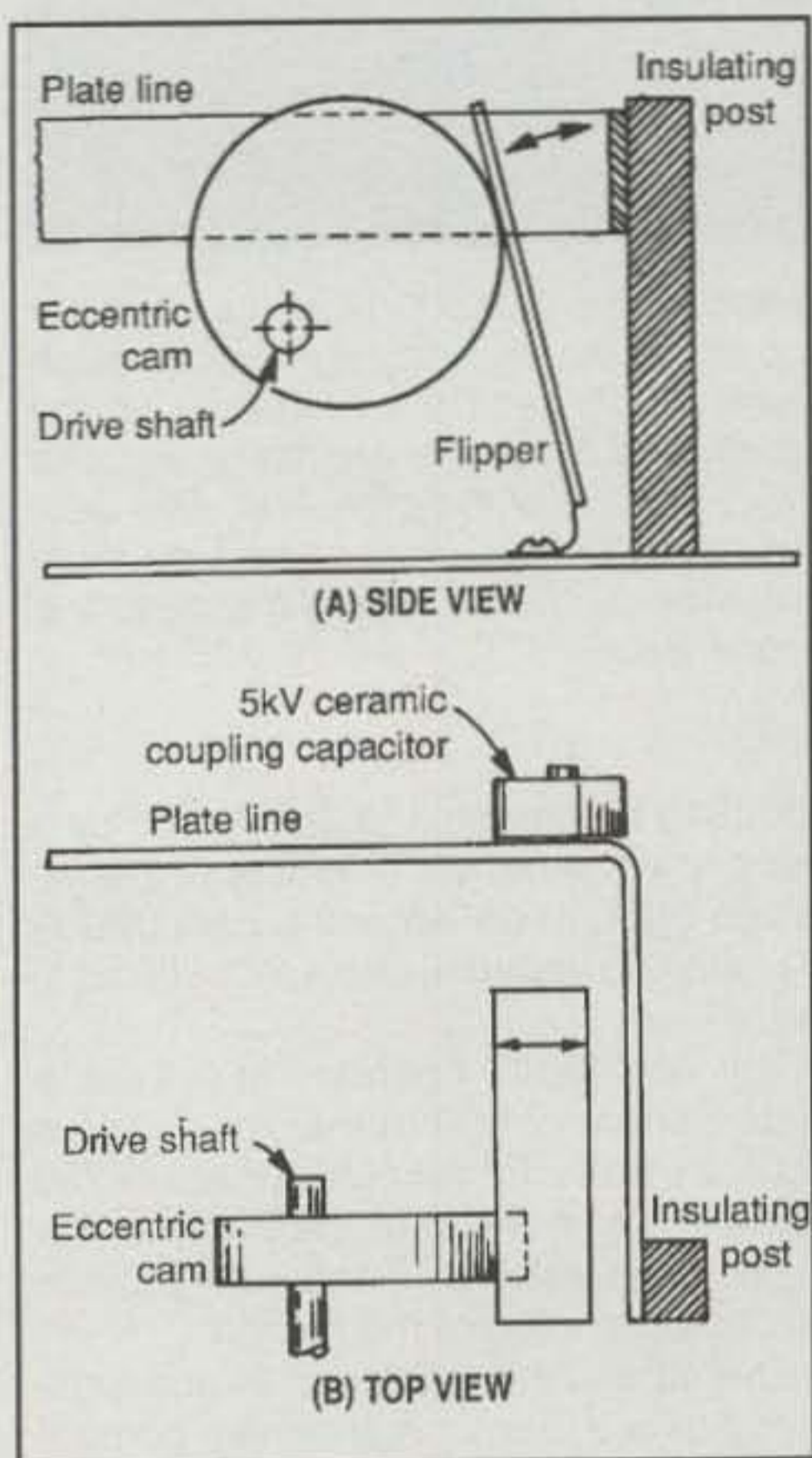


Fig. 3- (A) Side view of plate tuning flipper showing eccentric cam which presses against the hinged flipper plate. Assembly is panel driven through a vernier unit. (B) Top view of plate assembly showing placement of main components.

ed at the far end. Flipper capacitors at the plate end of the line provide tuning and loading.

All of these designs have proven practical in VHF service, but they suffer in that they require a certain amount of metal-mongering to make the stripline and the variable loading and tuning capacitors. Many amateurs do not have the tools or

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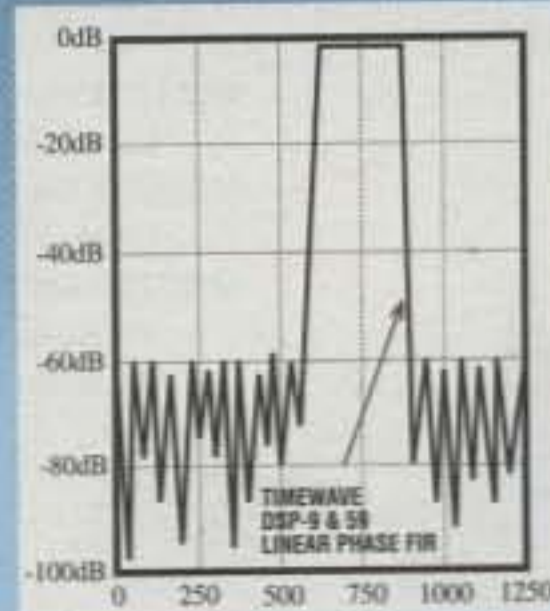
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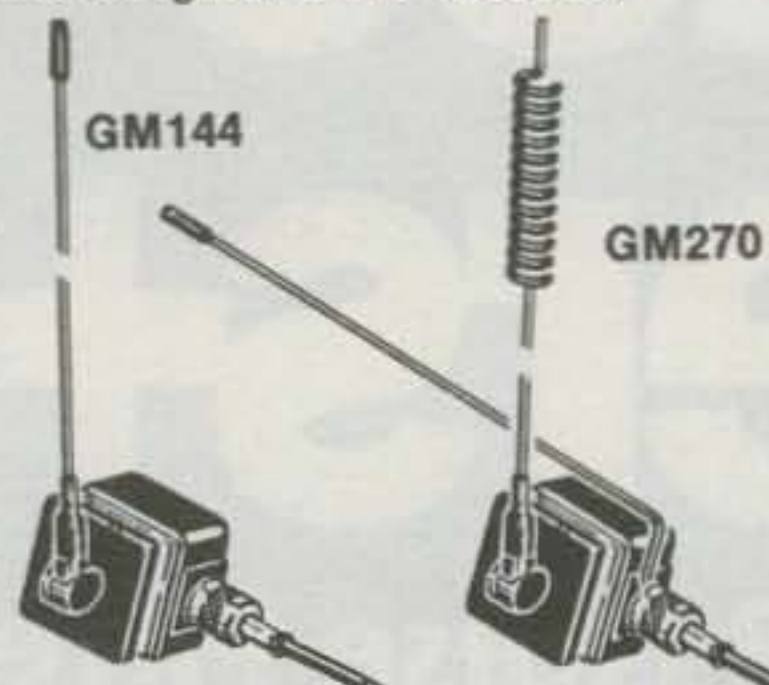
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PRO•AM's GM270 is 26 inches tall, handles 50 watts, and covers 144-148 plus 440-450 MHz with SWR less than < 2:1 at band edges (tunable via interior coupling unit). Gain is 2.6 dB 2m and 6.3 dB 70cm. A real tiger!

"Stylish, trim, and petite" only begin to describe PRO•AM's exciting new 2 meter, 70 cm, and dualband mobile antennas. They feature a slender black chrome whip and small candy kiss-size base that looks terrific on any auto. Inside the little 1 1/4 inch diameter base is a newly-developed and ultra-strong titanium magnet that holds in place like a bulldog, even at high speeds. These new micro magnet antennas are supplied fully assembled and ready to use, with 9 feet of RG-174 mini coax and BNC connector.

- Covers 144-148 MHz & 430-470 MHz
- Pretuned
- Low SWR
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- New micro magnet look
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Technical Data

- MM144B 2m: 19" tall
1/4 wave whip
- MM450B 70cm: 6.5" tall
1/4 wave whip
- MM270B 2m/70cm: 19" tall
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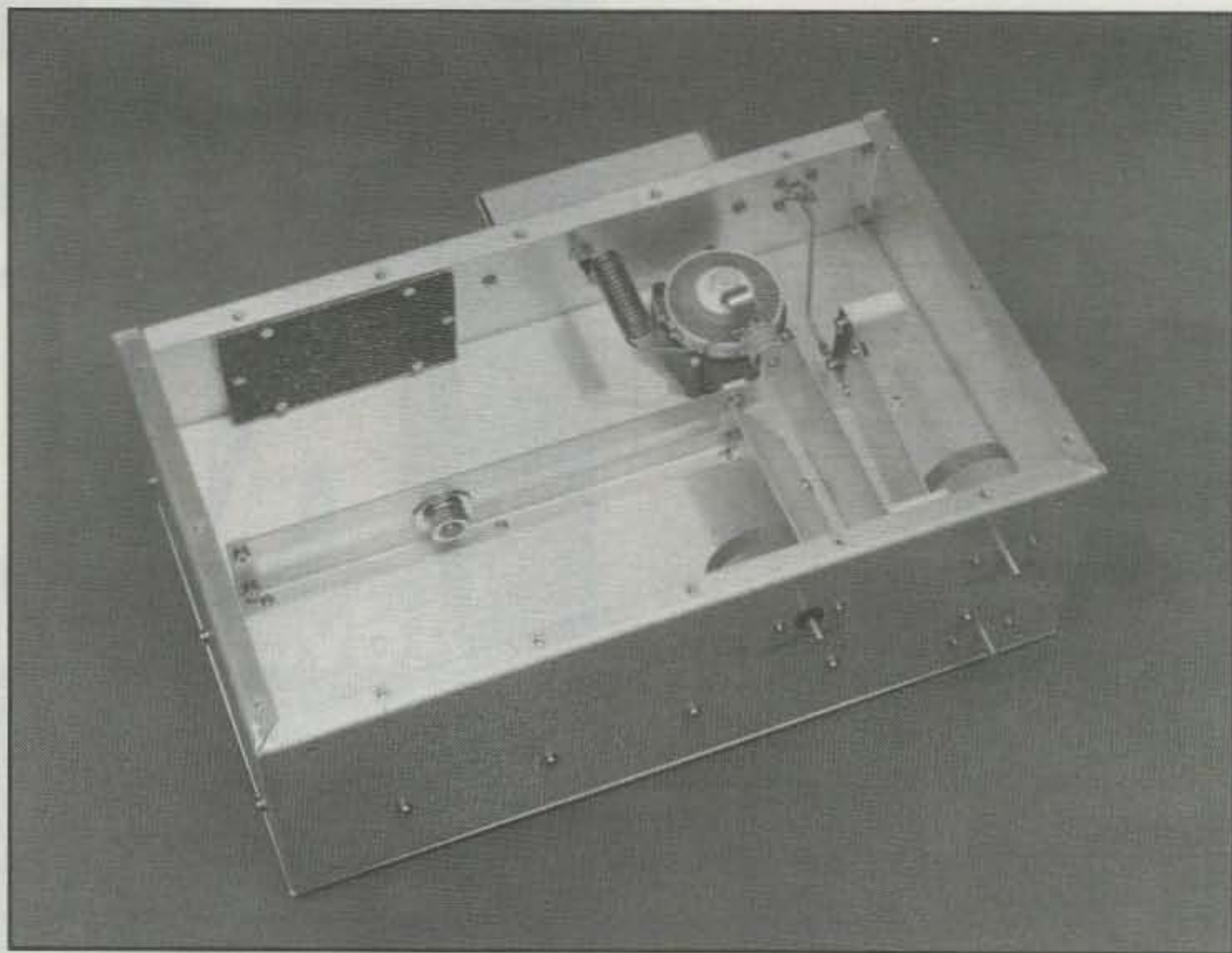


Photo A— Oblique view of amplifier plate assembly. The 3CX800A7 and socket are mounted directly in front of the small box covering the high-voltage feedthrough capacitor. Adjacent to the tube is the air-wound RF choke. The air intake is on the rear wall directly behind the stripline. At the plate end of the line are the tuning and loading flippers which move back and forth to a section of the plate line. This section is bent at right angles to the main line. The two eccentric drive cams are visible behind the front panel. A heavy shorting strap is positioned along the plate line to establish resonance.

the shop time necessary to construct these precision items.

There is a less-expensive method of achieving the goal of efficient plate circuit design which uses a modification of the quarter-wave stripline. The concept is shown in fig. 2. The design originated in Italy, as far as I know, and is used in low-power amplifier service in the 88-108 MHz FM band. Amplifiers using this assembly technique are available in the United States for FM service.³

Quarter-Wave Stripline Amplifier A Sheet Metal Special

Shown in photo A is a 1 kilowatt amplifier using a 3CX800A7 grounded grid, high- μ ceramic triode. This unit is configured for the 88-108 MHz FM band. The design should prove feasible down to perhaps 75 MHz, at which frequency conventional coil-capacitor circuits can be used. The upper frequency limit is probably about 150 MHz, as the plate line tends to "disappear into the tube" as the frequency is raised.

This circuit is novel in that it makes use of a very inexpensive plate circuit arrangement. Basically, it is a shunt-fed, quarter-wave stripline with capacitive

coupling to the antenna. It is tuned by a low capacitance, variable flipper panel-driven through an eccentric cam (made of insulating material) and a reduction dial (fig. 3).

The 3CX800A7 operates at 2 kV at a plate current of 500 mA. Drive power is about 25 watts. Power output is about 750 watts. A comparison of the photo of the plate circuit with figs. 2 and 3 will provide an understanding of the design.

The amplifier is enclosed in an aluminum box with the tube and main components mounted on a horizontal plate which provides enough space below it to accommodate the tuned cathode circuit. Cooling air is introduced into the anode compartment through a honeycomb RF filter in the back wall and exits through the anode, passing through the air-system socket to the under-chassis area.

Plate voltage is shunt-fed through a simple air-wound RF choke and a feedthrough capacitor mounted on the rear wall of the enclosure.

The flat aluminum quarter-wave plate stripline is mounted in the vertical plane and is connected to the tube anode through a 5 kV ceramic capacitor and a short length of phosphor-bronze strap, which is bolted to the plate cap of the

A NEW CONCEPT IN HF TRANSCEIVER DESIGN FROM A NEW COMPANY



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- Built-in XT keyboard interface (keyboard optional)
- 160-10M ham band coverage
- USB/LSB/CW/FSK modes
- 75W output power
- Built in digital power/SWR meter
- DDS VFO with 1Hz step size
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<ul style="list-style-type: none"> ■ Basic display lets you know exactly where you are. 	<ul style="list-style-type: none"> ■ Standard Display shows RX/TX VFO freq's, time and current memory
<pre>14.03510-T 0930 14.03510-R 7000</pre>	
<ul style="list-style-type: none"> ■ Send & Receive in: CW / RTTY(BAUDOT) / ASCII 	
<pre>TNX FER Q50, 73</pre>	<p>← Incoming data</p> <p>← Outgoing data appears here</p>
<ul style="list-style-type: none"> ■ Store up to nine 256 character messages. 	<ul style="list-style-type: none"> ■ Messages can be: edited, sent & appended to outgoing message
<pre>14.03510-T 0930 3> CANNED MSG █</pre>	<p>← Format & Edit stored MSG's here</p>
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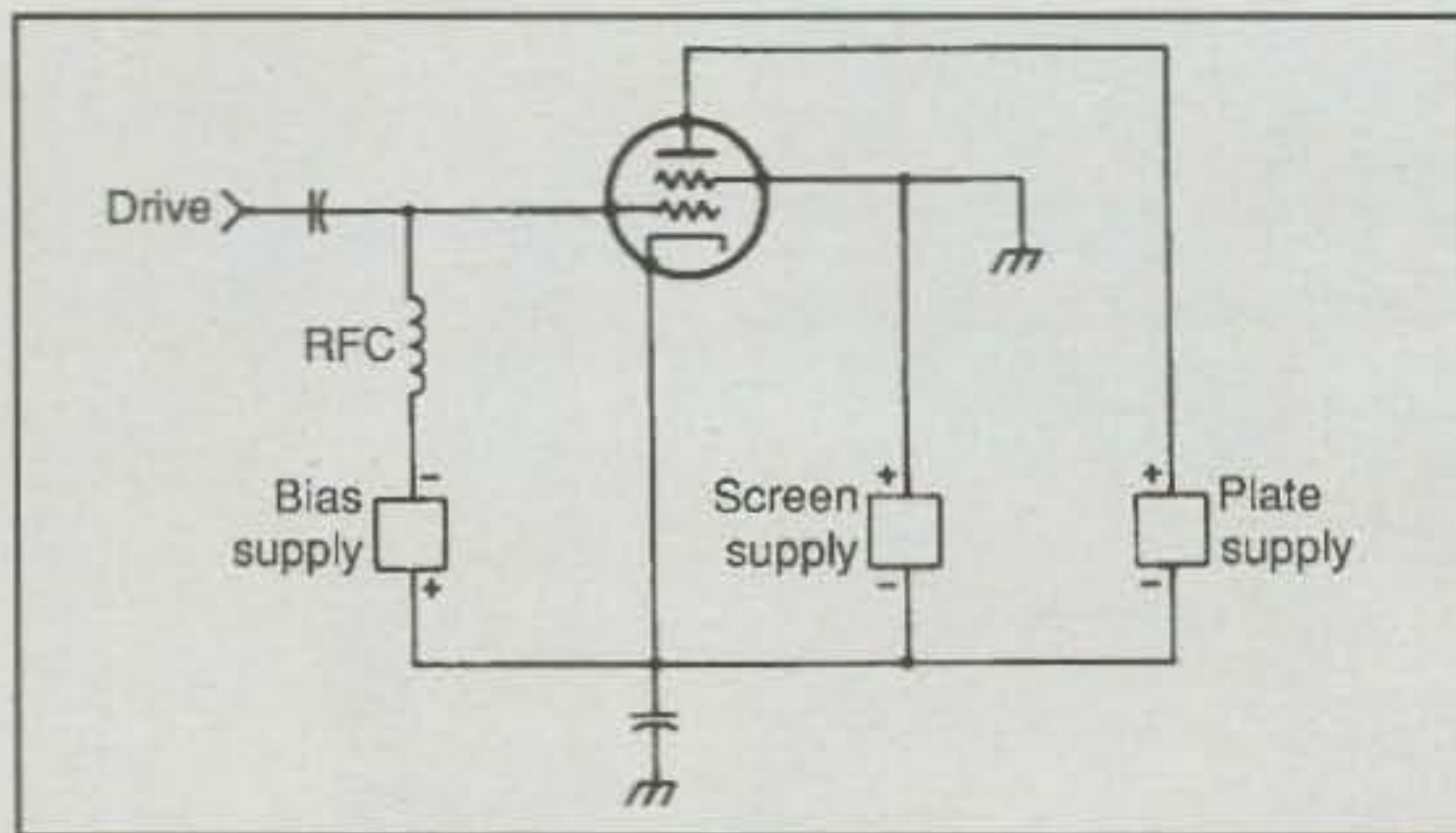


Fig. 4— Grid-driven tetrode circuit with screen at RF and DC ground potential.

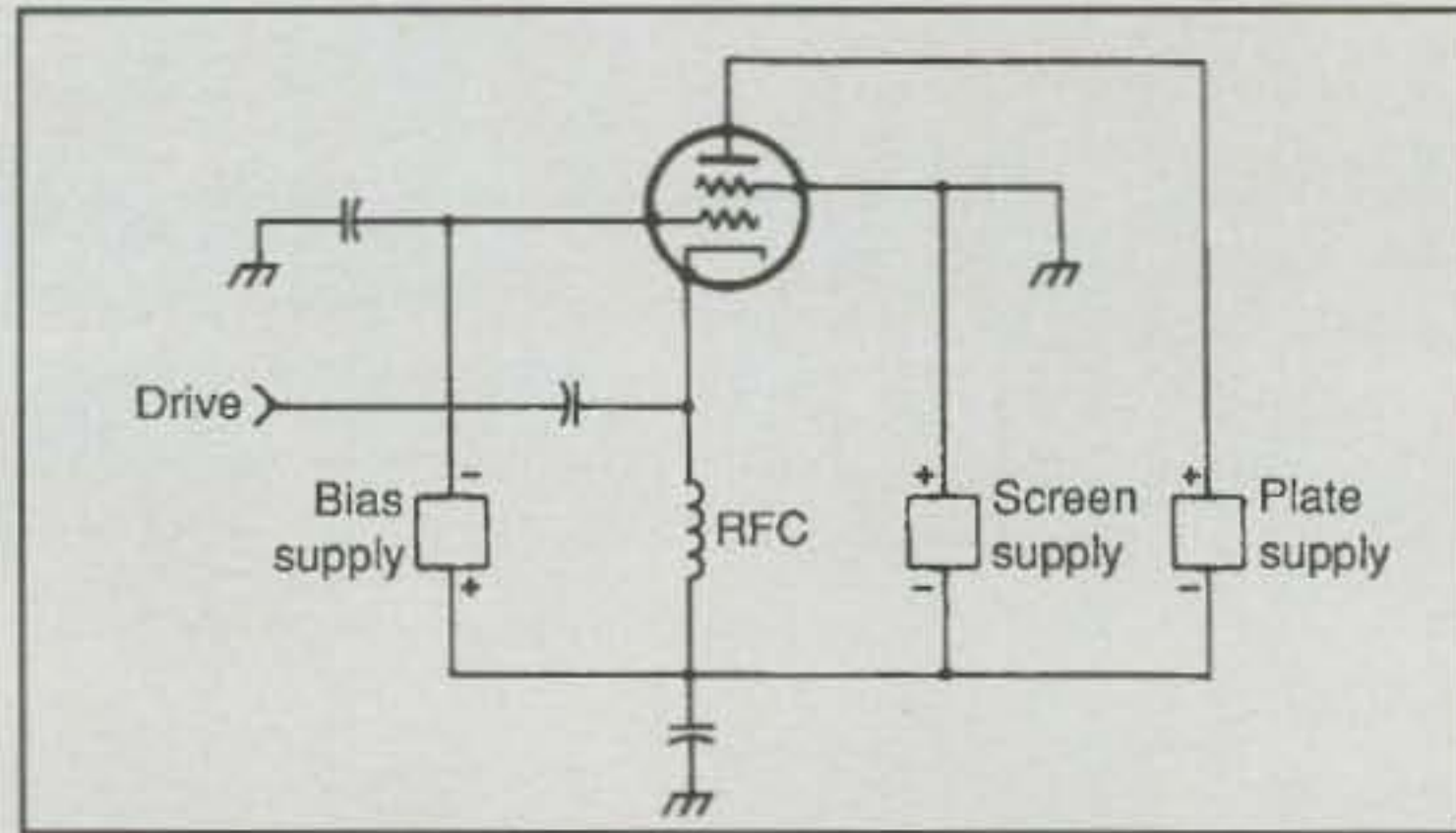


Fig. 5— Cathode-driven tetrode circuit with screen at RF and DC ground potential.

3CX800A7. The opposite end of the line is grounded by a movable short.

A matching aluminum strip is placed beneath the plate line and is separated from it by about $\frac{3}{4}$ inch. This lower strip is grounded along its length to the chassis plate, being bent at a right angle, so that a continuous "foot" runs along the strip for grounding purposes. A movable shorting strap is used.

The plate end of the upper strip is supported by a teflon post bolted to the lower strip, and at this point the plate strip is bent at 90 degrees to provide a mounting area for the plate coupling capacitor and to form a wide "stator" plate for the tuning and loading flipper capacitors.

The Tuning and Loading Controls

The tuning and loading capacitors are aluminum flipper plates which are mounted adjacent to the extension of the stripline. The extension is bent at a 90-degree angle to the stripline and is supported at the free end by a teflon post.

The plate tuning flipper is hinged at the base, the hinge being a wide strap of phosphor-bronze material bent back so the flipper is held away from the plate strip. It is moved toward the stator plate by an eccentric cam made of Lexan which is driven off-center by a reduction gear from the front panel. The antenna coupling flipper is mounted to a teflon post near the tube anode by a second phosphor-bronze hinge. It is swung back and forth by a second eccentric cam, also driven from the panel. This flipper is connected to a type-N receptacle mounted on the back of the amplifier cabinet.

Plate circuit resonance is roughly set by a heavy shorting strap which is moved along the plate line and firmly bolted in place at the proper point, determined by a dip-meter when the tube is in the socket. Resonance is then set by advancing

the plate flipper toward the plate line. Loading is controlled by the spacing of the output flipper from the plate line.

Adapting The Technique To An Amateur Amplifier

This is an "idea" article, not a construction one, and discrete dimensions are not given, as the amplifier shown is intended for the FM band. However, an approximation of the size of the stripline and flipper capacitors can be gained from the photo. Since the plate assembly is so simple, it can be rigged up and cut to size with metal shears. Once approximate resonance is found, the flippers can be added for fine tuning and loading.

A little experimentation with a dip-meter on a "brassboard" mock-up should provide insight into this interesting and easily built configuration. By trimming the plate line, operation at 144 MHz should be possible. In any event, it is another novel design for VHF addicts to ponder before they build their equipment.

An Alternative Design With The 4CX250B

The 4CX250B in grounded screen operation is a good candidate for a 500 watt amplifier of this general configuration. The lower output capacitance of the 4CX250B as compared to the 3CX800A7 (4.1 pF vs 6.1 pF) gives the builder a little more headroom as far as the length of the plate stripline goes. (Also, the cost of the tube is a lot less!)

In the 4CX250B design the cathode and grid are run at "below ground" potential, as the screen is at the chassis potential. This is a little tricky, but it is merely the result of moving the DC ground point from the cathode to the screen. This eliminates the screen RF bypass capacitor, which can be a bad performer in the VHF region (fig. 4).

The amplifier tunes up in the normal manner, and if neutralization is required, a small feedback plate mounted adjacent to the anode of the 4CX250B and coupled back in the conventional manner to the grid circuit will do the job.

As an alternative, the 4CX250B can be cathode driven, which dispenses with neutralization, at the expense of increased grid drive. The extra drive shows up, of course, as feedthrough power in the output circuit. A typical DC circuit is shown in fig. 5.

How's DX?

Or should I not ask? My friend Steve, KH6SB, at the Maui (Hawaii) ionospheric sounding station sent me a printout of the monthly averages of the measured reflection readings of the present cycle, as compared to the last one. The averages are declining much in the same fashion as happened approximately eleven years ago. If this cycle continues in step with the last one, the bottom may be reached about mid-1996. Even so, plenty of DX can be worked during a sunspot minimum, as old-timers who have survived through several sunspot cycles can remember.

This cycle is different, however, in that operating aids are at hand which assist the DXer in making the best of things. One of the most valuable aids is the computerized propagation prediction program, and I'm pleased to see that my friend Shel, W6EL, has brought out version 2.0 of his popular MINIPROP PLUS program for IBM and compatible computers.

The program works in this fashion: On any DX path specified by the user, and for any date, MINIPROP PLUS predicts the received signal levels for every half-hour of the day on each of seven user-specified frequencies between 3 and 30 MHz. In addition, MUFs (maximum usable frequencies), radiation angles,

beam headings, path lengths, sunrise and sunset times, and other useful information are reported to the user. A new feature in version 2.0 is the adjustment of MUF predictions for the geomagnetic K index.

Another new feature of the program is a world map showing the suggested frequency for use between any location and each of 57 areas of the world at any time or date. Great circle paths are shown, and the location of the "gray line" is given.

Shel has also included an on-disk atlas with latitude and longitude data on more than 370 locations, a list of all DXCC countries (which can be edited), plus a customized table of beam headings for the user's QTH to all locations in the atlas.

MINIPROP PLUS requires 512K RAM, DOS 2.11 or greater, and CGA/EGA/VGA or Hercules graphics. A math coprocessor is recommended but not required.

As far as I can determine, MINIPROP PLUS will do everything but work the DX for you! I am sure Shel is thinking about that for his next program! Contact W6EL Software, 11058 Queensland St., Los Angeles, CA 90034-3029 for prices and all data.

Unclear On The Concept

The October 1948 issue of *QST* (page 48) had a short article on the "recent Bell Telephone Laboratories' announcement of the 'Transistor.'" The article described the transistor and concluded, "It doesn't appear that there will be much use made of Transistors in amateur work, unless it is in portable and/or compact audio amplifiers. The noise figure is said to be poor, compared to that obtainable with vacuum tubes, and this fact may limit the usefulness in some amateur applications. These clever little devices are well worth keeping an eye on."

73, Bill, W6SAI

Footnotes

1. A 2 kW PEP 144 MHz amplifier using an 8877 in this circuit is shown in Chapter 18, pp. 18-2 to 18-7, of the 23d edition of the *Radio Handbook*, published by Howard W. Sams & Co., a division of MacMillan, Inc., LCC number 85-61776.

2. A 1 kW PEP 220 MHz amplifier using an 8874 in this circuit is shown in Chapter 18, pp. 18-7 to 18-11, of the 23d edition of the *Radio Handbook*.

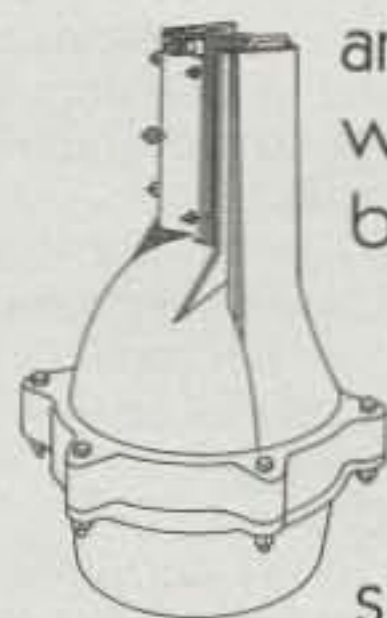
3. The amplifier shown in this article is a prototype unit for the Eimac CV-2222, designed for FM broadcast service. For additional information contact Varian-Eimac, 301 Industrial Way, San Carlos, CA 94070, Attention: Application Engineering Department. ■

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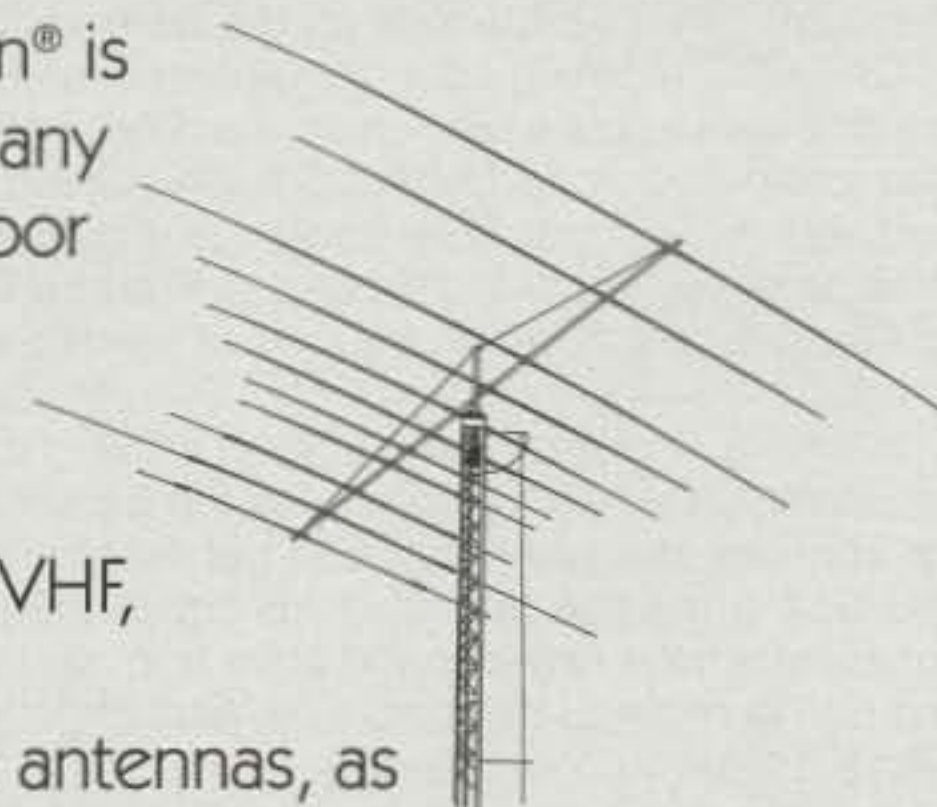
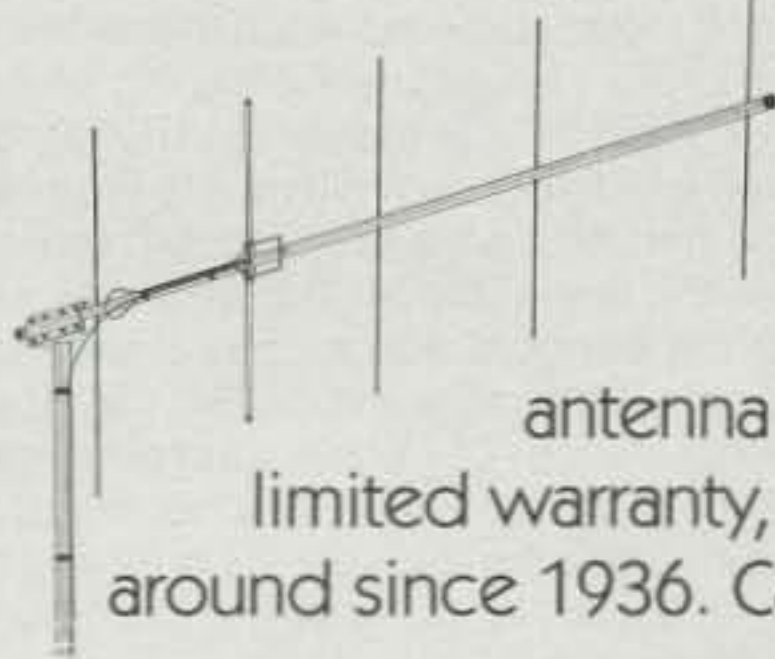
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ALL ABOUT THE WORLD ABOVE HF

Dayton 1994—Wet and Wild

The 1994 Dayton Hamvention was wet, wet, and wet, except if you came a day early. Your editor arrived on a sunny Thursday afternoon, the weather then giving no indication of what was to come. However, the passenger next to me on the plane, a local, warned me by saying, "You guys should've had your convention last week. The weather was perfect."

Somehow I knew the next sentence he was going to utter, without even having to hear it from him. "We're expecting rain tomorrow and Saturday." That set the tone for the weekend.

On Friday morning I got up, walked over to the little cafe about a block from the hotel, and had breakfast. It had already been raining, and, with my raincoat, I was dodging the drops. After breakfast I boarded the shuttle to take me to Mendelson's to catch the bus to the Hara Arena.

It was raining again when, upon arriving at Mendelson's, I had to run across the parking lot from the store's entrance to get on-board the bus. (I learned later that for subsequent runs, the shuttle driver would drive right up to the bus in order to discharge his passengers with the least inconvenience.)

Nearing the arena, as we drove past the parking lot behind the car dealership, I could already see trouble brewing. There, alongside some of the early-bird cars, was a tow truck. Inside the arena the cynical humor was that it cost \$10 to get into the Hamvention and \$45 to get out (to get your car out of the mud).

As an exhibitor, I could go inside at 8 AM. I didn't hesitate about that privilege. Once inside and at the CQ booth I spied a stack of my brand-new book, *The VHF "How To" Book*, which had just arrived from the printer the night before. Grabbing a bunch, I headed around the arena to find exhibitors who would be interested in promoting it. I got a few of my fellow media people to agree to review it. It is available from CQ's Book Shop for \$15.95 plus shipping and handling.

While I was away from the CQ booth, Randy Simons, NØLRJ (he's the guy with the awesome array permanently mounted atop his vehicle, and the one who paraded up and down the parking lot at closing time each day of the convention), having heard that the book would probably be available at Dayton and that a couple of his pictures were in it, came by to see if we had it. He wasn't disappointed on either count.

Randy took a copy back to his booth and put it down. Within 30 seconds, he claims, it was stolen! Well, I find it hard to believe. I didn't think that my utterances in print were that valuable. I really think that he did what I do so often. He put it somewhere and later, thinking that he put it somewhere else, went into a panic to find it. Nevertheless, he came by the CQ booth later to get another copy. This one he creased open

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VHF PLUS CALENDAR

June 18–July 18	50 MHz DX Marathon, sponsored by "The 50 MHz DX Bulletin." (See text for details.)
June 25–26	ARRL Field Day.
July 1	Last quarter moon.
July 1–8	NØTG, WA4DAN, AA4VK, and KW2P DXpedition to St. Paul Island. (See text for details.)
July 3	Apogee.
July 8	New moon.
July 9–10	CQ WW VHF WPX Contest, 1800 UTC 9 July to 2100 UTC 10 July. (See May issue for rules.)
July 15	First quarter moon.
July 17	Moderate EME conditions.
July 18	Perigee.
July 22	Full moon.
July 24	Moderate EME conditions.
July 29–30	Central States VHF Society Conference, Memphis, Tennessee. (See text for details.)
July 31	Apogee and last quarter moon. Poor EME conditions.
August 6–7	ARRL UHF Contest, 1800 UTC 6 August to 1800 UTC 7 August.
August 7	New moon. Very poor EME conditions.

to where his pictures were, thereby destroying some of its resale value (and, presumably, its theft value). He also got me to autograph it, thereby cinching its loss in value.

When the show opened to the public at noon, it was wall-to-wall bodies. It remained that way for almost the entire weekend. Only on Sunday, when the rain finally let up (it was still bitter cold) did some venture out into the flea market for any length of time.

For the next two days at the convention, except when I was attending the VHF forums, I spent much of the time hawking the book from the CQ booth.

I didn't limit my selling to the booth. At the VHF banquet on Friday night I sat with the VE3ONT gang. I pointed to the write-up I did on the Algonquin EME adventure in the book and sold a few more copies to these deservedly proud Canadians. The only one of the group who didn't initially buy one was Dennis Mingham, VE3ASO. He declined, claiming he had to wait until after dinner to see how much money he had left before committing it to the book.

I think that he had a premonition, though, because the first of the 36 prizes to be given away at the banquet was a copy of the book and the new *Getting Started in VHF* video tape. Wouldn't you know it? Dennis was the winner!

Nevertheless, many of the other banquet participants, hearing my story of not having the money for dinner, took pity on me and bought a copy of the book.

Speaking of prizes, Christopher Nyiri, the now five-year-old son of Jack Nyiri, AB4CR, once again assisted Hal Perry, KC4YO, and Brian Snyder, WA8MZQ, the wonderful hosts of the banquet, in the prize drawing. Unlike last year, Chris did not pull his dad's name from the hat.

During the evening his dad related to me an

amusing incident involving this column. Last July I published Chris's picture along with a write-up about his participation in the banquet. After school started in the fall, Chris told his teacher that his picture was in a magazine. His teacher uttered a "right!" with the tone that implies "Prove it to me."

The next day Chris took the magazine to school and did just that. His teacher, commendably eating some humble pie, made Chris the hit of show-and-tell for that day. Well, here's your chance again, Chris!

I really did have enough money for the banquet, as did over 115 other VHF weak-signal operators in town for the convention. It was a great time to see the guys and gals we so often talk with during band openings on the VHF+ frequencies.

The VHF forums were scheduled for Saturday morning. Heading them off was Bill Parker, W8DMR. He spoke on the subject of "Faster Than the Speed of Light." (You had to be there to see his talk. It went so fast that I almost missed it.) Next Emil Pocock, W3EP, the VHF editor of *QST* and I fielded questions from the floor relating to the wonderful world of VHF weak-signal work.

Tom Whitted, WA8WZG, talked about using no-tune transverters. Peter Putman, KT2B, showed how to backpack a VHF portable station. Then Michael Owen, W9IP, and Peter Shilton, VE3VD, showed us how they made so many EME contacts from the Algonquin dish. They also announced tentative plans to be back for this fall's EME contest.

Kent Britain, WA5VJB, talked about low-noise pre-amps. And finally, Dave Wood, WB4KPD, talked about spread-spectrum communications. There was an average of more than 150 in attendance at each of the forums. With something for everyone, no one went



Lately Rover operations have really gone to the dogs. Here this lassie, also known as K9ARF, is operating from rare grid locators in southern Colorado. Perhaps you will also want to activate some rare grid locators near you during the CQ WW VHF WPX Contest scheduled for 9-10 July. (Some of you may also recognize NØLRJ's Portaple antenna setup in this photo. It was seen cruising the parking lot at Dayton this past April. For more info on NØLRJ's setup see this month's column.)

away disappointed in what they heard or saw.

On the heels of the VHF forum was a forum honoring SAREX. Commemorating the tenth anniversary of SAREX activity aboard the Space Shuttle, the forum featured Roy Neal, K6DUE, who moderated it, and Shuttle astronauts Tony England, WØORE, and Steve Nagel, N5RAW. Also participating in the forum were several members of the SAREX working group.

Joining in the forum via land line were astronauts Jay Apt, N5QWL, at the Johnson Space Flight Center in Houston; Ron Parise, WA4SIR, at the Goddard Space Flight Center in Greenbelt, Maryland; and Ken Cameron, KB5AWP, in Star City, Russia. Ken is now in training there for an upcoming joint NASA/Soyuz mission to the Russian Space Station, *MIR*. All of these astronauts spoke of their onboard experiences with amateur radio and answered questions from the forum attendees.

What probably was the highlight of the forum was the students who previously had contacted the Shuttle astronauts, sharing their experiences with the audience.

Talk about great publicity for amateur radio! There was local TV coverage, from all three Dayton commercial television stations, of the astronauts speaking to the standing-room-only crowd of nearly 500 attendees.

All-in-all Dayton once again lived up to its reputation for being the biggest and best hamfest in the country.

New Equipment: Around the arena were displays of the new products available for the VHF enthusiast. Among the weak-signal radios offered by the majors were the following.

From ICOM, the IC-736 and the IC-820H

were on display. The IC-736 is an all-band radio that includes 6 meters. Previous offerings of all-band radios that included 6 meters did so with reduced power on that band. Not this one. It produces a full 100 watts. In addition, it includes a built-in antenna tuner that works on 6 meters! There are other goodies inside the box, and I will discuss them in a future column.

The IC-820H is a dual-band radio specifically designed for satellite work. Nevertheless, it makes an excellent radio for the weak-signal enthusiast who wants to work 2 meters and 70 cm. It has a surprisingly high 35 watts out on 2 meters and 30 watts out on 70 cm, both of which are adequate to drive most of the bricks on the market. Another neat feature is dual receive. Now when you want to move someone up to 70 cm in the contest, all you have to do is push a button!

From Kenwood, the TS-60 was on display. On the heels of the success of its HF predecessor, the TS-50, this little radio has found an immediate home with the 6 meter crowd, particularly those of us who like to travel. This compact radio runs 90 watts and fits into a briefcase. If you are a traveler, you can get the radio, power supply, and antenna all inside a carry-on bag. Then, upon arrival at your destination, you have a no-compromise radio to work those band openings. I predict that before this summer ends, this radio will be used to activate plenty of rare grid locators. I know I plan on using mine for just such activities.

Perhaps the most popular item from the "non majors" was the Portaple. When Randy Simons, NØLRJ, was not driving his car around the parking lot showing off his antenna array, he was inside showing off his Portaple. A

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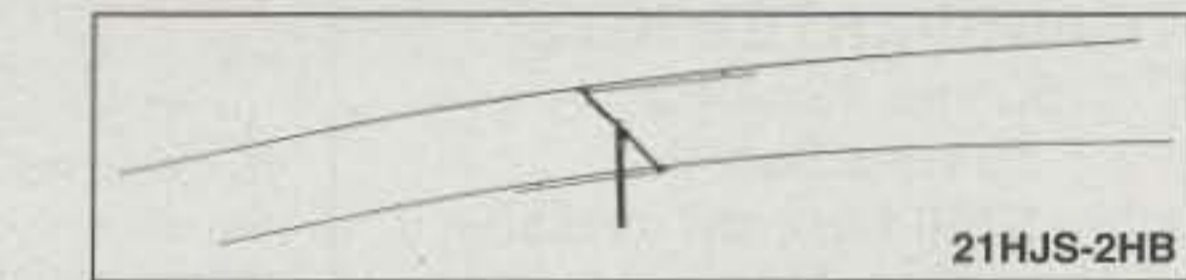
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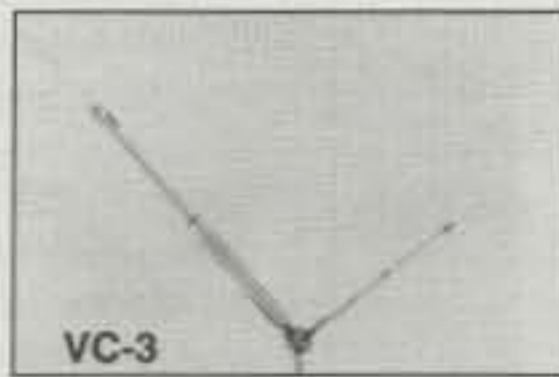
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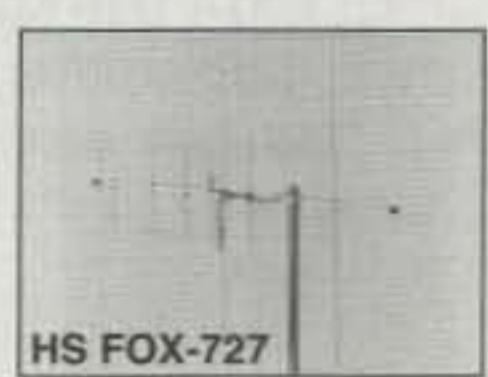
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CIRCLE 13 ON READER SERVICE CARD

Portable is a telescoping mast that is designed for portable use. There are two Portable models, one that extends to 26 feet and another that extends to 40 feet. Randy, who is almost as tall as the 26 foot model, could be seen in various parts of the arena demonstrating how easy it was to fully extend one of his poles. If you didn't have a chance to see him and his poles (and that would only have been if you didn't make it to Dayton), then call him at 303-761-1458. Incidentally, Randy tells me that because of his success at Dayton he only has a limited number of Portables in stock.

There were plenty of other goodies of use to the weak-signal VHF enthusiast. If you weren't there, you missed out on spending your dollars on many of them.

Dayton Disaster: While the convention was great fun for most of the attendees, the festive atmosphere was marred by a multi-car pile-up (some estimates say as many as 34 cars) on I-70 east of town. The wreck involved several amateurs who were traveling home eastbound on I-70 on Saturday afternoon.

Among the weak-signal VHF enthusiasts involved were Bob Carnahan, NW3C, and Burt Neswald, N8TLZ. Both Bob and Burt sincerely believe that the air bags saved them from serious injuries. As it was, they received some bumps and bruises. And Burt received a broken hand from holding his new 1296 MHz amp in his lap. They spent the next 24 hours at the hospital being treated and observed. They made it home late Sunday night, a bit worse for the wear but happy to have survived. I spoke with both of them Monday night and found them in good spirits and very appreciative of the outpouring of encouragement they received once they returned home.

VE7BQH Joins Exclusive Club

On 3 January of this year Lionel Edwards, VE7BQH, became the fourth recipient of the coveted 2 meter DXCC award, thereby joining an exclusive group of VHF DXers. The three other award recipients are Dave Blaschke, W5UN, Gary Crabtree, KB8RQ, and Kjell Rasmussen, SM7BAE.

Lionel began his quest for the DXCC award, without realizing it, in 1968 when he first got on 2 meters EME simply to try to work a few guys off the moon. His first DX (and initial) contact was with Sam Harris, W1FZJ/KP4, who was making contacts from his own antenna array at his house. Then Lionel was using a small number of collinears for an antenna array.

Lionel was very active until 1971. He then dropped out for the next seven years, after working only six or so stations, to raise a family. As he said, he was a young father with a young growing family and his interests centered around coaching baseball and soccer.

After his son turned 17 in 1978, Lionel went back on the air. He called Bob Sutherland, W6PO, and found out that there were now 50 stations on 2 meters EME.

Lionel said from that restart it has been fun all the way. His two low points were losing the antenna twice. He reported that each time it got harder and slower to put it back up, and that the last time it cost him six or so countries before he could get back on.

Lionel really dates his jump out of the starting block around 1980. He said that all the countries he worked in the 1960s and 1970s

he has reworked in the past three to four years.

For quite some time Lionel was stuck at a plateau of 98 countries. He thought that the last two countries were going to be very difficult. However, quite suddenly there was a burst of activity spurred on by the creation of the new countries from the former Yugoslavia, and before he knew it, he actually had two more than needed. On 30 Oct. 1993 he worked EA8/ON5FF to complete his hundredth country.

Lionel, as well as many other EME enthusiasts, has really appreciated the hard and selfless work of Jimmy Treybig, W6JKV, who has provided a dozen or so countries with his many DXpeditions.

Lionel remarked that what has kept him going over the many years is the spirit of the EME operators on 2 meters. He said that everyone helps everyone else to try to achieve their goals. He specifically cited the sense of fairness, the camaraderie, and the fair play among operators as examples of how everyone cooperates for mutual success.

During the course of my interview with Lionel, I asked him, considering the equipment available today, how long it would take someone starting out to achieve DXCC. He replied that it could be accomplished with five years of hard work. He noted that often the beginner starts out with a minimum station and then upgrades. He feels that if someone is serious about that goal, they should start out with the right kind of station.

Lionel said that the beginner should have a good 8- to 16-element Yagi antenna, a hot receiver or transverter, the necessary pre-amp, and the legal limit in power.

Lionel's station, by the way, consists of a 384-element collinear antenna (which is the equivalent of twelve 16-element KLM Yagis) that has polarity rotation. He rotates the whole array with a medium-size prop pitch motor. He says that it appears to the neighbors of his city size lot that he has a large antenna attached to a small house. The antenna is fed with $7/8$ heliax and is phased with $5/8$ CATV hardline. His receiver is a TS-830, with a homemade converter and a GaASFET pre-amp. The pre-amp has lots of stubs to keep commercial stations out. His transmitter is an IC-211, with a 150 watt brick that drives a homebrew 4CX1000 amplifier.

Lionel noted that because of his "city lot" location, he has become outstanding at being able to fix RFI on telephones and stereos. He has become so good that the DOC (their FCC, now called the Department of Industry and Science) has used his expertise as an unofficial source for such problems. He said that it didn't hurt to have been working for the telephone company for a number of years. He noted that while not commercially working on phones, he has nevertheless discovered how to design a nearly "crunch proof" product. Lionel volunteered that he would be happy to assist someone who is having a problem with his or her phone.

One quirk in the DXCC award Lionel observed was that even though he has made all his contacts on CW, he did not qualify for that endorsement because the starting date for it occurred after some of his initial DXCC contacts. He ironically noted that he could have qualified, had he known about the endorsement, but chose instead to include the QSL cards from the countries worked in their chronological order.

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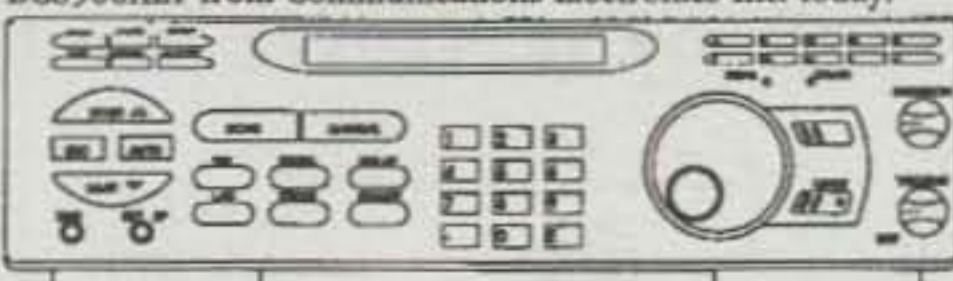
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 137.000 - 173.995 MHz. (NFM), 174.000 - 215.995 MHz. (WFM),
 216.000 - 224.995 MHz. (NFM), 225.000 - 399.995 MHz. (AM)
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I asked him if there are other EMEers close to the goal of DXCC. He replied that there are quite a number and that eight to ten stations are currently in the 90s, with two to three of them hovering at 98. He stated that for the moment it seems the availability of new countries has dried up. Referring back to Jimmy, he stated that now that Jimmy is a new father, he has not been on many trips and has thereby reduced the number of exotic countries on the air.

(Editor's note: Manfred Kubat, DL8DAT, has reportedly sent the required number of cards to the ARRL for certification, but as far as anyone has been able to determine, they appear to be lost somewhere within the German postal system.)

Lionel has worked tirelessly for years as the net control for the weekend 2 meter EME nets.

He is always available to encourage a newcomer and to assist a seasoned veteran in trying to accomplish his or her EME goals. Congratulations go to a most deserving VHFer on achieving this plateau in amateur radio accomplishments.

Maritime Mobile Grids Activated

The following letter is from Clint Walker, N1KTM. It is included with the QSL card he sends out for his maritime mobile operation.

Dear VHF Enthusiast:

Thanks for the QSOs and your QSL cards(s); hopefully my card(s) has made it back to you in a timely manner. Here's a little info about the

ship, her route, and what I am doing out here in all these different grid squares.

The S.S. Chemical Pioneer is an American flag, double-hulled, coast-wise tanker carrying clean products from Texas to New Jersey. The antifreeze and motor oil in your car, and alcohol in your mouthwash may very well have been transported on this ship at one time.

I am the chief mate on the vessel, my responsibility being mainly the cargo. The vessel has a crew of 27, and it takes an average of 3 weeks to make one round trip. Most of the crew members work for two to three months at a time and then go on vacation for an equal period of time. I usually try to work a total of about six months a year.

We don't have a dedicated radio officer aboard. The captain and I do, however, have General Radio Telephone licenses. A telegraphy license is not required as long as the vessel does not venture more than 150 NM from land. This explains why we make a dog leg in the Gulf of Mexico instead of going straight from Galveston to Dry Tortugas. When northbound on the east coast, we tend to be farther offshore than when we are southbound. This is to take advantage of the gulf stream.

Below is a list of water only grid squares we routinely pass through every voyage, and also a list of ones we occasionally pass through when taking a more offshore route in the summer months. I've also included a list of ship's particulars and the amateur gear I have on board. I hope this answers some of the more common questions.

In addition to terrestrial modes, I am also active on RS-10, usually around 29,390.00 kHz. If you did include an SASE, thank you! Also, remember to point that beam toward the water and take a listen once in a while, because there may be another "New One" there waiting!—Best 73 de Clint Walker, N1KTM/MM2.

Here are the grid locators from which Clint and his friend Dave Williams, N1NLX, operate. Routinely traveled grid locators are EL38, EL37, EL47, EL48, EL58, EL57, EL67, EL77, EL76, EL75, EL85, EL84, FL05, FL06, FL07, FL08, FL09, FM00, FM01, FMI3, FM24, FM38, and FM39. Occasionally traveled grid locators are FM12, FM23, FM34, FM35, FM36, and FM37.

Equipment used by the crew:
HF—Yaesu FT-890.
HF Antennas—G5RV, Cushcraft vertical.
VHF/UHF—Yaesu FT-736R, ICOM 275H, Yaesu FT-5100.

VHF/UHF Antennas—6 meters, Cushcraft 5-element Yagi; 2 meters, Cushcraft 10-element Yagi; 70 cm, Cushcraft 6-element Yagi; FM, dual-band Ringo vertical.

TNC—KAM All Mode.
Computer—Toshiba 486 Notebook.

For you nautical junkies, here are the ship's particulars: ship's callsign KAFO; length 688ft. 6 in.; beam 90 ft.; maximum draft 35 ft. 10 in.; propulsion steam turbine, 15,000 SHP; maximum speed 17.2 knots; cargo tanks 48, combined capacity 9,000,000 gallons.

Clint mentions in a letter to Brian Snyder, WA8MZQ, that he is looking for a 6 meter radio to replace the FT-736R, which he would prefer to keep at home.

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N4MW, tells of this month's Central States VHF Society Conference:

The 28th annual conference of the Central States VHF Society will be held July 29-30, 1994 at Wilson World Mall of Memphis. Approximately 200 amateur radio operators with special interest in the VHF and higher bands (50 MHz and up) are expected to attend from as far away as Australia and England. The conference consists of two days of operating and technical presentations, preamplifier measurement sessions, antenna range testing, a unique VHF+ fleamarket, and finishing up with an enjoyable banquet. A Society annual business meeting will also take place, including selection of some directors and next year's officers.

Representatives from the ARRL, AMSAT, and major VHF+ suppliers will be actively participating in the conference. This is your opportunity to find out more about trends and techniques in VHF operation and technology, right in your backyard. The papers presented in the technical sessions and others submitted prior to the conference will be published by the ARRL in book form. These proceedings will be provided to the attendees and will be available for purchase from the ARRL after the conference for those who could not attend. For more info, contact Dave Meier, N4MW, CSVHF Society 1994 President, at 901-382-4919, or send a note to 3205 Covington Pike, Memphis, TN 38128.

Speakers and their topics for the conference to date include the following: Shep Shepard, W7HAH, *The History of EME*; Dr. Walter Howse, VK6KZ, *VHF/UHF/SHF in Australia*; Peter Shilton, VE3VD, and Michael Owen, W9IP, VE3ONT, *Algonquin EME Expeditions*; Bob Carpenter, W3OTC, *Proplog, Automatic Logging of VHF Propagation*; Bill Tynan, W3XO, *The History of VHF*; Tom Clark, W3IWI (two talks), *AMSAT Phase 3D and GPS Applications*; Ray Rector, WA4NJP, *Practical Construction Help on Dish Antennas*; Kent Britain, WA5VJB, *Simple Yagi's, How to Make Them*; Joel Harrison, WB5IGF, *Regulatory Threats on Our Spectrum*; and Dave Meier, N4MW, *1296 MHz Power Amplifier Notes*.

Hotel information: The conference will be held at the Wilson World Hotel, 2715 Cherry Rd. (This is the Wilson World Mall of Memphis, not Graceland). Rooms start at \$55 single plus tax. Phone 800-872-8366 for reservations. A registration mailing should have gone to the Society membership in early June; others can contact Dave at the above number.

Current DXpeditions

A group consisting of Bill Rowe, NØTG, Murray Adams, WA4DAN, Ron Oates, AA4VK, and Bob Stewart, KW2P, will activate St. Paul Island for eight days beginning 1 July. Based on the pattern of this group's previous DXpeditions, they should have 6 meters. QSLs go to NØTG at Rt. 5 Box 171D, Waxahachie, TX 75165.

Current Contests

This month is the third anniversary of the rejuvenated CQ WW VHF WPX Contest. The contest runs between 10-11 July, starting at 1800 UTC and ending the following day at 2100 UTC. The rules for the contest were printed in

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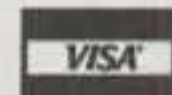
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the May issue. The results of last year's contest are published elsewhere in this issue.

Because of the enormous popularity of the QRP category, it has been made a permanent part of the rules. If you have not already done so, request your logs and summary sheets from CQ (76 North Broadway, Hicksville, NY 11801). I do not have log sheets, so do not ask me for them. However, please send your entries to me at my home address (published at the bottom of the first page of this column).

Hopefully, we will have some form of propagation and it won't be like last year, when a few of you commented that 6 meters opened as the contest was ending. Nevertheless, I will be looking for you this month and your log entries next month.

Information on the following contest arrived too late for inclusion in last month's column. However, because of the mailing schedule of CQ, the information should reach you in time to enter.

"The 50 MHz DX Bulletin" announces its first annual 50 MHz DX Marathon. The contest is to take place between 18 June and 18 July. It is a distance contest with points given only for DX contacts greater than 1500 km. It is also an SWL contest because points are given for hearing, but not working other stations. Because the rules are quite complicated, I suggest that you send an SASE to Victor Frank, K6FV, editor of "The 50 MHz DX Bulletin," 12450 Skyline Blvd., Woodside, CA 94062-4541, for a copy of them.

send directly to Chris at Old White Lodge, 183 Sycamore, Farnborough, Hampshire, GU14 6RF, England. The current rate is \$22 per year.

Rover Rules Acceptable Changes?

What has quietly been circulating among members of the ARRL's Contest Advisory Committee is the proposed change printed below. It has become known as the W3EP solution because it was proposed by Emil Pocock, W3EP, acting as a private individual and not in his capacity as VHF editor for QST. Nevertheless, it seems appropriate that Emil develop a proposed solution because it was he, Curt Roseman, K9AKS, and Michael Owen, W9IP, who first proposed the Rover category via their column in NCJ.

At the West Coast VHF Conference Mark Wilson, AA2Z, the Editor of QST and an avid weak-signal VHFer, discussed it with attendees to see what kind of response it would get. According to Tim Marek, NC7K, writing in the "West Coast VHFer," it received very favorable responses, particularly by him and Ron Hammel, KC6WLC, who was second in the country in the Rover category for the 1993 June VHF QSO Party.

Additionally, Wayne Overbeck, N6NB, a long-time contester who has operated in (and won) contests on both coasts, following the conference, wrote an extensive letter to the CAC outlining his support of the W3EP plan. Two of his points are:

1. "It gives Rovers an incentive to remain in each grid [locator] long enough to work everyone who would like a chance to work that grid [locator]."

2. "There's a strong incentive to achieve a substantial score in each grid [locator] (because the total score is simply the sum of the individual scores)."

Wayne adds, "Adopting the W3EP plan will not only restore some equity to the scoring opportunities for various classes of stations, but it will also give more stations a chance to work Rovers in rare grid [locators], especially on the higher bands."

Here are the changes as they would appear in the ARRL contest rules:

Rule 1 (C) Rover: A rover consists of one or two operators of a single station that moves among two or more grid locators during the contest. A rover vehicle may transport only one station using a single callsign; thus, a rover may not operate with multiple callsigns under the family rule 7(C). Rover vehicles must transport all the equipment, power supplies, and antennas used at each operating site. This rule is not intended to prevent an operator from using the same callsign to submit separate logs for single-operator (fixed station) and rover-class entries. Rovers add "rover" on phone and /R on CW after their callsigns.

Rule 4 (D) Rovers only: The total rover score is the sum of the scores made from each grid locator. Submit separate logs for each grid where operating sites were established and score them individually, as explained in paragraphs (A)-(C) above. Then add the scores from each grid on the summary sheet for the total rover score. Rovers are listed in the published contest results under the division from which the highest aggregate score was made.

Current Meteor Showers

This month there are a number of minor showers. The most intense, the *delta-Aquarids*, is a southern latitude shower. It has produced in excess of 20 meteors per hour in the past. Its predicted peak is around 28 July at 2240 UTC.

The other southern latitude showers are all named *Capricornids*, and all produce around five meteors per hour, which is right at the sporadic rate of meteors for an average sky.

The only northern latitude shower is the *alpha Cygnids*. It is supposed to peak around 20 July, but with a rate of only five meteors per hour.

At about this same time you should start to look for meteors associated with the *Perseids* meteor shower. Beginning around 17 July and lasting until approximately 14 August, you will see activity tied to it. Despite the poor showing in the North American skies last year, this shower is predicted to be fairly decent. The predictions do show that it will favor the U.S. at its peak on 12 August. I will have more extensive coverage of this shower next month.

Notes On Newsletters And Other Publications

Kent Britain, WA5VJB, has become the North American column editor of *Dubus*, the widely respected European weak-signal VHF magazine. It is available for subscriptions in North America via its agent, Russ Miller, N7ART, 12041 S.W. Peninsula Dr., Crooked River Ranch, OR 97760, or call 503-548-1221. The subscription rate is \$25 per year.

Chris Gare, G3WOS, reports that Charles Ruhlman, WA2LPG, is no longer the North American subscription agent for the UK Six Metre Group's *Six News*. For subscriptions,

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CIRCLE 134 ON READER SERVICE CARD

[For the January VHF Sweepstakes only:] Rovers entering club competition must indicate the grid locators where operating sites were within 175 miles of the club's center. Only scores made from those grid locations count for club competition.

And Finally . . .

The Rover issue has been one of the most controversial issues to affect the VHF+ community in quite some time. Unfortunately, it has caused some bitter feelings within the fraternity. Among some of the reactions to the controversy was a resignation by one of the members of the ARRL Contest Advisory Committee and boycotting of the club competition in the ARRL January VHF Sweepstakes by a few of the clubs.

Hurt feelings don't easily go away. However, perhaps we can look at this matter from a different perspective.

As members of the weak-signal VHF fraternity, we are all members of the same "family." As such, we have a responsibility to each other to find ways of resolving our differences. There is a saying about "not letting the sun go down on your wrath." There have been plenty of sunsets since this problem arose. Now, as it appears that a solution to the controversy is near, it is time for healing.

Never mind who was right, who was wrong, who started it, who ended it. What matters right now is that long-standing friendships are on the line over a matter that has to do with a hobby.

Now is the time to pick up the phone and say, "Hey, I'm sorry." Or "I don't agree with your viewpoint, but perhaps we can find a common ground in the new rule."

In a poem entitled "A Distant Star," Ed Hucceby describes friendships like flames that almost go out in the winds of death, yet somehow continue to burn on, to shine like the light of a distant star.

The flames of our friendships never quite go out. Sometimes they do seem as distant as "a distant star," but they are always there, ready to be rekindled for another day of camaraderie and kinship among fellow members of the fraternity. I hope that very soon we all can find once again the flames of our friendships within the weak-signal VHF fraternity.

Next month: After preparing the piece on the Shuttle *Endeavor* for last month's column, I came across a write-up in the Rochester VHF Group "Journal" newsletter on their activities attempting to work astronaut-amateurs aboard another shuttle. The author almost apologized for coverage of the activities in a "weak-signal VHF" newsletter. He should not apologize, because as he so aptly expressed later in the article, the future of amateur radio is with its young people.

Having related the above, I have to add, "watch for next month's column" for an addendum to the "rest of the story" from last month's coverage of the Shuttle *Endeavor*. I am not going to ruin the surprise by telling you the story now, because as I write this column, what I expect to happen hasn't yet taken place. Nevertheless, it could involve Astronaut Linda Godwin, N5RAX, and the kids of the Anthony, Kansas Elementary School.

That's all the room for this month's column. My appreciation goes to all of you who send me your reports and all of you newsletter editors who include me on your mailing list. As always I can be contacted at 405-528-6625, or FAXed at 405-528-0746, or sent e-mail via CompuServe (internet: 72124.2734@compuserve.com). Until next month . . .

73, Joe, N6CL

It appears this is the solution that is headed for adoption. It has received a favorable vote from a majority of the CAC, and in all likelihood, by the time you read this it will have been adopted by the League for its future contest, maybe as early as the September contest.

No solution is perfect, and as my fellow CQ columnist John Dorr, K1AR, has pointed out in the past in his column, we must avoid creating rules that can only be interpreted by an attorney. Nevertheless, I think this solution does present a "fair" compromise for all concerned.

For the last several months I have stayed out of the fray for two reasons. First, it was taking up much too much column space and thereby not leaving room for other column news. Second, what I could have published was constrained by the lead time of this column. In other words, what was relevant one minute could, and in some cases did, lose its relevancy two months later. I appreciate all of your correspondence on this subject and expect you can understand why I did not make this column a forum for the debate.

So what about the CQ WW VHF WPX Contest? The rules for this year's contest have already been published. As the contest manager, I will see how the ARRL rules will play in their future contests and make a decision accordingly. As they say, "Stay tuned."

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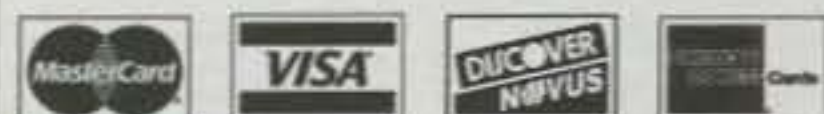
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NEWS OF CERTIFICATE AND AWARD COLLECTING

Our July featured USA-CA recipient is

Joseph Gardner, N2ARE
USA-CA All Counties #805
June 7, 1993

"My first interest in amateur radio was kindled by WSØZS and his pair of 45s in push-pull while we were in our senior year in high school. However, WW II put a hold on my amateur radio activities before I got my ticket.

"Completion of my Naval career presented new and more important challenges such as employment and marriage. I met and conquered them in that order. I was employed by the New York Telephone Company in Syracuse, New York and married my understanding wife, Doris, the same year. My marriage lasted longer than my career, as I retired from 'Ma Bell' in 1983 after 35 years in the communications industry. Doris kept me on the job, though.

"Like many young married males, my activities were confined to family matters and a career, with amateur radio on the back burner awaiting its turn. I ran the gamut from Cub Scouts to Little League, etc., until my kids were on their own. Then the amateur in me was nurtured to life. My telephone engineering group was 90 percent hams, and with their urging and help I became one, too.

"Good friend and DXer K2TQC attended to the Novice paperwork; then came a phone call to my desk requesting that I take a message. To my surprise, the message was a series of dots and dashes describing the equipment, QTH, and antenna of a mutual friend. My five WPM CW test was passed by a series of tone pulses sent via a touch-tone pad.

"After receiving my Novice call, which was WB2SVX, I went to General and Advanced class, changing my call to the present N2ARE. With a shorter call and peer pressure, I started on DXCC with my new 101EE and TA33. I confirmed 220 during a stint of aeronautical mobile 2 meter work on the side. WAS and WAC were part of the quest.

"Then, contemplating retirement, I sold the 'Big Shack' and TA33 and moved to an apartment where I learned that beams and dipoles were a no no. Then what? I took a couple of years respite from radio and completed my term as Master of my Masonic Lodge.

"Again the RF began to flow. Armed

SPECIAL HONOR ROLL

William E. Starten, NC6M
 USA-CA All Counties #834
 April 15, 1994

Merle Elson, N6PYN
 USA-CA All Counties #835
 All 20M SSB, All Mobile
 April 26, 1994

Ruric "Doc" Mason, W5FHL
 USA-CA All Counties #836
 April 26, 1994

HONOR ROLL

500		N6PYN	1103
NC6M	2754	W5FHL	1104
N6PYN	2755		
W5FHL	2756	2000	
IV3GOW	2757	NC6M	1014
S51RU	2758	N6PYN	1015
KGØAY	2759	W5FHL	1016
DF2HL	2760		
1000		2500	
NC6M	1314	NC6M	936
N6PYN	1315	N6PYN	937
W5FHL	1316	W5FHL	938
WB2FXK	1317		
1500		3000	
NC6M	1102	NC6M	858
		N6PYN	859
		W5FHL	860

with some cast-off Hustler parts, the 101 and I went mobile and found DX a little more arduous, to say the least.

"Then one day in Florida, while stuffing the 101 in a Buick, I tried several CQs to no avail. I tuned to 14.336 and contacted Mitch, W4RKV, and put out my first county. Mitch took me off frequency, read me my rights (and wrongs), and I was hooked. That was ten years ago. The 101 went the way of all 101s and was replaced by a 730 that was a lot easier to install and remove.

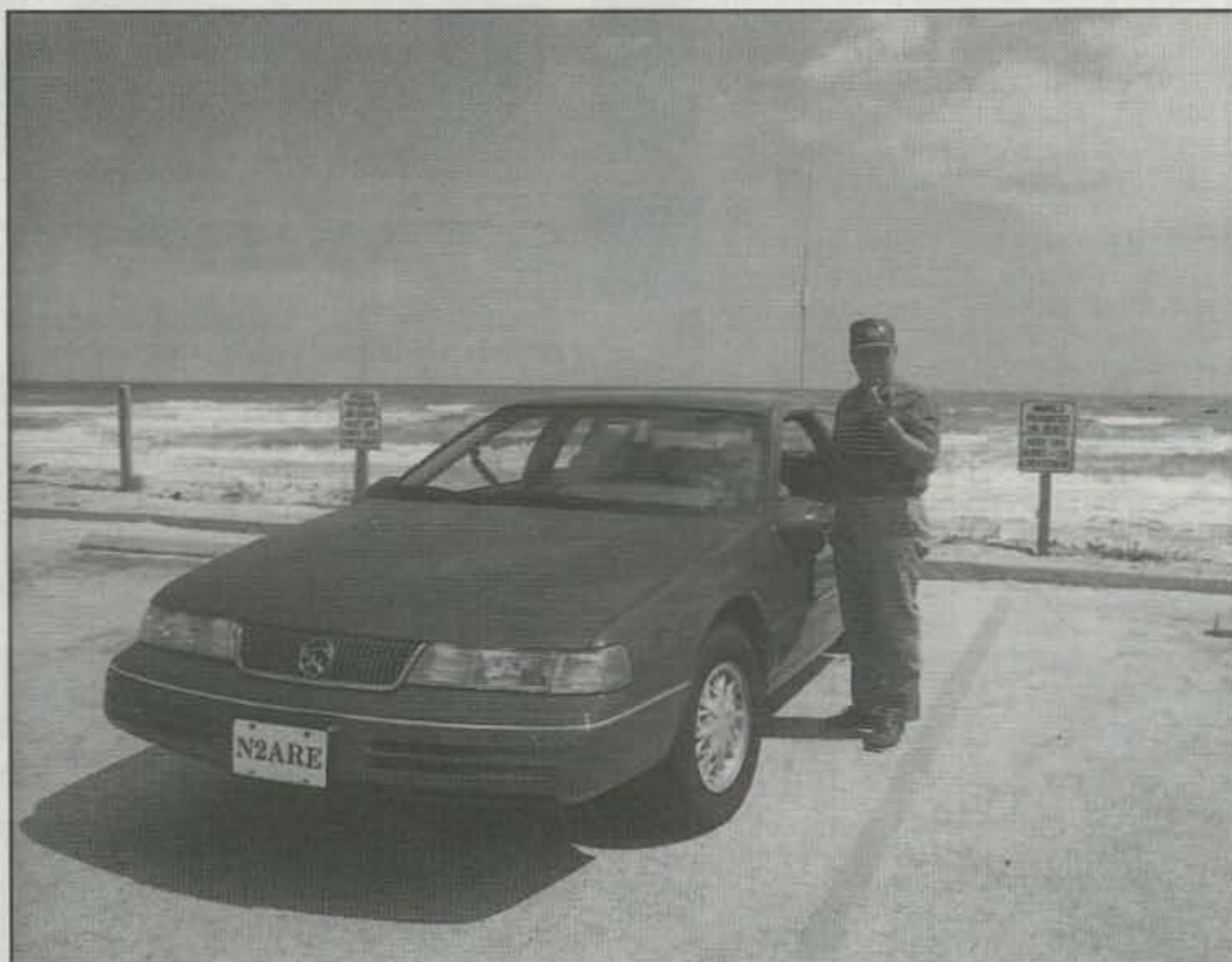
"I soon discovered that County Hunters are a great and helpful group. Many long traveling hours were shortened by the friendly nets and mobilers. It also instilled

a feeling of togetherness and comfort while traveling in strange areas.

"My goal was to work all my counties Mobile to Mobile, a decision I came to regret. I did not compromise, though. The last 100 took as long as the first 2976. With the help of dedicated net controls, fellow mobilers, and luck we made it.

"Down to the last one—Perry, PA—I asked Paul, WA3TUC, if he ever went there. A quick reply was 'If it's your last for the whole ball, be on the net at 10 AM tomorrow. I was, he was, and that was the end of the quest.

"The paperwork was completed and I



Joe Gardner, N2ARE, USA-CA All Counties #805, June 7, 1993.

Box 76, Pleasant Mount, PA 18453-0076

Band	Novice	CW	RTTY	SSTV	SSB	Satellite
1.8	—	10	8	6		8
3.5	32	8	6	6	4	
7	24	6	5	5	3	
10	—	5	4	0	0	
14	—	3	2	2	1	
18	—	3	2	2	1	
21	16	5	4	4	3	
24	—	6	5	5	4	
28	—	7	6	6	5	
50	—	8	7	7	6	
144	—		48			

Table 1— Division of points by bands and modes for the Icelandic Radio Amateurs Award. Mixed mode contacts, CW to SSB, etc., and cross-band contacts are not valid, except for contacts via amateur satellites. Each station may be contacted only once per band per mode, as defined by the columns of the above table.

waited. When Norm, WA3RTY, called to give me my number and said that he would announce it on the Net in five minutes, it was better than DXCC.

"I went mobile, fired up the 730, and waited for my achievement to be announced. Then with the dry throat of a Novice on his first QSO, I gave my number, 805, first to Paul, WA3TUC, then to Mitch, W4RKV, suitably my first and last.

Then the multitude filled the air waves with congratulations and well wishes. I heard Steve, who let me borrow a resonator when mine filled with water; then Paula, who gave me my last in Florida. There were many more who made my day.

"Thanks to the greatest collection of people in the greatest hobby there is. I'll be back soon for bingo!—73, Joe, N2ARE, USA-CA All Counties #805.

Awards Issued

I had the pleasure of personally giving two awards at Dayton this year. Ruric 'Doc' Mason, W5FHL, received USA-CA All Counties #836 dated April 26, 1994. The County Hunter's CW guru, Harry Brundridge, NFØX, assisted me and gave Jack Slocum, WB2FXK, USA-CA 1000 #1317 (All 40 Meter CW). Jack received USA-CA 500 #822 (All 40 Meter CW) on November 9, 1970, twenty-four years ago.

Other USA-CA All Counties awards issued were: William E. Starten, NC6M, #834, April 15, 1994; Merle Elson, N6PYN, #835, All 20 Meter SSB, All Mobile, April 26, 1994.

The following amateurs received their basic certificates:

IV3GOW, USA-CA 500 #2757; S51RU, USA-CA 500 #2758; KG\$\$AY, USA-CA 500 #2759; DF2HL, USA-CA 500 #2760.

NC6M also received USA-CA 500 #2754, 1000 #1314, USA-CA 1500 #1102, USA-CA 2000 #1014, USA-CA 2500 #936, and USA-CA 3000 #858.

N6PYN received USA-CA 500 #2755, USA-CA 1000 #1315, USA-CA 1500 #1103, USA-CA 2000 #1015, USA-CA 2500 #937 and USA-CA 3000 #859.

W5FHL received USA-CA 500 #2756, USA-CA 1000 #1316, USA-CA 1500 #1104, USA-CA 2000 #1016, USA-CA 2500 #938, and USA-CA 3000 #860.

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Corrections to last month's numbers are as follows: YV5MRR should be USA-CA 500 #2752; CT1BWW should be USA-CA 500 #2753.

Award News

The Icelandic Radio Amateurs Award (IRAA). This award is available to licensed amateurs and SWLs outside TF. Only contacts with stations of Icelandic citizens operating from Icelandic territory are valid.

There is no date limit to QSOs. QSL cards or certified photocopies of them must be submitted to the sponsor together with a list of the complete log entries for the contacts.

Novice stations have five watts and three bands: 3500-3600 kHz, 7000-7040 kHz, 21000-21150 kHz. They are identified by a three-letter suffix ending in "N."

All contacts must be made from the same call area, or where no call area exists, from the same country.

The fee for the award is 14 IRCs or the equivalent. The address for applications is: IRA Award Manager Brynjolfur Jonsson, P.O. Box 121, IS-602 Akureyri, Iceland.

Requirements:

I. ITU zones 5, 9, 18-20, 27-29: 98 points.

II. ITU zones 1-4, 6-8, 21-26, 30, 31, 36, 37: 48 points.

III. ITU zones 10-13, 32-35, 38-40, 46-48: 28 points.

IV. ITU zones 14-16, 41-45, 49-75: 18 points.

The IRA Zone 40 Award. This award is available to all licensed radio amateurs and SWLs. There is no time limit on QSOs. There are no band limitations, but all QSOs must be in the same mode to achieve the award—i.e., 2xCW or 2xSSB or 2xRTTY, etc. Single band achievement can also be endorsed upon request.

Required are confirmed contacts with each of the following DXCC countries located in CQ Zone 40: Iceland (TF), Greenland (OX), Jan Mayen (JX), Svalbard (JW), and Franz Josef Land (UA1).

DX Stations: One confirmed contact with each country (a total of 5 QSOs).

EU Stations: Same as for DX except QSOs are stipulated with three different TF stations (a total of 7 QSOs).

TF Stations: Same as for DX, except QSOs are stipulated with 15 different TF stations (a total of 19 QSOs).

Please note: Contacts with stations signing /TF, /OX, etc., are not valid for this award.

A GCR list, verified by two licensed radio amateurs or local club officials, must be submitted. The list must show: Stations Worked, Date, Year, Time, Band, Report, and Mode. The IRA Awards manager reserves the right to ask for submission of QSL cards.

The first award issued to a DXCC country will be endorsed as such.

Fee for the IRA Zone 40 Award is 15 IRCs, or the equivalent. Address for applications: IRA Award Manager, Brynjolfur Jonsson, P.O. Box 121, IS-602 Akureyri, Iceland.

Dayton In Review

Well, the Dayton Hamvention again this year came through with three days of rain. Thirty-thousand amateurs jammed into the Hara Arena. Those folks of the Dayton Amateur Radio Association do a fine job, however. The weather is not their fault.

I enjoyed being part of the County Hunter Forum. John Sebastian, N8BGF, was outstanding as the convener. Gene Tyree, N4ANV, gave a truly inspirational look at county hunting. I understand there were a few converts in the congregation Friday afternoon.

The Saturday evening banquet was very nice—good meal, good fellowship. It gives definition to that good old German word *Gemutlichkeit*. I met a nice group from Wisconsin, who pride themselves on being known as the BOZOS—interesting group, to say the least. Listen for them on the bands. You'll know them when you hear them on CW or sideband.

73, Norm, WA3RTY

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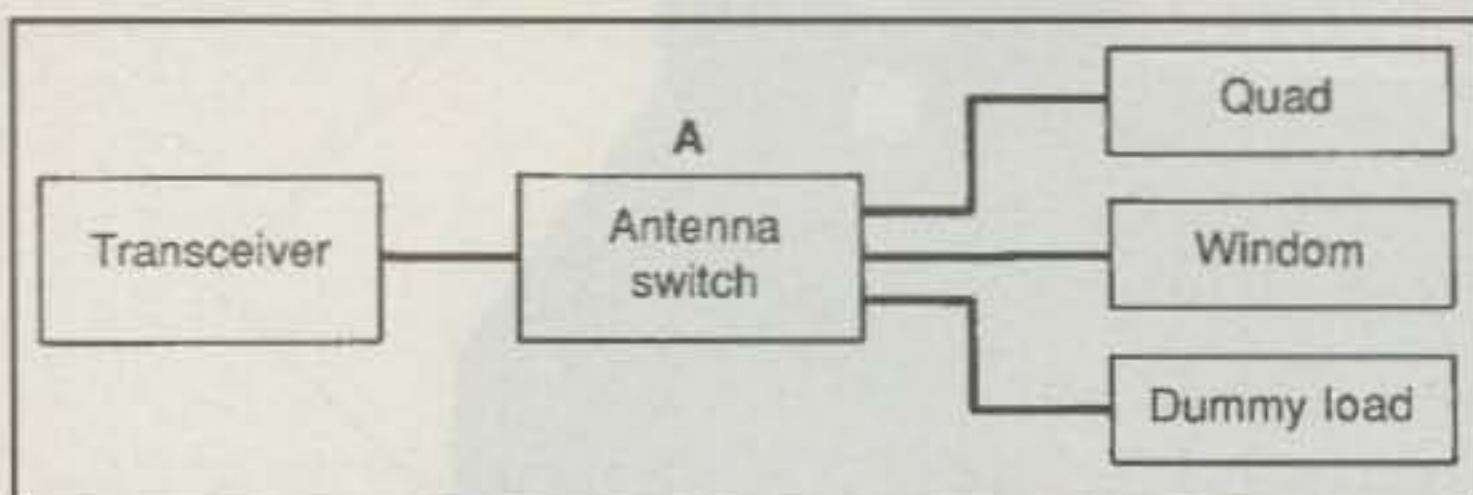
"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Novice-Technician Licensing Course—Part III

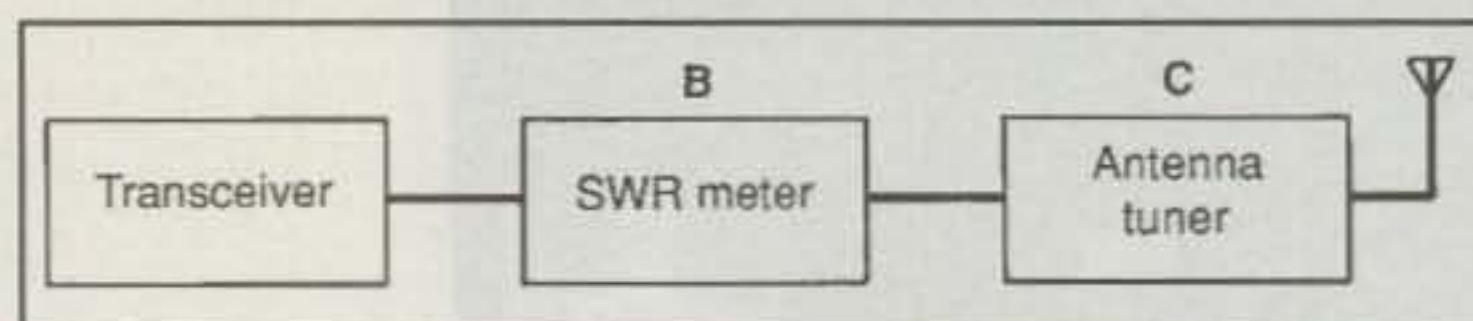
This month we pick up where we left off in our amateur radio licensing course. We begin our lesson with an overview of practical circuits.

Practical Circuits

Equipment and Accessories Connections

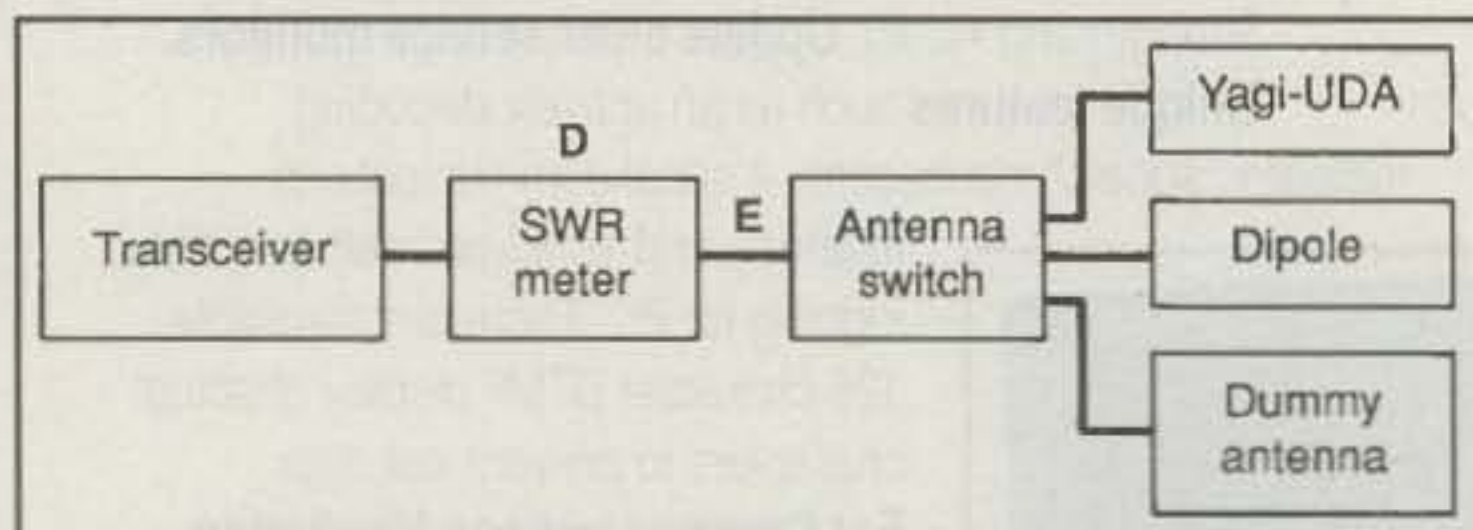


A = Antenna switch is used to select a desired antenna/load.



B = An SWR (standing wave ratio) meter can be connected between a transceiver and antenna tuner.

C = An antenna tuner enables the user to match the antenna system's impedance to the transceiver's impedance. It can enable an antenna to be used on a band other than the one on which it is resonant.



D = An SWR meter can be connected between a transceiver and an antenna switch.

E = Feedline is used to interconnect the transceiver, SWR meter, antenna tuner, antenna switch, and antenna.

Do not connect a transceiver's transmitter output to the input of a receiver.

If a mobile transceiver operates correctly in a vehicle, but does not function when it is installed in a fixed station, the AC-to-DC power supply is probably defective.

A transceiver requires a heavy-duty power supply to convert 120 VAC house power to the required DC output of about 12 VDC.

Code/Voice/Radioteletype/Packet Radio Interconnections

A telegraph key (or keyer or bug) must be connected to a transceiver to operate it on code/radiotelegraphy. An electron-

ic keyer (with a paddle) can be used to send well-formed Morse code symbols.

A microphone must be connected to a transceiver to operate it on voice/radiotelephony.

A modem is connected between the transceiver and teleprinter (or computer system) to operate it on radioteletype (RTTY). *Note:* Modem is coined from the words **MOD**ulator and **DEM**odulator, which is what it does.

A terminal node controller (TNC) is connected between the transceiver and a computer system to operate packet radio.

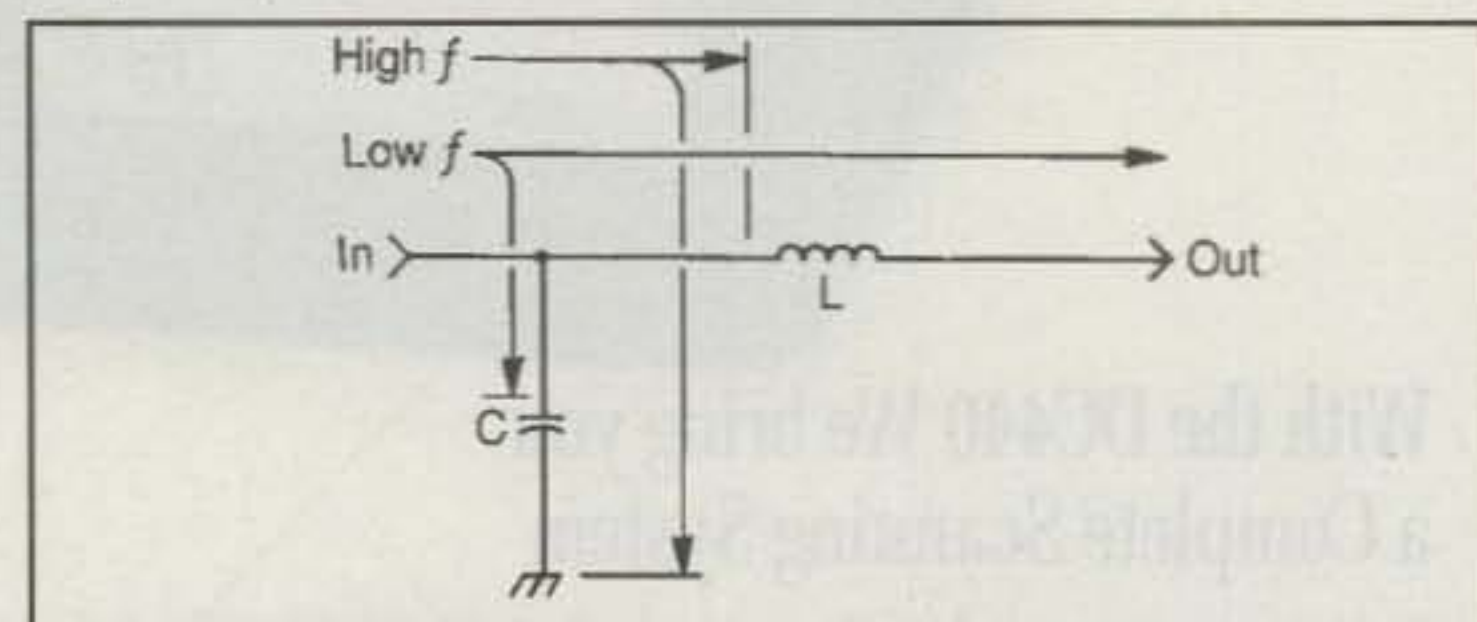
Test questions often require one to identify an unmarked block in a block diagram.

A low-pass filter passes low frequencies with little opposition, whereas it offers a lot of opposition to higher frequencies.

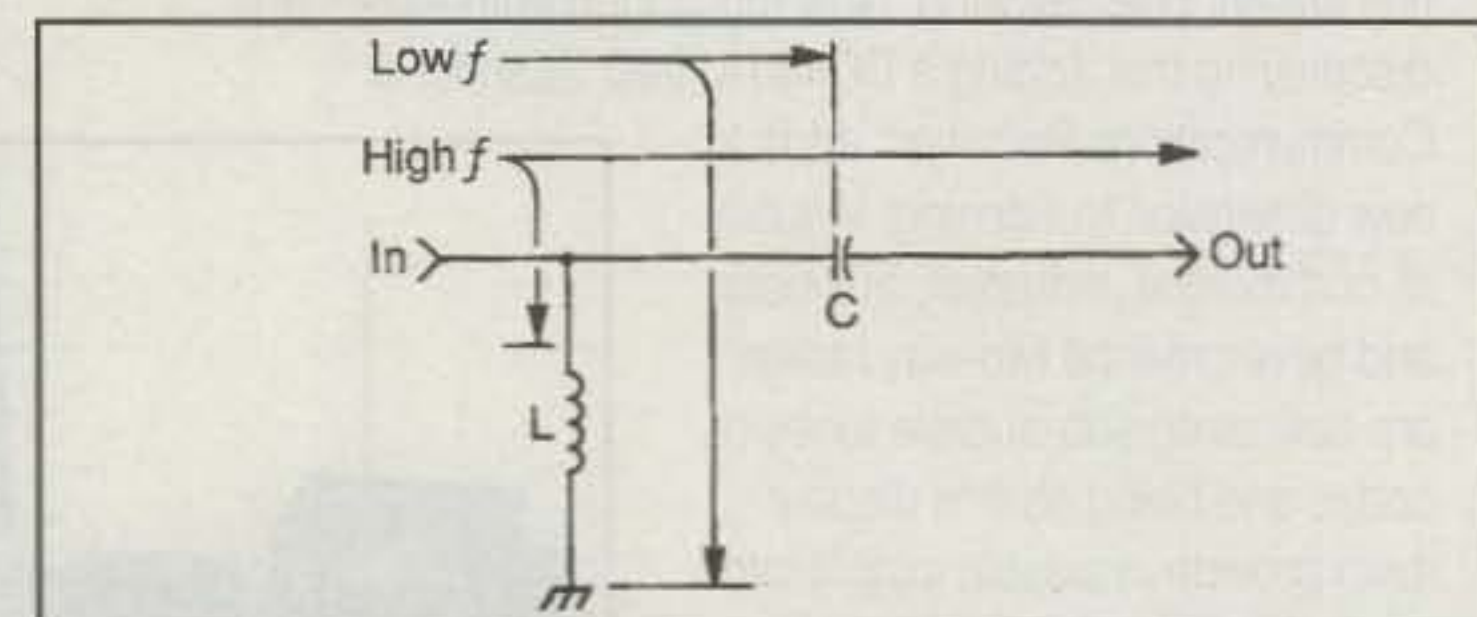
A high-pass filter passes high frequencies with little opposition, whereas it offers a lot of opposition to lower frequencies.

A band-pass filter opposes the passage of frequencies above and below the band/range of frequencies it is designed to pass.

Simple Low-Pass Filter

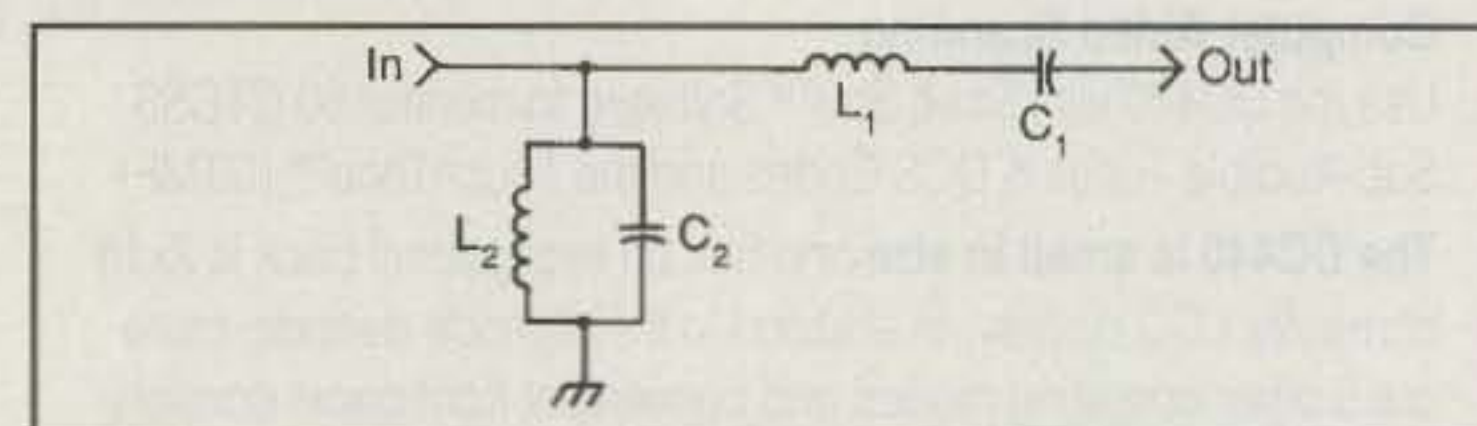


Simple High-Pass Filter



Note: Filter schematics and reactance formulas are not in test.

Simple Band-Pass Filter



Series-connected C_1 and L_1 allow desired frequencies to pass from input to output with little loss, whereas parallel-connected C_2 and L_2 are resonant to the same frequency, providing maximum opposition to passage of the desired output frequency range. Lower frequencies are bypassed to ground through L_2 .

Higher frequencies are bypassed to ground through C2.

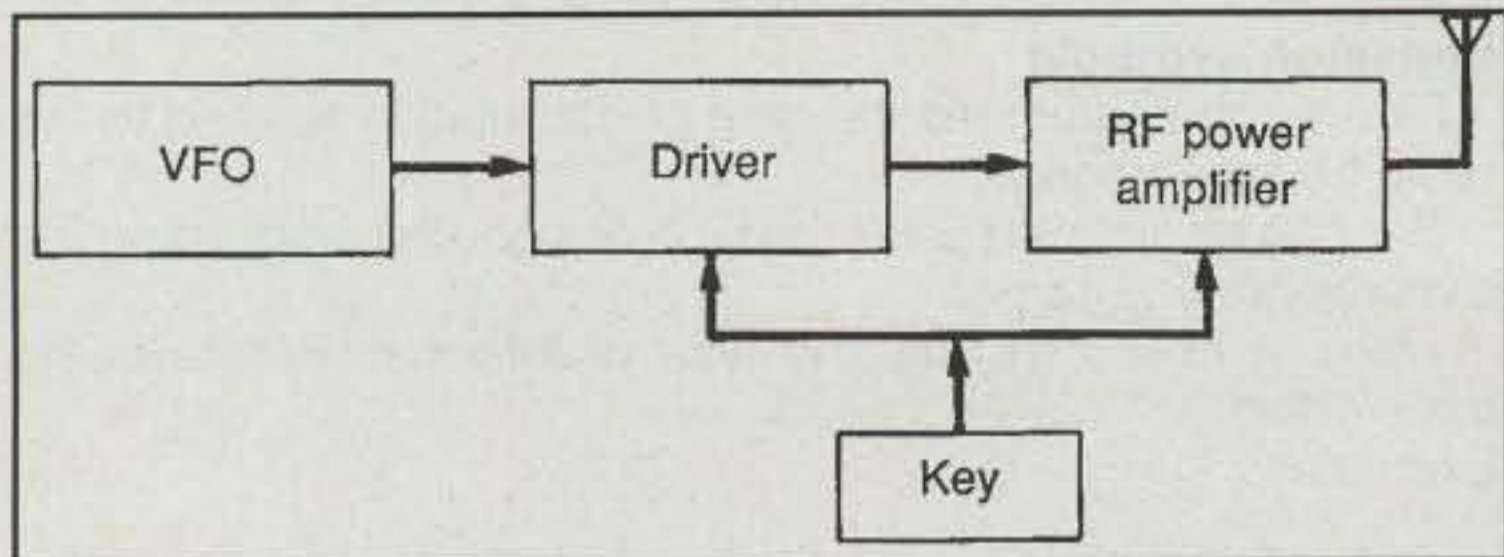
A common application of a low-pass filter is in the output of a transmitter, where it passes the lower (3-30 MHz) amateur high-frequency signals and opposes harmonics at higher (TV) frequencies.

A common application of a high-pass filter is between a TV antenna and a TV receiver, where it passes the higher TV frequencies and rejects the lower amateur frequencies.

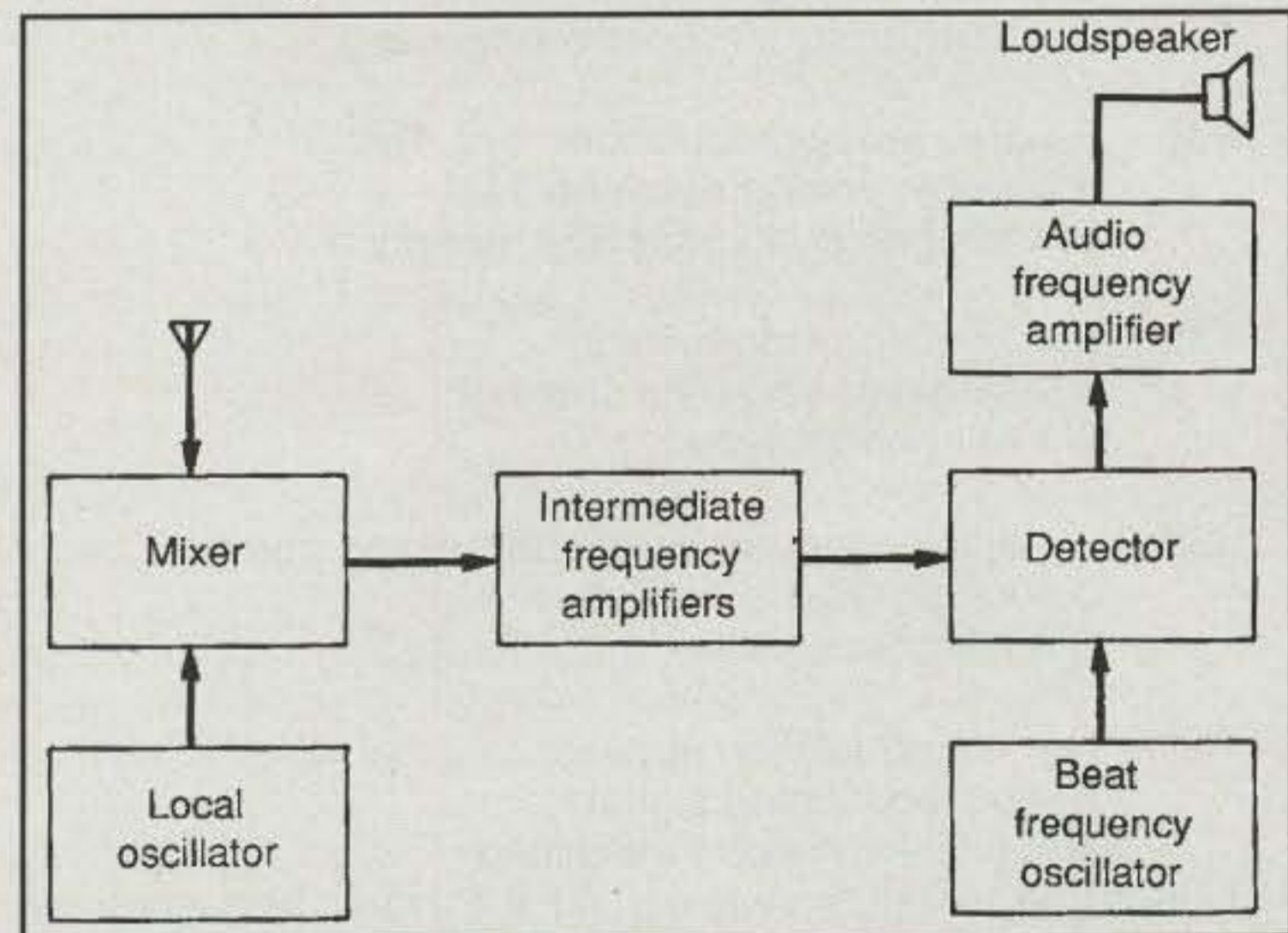
A common application of a band-pass filter is between the intermediate frequency stages of a receiver, where it bypasses (grounds) frequencies above and below the desired band/range of frequencies.

A detector stage is common to most receivers. It rectifies the input signal received from the intermediate frequency amplifiers, bypasses the remainder of that frequency to ground, and passes the remaining audio signal to the audio frequency amplifier.

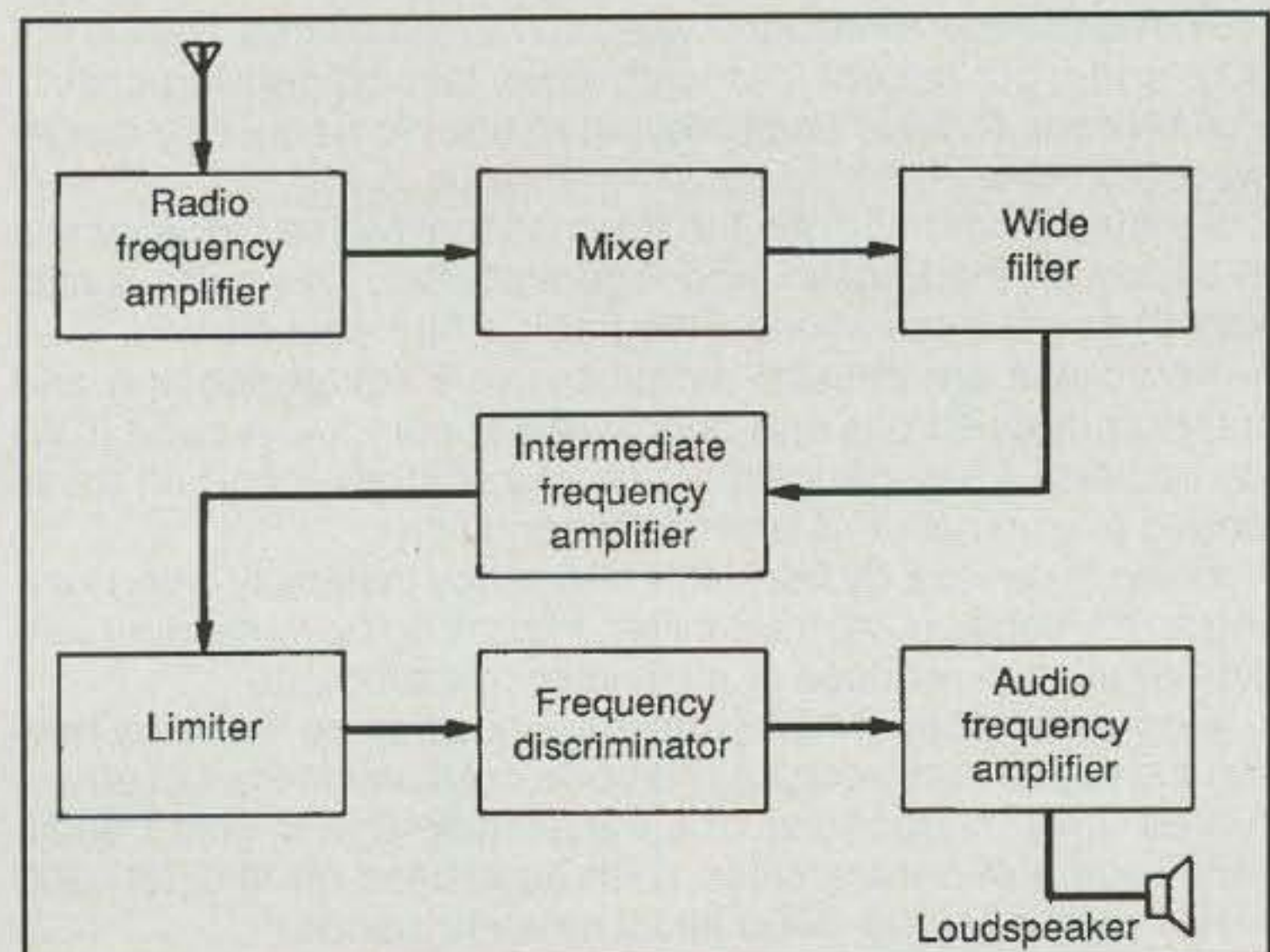
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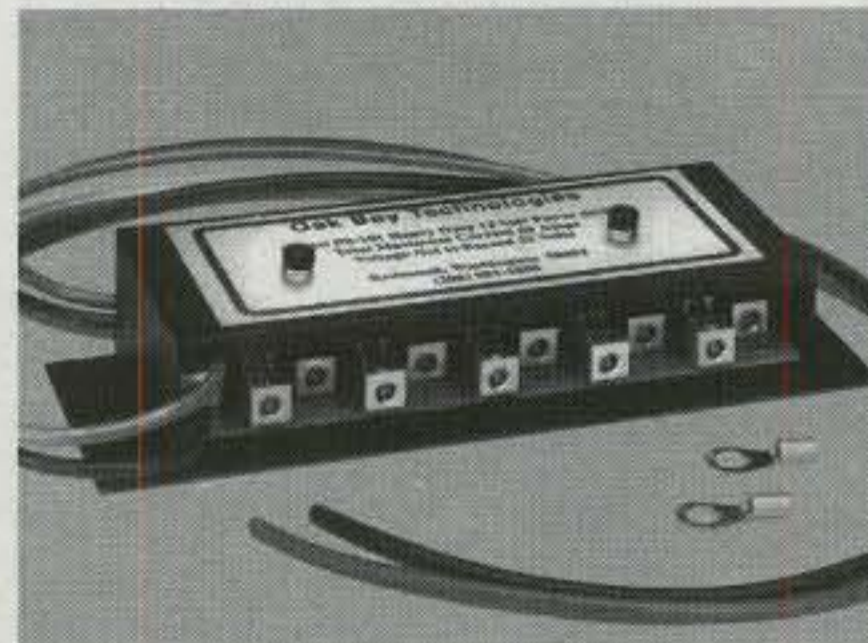
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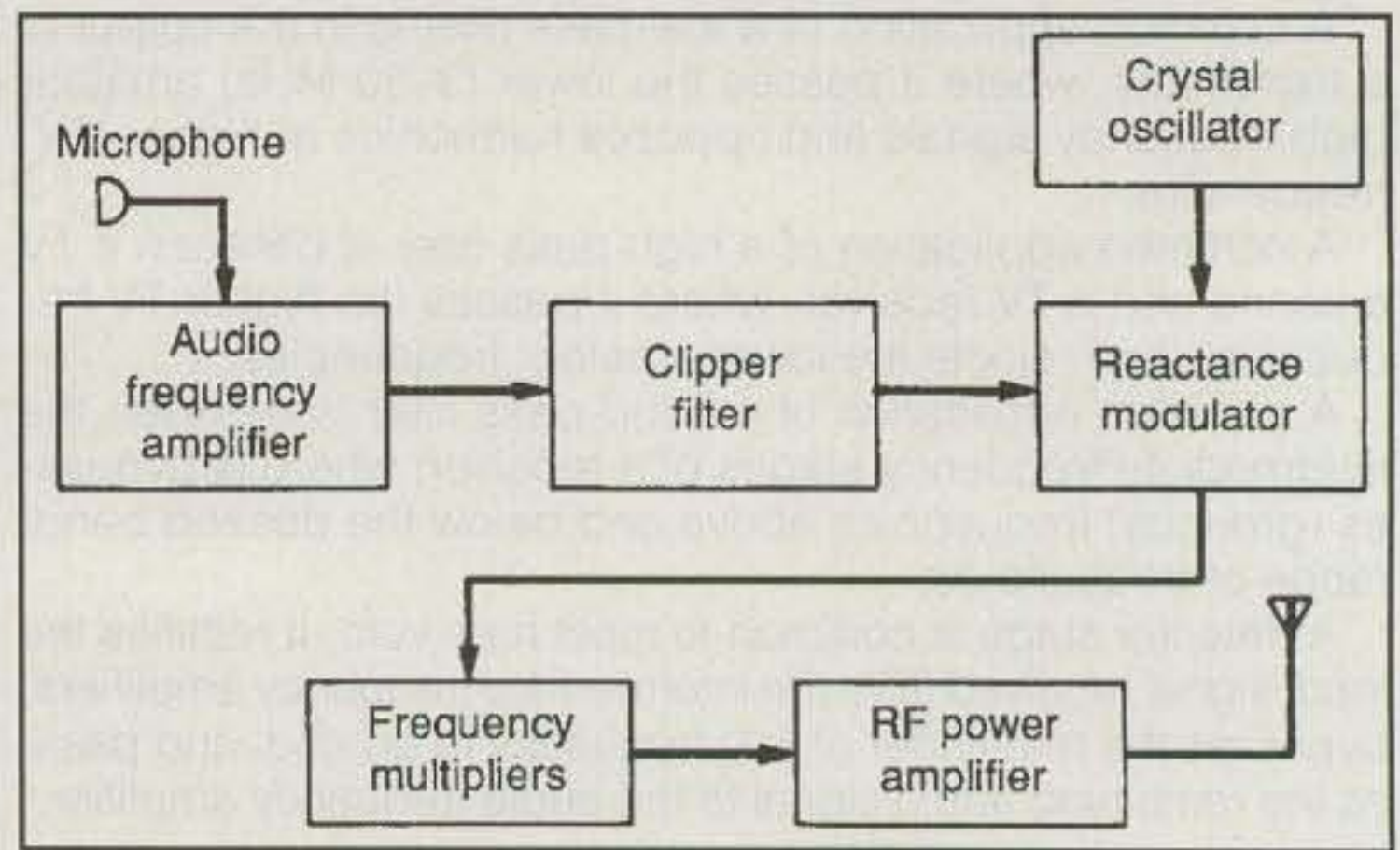
N1EJF in a review about our XP 706 in 73 magazine, 4/1987

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Frequency Modulation Transmitter



Signals and Emissions

Emission symbols

First symbol indicates the type of modulation applied to the radio frequency carrier.

Second symbol indicates the type of signal(s) modulating the radio frequency carrier.

Third symbol indicates the type of information/data being transmitted.

Examples:

A1A A = double identical sidebands
 1 = single digital channel
 A = telegraphy for reception by ear

F3B F = frequency modulation
 3 = single analog data channel
 B = telegraphy for machine reception

F3E F = frequency modulation
 3 = single analog data channel
 E = telephony/voice

J3E J = single sideband with suppressed carrier
 3 = single analog data channel
 E = telephony/voice

N0N N = no modulation applied
 0 = no modulating signal
 N = no information transmitted

N0N is true continuous wave (CW). It is a radio frequency carrier, such as what would occur if one holds a telegraph key depressed (closed) when tuning or testing.

A1A code is erroneously called CW in the exams. N0N is not A1A code, but accept it as such when taking licensing tests.

A1A code (CW) is on/off keying of a radio frequency carrier wave.

Amateurs normally use the International Morse Code, which is based on the English language alphabet. This code is also known as the International Telegraphic Alphabet #1.

Key clicks are caused by excessively square leading and trailing edges on dits and dahs when sending A1A code (CW) characters. A key click filter is used to slightly round off these edges to eliminate this unwanted condition.

Chirp is caused by oscillator frequency instability when keying an A1A code (CW) transmitter. Improving power supply voltage regulation reduces or eliminates this problem.

Modulated code (MCW) transmissions can be made by having the keyed audio output of a code oscillator in front of an actuated (live) microphone of a transmitter. This is on/off audio tone keying of a transmitter, such as is used on VHF (30-300 MHz) and UHF (300-3000 MHz) amateur bands.

Radiotelephone emissions are called voice transmissions. They include amplitude modulation (AM), frequency modulation (FM), phase modulation (PM), and single sideband (SSB-J3E). Novices and Technician-Plus operators use upper sideband (USB) on the 10 meter band.

Amateurs use upper sideband on the upper frequency bands (10, 15, and 20 meters) and use lower sideband (LSB) on the lower frequency bands (40 and 80 meters). This usage is not by regulation; it is used to minimize confusion in regard to which sideband one should select.

Single sideband suppressed carrier voice (J3E) is popular on the 3 through 30 MHz high-frequency (HF) bands, as well as on the VHF and UHF bands.

When using USB, the audio intelligence is directly above one's center frequency, with no audio below the center frequency.

A modulator adds audio intelligence to a radio frequency carrier wave by changing (modulating) the carrier's amplitude (AM), frequency (FM), or phase (PM). SSB is a variation of AM.

Overmodulation causes splatter, which can cause interference to stations using adjacent frequencies. When operating on SSB, splatter will occur if the microphone gain is set too high, or if one speaks too loudly. The use of excessive speech processing can also cause splatter.

A defective capacitor in a power supply can result in AC hum being added to the DC output of the supply. This hum is heard in the output of the receiver and it is superimposed on the transmitter's output signal.

Frequency modulation (FM) voice emissions are popular on the VHF (30-300 MHz) and UHF (300-3000 MHz) bands. FM voice provides good fidelity, increasing one's ability to copy weak signals during poor reception conditions. Overmodulation of an FM transmitter results in overdeviation of the output signal, resulting in out-of-channel emissions. This problem can be eliminated by reducing the microphone gain, speaking more quietly, and/or holding the microphone farther away from one's mouth.

A reactance modulator is used to add audio intelligence to the carrier wave in a frequency modulation (FM) transmitter.

Phase modulation (PM) is also called pseudo frequency modulation.

Radioteletype (RTTY) is a narrow-band direct-printing telegraphy communication system. Transmission and reception is by machine. When operating below 30 megaHertz, the maximum frequency shift with RTTY is 1 kiloHertz.

Packet radio emissions are data transmissions. They require one to connect a terminal node controller (TNC) to the microphone input of a transmitter.

Typical emission widths

A1A code (CW) = 5 times keying speed, or 50 Hz at 10 wpm

J3E SSB voice = 3 to 3 kHz

F3E FM voice = 10 to 20 kHz

Receiver bandwidth is usually selectable, which enables an operator to select a bandwidth that is wide enough to include all of the received audio information, but is narrow enough to exclude unwanted signals (including noise) above and below the spectrum containing the desired audio.

Examples of desirable bandpass filter widths for receivers are as follows:

A1 code (CW) = 250 to 500 Hz

J3E SSB voice = 1.8 to 2.7 kHz

VHF/UHF FM voice = 10 to 20 kHz

HF radioteletype = 1000 Hz/1 kHz

Harmonics are whole number multiples of a fundamental (basic) frequency. They are the basic frequency times 2, 3, 4, etc. The third harmonic of 7125 kHz is 21,375 kHz, which is also 21.375 MHz. If a Notice of Violation states that your signal was heard on 21,375 kHz when you were operating on 7125 kHz,

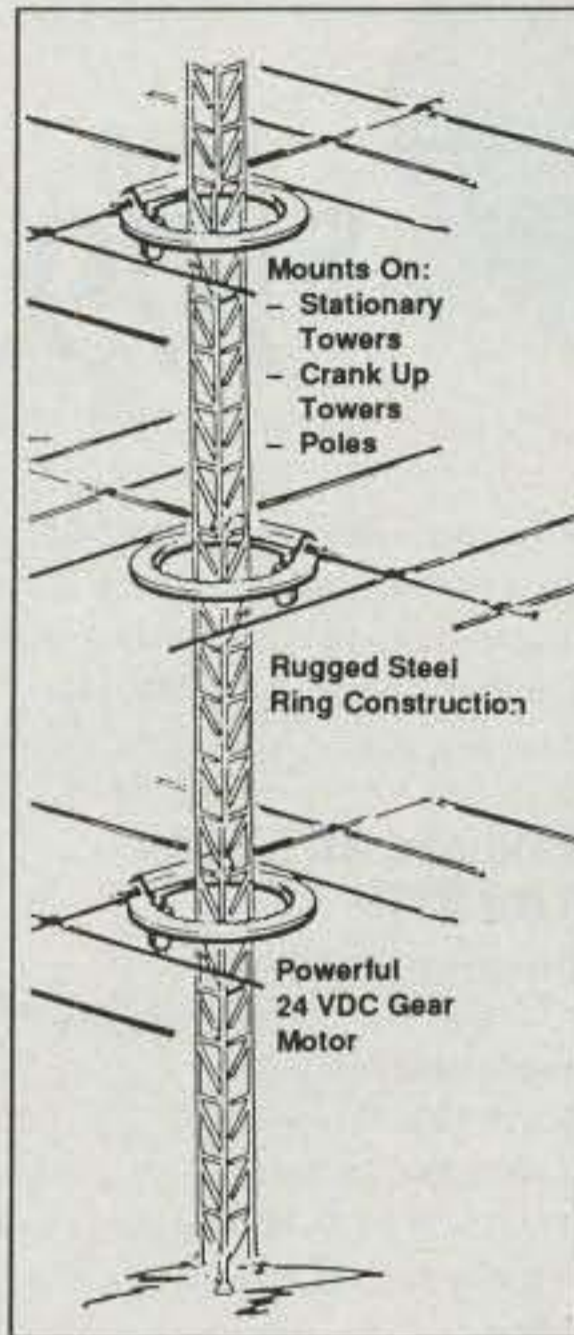
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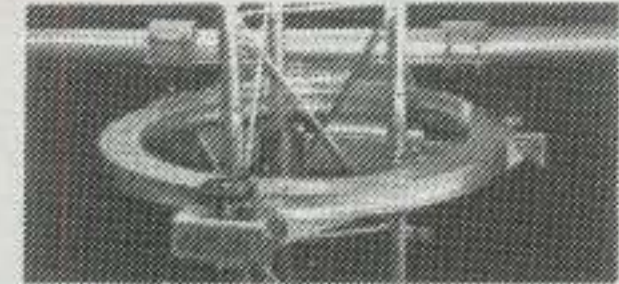
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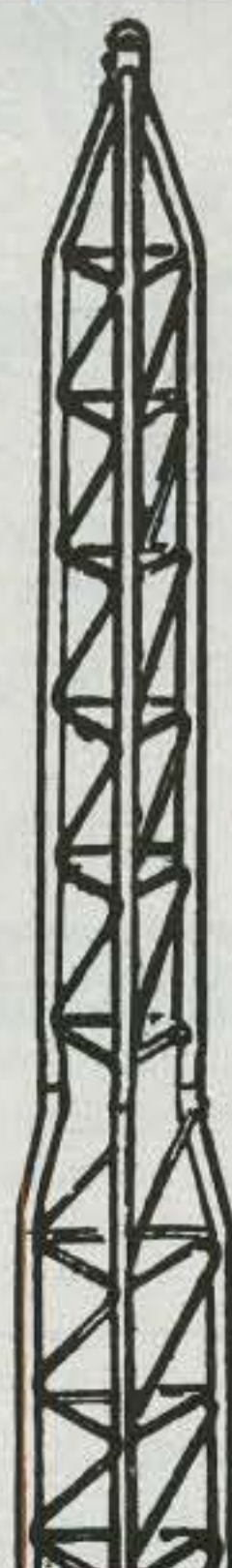
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Here is Todd Johnstone, KD4KJW, operating the station he shares in Ormond Beach, Florida with his father (Gordon, KD4JXA). He certainly appears to be relaxed while he operates. It must be a successful approach to use, because he has made about 200 contacts already. Todd and Gordon thank Ernie Wachter, N7SD, and Leah Wachter, WB7PHL, for instructing the 18-week licensing course that helped them get their Novice tickets during March 1992. Todd is practicing code because he wants to upgrade soon.

this problem is due to third-harmonic output from your transmitter. The fourth harmonic of 7160 kHz is 28,640 kHz, which is also 28.64 MHz.

A spurious emission is any unwanted emission—any emission other than the intended emission on the intended transmission frequency. Spurious emissions include harmonic and parasitic emissions. Spurious emissions may result in transmissions outside the amateur bands and/or interference to other stations. Missing shielding may result in spurious emissions.

Tube-type transmitters may emit spurious emissions when the final RF power amplifier stage needs to be neutralized.

Exposure to radio frequencies causes body parts to heat, which can harm people.

When you are going to work on an antenna, make sure transmitter output power won't/can't be turned on.

Mid-roof mounting of an antenna on a vehicle presents minimum RF exposure to occupants of the vehicle.

(To Be Continued)

Photographs Wanted

Photographs of new amateurs in their shacks provide introductions to a few of the newer licensees. Photograph size is unimportant, but good definition, contrast, and subject matter are important. Color pictures can be used, but black-and-white photographs are preferred. Operating activities and achievements, plus a self-introduction, are needed with each picture. Send an SASE if a picture must be returned. A free one-year CQ subscription (or renewal) is awarded to the one amateur whose picture I select as the winner for the month. If you are a subscriber, please enclose the mailing label (or copy) from your latest CQ issue. One award is made each month, no matter how many photographs are printed. DX amateurs, who frequently work the American Novice bands, are also urged to submit photographs.

73, Bill, W6DDB

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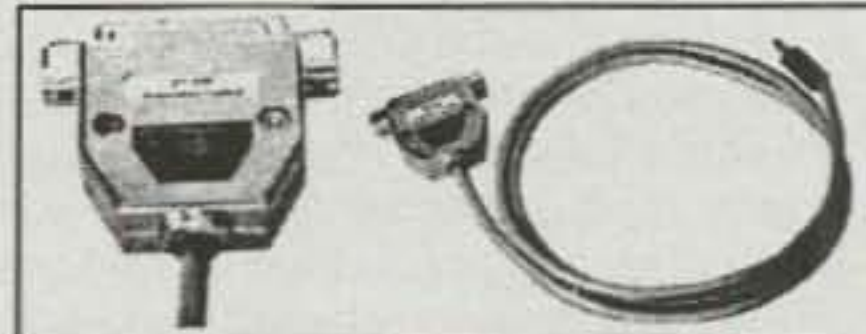


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WHAT'S NEW AND HOW TO USE IT

Radiation Hazards Primer

Being amateur radio operators, we are constantly exposed to RF energy of some sort as long as we are transmitting a signal. As most of you are aware, there is a growing concern about the dangers of such exposure, and I thought it would be a good idea this month to give you a simple "primer" on what the concerns are.

There are two types of radiation—ionizing and non-ionizing. Ionizing radiation—such as that produced by unshielded nuclear generating facilities, radioactive waste products, medical and dental x-ray machines, and even the sun—can carry enough energy to actually strip electrons from the atoms in our bodies. This leaves them charged and capable of combining with other atoms. The results of such combinations can be damaged cells, or worse—damaged genetic material. This is primarily why the exposure to this type of radiation should be minimized as much as possible.

Non-ionizing radiation, on the other hand, does not strip electrons from atoms. It does, however, cause thermal effects (heating) in many substances. The most common form of non-ionizing radiation that we as amateurs encounter is of course RF energy. We are literally "bathed" in RF every time we key a transmitter. When RF energy encounters any solid object, it can travel through it, be absorbed by it, or be reflected by it, depending on the material of which it is made. Insulators such as teflon, polystyrene, or other plastics are transparent to RF and allow it to pass easily. Metals, for the most part, are good reflectors of RF, but the human body is part of a group of substances that unfortunately absorb RF energy. It is this fact that is of concern to many researchers.

We all are familiar with the thermal effects of RF every time we use our microwave ovens. Although it takes a very high power density to produce significant heating (a typical microwave oven produces at least 500 watts), the human body becomes more sensitive to RF at frequencies where it resonates. An average adult, for example, has a very rough resonant frequency of 30 MHz, while a baby's head reaches the 700 MHz region.

Although the body has the ability to self-regulate its internal temperature and dissipate heat through perspiration and aspiration, it would appear that only long-term exposure to high RF levels would be life threatening. This would ordinarily be true except that there are parts of the

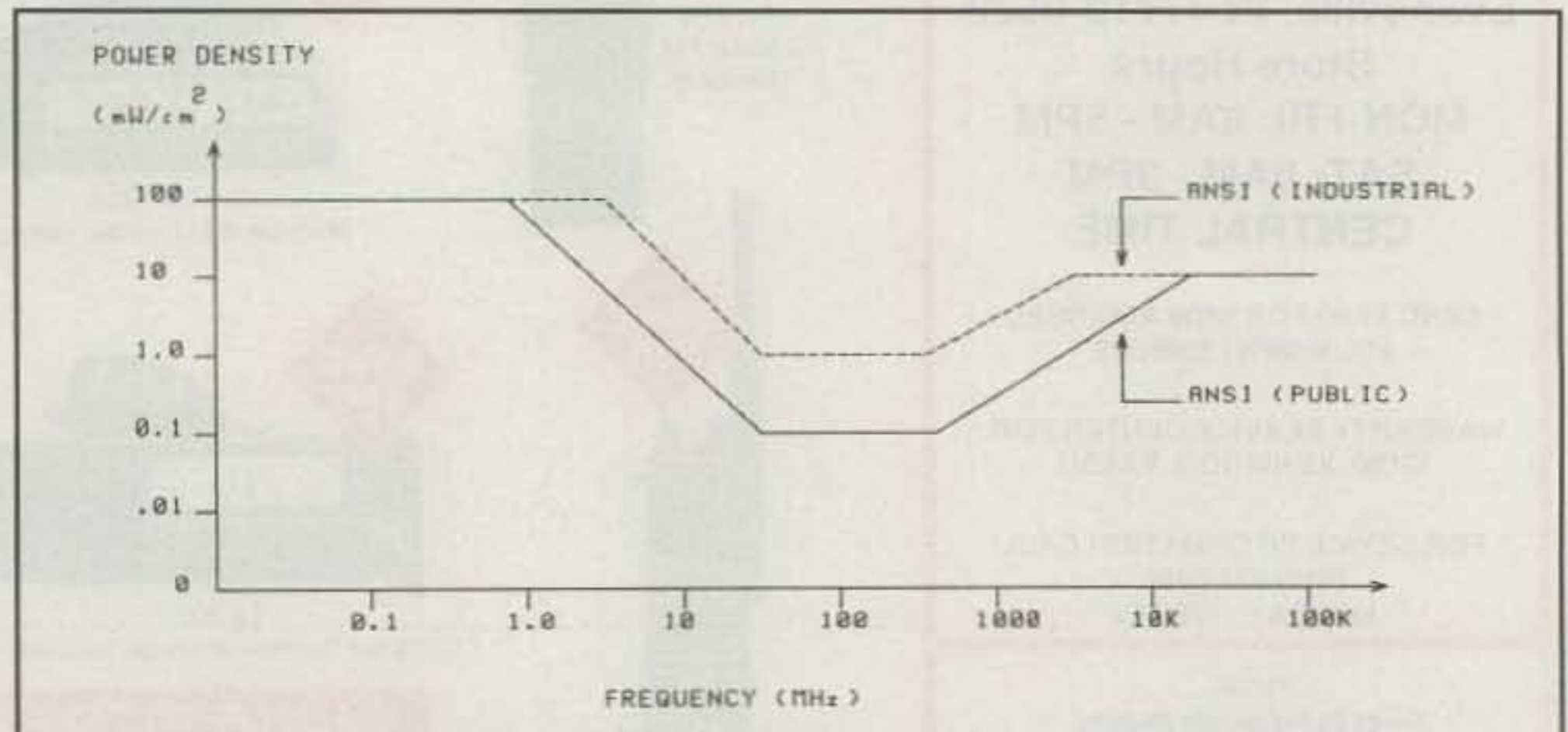


Fig. 1— Safe recommended RF exposure levels. (ANSI = American National Standards Institute.)

human body, such as the corneas of the eye, where such temperature regulation is limited. As a result, many studies have been made to determine just what the danger levels are. The result of these investigations is summarized in fig. 1.

This chart indicates the safe levels of RF exposure as recommended by several professional and governmental agencies. The levels are given in milliwatts per square centimeter and are for field intensity, not power output from a transmitter. What this chart infers in principle is that being in the direct radiated beam of RF from a 10 dB 2 meter Yagi is ten times worse than being near a 1/4-wave whip connected to the same transmitter.

In addition to gross thermal heating, there is a growing body of experimental evidence that *seems to indicate* that RF can be hazardous to health even at much lower levels. Such studies have linked higher than normal rates of cancer in groups of people who have had continuous exposure to very low levels, even those produced by the 60 Hz power line. Other studies suggest that the combination of exposure to RF coupled with certain hazardous chemicals results in increased incidents of brain cancer as well as increased mortality from leukemia and lymphatic cancer. One must understand that these studies are very inconclusive at this point in time, and there is certainly no need to panic. These effects, if they are at all true, are probably quite subtle.

What all of this means, however, is that as amateurs, we should at least try to limit our overall exposure to RF to a minimum on a practical level. It certainly does not hurt to plan the location of our shack to be as far from the output of our kilowatt

antenna as possible, be certain that the radiation pattern of our beam antennas does not include the operation position, and try to limit the length of the rag-chewing from our handie-talkie to a minimum. If this results in higher antenna towers, more "in-the clear" VHF and UHF antenna sites, and less QRM on the various repeaters in our area, we may not necessarily be safer, but the hobby of amateur radio will become much more enjoyable.

For those who wish to pursue this subject further, I have prepared the following bibliography.

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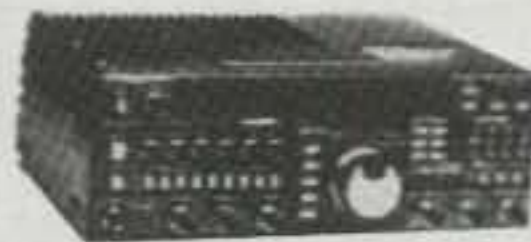
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Separate Administration

A group of stateside DXers plans to operate from **St. Paul Island CY9** July 1-9. Veteran DXpeditioners Randy Rowe, NØTG; Ron Oates, AA4VK; Murray Adams, WA4DAN; and Bob Stewart, KW2P, will stage an all-band, all-mode operation from this small Canadian island. This team conquered Desecheo KP5 and Navassa KP1 in the past few years. In 1994 each operator will use his own callsign /CY9. QSL all callsigns via NØTG.

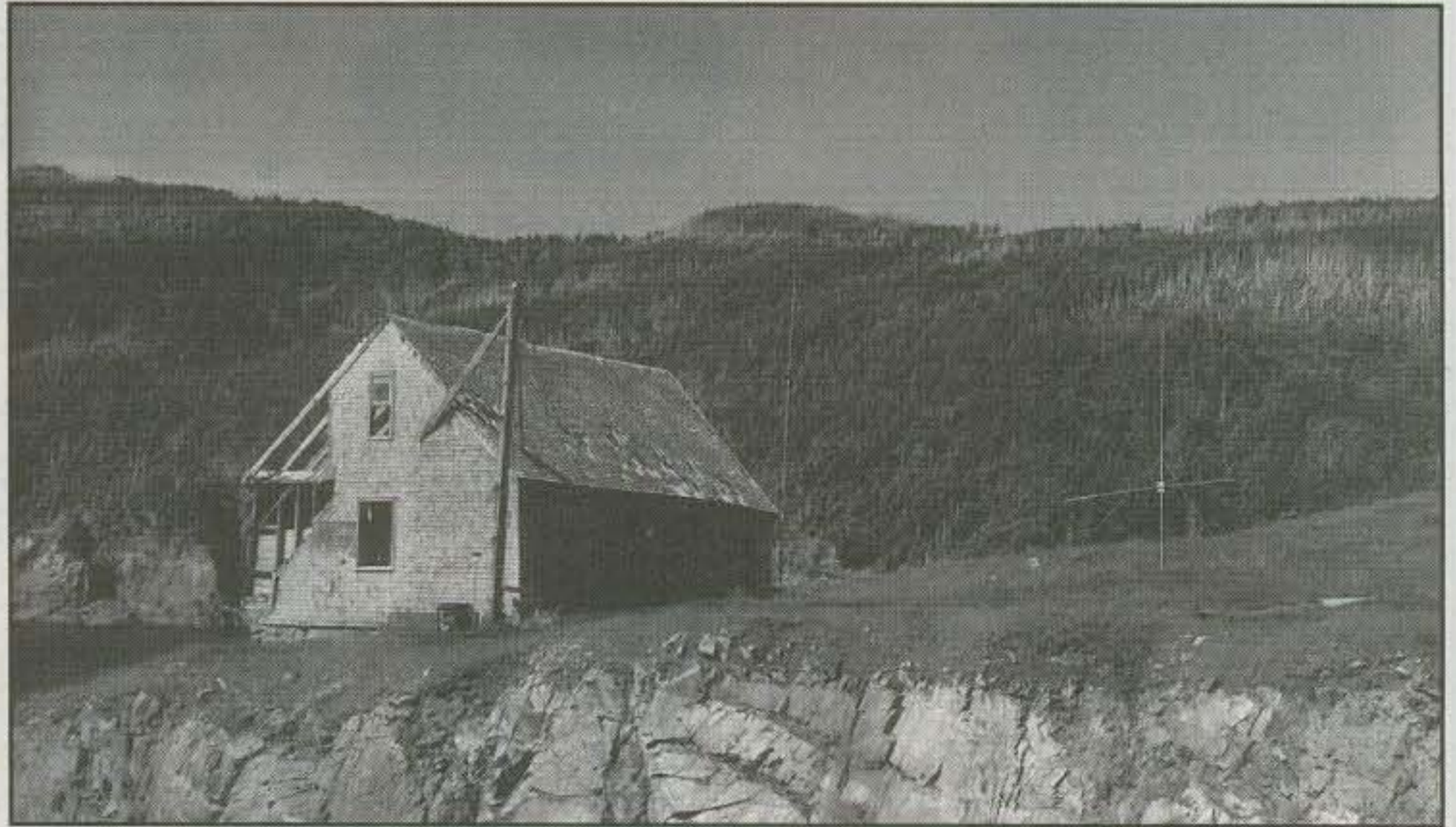
This operation follows another St. Paul Island DXpedition last month. Scott, N9JCL; Tom, KØSN; Bob, AA9GZ; Paul, WC9E; and Ken, WB9OBX, also signed /CY9. QSL to Tom Hellem, KØSN, W6321 Two Mile Rd., Porterfield, WI 54143 with SASE and US\$1.

St. Paul is only about one mile by three miles, and is known as the "graveyard of the Atlantic" because of the 3000 sailors buried there from hundreds of shipwrecks over the years. The island sits about 15 miles north of the northern tip of Nova Scotia, in the busy Cabot Strait, which is the main route to the Gulf of St. Lawrence, and hence the Great Lakes. Weather in the strait can be wild. I vividly remember returning from Newfoundland on a large ferry in 40 foot waves when I was the only passenger in the dining room. All the rest were lining the rails, feeding the fishes. And this was in the middle of the summer—the calm season!

Due to the weather in the region, DXpeditions to St. Paul are always in mid-summer. The typically low maximum usable frequencies (MUFs) in the summer mean that relatively few DXers have worked St. Paul on the high bands.

St. Paul had a large resident population in the 1940s and 1950s, mostly serving on search-and-rescue teams and relief operations for the numerous shipwrecks. In the '60s the Canadian government upgraded the navigational aids and automated the two lighthouses on the island. These lighthouses are tended yearly, but otherwise the wind-swept island is currently uninhabited.

DXpeditioners usually aim for Governor's Bay on the south side of the island, away from the surf on the north and west sides. However, the island is surrounded by steep cliffs. DXpeditioners must haul their equipment, generators, fuel, etc., up from the small beach by rope to the top



This dilapidated shack on the top of the cliff on St. Paul Island was the site of the WV2B/WA2UJH 1993 DXpedition.

of the cliff. Once on the island, there are many abandoned buildings that provide some measure of shelter. Most have lost all their windows and few have intact roofs due to the winds and storms. However, the buildings are better than tents. An additional hazard besides the cold, wind, and rain is mosquitoes. The St. Paul mosquitoes are not really the size of sea gulls; they just feel that way when they bite.

The two 1994 DXpeditions to St. Paul should provide ample opportunity for most DXers to work this DXCC "country" on several bands and modes.

Newer DXers may wonder why an island just 15 miles off the coast of Canada, owned by the Canadian government, counts as a separate DXCC country. To provide insight into this matter we have to go back about 20 years to the early '70s.



Leo, PP1CZ; Paul, PT2NP; Peter, PP5SZ; Daniel, PT7BI; Lunkes, PT2HF; and Stuckert, PT2GTI, operated as PYØA on SSB and PYØB on CW from Abrolhos Archipelago (SA-019) in February.

P.O. Box 50, Fulton, CA 95439

Prior to 1976, decisions on new DXCC countries were made at ARRL Headquarters by a small group of Headquarters staffers called the Headquarters Awards Committee (HAC). These seven amateurs reviewed any suggestions for new countries, and then voted for or against. Four votes were enough to add the country to the DXCC list.

In 1974 some enterprising DXers latched on to the "distinctly separate administration" phrase in the DXCC country criteria. (At that time DXCC country criterion Point 1 read "An area by reason of government or a distinctively separate administration constitutes a separate entity.") These DXers argued that Kingman Reef is under the distinctively separate administration of the US Navy, while nearby Palmyra is under the Fish and Wildlife branch of the Interior Department. Thus, they claimed that Kingman should be a separate entity—i.e., a new DXCC country. The HAC narrowly accepted this argument, and Kingman was added to the DXCC countries list in 1974.

This decision opened up a floodgate of "distinctly separate administration" DXCC countries applications. The next one was for Sable Island, an island east of Nova Scotia, Canada. This island is under the administration of the Canadian Coast Guard, which is "distinctly separate" from the mainland government. The application for Sable Island included St. Paul, which is also under Coast Guard administration, and separated from Sable by the "foreign land" of Nova Scotia. Both islands were added to the DXCC countries list in 1976.

These additions sparked considerable controversy. Many DXers objected to the apparently open-ended HAC interpretation of the "separate administration" clause. Some feared wholesale additions to the countries list under this interpretation. Others objected to the secrecy and lack of public scrutiny in the process of adding new countries to the DXCC list. Why should four relatively little-known amateurs have the power to "dilute" the DXCC list?

As a consequence of this heated discussion, the ARRL Board of Directors passed a motion changing the way new countries are added to the DXCC list. They directed that all such applications had to go through the DX Advisory Committee (DXAC). This directive remains in effect today. In fact, the HAC, now called simply the Awards Committee, is limited to accepting DXAC decisions, or sending them back to the DXAC for review. The Awards Committee cannot unilaterally change such decisions. Thus, the addition of St. Paul Island (and Sable) to the DXCC list fundamentally altered the way new countries are determined!

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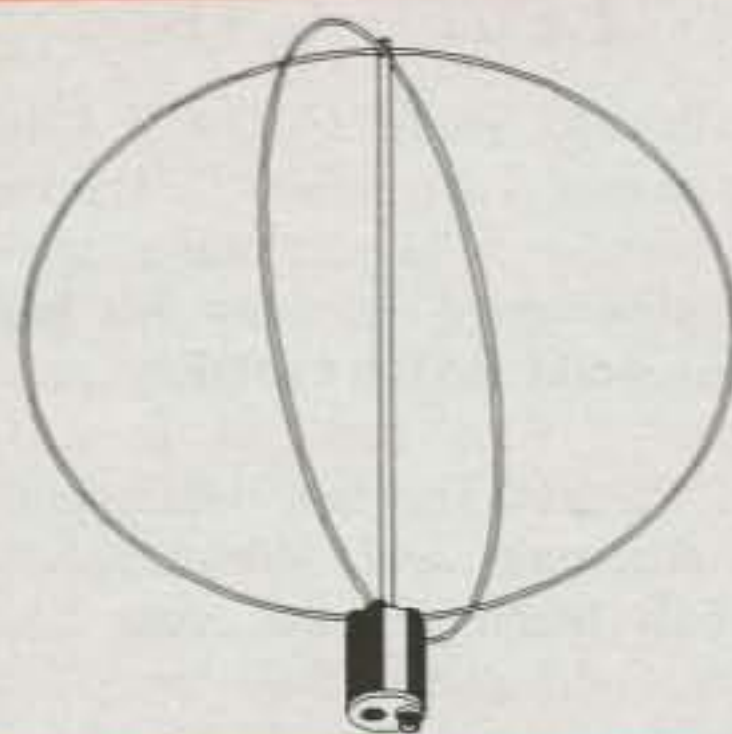
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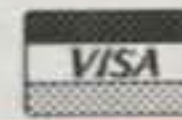
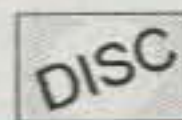
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300 OHM HEAVY DUTY TWIN LEAD 18GA STRD	15/FT	13/FT
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LMR 400 LOW LOSS (SIMILAR TO 9913)	62/FT	60/FT
LMR 240 LOW LOSS (MINI 8 SIZE)	37/FT	35/FT

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SSB

2444	IK4SWX	2451	WA4PLY
2445	EA9TQ	2452	KA4GYU
2446	EA3GJW	2453	G4OBE
2447	EA5OB	2454	KABCKN
2448	KB4BCC	2455	T3DJH
2449	SP5AUB	2456	VE3FSV
2450	I2LXA	2457	NT2V

CW

2815	EA6BD	2817	YU1TR
2816	JA1XCZ		

MIXED

1653	T91ELS	1655	I2LXA
1654	NU5V	1656	S51RU

Mixed: 450 T91ELS, I2LXA, S51RU. 500 T91ELS, I2LXA, S51RU. 550 T91ELS, I2LXA, KL7OH, S51RU. 600 T91ELS, I2LXA, S51RU. 650 T91ELS, I2LXA, S51RU. 700 T91ELS, I2LXA, S51RU. 750 T91ELS, I2LXA, S51RU. 800 T91ELS, I2LXA, S51RU. 850 T91ELS, I2LXA, S51RU. 900 T91ELS, I2LXA, S51RU. 950 JN3SAC, T91ELS, I2LXA, S51RU. 1000 JN3SAC, I2LXA, S51RU. 1050 JN3SAC, I2LXA, S51RU. 1100 JN3SAC, I2LXA, S51RU. 1150 JN3SAC, I2LXA, S51RU. 1200 I6DQE, I2LXA, S51RU. 1250 I6DQE, S51RU. 1300 I6DQE, S51RU. 1350 I3DQE, S51RU. 1400 I6DQE, S51RU. 1450 I6DQE, S51RU. 1500 S51RU. 1550 LUBDY. 1950 HA5NK. 2000 HA5NK. 2050 HA5NK. 2400 WB2YQH. 3100 I2PJA. 3150 I2PJA. 3200 I2PJA. 3300 W2FXA.

SSB: 350 EA9TQ, EA5OB, SP5AUB, I2LXA, T30JH. 400 EA5OB, SP5AUB, I2LXA, T30JH. 450 EA5OB, SP5AUB, I2LXA, T30JH. 500 EA5OB, SP5AUB, I2LXA, T30JH. 550 EA5OB, SP5AUB, I2LXA, T30JH. 600 WW0E, EA5OB, SP5AUB, I2LXA, T30JH. 650 EA5OB, SP5AUB, I2LXA, T30JH. 700 EA5OB, I2LXA, T30JH. 750 I2LXA, DJ8WQ, T30JH. 800 I2LXA, T30JH. 850 I2LXA. 900 I2LXA. 950 I2LXA. 1000 I2LXA. 1550 LUBDY. 3100 I2PJA. 3150 I2PJA. 3200 I2PJA.

CW: 350 JA1XCZ, YU1TR. 400 JA1XCZ, YU1TR. 450 JA1XCZ, YU1TR. 500 JA1XCZ, YU1TR. 550 JA1XCZ, YU1TR. 600 JA1XCZ, YU1TR. 650 JA1XCZ, YU1TR. 700 EA7TG, JA1XCZ, YU1TR. 750 EA9TG, JA1XCZ, YU1TR. 800 EA7TG, JA1XCZ, YU1TR. 850 JN3SAC, EA9TG, JA1XCZ. 900 JN3SAC, EA7TG. 950 JN3SAC. 1000 JA3ARM. JN3SAC. 1050 EA6AA, JN3SAC. 1150 IK2ECP. 1200 IK2ECP.

10 Meters: JN3SAC, WA4PLY, JA1XCZ.
15 Meters: JA3ARM.
20 Meters: RA6YJ, T30JH.
40 Meters: OZ-DR2044
160 Meters: K2LUQ.

Asia: I8YQV, SP5AUB, T30JH.
No. Amer: I8YQV, RA6YJ, KE4BM, JA3ARM.
Europe: I8YQV, SP5AUB, G4OBE, JA1XCZ.
Oceania: DK5WQ, T30JH.

Award of Excellence: W8ULU.

Award of Excellence with 160 Meter Bar: none.

Award of Excellence Plaque Holders: I8YRK, W4CRW, SM0AJU, K5UR, K6XP, N5TV, K2VV, VE3XN, W6OUL, DL1MD, DJ7CX, DL3RK, WB4SIJ, SM6DHU, N4KE, I2UIY, DL7AA, ON4QX, WA8YTM, YU2DX, OK3EA, I4EAT, OK1MP, N4NO, ZL3GQ, VK9NS, DE0DXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, W4BQY, I8JX, SM6CST, VE1NG, I1JQJ, WA1JMP, PY2DBU, H18LC, KA5W, K0JN, W4VQ, KF2O, K3UA, HA8XX, HA8UB, W8CNL, K7LJ, W1JR, F9RM, W5UR, WB8ZRL, SM3EVR, CT1FL, K2SHZ, UP1BZZ, W8RSW, WA4QMO, EA7OH, K2POF, DJ4XA, I79TQH, W8ILC, K2POA, N6JV, W2HG, ONL-4003, VE7DP, K9BG, W5AWT, KB0G, HB9CSA, F6BVB, W1BWS, YU7SF, G4BUE, N3ED, DF1SD, K7CU, I1POR, LU3YL/W4, NN4Q, KA3A, YB0TK, VE7WJ, VE7IG, K9QRF, YU2NA, N2AC, W4UW, NX0I, W9NUF, N4NX, SM0DJZ, DK5AD, WB4RUA, DK5AD, WD9HC, W3ARK, I6DQE, LA7JO, VK4SS, K6JG, I1EEW, I8RFD, I3CRW, VEFXR, N4MM, KC7EM, ZS6BCR, CT1YH, IV3PVD, KA5RNH, ZP5JCY, F1HWB, KC8PG, NE4F, VE3MS, K9LJN, ZS6EZ, YU2AA, I1WXY, IK2ILH, DE0DAO, LU1DOW, N1IR, IK4GME, WX3N, KC7X, N6IBP, W5ODD, I8RIZ, I2MQP, F6HMJ, HB9DDZ, W8ULU.

Award of Excellence Plaque Holders with 160 Meter Endorsement: CT1YH, IV3PVE, KA5RNH, ZP5JCY, AB9O, FM5WD, SM0DJZ, DK5AD, SM6CST, I1JQJ, PY2DBU, W3ARK, H18LC, KA5W, UR2QD, VE3XN, K6XP, LA7JO, W4VQ, K6JG, K3UA, HA8UB, W4CRW, N4MM, K7LJ, SM0AJU, KF2O, SM3EVR, K5UR, UP1BZZ, OK1MP, N5TV, K2POF, W8CNL, DJ4XA, I79TQH, DL9RK, N6JV, ONL-4003, W1JR, W6OUL, W5AWT, KB0G, F6BVB, W4BQY, YU7SF, W5UR, N4NO, DF1SD, K7CU, I1POR, W8RSW, N4KE, I2UIY, YB0TK, W8ILC, W1BWS, VE7WJ, K9QRF, NN4Q, W4UW, NX0I, G4BUE, LU3YL/W4, I4EAT, WB4RUA, VE7WJ, N4NX, DE0DXM, VE7IG, K9BG, I1EEW, AB9O, CT1YH, IV3PVD, KA5RNH, ZP5JCY, I2MQP, I8RIZ, W5ODD, WX3N, IK4GME, HA8XX, YU1AB, F6HMJ, HB9DDZ.

Complete rules and application forms may be obtained by sending a business-size self-addressed, stamped envelope (foreign stations send extra postage if airmail desired) to: "CQ WPX Awards," P.O. Box 593, Clovis, NM 88101-9511 USA.

tion" phrase, however, remained in the DXCC Country Criteria. Additional applications for new ones under this rule continued to arrive at the ARRL. In 1978, under DXAC chairman Bob Locher, W9KNI, the DXAC voted to remove that phrase from Point 1 of the Country Criteria. This recommendation was accepted by the ARRL Board in 1979, and the prospect of dozens of new countries faded. (One more country sneaked in under the "distinctly separate administration" rule before it was deleted: Desecheo KP5 was added to the DXCC list in March 1979. Note that the same group that went to Desecheo a couple of years ago is now headed for another of the "distinctly separate administration" countries this year: St. Paul Island.)

Thus, the addition of St. Paul Island to the DXCC list not only changed the way new DXCC countries are determined, it also led to a major change in the DXCC Country Criteria!

The question of "distinctly separate administration" refuses to die. Earlier this year the DXAC reviewed an application to reinstate the deleted DXCC country of Aldabra, now part of the Seychelles S7. The petitioner claimed that Aldabra was under private ownership separate from that of the rest of the Seychelles. This is precisely the sort of "distinctly separate administration" that was eliminated from the DXCC Country Criteria in 1979. Don't look for Aldabra to be reinstated.

Scarborough Reef

On the other hand, there is another application for separate DXCC country status that has a greater chance of being accepted. Hans Hannappel, DK9KX, has submitted a petition to add Scarborough Reef (aka Huangyan Dao) to the DXCC list based on Point 2(a) of the country criteria: islands more than 225 miles from the "parent" country. The parent country

The WAZ Program Single Band WAZ

15 Meter SSB

468.....JA4DUD

20 Meter SSB

945.....ON4ATW 946.....WW1N

10 Meter CW

141.....N7RT 142.....N4CC

15 Meter CW

256.....N7RT 257.....N4CC

20 Meter CW

445.....JH7MJB 446.....N4CC

80 Meter CW

40.....N4CC

RTTY

90.....IK5JAU

Satellite

12.....VE3NPC 13.....WB4MLE

All Band WAZ SSB

4164.....SMØEBP 4167.....IK4ADE
4165.....K5EPE 4168.....KB6JRI
4166.....CU3AN 4169.....NØFIK

CW/Phone

7450.....OK1DTO (CW) 7453.....HB9CRV (CW)
7451.....PY2VA 7454.....HB9CRV
7452.....W4BAI

All CW

44.....WO2N 46.....K7EHI
45.....IK4PKZ 47.....W7ULC

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and \$1.00 to: WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Road, Sudbury, MA 01776. The processing fee for all CQ awards is \$4.00 for subscribers (please include your most recent CQ mailing label or a copy) and \$10.00 for nonsubscribers. Please make all checks payable to the Award Manager. Applicants sending QSL cards to a CQ checkpoint or the Award Manager must include return postage. Questions regarding the WAZ Award may be sent to K1MEM with an SASE.

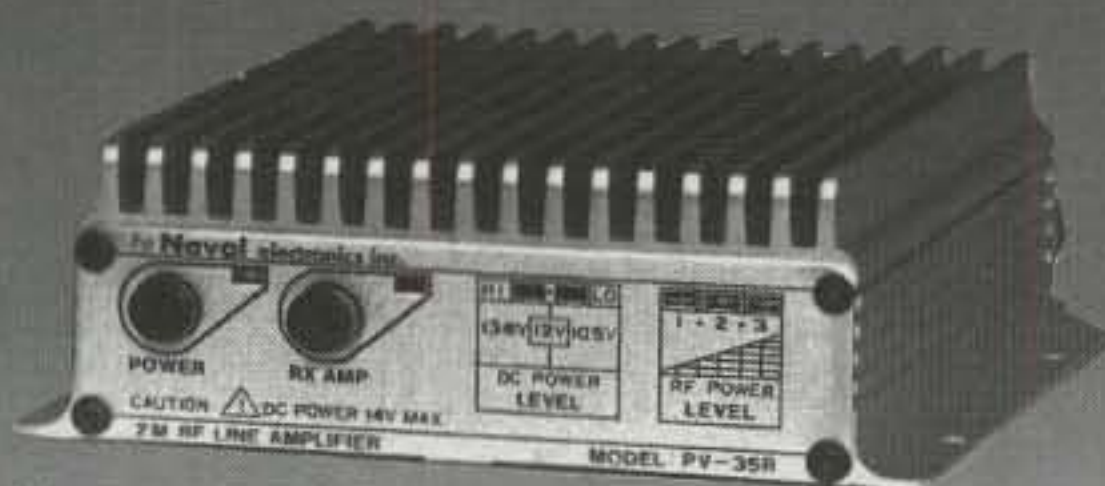
in this case is the Peoples Republic of China BY. Scarborough Reef lies in the South China Sea (also home to the Spratlies 1S), almost due west of Manila, in the Philippines. DK9KX argues that Scarborough Reef is claimed by China and not by the Philippines, and lies more than 225 miles from the nearest land claimed by China: the Paracel Islands.

Some DXAC members didn't feel comfortable about the fact that Scarborough Reef doesn't appear to have much dry land. In fact, the China Sea Pilot refers to a widely scattered collection of small rocks. Veteran DXers harken back to Minami Tori-Shima 7J1RL, the controversial "country" that at high tide was about the size of a dining-room table. DXpeditioners had to bring their own island to operate; construction scaffolds made a plat-

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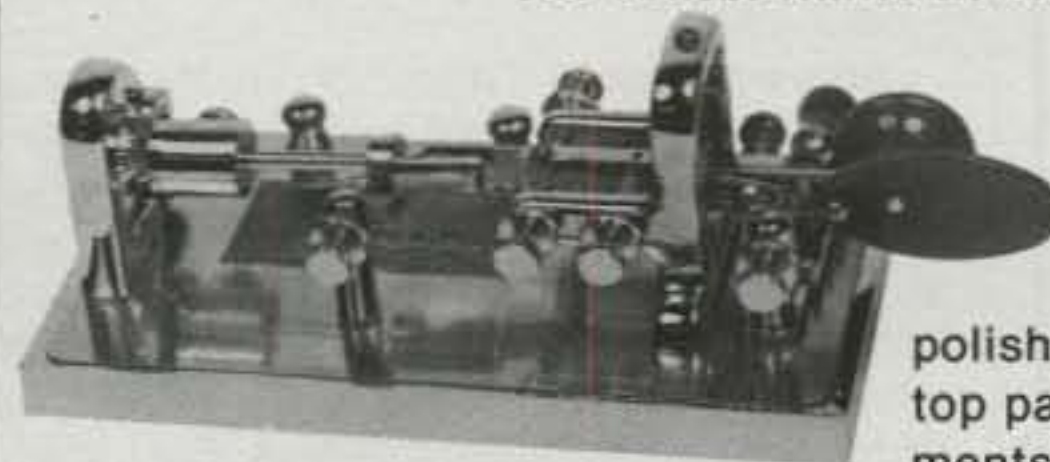


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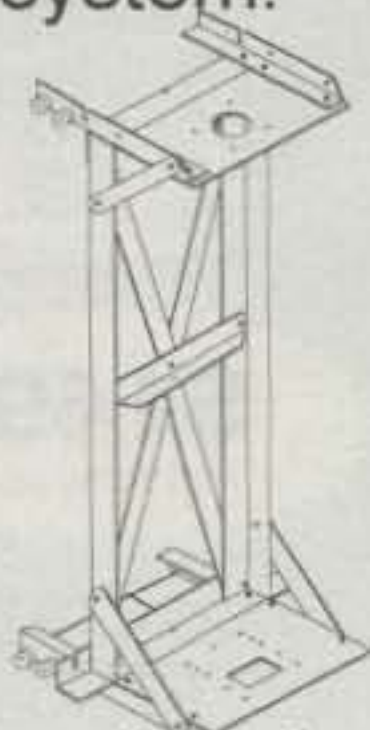
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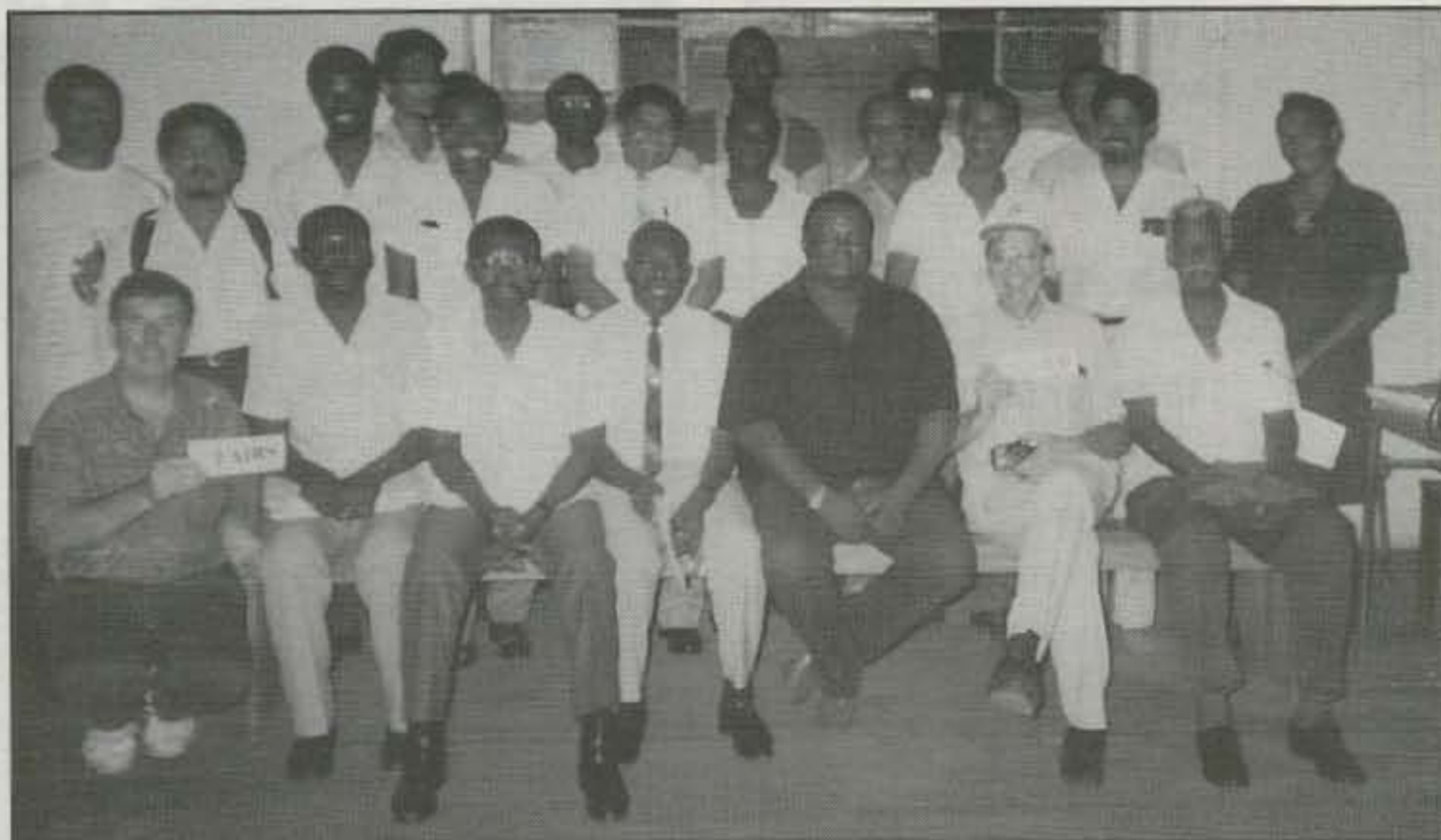
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The FAIRS group helped the Guyana 8R Amateur Radio Association install new officers in March of this year. In the front row, from the left, are Larry, N4VA; Shiroxley, 8R1SG, GARA treasurer; George, 8R1AR, secretary; Cleophas, 8R1CJ, president; Lennox, 8R1Z, vice-president; David, KK4WW; and Roland, assistant secretary.

form 10 feet above the rock to keep rigs and operators dry!

To learn more about Scarborough Reef, DX Hall of Fame member Martti Laine, OH2BH, chartered a plane out of Manila and surveyed the reef a few months ago. Here is his report, sent via Wayne Mills, N7NG.

Background: This reef is claimed by China (PRC) and a DXCC application has been filed on the basis that the reef lies more than 225 statute miles from the coast of mainland China. At the same time, it is located only 120 miles west of the coast of the Philippines—and according to the application, the reef is not claimed by the Philippines even though it is located within the 200 mile economic zone of the Philippines.

According to the latest volume of the Sea Pilot, the reef is nearly awash while several rocks of 3 to 10 feet height lie on the reef. The wreck of a fishing vessel, stranded in 1971, is reported along with several pieces of other shipwrecks.

Survey flight: Today, April 24, 1994, OH2BH and DL5VJ chartered a twin-engine Britten-Norman airplane out of Manila and flew to Scarborough Reef, a two-hour flight, and surveyed the reef in great detail for 45 minutes. Some 100 pictures were taken, as well as 30 minutes of video. Included in the video is an interview with the pilot before and after the survey flight.

Survey conditions: For today, the high tide was calculated for 9:05 AM. The party arrived at Scarborough Reef at 9:55 AM. The difference between high and low tides for this date is 55 cm, less than 2 feet. The weather was clear and the sea was calm. Part of the survey was conducted as low as 100 feet above sea level.

All measurements and statements will be shared between several participants. A detailed report will be provided for the ARRL, the DXAC, and the NCDXF, and possibly others.

A brief report of findings: With the excep-

tion of several rocks or coral heads, the narrow belt of coral reef is totally under the surface of the sea. The diameter of the reef was estimated at 10 miles. There is an opening into the lagoon at the southern end of the reef. Several rocks are found in the lagoon, but all are under the surface of the water.

Along approximately 30 miles of reef, only some 30 "rocks" (coral heads) were found protruding from the water. Only two of them were of significant size, and they were carefully observed. These rocks are estimated to be 5 by 6 feet with a height of approximately 6 feet above sea level. About half of the rocks were with "dry nose" at the time of the survey.

Landing and operating from Scarborough: With calm conditions, anchorage is possible within the lagoon. Staying and operating from the solid soil of the reef is impossible at high tide. The only possible operating site would be one of the ship wrecks which were well above sea level at the time of the survey.

Conclusion: It is now up to adventurous expeditioners to get to the vicinity of the reef and find a dry piece of land at low tide or one of the wrecks from which to operate. It is up to the DXAC to decide whether those 30 coral heads are enough to make this another DXCC counter.

Postnote: There is often adventure present when DX is in the making, but this survey trip was supposed to be an exception. Having just left the reef, the control panel of the plane was seemingly on fire, with smoke and smell. All electricity went off, including that for the radios and navigation equipment. But the engines were still running, and we were able to find and reach the west coast of the Philippines and land at Subic Bay, the ex-US military base. From there we were transferred to Manila by another plane. God is often with DX, and we are delighted to report Her presence in Manila. We are glad to be back.

Bear in mind this kind of "adventure" the next time you hear of a DXpeditioner planning a trip to a potential DXCC New

One! Incidentally, Hans, DK9KX, has a reputation for success with new country petitions. His research and assistance were instrumental in adding the Penguin Islands ZSØ to the list in 1991.

And speaking of the Penguin Islands, as expected (see the February 1994 DX column), the DXAC voted to delete both the Penguins and Walvis Bay ZS9 from the DXCC countries list effective March 1, 1994. The Awards Committee concurred on April 27, voting unanimously to accept the deletion recommendation. This reduces the number of current DXCC countries to 326.

In other DXAC news, the DXAC voted down a proposal to add additional single-band awards to the DXCC program. The vote was 13 to 2 against the idea of adding 30, 20, 17, 15, and 12 meter single-band awards.

The DXAC also voted 15 to 1 against a proposal to add a 10 meter DXCC Honor Roll to the existing program, citing DXCC desk work load.

The vote to reconsider the addition of **Mt. Athos SY** to the DXCC countries list (in essence, to remove the country from the list) will be re-balloted. There were concerns over the wording of the question on the ballot.

The DXAC voted 15 to 1 to **accept** the QSLing guidelines as per subcommittee report. This report has not yet been made public.

Active agenda items as of late April included Pratas Island, Aldabra Island, Scarborough Reef, minimum size for a DXCC country, working by call areas, the Turkish Republic of Northern Cyprus, and Mt. Athos.

The question of a minimum size for a DXCC country was sparked by the Scarborough Reef petition. Sometimes

5 Band WAZ

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N7RT	JA1SDV
SM3BIZ	YBØRX
IK6BOB	DF4DI

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N4WW, 199 (26)	JA2IVK, 199 (34, 40m)
K6YRA, 199 (34)	W6TC, 199 (34)
AA4KT, 199 (26)	KA5W, 199 (26)
K7UR, 199 (34)	K1ST, 199 (26)
NAØY, 199 (26)	YZ1MB, 199 (23, 40m)
VE7DX, 199 (34)	4X6DK, 199 (4)
WØPGI, 199 (26)	SM6AHS, 198 (12, 31)
W2YY, 199 (26)	ABØP, 198 (23, 34)
W9WAQ, 199 (26)	UA3AGW, 198 (1, 12)
K6EID, 199 (34)	KL7Y, 198 (34, 36)
W1JR, 199 (23)	VO1FB, 198 (19, 27)
VE7AHA, 199 (34)	EA5BCK, 198 (27, 39)
W1FZ, 199 (26)	KZ4V, 198 (22, 26)
IK2GNW, 199 (1)	K4PI, 198 (23, 26)
W9CH, 199 (26)	G3KDB, 198 (1, 12)
ACØM, 199 (34)	EA2KL, 198 (22, 26)
G3MXJ, 199 (12)	DK2GZ, 198 (1, 24)
IK8BQE, 199 (31)	

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

JAØDWY, 200 Zones	WW1N, 174 Zones
YZ1MB, 200 Zones	WA8YTM, 182 Zones
DK2GZ, 198 Zones	HB9CRV, 168 Zones
JA1SDV, 200 Zones	
YBØRX, 200 Zones	

Endorsements:

EA8PP, 190 Zones	PY7ZZ, 200 Zones
N7RT, 200 Zones	4X6DK, 199 Zones
SM3BIZ, 200 Zones	AA3DI, 164 Zones
KE4VU, 195 Zones	DF4DI, 200 Zones
IK6BOB, 200 Zones	

892 Stations have attained the 150 Zone level as of March 31, 1994.

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and \$1.00 to: WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Road, Sudbury, MA 01776. The processing fee for all CQ awards is \$4.00 for subscribers (please include your most recent CQ mailing label or a copy) and \$10.00 for nonsubscribers. Please make all checks payable to the Award Manager. Applicants sending QSL cards to a CQ checkpoint or the Award Manager must include return postage. Questions regarding the WAZ Award may be sent to K1MEM with an SASE.

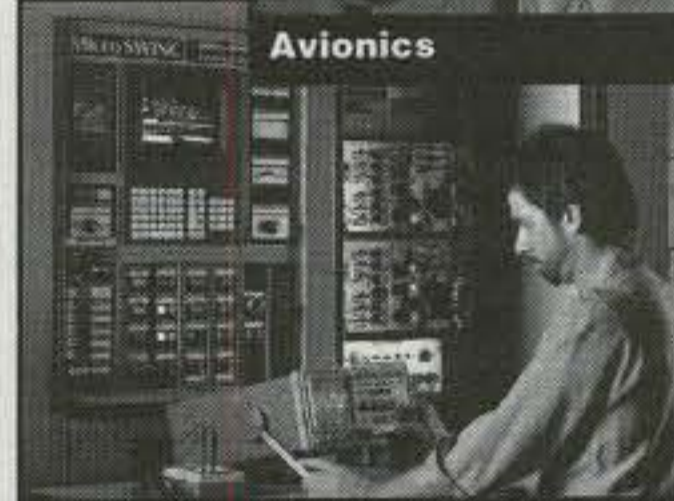
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ACQ19



Can you imagine a national amateur radio convention attended by all the countries' amateur radio ops? Here Bob, W7TSQ/ A35SQ, and wife Helen; Craig, A35CT, and wife Dawn; Father Kevin, A35KB; and Al, A35AP, and his wife hoist an 807.

CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries for the mode indicated. The ARRL DXCC Countries List is used as the country standard. Honor Roll listing is automatic when submitting application or endorsement for 275 or more countries. Deleted countries do not count and are dropped from listing as they occur. Currently there are 329 countries. To remain on the CQ DX Honor Roll, annual updates are required. Honor Roll updates may be made at any time, in any number. Updates indicating "no change" will be accepted to meet the annual requirement. All updates must be accompanied by an SASE for confirmation. The fee for endorsement involving the issuance of a sticker is \$1.00.

CW

K2TQC.....329	KD8V.....329	WA4IUM.....328	I2QMU.....326	IT9TQH.....321	K9TI.....317	VE7DX.....310	YU1TR.....301	WB4UBD.....284
K1MEM.....329	9A2AA.....329	KZ4V.....328	W8SR.....325	W8XD.....321	K1HDO.....317	K4JLD.....310	N5FG.....301	F6HMJ.....284
W9DWO.....329	N4KG.....329	K9IW.....328	WA4JT1.....325	WB4RUA.....320	W3BBL.....317	K2JLA.....309	WA8YTM.....300	KP4P.....283
N4MM.....329	OK1MP.....329	K8LJG.....327	AG9S.....325	K4IQJ.....320	N4AH.....317	KA7T.....309	YU2TW.....300	K7JYE.....283
K2FL.....329	W8IZ.....329	EA2IA.....327	N7RO.....324	F3TH.....320	K2JF.....316	W6DN.....308	WB6OKK.....298	WB4DBB.....283
DL1PM.....329	PA8XPQ.....329	KB8DB.....327	W7CNL.....324	AA5NK.....320	Y33VL.....316	KB4HU.....308	OZ5UR.....295	KF5PE.....282
K3UA.....329	W2FXA.....329	WA8DXA.....327	ON4QX.....323	WB5MTV.....320	W5OG.....315	G3KMQ.....308	YV5ANT.....294	W2LZX.....279
K9BWQ.....329	SM6CST.....329	IT9QDS.....327	K9QVB.....323	W1WAI.....320	I5XIM.....314	K1VHS.....306	HB9DDZ.....292	HB9AFI.....278
K9MM.....329	N4JF.....329	W6DN.....327	DJ2PJ.....323	N6AV.....319	AA2X.....314	N1HN.....306	KB3X.....289	HA5NK.....278
K2ENT.....329	W2UE.....329	G4BWP.....327	K9AB.....322	AA6AA.....319	WA2HZR.....312	W8URM.....305	WG5G/QRPP.....288	KA3R.....277
K2OWE.....329	W9WAQ.....329	IT9TGO.....326	IT9ZGY.....322	KU0S.....319	NC9T.....311	G2FFO.....304	W7IIT.....287	W3HQU.....276
K4CEB.....329	N6AR.....328	W7ULC.....326	W4OEL.....322	W4OEL.....319	OH3NM.....311	VE9RJ.....304	K8HQW.....286	WF9K.....276
I4EAT.....329	YU1HA.....328	N7MC.....326	K4XO.....321	N5FW.....318	VE7CNE.....311	WA4DAN.....302	CT1YH.....284	YU7FW.....275
K6JG.....329	AA4KT.....328	W0HZ.....326	N2KW.....321	N6CW.....318	IK2ILH.....311	KA2DIV.....301	N4OT.....284	
K6LEB.....329	K8NA.....328	W0JLC.....326	VE3HO.....321	KA5TQF.....318	K4CXY.....310			

SSB

K4MZU.....329	DL9OH.....329	SV1ADG.....328	WD0GML.....325	WS9V.....321	WB6PSY.....318	K1VHS.....312	N6RJY.....303	TI5RLI.....287
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K2FL.....329	W6EUF.....329	WA4WTG.....328	W7FP.....325	VE4AT.....321	9H4G.....318	N1ALR.....311	KD5ZD.....303	IK8BMW.....286
W9DWO.....329	OE3WWB.....329	WD8PUG.....328	WW1N.....325	ON5KL.....321	ZL1BIL.....318	KF8VW.....311	WA8MEM.....303	N8BJQ.....285
W9SS.....329	W2FXA.....329	N4JF.....328	XE1CI.....324	WA4DAN.....321	WA6DTG.....318	I2MQP.....311	RA2YA.....302	KB5RF.....284
WA4IUM.....329	SM6CST.....329	W7OM.....327	W5XQ.....324	AA6AA.....321	NC9T.....318	I4CSP.....311	W2LZX.....302	KJ5LJ.....284
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XE1AE.....329	K3UA.....329	AA4KT.....327	KA5TQF.....324	KI3L.....321	W3GG.....317	KA5RNH.....310	NO4J.....301	XE1LI.....283
EA2IA.....329	OK1MP.....329	KC8EU.....327	WB4PUD.....324	KR9O.....321	XE1XM.....317	TI2JJP.....310	WP4AFA.....301	KE6CF.....283
K2ENT.....329	W6DN.....329	KM2P.....327	LZ1HA.....324	VE3HO.....321	KB3OQ.....317	ZL1BOQ.....310	WA5SUE.....301	YC3OSE.....282
OZ5EV.....329	I2QMU.....329	LA7JO.....327	K6WR.....323	XE1MD.....321	LU7HJM.....317	W3SOH.....310	YU2TW.....300	YV1JV.....282
KA3HXO.....329	PA8XPQ.....329	K7LAY.....327	WA3HUP.....323	KB2MY.....321	KV2S.....316	N6AHV.....309	WT4T.....300	WB2NQT.....282
CX4HS.....329	N4JF.....329	VE2WY.....327	K9HDZ.....323	KB1JU.....321	WA9RCQ.....316	KP4P.....309	W7KSK.....300	VE4MT.....282
F9RM.....329	CX1TE.....328	WB3DNA.....327	K0GT.....323	CE7ZK.....321	KB9OC.....316	XE1MD.....309	VE3FJE.....300	WA8QH.....281
I4EAT.....329	K5OVC.....328	K6LEB.....327	K4MQG.....323	WB4DBB.....321	KB8O.....316	WA8YTM.....309	AB4UF.....300	VU2DVP.....281
KB8DB.....329	AA6BB.....328	K8CSG.....327	YV5CWO.....323	WB2JZK.....321	EA3EQT.....316	KP4EQF.....309	WB4UHN.....300	W8/DL2SCA.....281
VE3XN.....329	KA6V.....328	IK8BOE.....327	TI2HP.....323	K9QVB.....320	N3ARK.....316	I8SGF.....309	I8IGS.....299	LU6FAZ.....281
YU1AB.....329	K5TVC.....328	VE2PJ.....327	VE7WJ.....323	KB5FU.....320	IK7DBB.....315	N5HSF.....309	K5DUT.....299	KB5MRT.....281
VE1YX.....329	I8ACB.....328	K7EHI.....327	IBXTX.....323	AA4AH.....320	KC2FC.....315	KA4RAW.....309	I2ZGC.....299	WN6J.....281
N4MM.....329	N6AR.....328	W6BCO.....327	I8YRK.....323	G4GED.....320	WA5HWB.....315	W8URM.....308	NW5K.....299	NX8I.....280
N7RO.....329	YU1HA.....328	K2JLA.....326	N5FW.....323	NJ0C.....320	HR1KAS.....314	N6AV.....307	WB6GFJ.....299	YU1TR.....280
YS1GMV.....329	WD8MGO.....328	K2JF.....326	TI2CC.....323	W6NLG.....320	OH5KL.....314	W5P.....307	Y33VL.....299	WN5K.....279
K9MM.....329	XE1L.....328	WB5TED.....326	K4POV.....323	IK8GCS.....320	WD8DMN.....314	TI2TEB.....307	AB4NS.....299	4X6DK.....279
4Z4DX.....329	K8LJG.....328	W6BCO.....326	I4LCK.....323	W6MFC.....320	ZS6A00.....314	VE3DLR.....307	KJ9N.....298	KK4TR.....279
ZL1AGO.....329	KB4HU.....328	WB4UBD.....326	N2KW.....323	K4SBH.....320	F6BFI.....314	KX5V.....307	VE3CKP.....297	KA8ZFX.....279
KF7SH.....329	K8NA.....328	PY4OY.....326	K8HQW.....323	WE2L.....320	W5GVP.....314	XE1MDX.....306	KD4YT.....297	HA5NK.....279
ZS6LW.....329	VE3MR.....328	W2CC.....326	KS2I.....323	N5ORT.....320	N6PTI.....314	VK3JF.....306	EA5RJ.....296	VU2CVP.....278
VK4LC.....329	VE3MRS.....328	WZ4I.....326	KA9I.....323	N2VW.....320	PY2DBU.....314	EA2AOM.....306	HP1JC.....296	VE7HAM.....278
YV5AIP.....329	OE2EGL.....328	W2FGY.....326	I8KCI.....322	XE1ZLW.....320	K7TCL.....314	W6SHY.....306	VE3XO.....294	K4BYK.....277
ZL3NS.....329	W4NKI.....328	I2EOW.....326	I0AMU.....322	OE7SEL.....320	KD9CN.....314	4X4JO.....306	KJ6GC.....294	WN5MBS.....277
K9IW.....329	KZ4V.....328	W8SR.....326	K4CXY.....322	EA8TE.....320	K4LR.....313	WA2FKF.....306	IT9VDO.....293	CT1AHU.....277
K6JG.....329	K3UA.....328	IK1GPG.....326	K9AB.....322	CX1TE.....319	W1LQO.....313	N4KE.....305	OA4QV.....293	KG6LF.....277
WA6OET.....329	VE3GMT.....328	AA5NK.....326	G4ADD.....322	K9TI.....319	I8INW.....313	K3LUE.....305	AA2FN.....293	YB1RED.....277
WA4JT1.....329	K9BWQ.....328	K8YVI.....326	OA4ED.....322	K1UO.....319	K8CMO.....312	WF9K.....305	TI2LTA.....292	VE2DRN.....277
YV1AJ.....329	IK8CNT.....328	YV1CLM.....326	I4WZK.....322	KF5AR.....319	K8NWD.....312	NI5D.....305	K9EC.....292	W0IKD.....277
YV1KZ.....329	W0YDB.....328	IK0IOL.....325	I4SAT.....322	I8IYW.....319	ZS6BBY.....312	G4NXG/M.....305	K2EEK.....292	G0LRX.....277
N6AHU.....329	OZ3SK.....328	IT9TQH.....325	KE5PO.....322	KD5ZM.....319	WA9IVU.....312	KJ6HO.....305	N6ITW.....291	KC6AWX.....276
EA4DO.....329	W4EEE.....328	WA4ECA.....325	W7ULC.....322	I1POR.....319	K3NEE.....312	WA1DHM.....304	CP5NU.....290	EA5GKE.....276
W9OKL.....329	A18M.....328	K9HQM.....325	I8LEL.....322	VE2GHZ.....319	WD0BNC.....312	W3YEY.....303	CT1EEB.....290	NX4Y.....275
9A2AA.....329	W4UW.....328	KC5P.....325	KB7VD.....322	KU9I.....319	IN3ANE.....312	AC0A.....303	WA3KKO.....290	AB4NS.....275
KD8V.....329	KE4VU.....328	K1HDO.....325	K4JLD.....322	K8YVI.....319	4N7ZZ.....312	KB9LN.....303	I4UFH.....289	DK5WQ.....275
DL8KG.....329	WB6OKK.....328	N4KEL/M.....325	N5FG.....322	W4UNP.....319	F1OZF.....312	AB4PY.....303	YB1RED.....289	
KZ2P.....329	AG9S.....328	W5LLU.....325	W0ULU.....322	KQ9W.....318				

RTTY

K2ENT.....307
WB4UBD.....275
K3UA.....266
N14H.....252
KE5PO.....228

it's simply amazing how interconnected this strange world of DX is!

Upcoming DX Operations

Robert Wilber, N4GCK, one of the 3Y0PI DXpeditioners, passes along the following:

I rcv'd FAX communiqué from Saudi diplomat (friend) stating that my request for operation has been approved for July 1994. Request was granted for use of callsign **700CW**. I nearly rcv'd same permission two years ago.

However, due to problems with another group of amateurs seeking operating authorization, Yemeni authorities abruptly broke all communications with my Saudi contact in Jeddah.

Needless to say, I was extremely surprised to have received this sudden permission to operate after nearly three years of efforts. One big problem does exist, however! After taking off nearly two months of work to join the Peter I Island 3Y0PI DXpedition, I am critically short of vacation time. Although I believe I will somehow pull this off, I'm not too certain at this point of just how I'll do it!

If I can manage the time constraints with my

overseas work, I plan to operate from Yemen 700CW for 4 to 5 days, mostly CW! I will inform you as further developments unfold. Stay tuned! X fingers!

A large group of Dutch operators will be active from Sliema, June 24th until July 4th. During their DXpedition/holiday they plan to be active on 70 cm, 2 meters, 6 meters, and 10-80 meters (including the new bands). Operations will be on CW/SSB, and they also plan some AO-13 activity. Look for the following operators:

CQ DX Awards Program

SSB

2082IK2NCJ 2084KB8NTY
2083EA3CCN 2085F3PZ

CW

896KB8NTY 898K7EHI
897F6HMJ

RTTY

18G4BWP 19KB8DB

SSB Endorsements

320N4KG/329	310W4UNP/319
320DL9OH/329	310KD9CN/314
320OK1MP/329	310I4CSP/311
320K3UA/329	300W6SHY/306
320W6DN/329	275KD4YT/297
320I2QMU/329	275AB4NS/299
320PA0XPQ/329	275K2EEK/292
320N4JF/329	275G0LRX/277
320W2FXA/329	250KQ4GC/266
320WA4WTG/328	250VE9RJ/254
320WD8PUG/328	250EA3CCN/261
320K7EHI/327	150KB8NTY/190
320W6BCQ/327	150IK2NCJ/163
320YV1CLM/326	150F3PZ/150
320K8YVI/326	28 MHzKB8NTY
320KA9I/323	28 MHzEA3CCN
320WB2JZK/321	3.5/7 MHzEA3CCN
320EA8TE/320	1.8 MHzEA3CCN
320N5ORT/320	

CW Endorsements

320N4KG/329	320G4BWP/327
320OK1MP/329	320I2QMU/326
320W0IZ/329	320W4OEL/322
320W2UE/329	300VE9RJ/304
320PA0XPQ/329	300YU1TR/301
320W2FXA/329	275F6HMJ/284
320W9WAQ/329	250K7EHI/264
320KB8DB/327	150KB8NTY/169
320W6DN/327	28 MHzWB4DBB
320WA8DXA/327	

RTTY Endorsements

250K3UA/266 150G4BWP/164
200KB8DB/221

Total number of active countries is 329. 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 airmail reply. Please make all checks payable to the awards manager.

Frits, PA0BEA/9H3IE; Wim, PA3BIZ/9H3ON; Hank, PA0PRT/9H3IB; Ada, PA3DNW/9H3KF; Frank, PE1KNL/9H3QH; Egbert, PA3ETB/9H3KD; Jan, PA0JWK/9H3QD; and Nick, PA0PAN/9H3KE. Other operators awaiting their /9H3 callsigns are John, PB0AES; Peter, PE1NZA; and Teun, PA0TPM. QSL to operators CBA. (Thanks, OPDX.)

In special-event station news the Canton Amateur Radio Club will operate **W8AL** July 25-31 to celebrate the Pro Football Hall of Fame Greatest Weekend. On CW try 3700, 7125, 10120, 14050, 18080, 21125, 24910, and 28125 kHz. On SSB watch 3870, 7270, 14270, 18150,



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1RU7	19 x 7 x 1.75	36.50	2RU15	19 x 15 x 3.5	48.25
1RU10	19 x 10 x 1.75	38.75	2RU17	19 x 17 x 3.5	51.25
1RU12	19 x 12 x 1.75	42.75	3RU5	19 x 5 x 5.25	46.00
1RU15	19 x 15 x 1.75	45.75	3RU7	19 x 7 x 5.25	48.50
1RU17	19 x 17 x 1.75	48.75	3RU10	19 x 10 x 5.25	51.00
2RU5	19 x 5 x 3.5	36.50	3RU12	19 x 12 x 5.25	54.00
2RU7	19 x 7 x 3.5	38.75	3RU15	19 x 15 x 5.25	57.00
2RU10	19 x 10 x 3.5	41.25	3RU17	19 x 17 x 5.25	60.00

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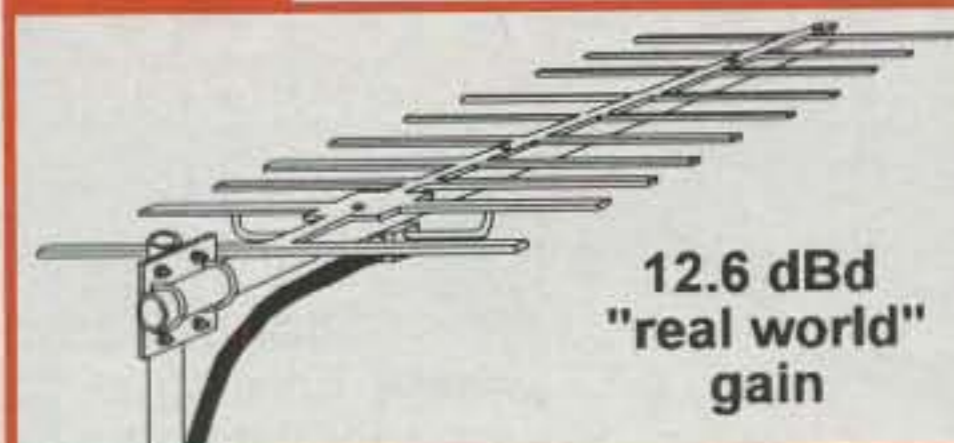
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4K4POL to UA8KCL
4L1AA to CT1CJJ
4L1HX to IK2MRZ
4M1I to I2CBM
4M4A to W1AF
4M5V to W1AF
4N5GBC to YU5GBC
4N5M to YU5GBC
4N5W to YU5GBC
4X58R to 4X4BE
5N8ASP to W3HCW
5N8MVE to ON7LX
5X1F to WB1DBC
5Z4FA to KB4EKY
5Z4JD to F6AJA
5Z4RH to WA4WTG
6Y5MC to WA4WTG
7Q7DU to KD4UDU
7Q7LA to G8IAS
8P8A to WA4WTG
8P6CZ to VE2RY
8Q7XE to DF2XE
8R1/N4VA to N4VA
9G1RZ to K8JP
9G1SD to N8NLP
9G1YY to IK7MCJ
9I2A to DL7VRO
9I2M to DL7VRO
9I2Z to DL7VRO
9J2B0 to W6ORD
9J2PI to KB8KVA
9K2ZC to KC4ELO
9K2ZZ to W8CNL
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C53HG to W3HCW
C6AHL to K3DI
C91AI to CT1DGZ
CG1B to VE1AL

CQ7CBI to CT1CBI
D3C to F6FNU
DK8KU to DK5VP
EK7DX to DL1VJ
EL2PP to N2CYL
ET3RA to HB9CVB
EU6MM to YL1XZ
EX8M to DF8WS
EY8MM to DL8WN
EZ5A to W5BWA
EZ5AA to W5BWA
F08HAR to WD5N
F08PT to DJ8FX
F05OU to F6GQK
FR5ZU/E to VE2NW
FT5YE to F1AAS
GD8SLY to WA3CGE
GJ3ULT to G3XTT
GJ4RTO to G4RTO
H21A to 9A2AJ
H44MS to DL2GAC
HH2J to KA9RLJ
HP1XBH to W4YC
HR28DC to AA5ET
HS8ZAA to KM1R
J37ZY to NS8G
J87BZ to DL7FT
JD1BIE to JA8FCG
P48U to W8UVZ
PJ8H to W1AF
PJ9Y to OH3GZ
PY8FF to W9VA
PY8FM to PY5CC
RU6LC/B to UA6LU
RW3TT/B to DLBAAM
S21ZG to W4FRU
S52DD to WA4WTG
S53RY to WA4JTK
S79KMB to KN2N
S79MX to HB9MX
SV/WY3V to WB2RQW
SV8HS to DJ8MT
T22CC to JR2KDN
T23JJ to JR2KDN
T38JJ to JR2KDN
T33KK to SM7PKK
T5YOU to WA6YOU
T91ENS to DJ8JV
T97M to DL8OBC
T97N to YU4EA
T97T to SM5AQD
TG9AJR to WA1ECA
TL8NG to WA1ECA
TM5FB to F5XL
TU2ZR to SM3DMP
TU5DX to F6ELE
T26FIC to F6KEQ

V59PI to DJ6SI
V63SD to K7ZSD
VA2TA to VE2BQB
VD2QK to VE2QK
VK3FBL to HB9AFI
VK6CHI to VK6LG
VK9NJ to G3SWH
V02BC to VE3YYR
VP2EJA to JA1VPO
VP5/K9IMM to WB9NOV
VP5/NS9L to WB9NOV
VP5N to N2VW
VP5P to WB3DNA
VP8GAV to GM8LVI
VQ9LV to KY3V
VR2GC to G5JJ
VS6WO to K9ES
VU3DEN to VU2DVC
VU7LI to VU2STG
XE2MOO to KD5RQ
XF8C to XE1BEF
XF4C to XE1BEF
XT2BW to WB2YQH
XX9AS to KU9C
XX9TZ to KU9C
YS1DRF to W2PD
YS1XS to WD4PDZ
YT5R to YU5GBC
Z38M to YU5GBC
Z31GX to YU5XTC
Z31PK to YU5XVD
Z32JA to YU5XTC
Z32KO to YU5FSO
Z32MC to YU5GBC
Z32MM to YU5GBC
Z32RY to YU5GBC
Z32UC to YU5GBC
Z32XA to YU5GBC
Z32XX to YU5GBC
Z32ZT to YU5GBC
Z37GBC to YU5GBC
ZK1TB to W7TB
ZP5XYE to JA7ZF
ZX8F to PY5EG
ZY8FT to PY5TM
9K2GS to Abdul, P.O. Box 1713, Safat, Kuwait
BA7KC to Quan, P.O. Box 388, Quanzhou, PRC
TR8LT to P.O. Box 8000, Libreville, Gabon
YI9CW to P.O. Box 11, Warsaw, Poland
Z32GB to P.O. Box 38, 92000 Stip, Republic of Macedonia
Z32RC to P.O. Box 60, 92000, Stip, Republic of Macedonia

21350, 24950, and 28350 kHz. There will also be satellite, RTTY, packet, and VHF activity. They offer a nice certificate for working the special-event station. For an unfolded certificate send your contact number and a 9 x 12 SASE with two units of first-class postage. For a QSL or folded certificate send your contact number and QSL with a #10 (business-size) SASE to Randy Phelps, KD8JN, 1226 Delverne Ave. SW, Canton, OH 44710-1306.

Also, the Old Barney Amateur Radio Club will operate **W2OB** Aug. 6-7 from Old Barney, the Barnegat Lighthouse in Barnegat Light, New Jersey. This is on the IOTA island of Long Beach (NA-111). They'll be active 1300-0000Z both days in the bottom 25 kHz of the General-class subbands of 40, 20, 15, and 10 meters. QSL to NU2F with a 9 x 12 envelope and two units of postage for an unfolded certificate.

Speaking of IOTA, the second IOTA contest is July 30-31. More details are in the contest column, but DXers should be

planning and "reserving" their islands soon. This is a great way for IOTA neophytes to get a good start on island chasing. Give it a try!

DX Gatherings

The Association of Radio Amateurs of the Republic of Mexico (ARARM) has announced their annual convention to be held in Puebla, Mexico, July 21-23. The convention will feature seminars on a variety of topics of interest to amateurs as well as cultural programs and tours, culminating with a Gala Fiesta Mexicana for amateurs and their families. ARARM would particularly like to invite amateurs from the USA and other countries. For further information contact Frank R. Smith, AH0W/XE2FIN, Consulate of Finland, 5933 West Grovers Avenue, Glendale, AZ (602-876-2718).

The 1994 **W9DXCC** Convention and Banquet (see the April 1994 DX column) has moved to a superior location: the

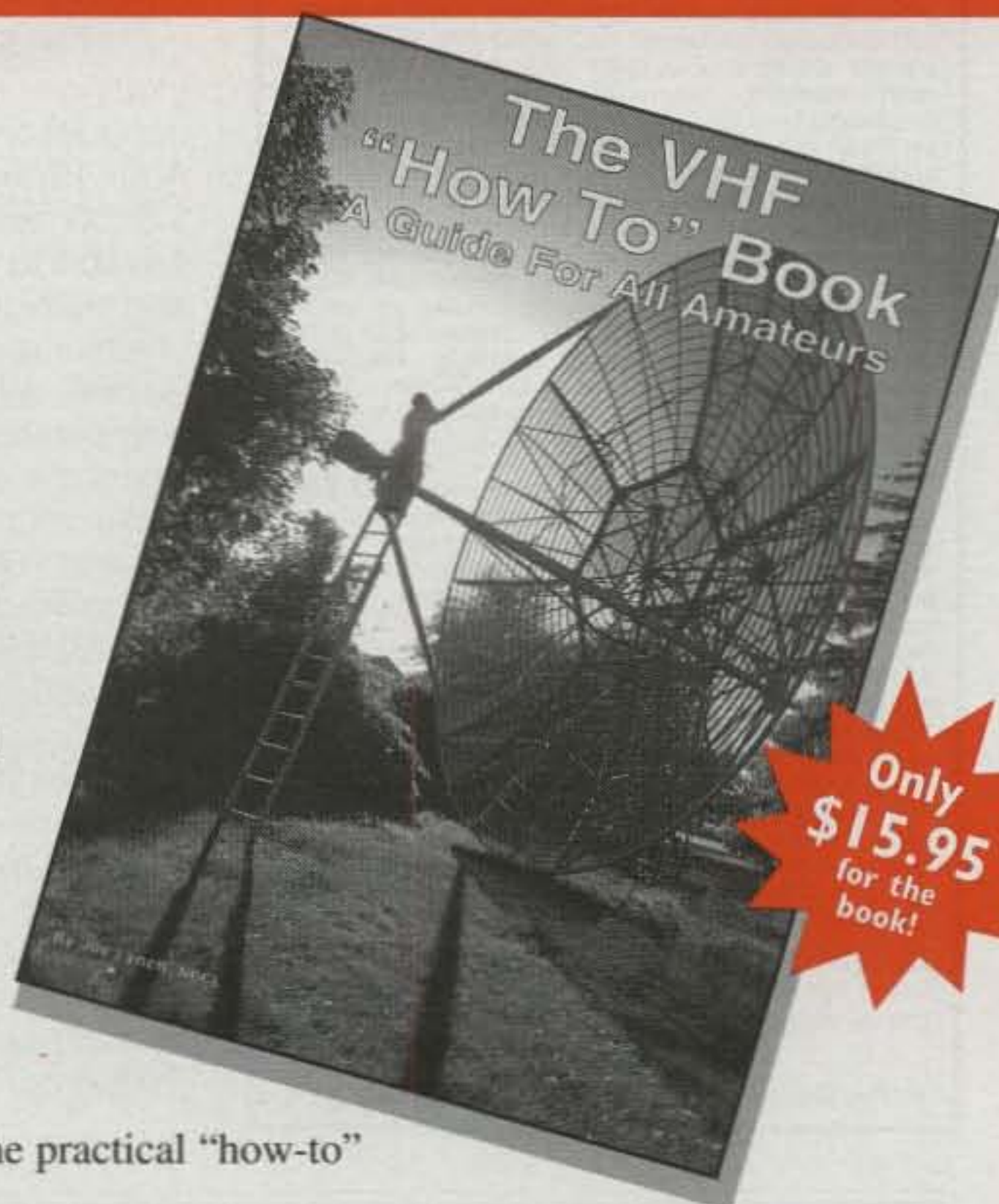
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Brian Beezley, K6STI

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Rolling Meadows Holiday Inn Holidome, 3405 Algonquin Road, Rolling Meadows, Illinois. The dates are Sept. 9-11. The program this year includes the 3YØPI Peter I Island DXpedition; Rod Newkirk, W9BRD; IOTA with W4BAA; Low-Band DXing by WB9Z; QSL checking for DXCC and CQ awards, and much more. The banquet speaker is Wayne Mills, N7NG. Registration is \$33.50 for full registration, including the banquet, or \$23.50 for the banquet only, both prior to Aug. 15. (After Aug. 15 the prices increase to \$38 and \$26.50, respectively.) Send your check payable to W9DXCC with name, address, and callsign, as well as dinner preference of either roast beef or chicken, to Gordon Bazsali, WB9EEE, 255 Hillcrest Street, Hampshire, IL 60140. Hotel rooms at the Holidome are \$65/night for 1 to 4 persons. Make your reservations directly with the hotel at 708-259-5000.

The Radio Society of Great Britain's (RSGB) 1994 International HF and IOTA Convention will be held Oct. 7-9 at the Beaumont Conference Centre, Old Windsor, Berkshire, UK. This year marks the 30th anniversary of the founding of the Islands On The Air program, with a birthday party Friday night. The program includes VK9MM, ZD9SXW, and 3YØPI DXpeditions, and many other technical and DXpedition programs. For more information contact Neville Cheadle, G3NUG,

Further Felden, Long Croft Lane, Felden, Hemel Hempstead, Herts HP3 0BN, UK.

Finally, some sad news. Katashi Nose, **KH6IJ**, passed away on April 7 following a stroke. Nose was first licensed in 1932. In the 1930s he was frequently the top scorer from Hawaii in the ARRL DX test and Sweepstakes on CW. He won the very first CQ WW DX CW contest in 1939 using a homebrew rig, with handmade capacitors. He provided the first KH6 contact for thousands of DXers around the world. Nose wrote many technical articles, covering various aspects of antenna construction. He was ex-president of the Honolulu Amateur Radio Club and served on the WARC-79 and ARRL Contest Advisory Committees. He earned the first WAS, DXCC, and WAZ from Hawaii. Nose was the second amateur inducted into CQ's Contest Hall of Fame, in 1987. He is survived by his wife, Matsuyo.

Another recent Silent Key is Harvey McCoy, W2IYX. Harvey was the inventor of frequency-shift keying radio teletype, and was the long-time editor of *The Long Island DX Bulletin*.

We send our condolences to the families of KH6IJ and W2IYX. They will be missed.

QSL Notes

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QSL **EA8AH** via operator Pekka Kolehmainen, OH1RY, at his new address: Kisatie 10, 21520 Palmo, Finland.

QSL **V31BW** to Bobby Webb, WB5B, 1001 W. Louisiana St., McKinney, TX 75069.

QSL **BZ4DHI, 3A/I1ZB, 3A/I1QOD, 3A/I1YRL** via Luc Glarey, I1YRL, Via San Martino 11, 10091 Alpignano (to) Italy.

QSL **8P9GG** to Michael Shaer, VE2XB, 5271 Connaught Street, Montreal, Quebec Canada H4V 1X5.

VU2DK reports that Indian postal workers have discovered that QSL requests often contain valuables, such as IRCs and currency. This has led to considerable tampering and pilfering of amateur mail. He reminds DXers to use standard techniques to reduce such problems: no folded return envelope (use envelopes of different sizes), disguise return postage, no call signs on envelopes, use security envelopes to ensure nothing can be seen

of contents, and carefully seal with tape all envelope flaps.

QSL the April Aland Island operation of **OH0MYF** via Harry Mantila, OH6YF, P.O. Box 30, SF-64701 Teuva, Finland.

The Chinese Taipei Amateur Radio League now has a QSL bureau for BV amateurs: P.O. Box 73, Taipei, Taiwan ROC.

QSL the WPX SSB operation of **CQ1A** via WA1ECA.

QSL **1C1AK** via Idris, Box 1, Grozny, Chechenia, via Russia.

QSL **CO2MA/CO4, T42CW, and T43VR** via Ed, CO2MA, Box 21056, Alamar, Havana 12500, Cuba.

QSL Alex L. Rubtson, **EY8CQ** (ex-UJ8JCQ), to Box 1102, Dushanbe 734032, Tajikistan Republic. Do **not** send cards via Moscow, and do **not** include any money; IRCs are okay.

QSL Lev N. Rubtson, **EY8AB** (ex-RJ8JAB), to Box 1047, Dushanbe 734036; other information as above.

QSL club station **EY1ZA** (ex-RJ7JYZ) to P.O. Box 126, Dushanbe 734025; other information as above.

QSL **EA8AH** to Pekka Kolehmainen, OH1RY, at his new address: Kisatie 10, 21530 Paimo, Finland.

QSL **6D2X, XE2XA, and XE0DX** via Ken Quin, K5TSQ, Box 734, Edinburg, TX 78540.

QSL **J52AG** via Erik Sjolund, SM0AGD,

Vestagatan 27, S-195 56 Marsta, Sweden. Most of Erik's 4000 QSOs were from the mainland; only 28 were from AF-020.

QSL **4X/VE2UJ** via 9A2AJ. Gil says he has answered all QSLs for **VE2LID**, his CQ Zone 2 operation in CQ WW CW 1992. Anyone still needing a VE2LID card should send it to Gil Ouellet c/o UNTSO, P.O. Box 5854, New York, NY 10017.

QSL **PY5CHO** via Lions Clubs de Curitiba Marumbi, P.O. Box 6058, CEP 80011-970, Curitiba PR Brasil.

QSL the contest call **PT5W** direct to Ulysses J. Santos Neto, PY5LY, P.O. Box 6058, 80011-970 Curitiba PR Brasil.

QSL contest call **ZY5WKS** direct to Alessandro C. Siva, PU5WKS, P.O. Box 1455, 80001-970 Curitiba PR Brasil.

QSL the contest call **ZY5RY** direct to Germano Lema, PY5RY, P.O. Box 6058, 80011-970 Curitiba PR Brasil.

QSL **ZF2VW, ZF2PV, FP8DK, and 6Y5/W7WY** via W7WY.

QSL **BV9P** via the CTARL bureau with SASE: P.O. Box 93, Taipei ROC, or via BV2TA, Box 112/16, Taipei, ROC.

QSL Jim Bennett, **TU4EI**, via manager W3HCW. Don't use the TU bureau; Jim reports not receiving any cards via that route.

QSL **VP2E/N4CD** and **VP2E/N2TPH** via Bob Voss, N4CD, 3133 Charring Cross, Plano, TX 75025.

73, Chod, VP2ML



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	DR-600T	\$20 OFF	EJ-7U (Tone Squelch)	\$ 5 REBATE	= \$40
			EDC-19 (Sep. Kit)	\$15 REBATE	
	DR-130T	\$20 OFF	EJ-20U (Tone Squelch)	\$ 5 REBATE	= \$30
			EJ-19U (100 Memory)	\$ 5 REBATE	= \$25
	DJ-580T	\$20 OFF	EMS-8Z (Speaker-Mic)	\$ 5 REBATE	
	DJ-180T/TH	\$10 OFF	EJ-15U (200 Memory)	\$ 5 REBATE	= \$20
			EMS-9 (Speaker-Mic)	\$ 5 REBATE	
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2. Send a copy of your invoice(s) dated between May 9 and July 20, 1994 to Alinco Electronics in order to receive your Bonus Coupon rebate check.
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WASHINGTON READOUT

REGULATORY NEWS IN THE WORLD OF AMATEUR RADIO

BY FREDERICK O. MAIA, W5YI

Amateur Packet Message-Forwarding Rules Amended

The FCC has relaxed the amateur service rules to enable modern packet radio message-forwarding systems to operate at hundreds of characters per second while retaining safeguards to prevent misuse.

This rulemaking got its start more than three years ago during the Persian Gulf War when the FCC's Norfolk, Virginia field office sent violation notices to eleven east coast amateurs. The citations were issued due to a single message that was posted by a Pennsylvania amateur on a packet bulletin board. The message addressed to @USA (all U.S. amateur stations) publicized a 900 number to call to register opposition to the war brewing in Iraq.

The message mentioned a New York City organization known as the "Coalition to Stop U.S. Intervention in the Middle East." Although never proven, it was reported that callers to the 1-900-44-NO WAR number were assessed a \$10 charge. A formal complaint was filed with the FCC by another amateur who believed the message to be a business-oriented communication prohibited by the then existing Part 97.113 of the amateur service rules. That rule specified "No amateur station shall transmit any communication the purpose of which is to facilitate the business or commercial affairs of any party."

Instead of issuing a citation against just the message originator, however, the FCC additionally sent violation notices to all packet (digipeating) stations listed in the message header that unknowingly retransmitted the notice. The point the FCC wanted to get across was that under rules then in effect, amateurs may not retransmit prohibited communications.

The amateur high-speed message forwarding system is a network of digipeating packet radio stations participating in a voluntary, cooperative, interactive arrangement. Traffic from the control operator of an originating station is transmitted to one or more destination stations via forwarding stations, most of which are automatically controlled. If the message is not for a receiving station, that station retransmits (digipeats) it further on down

the line. The addressee information is contained in the message header.

Almost instant pandemonium broke out in the amateur community once word got out regarding the FCC violation notices! Amateurs would now have to review all messages racing through their automatic relay stations, since they were also being held accountable for the violative communications passing through them. Up until this point amateurs believed that message originators were solely the accountable party. Many feared it would bring down the high-speed amateur packet radio system.

The FCC pointed out that there is no central supervisory authority in the amateur digital network which makes these unsupervised systems easy targets for misuse by uncooperative operators and non-licensees. Moreover, the Commission said that it could be difficult to establish after the fact that a particular VHF station originated a high-speed digital transmission. For these reasons the Commission said there must be on-going oversight of the system, and the control operators of the first forwarding stations are in the best position to provide such oversight.

The stage was set for a revision of the message-forwarding rules by the FCC's adoption of new permissible communications content parameters. Last July (1993), the Commission established a four-part test that amateurs would use in the future to determine permitted communications. Effective in September of last year, any amateur communications would now be permitted on the amateur bands:

- (1) as long as they were not for hire or material compensation (i.e., paid communications);
- (2) the control operator or;
- (3) his employer did not have a pecuniary (financial) interest in the communication and;
- (4) the communication was not specifically prohibited.

Basically, that meant "business" (including logistical) communications could indeed now be transmitted under certain circumstances. The "specifically prohibited" communications included music, communications facilitating a criminal act, messages obscured by codes and ciphers, obscene or indecent language,

and false or deceptive messages, signals, or identification.

New Packet Message-Forwarding Changes

Once the proposed change in the "no business" rule was underway, the FCC adopted another Notice of Proposed Rulemaking which looked toward holding "The control operator of the station originating a message and the control operator of the first station retransmitting that message . . . accountable. . . ."

Most amateurs wanted the message originator to be solely responsible. And ultimately that is basically what they got. The revised wording in the Report and Order states that the message originator is indeed the *primary* responsible party. The FCC Commissioners adopted a Report and Order which, effective June 1, 1994:

(1) Holds the message originator primarily accountable for its content. (New §97.219[b])

(2) Originators of messages posted for transmission (such as to a "bulletin board") by amateur stations but not yet entered into the packet system must be known to the licensee of the first forwarding station, or the licensee of the station which enters that traffic into the network must accept responsibility for its content. (§97.219[d])

The Commission also clarified the following: the station that receives a communication directly from the originating station and introduces it into the message-forwarding system is the first forwarding station. We believe that means that the originator and first forwarding station can be one and the same, if it is the originator who enters the message into the system.

The Commission believes that these rule changes will enable contemporary high-speed message-forwarding systems to operate as their designers intended, while retaining the minimum safeguards necessary to prevent misuse. The following is part of the text of the Commission ruling on message forwarding in the amateur service:

Report and Order

Adopted: March 30, 1994

Released: April 13, 1994

Effective: June 1, 1994

National Volunteer Examiner Coordinator, P.O. Box 565101, Dallas, TX 75356-5101 (817-461-6443)

Introduction

On March 18, 1993, we adopted a Notice of Proposed Rule Making ("Notice") in the above-captioned proceeding. In the Notice, we proposed to relax the amateur service rules to enable contemporary message-forwarding systems to operate at high speed while retaining safeguards to prevent misuse.

Discussion

Message-forwarding systems have been a mainstream operating activity since the inception of the amateur service early in this century. The development of digital technology now makes high-volume, high-speed communications systems practical. This development has resulted in thousands of amateur operators voluntarily linking their individually licensed very-high-frequency (VHF) stations together to form easily accessible ad hoc message-forwarding systems. Currently, the control operator of each station is held individually accountable for each message retransmitted. This introduces unnecessary message-content review and resultant system delays. The objective of this proceeding, therefore, is to ascertain the accommodations that should be provided for amateur stations operated in contemporary high-speed message-forwarding systems to eliminate unnecessary oversight procedures. There were 42 comments and 2 reply comments filed in response to the Notice.

The potential for transmitting a high volume of messages cannot be achieved because Section 97.103(a) of the Commission's Rules, 47 C.F.R. §97.103(a), holds each station licensee and control operator accountable for the proper operation of the station. This requires, in effect, the control operator of every forwarding station to review each message for improper content prior to its retransmission. The proposed new rule section provided that the control operators of intermediate forwarding stations, other than the first forwarding station, would not be held accountable when their stations retransmitted improper communications inadvertently. This approach would facilitate high-speed message forwarding yet retain a degree of protection against abuse. We also proposed to restate the definition of the term "repeater" in Section 97.3 of the Commission's Rules to preclude any confusion with the accommodations proposed for message-forwarding systems.

The commenters generally support our approach. They agree with relieving the control operators of intermediate forwarding stations of the need to review every message. Our proposal to retain the requirement for the control operator of the first forwarding station to be accountable for retransmitting improper communications, however, drew a mixed response. The American Radio Relay

League states that the obligation of the control operator of the first forwarding station should be the establishment of the identity of the station originating the message. Only when this is not done should these control operators be held accountable for improper message content. Comments from some amateur operators, however, do not deem it necessary to hold any control operator of a forwarding station accountable for improper communications. And another commenter recommends that the message format be regulated to assist in the identification of the originating station.

There is no central supervisory authority in an ad hoc amateur service digital network. The vulnerability of an unsupervised system can make it an easy target for misuse by uncooperative operators and non-licensees. It can be difficult, moreover, to establish after the fact that a particular VHF station originated a fleeting high-speed digital transmission. For these reasons there must be on-going oversight of the system. The control operators of the first forwarding stations are in the best position to provide such oversight. They are the stations that accept, on behalf of the system, messages from originating stations. We will, therefore, accept the League's recommendation. We are amending the rules substantially as proposed to hold accountable only the licensee of the station originating a message and the licensee of the first station forwarding a message in a high-speed message-forwarding system. The licensee of the first forwarding station must either authenticate the identity of the station from which it accepts communications on behalf of the system, or accept accountability for the content of the message. The matter of message format, however, will be left with the designers of the systems. Since we believe our modification to the rule is sufficient to ensure accountability for violative communications, we see no need to specify any particular message format. The League also requests that we clarify which station in a message-forwarding system is the first forwarding station. The answer is it is the station that receives a communication directly from the originating station and introduces it into the message-forwarding system.

The comments also agree generally that the accommodations for message-forwarding systems should not apply to other operating activities such as repeaters and auxiliary stations. The ARRL and the Colorado Council of Amateur Radio Clubs (CCARC), among others, suggest that we substitute the word "simultaneously" for "instantaneously" in the redefinition of a repeater. We concur with the comments and will adopt these modifications.

In summary, we have decided to

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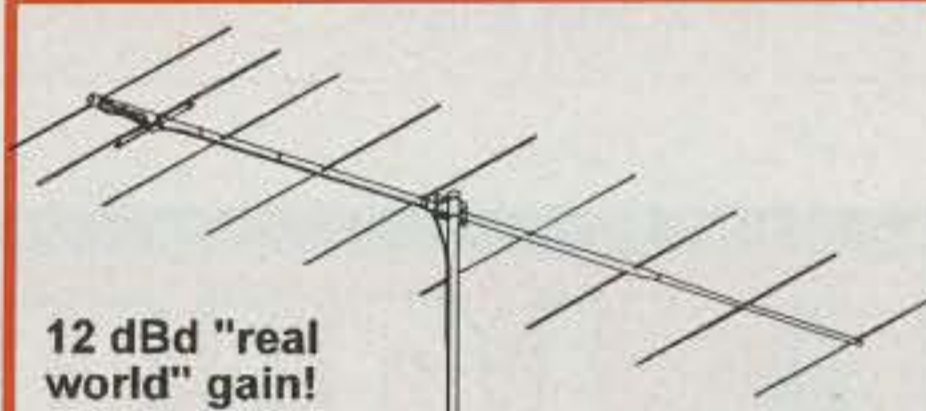
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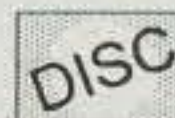
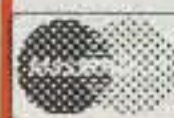


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amend the amateur service rules to accommodate message-forwarding systems. We believe these rule changes will enable contemporary high-speed message-forwarding systems to operate as their designers intended, while retaining the minimum safeguards necessary to prevent misuse.

Part 97 Rule Changes

§97.3 Definitions

(a)(7) *Auxiliary station.* An amateur station, other than in a message-forwarding system, that is transmitting communications point-to-point within a system of cooperating amateur stations.

(28) *Message forwarding system.* A group of amateur stations participating in a voluntary, cooperative, interactive arrangement where communications are sent from the control operator of an originating station to the control operator of one or more destination stations by one or more forwarding stations.

(36) *Repeater.* An amateur station that simultaneously retransmits the transmission of another amateur station on a different channel or channels.

Section 97.109(e) was revised to read as follows:

§97.109 Station control

(e) No station may be automatically controlled while transmitting third-party communications, except a station participating as a forwarding station in a message forwarding system.

A new paragraph (g) was added to Section 97.205 as follows:

§97.205 Repeater station

(g) The control operator of a repeater that retransmits inadvertently communications that violate the rules in this Part is not accountable for the violative communications.

A new Section 97.219 was added to read as follows:

§97.219 Message forwarding system

(a) Any amateur station may participate in a message-forwarding system, subject to the privileges of the class of operator license held.

(b) For stations participating in a message-forwarding system, the control operator of the station originating a message is primarily accountable for any violation of the rules in this Part contained in the message.

(c) Except as noted in paragraph (d) of this section, for stations participating in a message-forwarding system, the control operators of forwarding stations that retransmit inadvertently communications that violate the rules in this Part are not accountable for the violative communications. They are, however, responsible for discontinuing such communications once they become aware of their presence.

(d) For stations participating in a message-forwarding system, the control operator of the first forwarding station must:

(1) Authenticate the identity of the station from which it accepts communications on behalf of the system; or

(2) Accept accountability for any violation of the rules in this Part contained in messages it retransmits to the system.

Quotes From FCC Personal Radio Branch

In the view of FCC staff members with whom we spoke, the new rules are the minimum necessary to comply with the Communications Act—which requires that licensees control their stations.

On accountability for packet message traffic:

"The old rule was that every station is responsible for its transmissions," they explained. "We never thought it was unusual to ask someone to review, monitor, . . . control what their station was transmitting. But with the advent of digital systems, people were saying that this requirement slows things down.

"We looked at this and everyone agreed that the originating station should be responsible. The first forwarding station is a kind of gatekeeper to the packet system, so they are responsible for authenticating the originator's identity. You know who sent it, or you take responsibility for it.

"The rule says they are not responsible if they inadvertently retransmit violative communications. What is a violative communication? Rule 97.113 indicates that any communication is okay to transmit as long as you are not on the wrong side of a four-part test: Is it a message for hire? Is the message on behalf of your employer? Is it expressly prohibited? Is it for the pecuniary benefit of the station control operator? If it passes the test, you're home free. From what we have seen, the amateurs approve of this relaxing of §97.113."

On authentication of users:

"Amateurs are realizing that they need to protect their digital system because people are not using it the way it's intended to be used. Of course, one of the biggest complaints we have is unlicensed operation. Anyone can figure out the call-sign system, and falsify a call sign, and it may take a while for amateurs to catch on that this is an unlicensed person. This is the kind of abuse that can occur to a digital system that doesn't have some kind of authentication, some kind of protection, and it has been occurring."

On the new definition of repeaters in §97.3(36):

"The commenters agreed that a repeater does simultaneous and not instantaneous retransmission, and that it is on a different channel. It could be several different channels. But it was not digipeater operation, store and forward retransmission on the same channel. That was not what was meant by repeater. So we tried to pick a definition that describes what people commonly consider to be repeaters."

73, Fred, W5YI



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SL-11S	•	•	7	11	2 5/8 x 7 5/8 x 9 3/4	12
SL-11R-RA	•	•	7	11	4 3/4 x 7 x 9 3/4	13

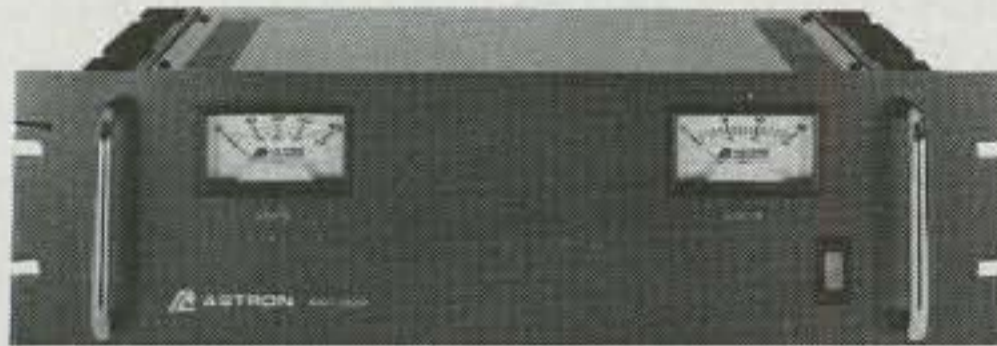
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RM-35A	25	35	5 1/4 x 19 x 12 1/2	38
RM-50A	37	50	5 1/4 x 19 x 12 1/2	50
RM-60A	50	55	7 x 19 x 12 1/2	60
• Separate Volt and Amp Meters				
RM-12M	9	12	5 1/4 x 19 x 8 1/4	16
RM-35M	25	35	5 1/4 x 19 x 12 1/2	38
RM-50M	37	50	5 1/4 x 19 x 12 1/2	50
RM-60M	50	55	7 x 19 x 12 1/2	60

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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-70A	•	•	57	70	6 x 13 3/4 x 12 1/8	48

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• Separate volt and Amp meters				
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
RS-70M	57	70	6 x 13 3/4 x 12 1/8	48

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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
• Variable rack mount power supplies						
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VRM-50M	37	22	10	50	5 1/4 x 19 x 12 1/2	50

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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
SL-11S	•	•	7	11	2 3/4 x 7 5/8 x 9 3/4	12

THE SCIENCE OF PREDICTING RADIO CONDITIONS

Sunspot Cycle Progress

The present solar cycle, the 22nd observed since accurate records have been kept, continues to decrease much as expected.

Dr. Andre Koeckelenbergh, Director of the Royal Observatory of Belgium, reports a mean sunspot number of 32 for March 1994. This results in a 12-month running smoothed sunspot number of 49 centered on September 1993. This is a drop of two points from the previous month's level.

There was a corresponding decrease in the 10.7 cm radio solar flux level, as observed at Canada's Dominion Radio Astrophysical Observatory located at Penticton, BC. A level of 90 was reported for March 1994. This results in a smoothed running number of 103 centered on September 1993.

Three different expert sources predict somewhat different levels of solar activity for July 1994. For example, the National Geophysical Data Center in Boulder, Colorado is predicting a smoothed sunspot number of 35 for July. Dr. Koeckelenbergh from the Belgium Observatory is calling for 28, while the Space Environment Service Center, Boulder is predicting a level of 20.

This month's column contains detailed Short-Skip Propagation Charts based on a smoothed sunspot number of 30, as well as charts centered on Hawaii and Alaska, valid for July and August 1994. The Short-Skip Charts contain forecasts for band-by-band openings between distances of 50 and 2300 miles. For detailed DX forecast over greater distances refer to the DX Propagation Charts for July, which appeared in last month's column. For an assessment of day-to-day conditions expected during the month, see the Last Minute Forecast, which appears at the beginning of this column.

End of Cycle 22 Prediction

Last month's column contained predictions for the remainder of Cycle 22 and the beginning of Cycle 23, which were provided by the Space Environment Service Center (SESC), NOAA in Boulder.

This month another prediction for the end of Cycle 22 is presented by SESC. It is based on a different prediction method, but closely confirms the previous predic-

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for July 1994

Propagation Index.....	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 4, 12, 16-17	A	A	B	C
High Normal: 9-11, 13, 15, 18, 30-31	A	B	C	C-D
Low Normal: 2-3, 5-6, 14, 19, 22-25, 28-29	B	C	D	D-E
Below Normal: 1, 8, 20, 26-27	C	C-D	D-E	E
Disturbed: 7, 21	C-D	D	E	E

Where expected signal quality is: A—Excellent opening, exceptionally strong, steady signals greater than S9.

B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S9 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.

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 date 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 July 1st, fair (C) the 2nd and 3rd, excellent (A) on the 4th, fair (C) on the 5th and 6th, etc.

tion for Cycle 22 to end sometime between the middle of 1995 and the end of 1996.

The method has been devised by Patrick McIntosh at SESC. It is based on the assumption that the pattern of the present solar cycle is a continuation of Cycle 21. McIntosh overlaid the progress of Cycle 22 on the data for Cycle 21. This is shown graphically in fig. 1. Using this approach, McIntosh concludes that the middle of 1995 is the earliest time of solar minimum for Cycle 22, which is represented by the black dot in fig. 1. From another perspective, he points out that a cycle ends about three to five years after the first spotless day is recorded after the peak of the cycle. This took place during the fall of 1993, and would result in the end of Cycle 22 occurring as soon as the early fall of 1996. He shows this date with a white circle in fig. 1. McIntosh also points out that while the average solar cycle is 11 years, a group of shorter cycles have a mean duration of 10.2 years. To date Cycle 22 appears to fit the short-cycle patterns, and with a 10.2 year lifetime it would reach its end by late 1996.

At this point in time it is beginning to look more and more likely that Cycle 22 will terminate sometime during 1996.

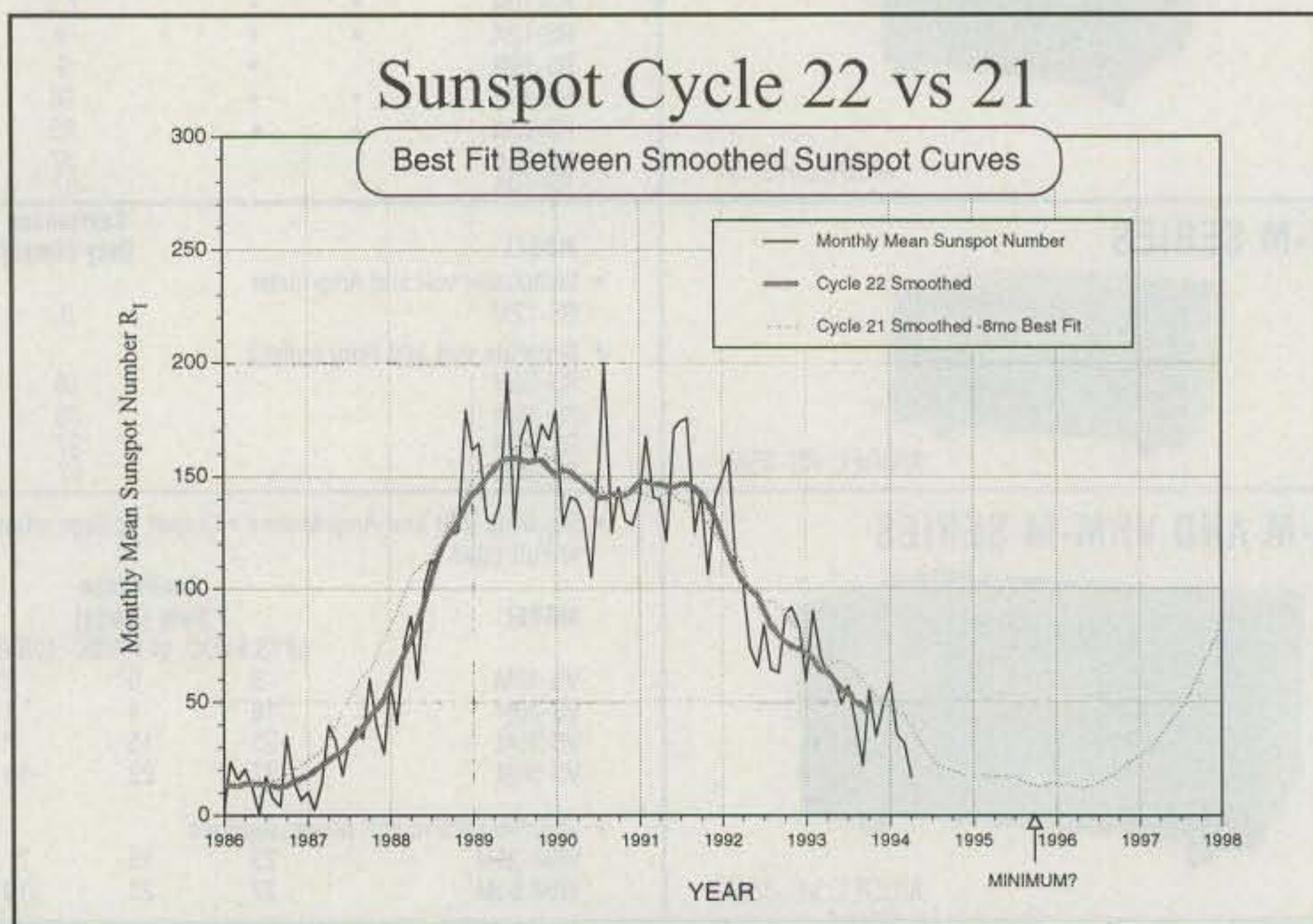


Fig. 1—Patrick McIntosh predictions for the end of sunspot Cycle 22. (The original plot was created by Patrick McIntosh, NOAA.) • = Earliest prediction mid-1995 based on overlay method. o = Prediction based on spotless sun observation, mid-1996. A prediction date of late 1996, although not shown on the chart, is based on the short-cycle pattern of Cycle 22.

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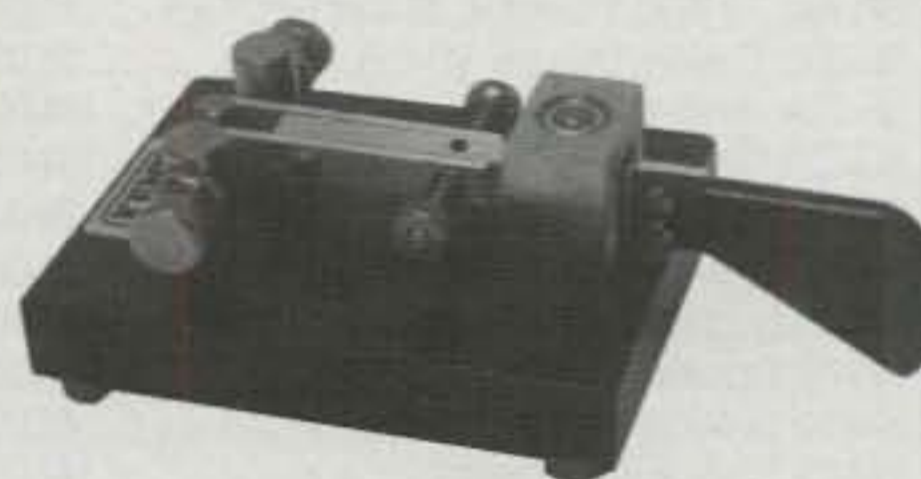
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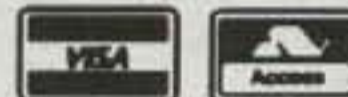
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HOW TO USE THE SHORT-SKIP CHARTS

1. In the Short-Skip Chart, the predicted times of openings can be found under the appropriate distance column of a particular meter band (10 through 160 meters) as shown in the left-hand column of the chart. For the Alaska and Hawaii Charts the predicted times of openings are found under the appropriate meter band column (10 through 80 meters) for a particular geographical region of the continental USA as shown in the left-hand column of the charts. An * indicates the best time to listen for 80 meter openings.

2. The propagation index is the number that appears in () after the time of each predicted opening. On the Short-Skip Chart, where two numerals are shown within a single set of parentheses, the first applies to the shorter distance for which the forecast is made, and the second to the greater distance. The index indicates the number of days during the month on which the opening is expected to take place, as follows:

- (4) Opening should occur on more than 22 days
- (3) Opening should occur between 14 and 22 days
- (2) Opening should occur between 7 and 13 days
- (1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

3. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 AM; 13 is 1 PM, etc. On the Short-Skip Chart appropriate daylight time is used at the path midpoint. For example on a circuit between Maine and Florida, the time shown would be EDT, on a circuit between New York and Texas, the time at the midpoint would be CDT, etc. Times shown in the Hawaii Chart are in HST. To convert to standard time in other USA time zones add 2 hours in the PDT zone; 3 hours in the MDT zone; 4 hours in the CDT zone; and 5 hours in the EDT zone. Add 10 hours to convert from HDT to GMT. For example, when it is 12 noon in Honolulu, it is 14 or 2 PM in Los Angeles; 17 or 5 PM in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to daylight time in other areas of the USA subtract 8 hours in the PDT zone; 7 hours in the MDT zone; 6 hours in the CDT zone; and 5 hours in the EDT zone. For example, at 20 GMT it is 15 or 3 PM in New York City.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts CW or 300 watts PEP on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts CW or 1 kw PEP on sideband. A dipole antenna a quarter-wavelength above ground is assumed for 160 and 80 meters, a half-wave above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the propagation index will increase by one level; for each 10 dB loss, it will lower by one level.

5. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept. of Commerce, Boulder, Colorado 80302.

CQ Short-Skip Propagation Chart July & August 1994 Local Daylight Savings Time At Path Mid-Point

Band (Meters)	Distance Between Stations (Miles)			
	50-250	250-750	750-1300	1300-2300
10	Nil	08-10 (0-1)* 10-14 (0-3)* 14-18 (0-1)* 18-22 (0-2)* 22-00 (0-1)*	08-10 (1)* 10-14 (3)* 14-18 (1-2)* 18-22 (2-3)* 22-08 (1)*	08-10 (1-0)* 10-14 (3-1)* 14-18 (2-1)* 18-22 (3-1)* 22-08 (1-0)*
15	Nil	08-10 (0-2)* 10-14 (0-3)* 14-18 (0-2)* 18-20 (0-3)* 20-22 (0-2)* 22-08 (0-1)*	08-10 (2)* 10-14 (3)* 14-18 (2)* 18-20 (3)* 20-22 (2)* 22-00 (1-2)* 00-08 (1)*	08-10 (2-1) 10-14 (3-2) 14-18 (2-3) 18-20 (3-4) 20-21 (2-3) 20-00 (2-1) 00-08 (1-0)
20	10-01 (0-1)*	07-10 (0-2)* 10-16 (1-4)* 16-21 (1-3)* 21-01 (1-2)* 01-07 (0-1)*	07-10 (2-3)* 10-17 (4)* 17-22 (3-4)* 22-01 (2-3)* 01-07 (1-2)*	07-10 (3-2) 10-16 (4-2) 16-17 (4-3) 17-22 (4) 22-00 (3) 00-01 (3-2) 01-07 (2-1)
40	08-12 (1-2)* 12-17 (2-4)* 17-21 (3-4) 21-23 (1-2)* 23-08 (0-2)*	08-10 (2-4)* 10-12 (2) 12-17 (4-2) 17-18 (4-3) 18-21 (4) 21-23 (2-4) 23-05 (2-4) 05-08 (2-3)	08-10 (4-1) 10-17 (2-1) 17-18 (3-1) 18-21 (4-3) 21-05 (4) 05-06 (3-4) 06-08 (3)	08-18 (1-0) 18-21 (3-2) 21-06 (4) 06-08 (3-1)

80	07-12 (3-4) 12-16 (4-3) 16-22 (4) 22-05 (3-4) 05-07 (4)	08-10 (4-1) 10-12 (4-0) 12-16 (3-0) 16-18 (4-1) 18-20 (4-2) 20-22 (4-3) 22-07 (4) 07-08 (4-2)	08-10 (1-0) 10-16 (0) 16-18 (1-0) 18-20 (2-1) 20-22 (3-1) 22-05 (4) 05-07 (4-3) 07-08 (2-1)	08-18 (0) 18-20 (1-0) 20-22 (1) 22-04 (4-3) 04-05 (4-2) 05-06 (3-2) 06-07 (3-1) 07-08 (1)
160	18-19 (1-0) 19-20 (1) 20-22 (3-2) 22-00 (4-3) 00-06 (4) 06-08 (3-2) 08-09 (1) 09-10 (1-0)	19-20 (1-0) 20-21 (2-0) 21-22 (2-1) 22-00 (3-2) 00-04 (4-2) 04-06 (4-3) 06-08 (2-1) 08-09 (0-1)	21-22 (1) 22-01 (2-1) 01-04 (2) 04-06 (3-2) 06-07 (1) 07-08 (1-0)	21-23 (1-0) 23-01 (1) 01-06 (2-1) 06-07 (1-0)

* Predominantly Sporadic-E Openings

HAWAII July & August 1994 Openings Given in Hawaiian Standard Time

	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	14-16 (1)	06-11 (1) 11-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	13-15 (1) 15-17 (2) 17-18 (3) 18-20 (4) 20-22 (3) 22-02 (2) 02-04 (3) 04-06 (2) 06-09 (1)	18-20 (1) 20-00 (2) 00-02 (1) 21-00 (1)†
Central USA	14-16 (1)	06-08 (1) 08-13 (2) 13-17 (3) 17-18 (2) 18-19 (1)	06-08 (2) 08-14 (1) 14-16 (2) 16-18 (3) 18-20 (4) 20-23 (3) 23-03 (2) 03-06 (3)	18-21 (1) 21-22 (2) 22-01 (3) 01-02 (2) 02-03 (1) 20-22 (1)† 22-00 (2)† 00-02 (1)†
Western USA	11-14 (1) 14-17 (2) 17-18 (1)	07-08 (1) 08-10 (2) 10-12 (3) 12-16 (4) 16-17 (3) 17-18 (2) 18-20 (1)	06-08 (4) 08-10 (3) 10-13 (2) 13-15 (3) 15-20 (4) 20-22 (3) 22-05 (2) 05-06 (3)	18-19 (1) 19-20 (2) 20-02 (4) 02-04 (3) 04-05 (2) 05-06 (1) 19-20 (1)† 20-22 (2)† 22-02 (3)† 02-03 (2)† 03-04 (1)†

See explanation in "How To Use Short-Skip Charts" which appears in the box at the beginning of this column.

† Indicates best time for 80 meter openings.
 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.

Note: The Alaska and Hawaii Propagation Charts are intended for distances greater than 1300 miles. For shorter distances, use the preceding Short-Skip Propagation Chart.

ALASKA July & August 1994 Openings Given in GMT

	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	Nil	00-02 (1)	12-15 (1) 22-01 (1) 01-04 (2) 04-06 (1)	07-10 (1)
Central USA	Nil	21-00 (1) 00-03 (2) 03-04 (1)	13-16 (1) 22-00 (1) 00-03 (2) 03-05 (3) 05-06 (2) 06-08 (1)	08-12 (1)
Western USA	01-04 (1)	17-22 (1) 22-00 (2) 00-03 (3) 03-04 (2) 04-05 (1)	13-14 (1) 14-15 (2) 15-19 (3) 19-01 (2) 01-03 (3) 03-05 (4) 05-07 (3) 07-09 (2) 09-11 (1)	07-09 (1) 09-12 (2) 12-13 (1) 09-12 (1)†

Radio Storminess

The unusually long and intense periods of geomagnetic and associated ionospheric radio storms which took place during February and March continued through early April. In fact, radio storminess took place on 15 of the first 17 days of the month, when the Planetary A-Index (Ap) rose above 25. This index measures the earth's geomagnetic field on a worldwide basis. Exceptional days of storminess took place on April 3, when the level of Ap reached 76, and on April 17, when it rose to a near record level of 130.

Geomagnetic instability subsided considerably after April 17, returning to levels more normal for the present stage of low solar activity.

July Propagation

With longer hours of daylight and the sun high in the northern sky, HF propagation conditions should be considerably more stable during July than they were during the spring months.

Twenty meters should be the optimum band for DX propagation during the month. The band should remain open to one area of the world or another from sunrise through midnight, and at times almost around the clock. Peak conditions should take place for several hours after local sunrise, and again during the late afternoon and early evening hours. During these peak periods 20 meters may be open in almost all directions at the same time.

With declining solar activity and the doldrums of summertime propagation, not much DX propagation is expected on 15 and 17 meters, and even less on 10 and 12 meters. Fifteen and 17 meters should still open fairly frequently towards the south. Short-skip openings into the Caribbean area and Central America may be possible as early as 10 AM. Longer skip openings should take place later in the day, between 3 and 6 PM local daylight time. The bands may occasionally open during the late afternoon to Africa, and during the early evening to the Pacific area and Australasia. On 10 and 12 meters the only DX looks like short-skip openings during the day towards the Caribbean and Central America and a very occasional longer skip opening towards South America during the afternoon.

During the hours of darkness, 30 and 40 meters should open to many areas of the world, but seasonally high static levels may often mar DX reception. High static levels are also expected to hinder DX conditions on 80 meters, although some good long-distance openings are forecast during the hours of darkness. Not many

DX openings are expected on 160 meters during July because of seasonally high levels of static and solar absorption.

Peak Short-Skip Conditions

This month's column contains Short-Skip Propagation Charts for July and August, as well as charts centered on Hawaii and Alaska. The Short-Skip Chart contains propagation forecasts for distances between 50 and 2300 miles from your transmitting location.

Short-skip propagation conditions are expected to be optimum during July as a result of a seasonal peak in sporadic-E propagation. During the daylight hours considerable short-skip openings are forecast for 10, 12, 15, and 17 meters over distances ranging between approximately 500 and 1300 miles, with some openings extending out to beyond 2000 miles. Around-the-clock short-skip openings are expected on 20 meters between distances of 300 and about 2300 miles. Conditions on 20 should peak during the late afternoon and early evening.

Good daytime short-skip openings on 30 and 40 meters are forecast for distances between 100 and 750 miles, with good nighttime openings expected between 250 and 2300 miles. Conditions on 80 meters are also expected to be good during the daylight hours, with openings up to approximately 300 miles. During the hours of darkness good openings should be possible up to the one-hop limit of 2300 miles. While no short-skip openings are expected on 160 meters during the daylight hours, some good openings should be possible during the hours of darkness up to at least 1300 miles, and as long as 2300 miles.

For a more detailed discussion of sporadic-E propagation, and methods for predicting its occurrence, refer to the "Propagation" column in the May 1994 issue of *CQ*, or to the chapter entitled

"Unusual H.F. and V.H.F. Ionospheric Propagation" contained in *The Short-wave Propagation Handbook*, by G. Jacobs and T. Cohen, available from *CQ*.

VHF Ionospheric Openings

Intense sporadic-E ionization expected during July is very likely to result in numerous 6 meter openings and an occasional 2 meter opening. Fairly frequent 6 meter openings should be possible over distances ranging between approximately 600 and 1300 miles, with some openings extending out to as much as 2300 miles. While sporadic-E short-skip openings can take place at just about any time of the day or night, statistics indicate that conditions peak for a few hours before noon and again during late afternoon and early evening.

During intense sporadic-E ionization, as the skip distance is observed to be decreasing on 6 meters, the MUF will be increasing. When skip stations as near as 500 miles are heard on 6 meters, check 2 meters for possible openings in the same direction. As a good rule of thumb, when the 6 meter skip distance falls below 500 miles, 2 meter openings may be possible between distances of about 1000 and 1400 miles.

Check during the last days of July for some possible meteor-scatter-type openings on the VHF bands. These should result from the *Delta Aquarids* shower, which is expected to take place with a predicted maximum meteor count on the order of 20 an hour.

Some VHF openings are also likely to occur during auroral activity. Check the Last Minute Forecast at the beginning of this column for periods that are expected to be Disturbed or Below Normal during July. These are the dates on which auroral-type short-skip openings are likely to occur on the VHF bands.

73, George, W3ASK

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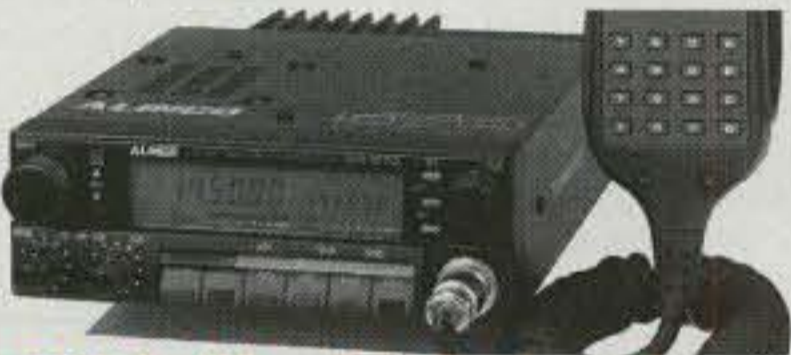


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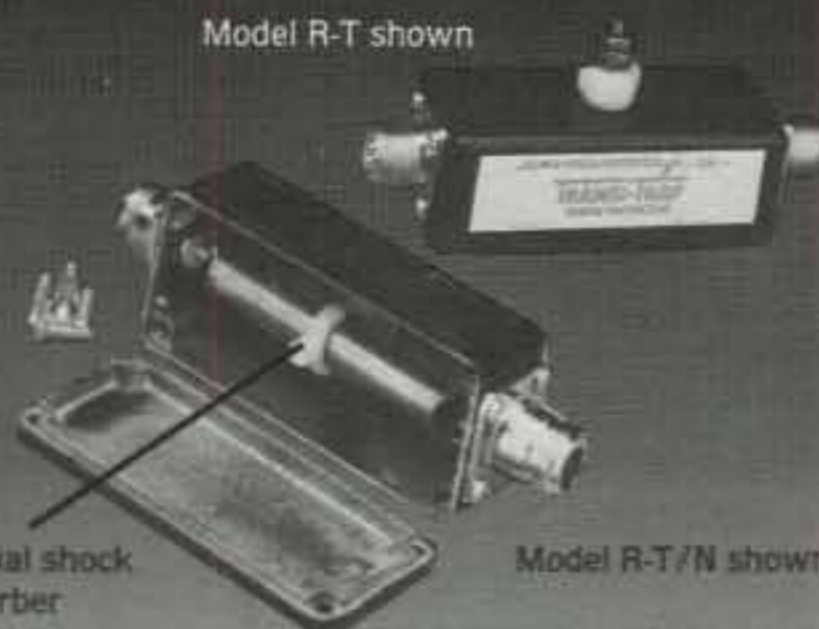
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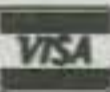
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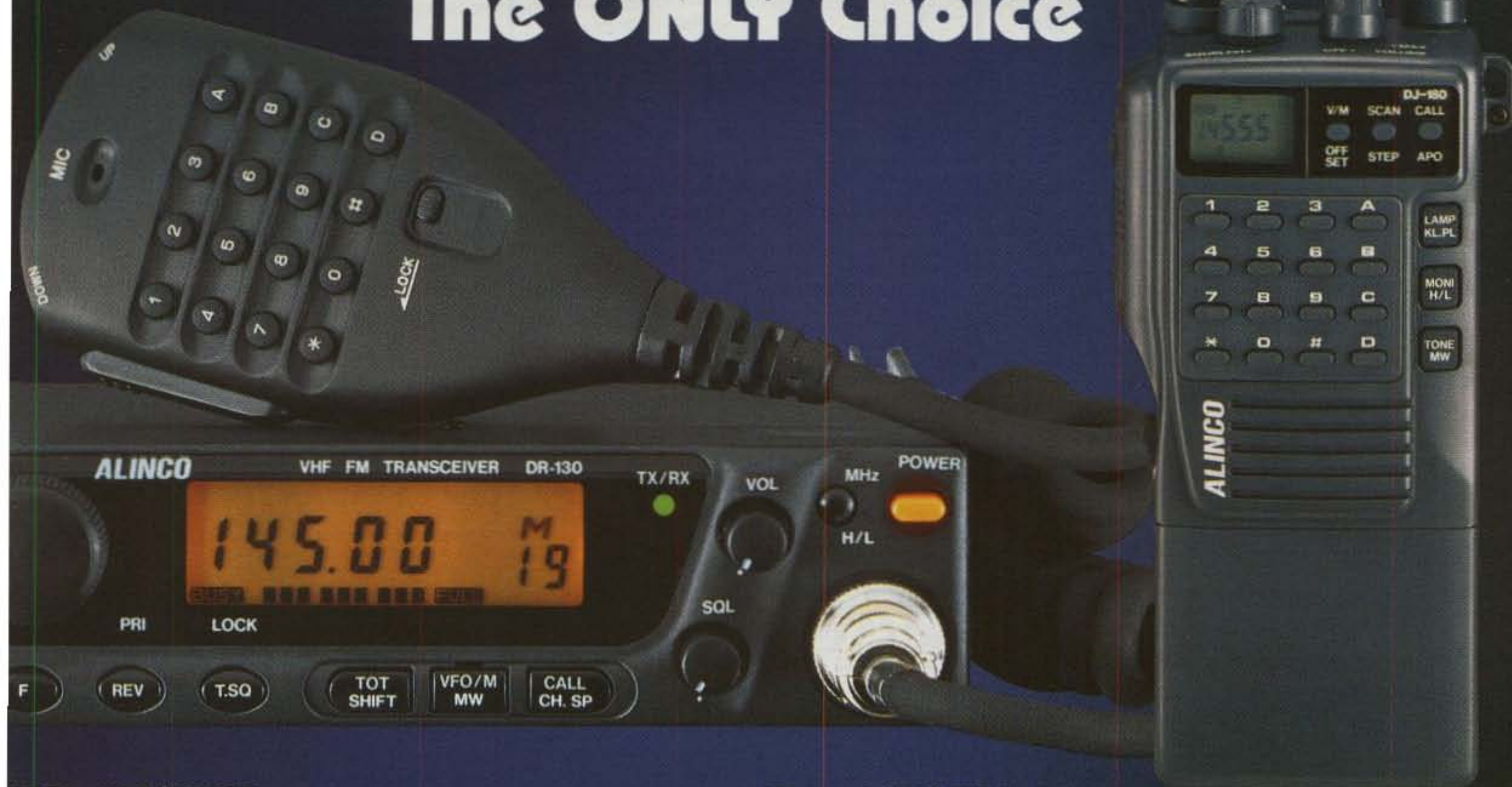
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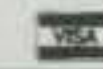

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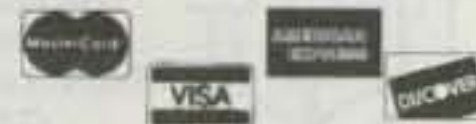
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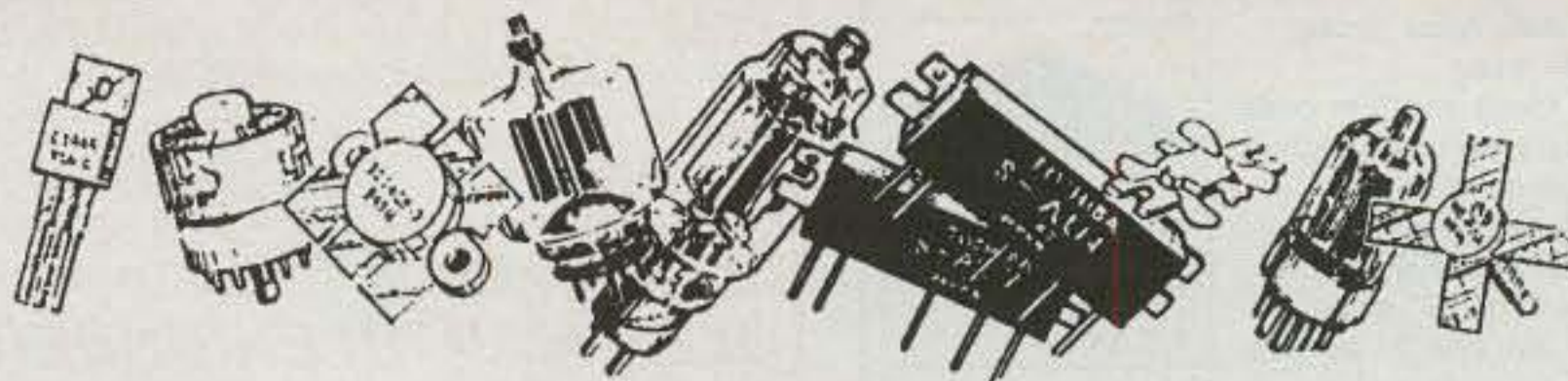
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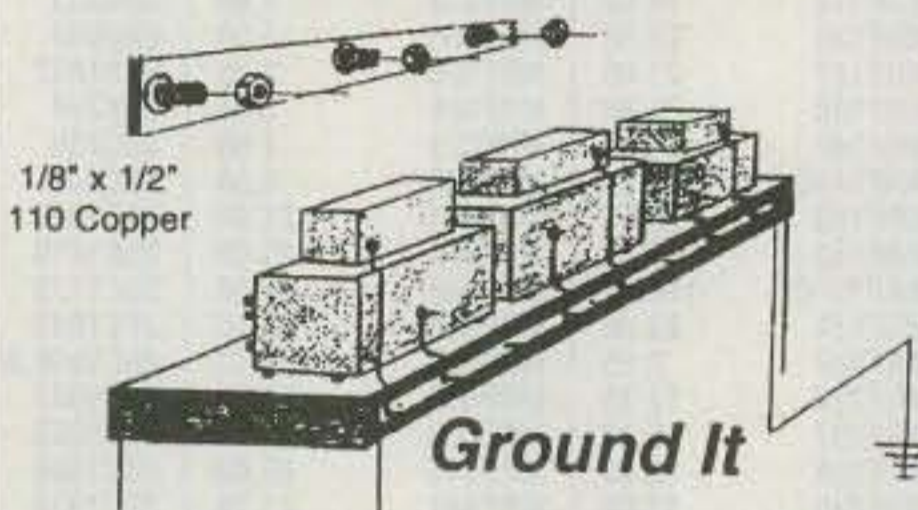
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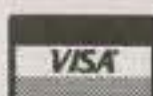
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CIRCLE 7 ON READER SERVICE CARD

Announcements (from page 6)

July 15-16, **North Area Repeater Assn. Electronics Fair '94**, Aldrich Arena, Maplewood, Minnesota. Contact Electronics Fair, P.O. Box 26331, St. Paul, MN 55126 (612-653-9999).

July 16, **Red Rose Repeater Assn. Computer and Electronics Show**, McCaskey High School, Lancaster, Pennsylvania. Contact Red Rose Repeater Assn., P.O. Box 8316, Lancaster, PA 17604. (handicapped accessible.)

July 16-17, **Mountain ARC Swapfest/Camp-out**, Red Rocks Campground, Pike National Forest, north of Woodland Park, Colorado. Contact Fred, NØPKA, 719-687-9727.

July 17, **Van Wert ARC Hamfest '94**, Van Wert County Fairgrounds, Van Wert, Ohio. Contact before 5 PM, Bob High, 419-795-5763; after 5 PM, Bob, WD8LPY, 419-238-1877.

July 17, **Sussex County ARC Hamfest**, Sussex County Fairgrounds, Augusta, New Jersey. Contact Dan carter, N2ERH, 8 Carter Lane, Branchville, NJ 07826 (201-948-6999).

July 17, **Amateur Cross Link Repeater Assn. Hamfest**, Devry Institute of Technology, Chicago, Illinois. Call 312-714-5411.

July 17, **MIT and Harvard Clubs Amateur radio & Electronics Fleamarket**, Albany & Main Streets, Cambridge, Massachusetts. Call 617-253-3776.

July 17, **Zero-Beaters ARC Hamfest**, Bernie H. Hillerman Park (Washington Fairgrounds), Washington, Missouri. Contact ZBARC, P.O. Box 24, Dut-zow, MO 63342, or Tuesday night net 8 PM on the WAØFYA repeater 147.240+. (Exams.)

July 22-24, **Fort Tuthill Hamfest**, Fort Tuthill, Flagstaff Airport Exit 337, Flagstaff, Arizona. Contact (north) Tim, 477-2748; (central) Chris, 843-0960; (south) Cliff, 744-9095. (Exams, reservations by July 1.)

July 22-24, **Northwest DX Convention**, Richmond Inn, Richmond, BC, Canada. Contact British Columbia DX Club: (US) Box 3048, Blaine, WA 98230; (Canada) 16969 20th Ave., South Surrey, BC V4B 5A8 Canada.

July 23, **Radio Com '94**, Herkimer County Fairgrounds, Frankfort, New York. Contact Bob Decker, AA2CU, 315-797-6614, or P.O. Box 71, Utica, NY 13502. (Exams, check-in time 9 AM.)

July 23, **Ausable Valley ARC Swap-n-Shop**, Mio Ausable High School, Mio, Michigan. Contact Ausable Valley ARC, P.O. Box 1, Mio, MI 48647 (517-848-5996 or 826-6454).

July 24, **DuPage ARC Hamfest**, Hawthorne Race Course, Stickney, Illinois. Contact Edwin Weinstein, 7511 Walnut Ave., Woodridge, IL 60517 (708-985-0527 evenings). (Exams 9 AM until 12 noon.)

July 24, **Hall of Science ARC Hamfest**, New York Hall of Science parking lot, Flushing Meadow Park, Queens, New York. Contact, evenings only, Charles Becker, WA2JUU, 516-694-3955; or Arnie Schiffman, WB2YXB, 718-343-0172.

July 30, **Western Carolina Hamfest**, Haywood County Fair Grounds, near Waynesville and Lake Junaluska, North Carolina. Contact Dick Critchell, KY2Y, 704-299-7856.

July 31, **Fox River Radio League Hamfest**, Waubensee Community College, Sugar Grove, Illinois. Contact Bill Schaben, WA9AUW, 708-208-4870; or Mark Hougaard, KB9FCC, 708-979-1717. (Exams 10 AM.)

July 31, **Eastern Michigan ARC Swap '94**, St. Clair County Community College Student Center, Port Huron, Michigan. Contact Hank Kohl, K8DD, 1640 Henry Street, Port Huron, MI 48060 (810-982-7088).

July 31, **Ashtabula County Hamfest & Computer Show**, Nappi's Party Center, Ashtabula, Ohio. Contact Ken Stenback, A18S, 722 Lyndon Ave., Ashtabula, OH 44004 (216-964-7316 evenings and weekends before 9 PM).

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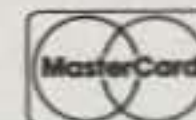
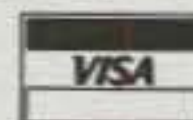
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Easy To Use 2 Meter FM
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2 Meter Mobile



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Compact 2M/70cm Mobile.
Built-In Antenna Duplexer



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Handheld With
Up To 7 Watts
Output



FT-5200
Dual Band Mobile With
Snap-Off Front Panel



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"Built-in VOX? Right!"



"Dual Decode. Now that's a first!"

"Wow, a real Battery Voltage Readout!"

"Yaesu did it again!"



FEATURES	Yaesu FT-530	Kenwood TH-78A	Alinco DJ-580	Icom IC-W-21AT
Memory Channels	82	50	40	70
Slide-out Lithium Battery	YES	NO	NO	NO
Dual CTCSS Decoder	YES	NO	NO	YES
Battery Voltage Readout	YES	NO	NO	NO
Automatic CTCSS Tone Search	YES	NO	NO	NO
Transmit Battery Saver (Repeater & Simplex Operation)	YES	NO	NO	NO
Built-In Vox	YES	NO	NO	NO
One Touch Reverse Button	YES	NO	NO	NO
Dual In-Band Receive (V+V, U+U)	YES	YES	NO	YES
Programmable External Speaker Audio	YES	NO	NO	YES
Optional Digital Display Mic with "S" Meter	YES	NO	NO	NO
AM Aircraft Receive	YES	YES	YES	YES

The Best vs. "the rest."

FT-530 Dual Band Handheld

- **Frequency Coverage:**
2-Meter 130-174 MHz RX
144-148 MHz TX
70 cm 430-450 MHz RX/TX
- 4 TX Power levels:
w/FNB-25: 2.0, 1.5, 1.0, 0.5W
w/FNB-27: 5.0, 3.0, 1.5, 0.5W
- DTMF Paging and Coded Squelch
- AOT - Auto On-Timer with built-in clock and alarm functions
- IBS - Intelligent Band Select (provides automatic TX band select on scan stop)
- Backlit keypad and display with time delay
- Built-in cross-band repeat function
- APO - Automatic Power Off
- 5 Watts output w/ FNB-27 battery or 12 VDC
- 2 VFO's for each band
- **Accessories:**
NC-42 1-Hour Desk Charger
FNB-25 600 mAh Battery (2 watt)
FNB-26 1000 mAh Battery (2 watt)
FNB-27 600 mAh Battery (5 watt)
FBA-12 6 AA Cell Holder
CSC-56 Vinyl Case w/ FNB-25
CSC-58 Vinyl Case w/ FNB-26/27
E-DC-5B 12 VDC Adaptor
YH-2 Headset for VOX
MH-12A2B Speaker Mic
MH-18A2B Lapel Speaker Mic
MH-19A2B Mini Earpiece Mic
MH-29A2B LCD Display Mic with Remote Functions
MMB-54 Mobile Mounting Hanger



No other dual band handheld beats the FT-530 on features for performance and ease of use. With the largest backlit keypad available, 82 memories, exclusive Dual CTCSS Decode and AM Aircraft Receive, the FT-530 is simply the best value there is.

Compare for yourself, then forget "the rest." See your dealer for the best dual band handheld you can buy. The FT-530.

YAESU

Performance without compromise.SM

FT-2500M/FT-7400H 2m/70cm Mobiles

NEW

Specifications

- **Frequency Coverage:**
FT-2500M
RX: 140-174 MHz
TX: 144-148 MHz
FT-7400H
RX/TX: 430-450 MHz
- Rugged Military Spec Design
- Advanced Track Tuning (ATT)
- Selectable Alpha-Numeric Display
- Largest Display Available
- Power Output:
FT-2500M 50/25/5 Watts
FT-7400H 35/20/5 Watts
- Flip Up Front Control Panel Hides Seldom Used Buttons
- Backlit DTMF Mic
- 31 Memory Channels
- CTCSS Encode Built-in
- Automatic Power Off (APO)*
- Time-Out Timer (TOT)*
- Manual* or Automatic Backlighting Adjustment
- **Accessories:**
FTS-17A CTCSS Decode Unit
FRC-6 DTMF Paging Unit
SP-4 External Speaker
FP-800 Power Supply

*FT-2500M

"No other mobile has a Military spec rating. This radio can really take it!"

"New Omni-Glow display and backlit DTMF Mic, too. Both Yaesu 'firsts!'"

"3-stage advanced track tuning really reduces intermod. Its great!"

"Yaesu did it again."



Performance beyond the call of duty.

Just when you thought you had the most formidable mobile built, we made the FT-2500M – the next evolution of powerful, rugged mobile radios.

The FT-2500M takes the durable quality, features, and performance of the popular FT-2400H and goes one better! A new easy-to-operate front panel design with rubber coated knobs, new, large state of the art Omni-Glow display to provide enhanced viewing at all angles and light levels, and Yaesu's exclusive 3-Stage Advance Track Tuning feature that reduces intermodulation and front-end overload puts the FT-2500M as close as you can get to commercial grade performance in amateur frequencies.

The FT-2500M is the only mobile with a Military spec rating and the most often used controls on the front and

those you "set and forget" neatly hidden. It's the first mobile radio with a backlit DTMF mic, too. With its extra large heat sink and one-piece die-cast chassis, the tough FT-2500M is unlike any other mobile in its class.

Test the mettle of your mobile. If it doesn't measure up to the endurance standards of the U.S. Military, get the FT-2500M. For flawless performance in rough and rugged situations, the FT-2500M is really formidable – just what you'd expect from Yaesu. See it at your dealer today!

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Performance without compromise.™

FT-2200/7200

Just 5.5"W x 1.6"H x 6.5"D, the FT-2200/7200 radios are designed to fit into today's more compact cars with ease.

SPECIFICATIONS • Frequency Coverage: FT-2200 RX: 110-180 MHz, TX: 144-148 MHz. FT-7200 RX/TX: 430-450 MHz. • Wide Receiver Coverage: 110-180 MHz • AM "Aircraft" Receive: 110-139 MHz • Built-in DTMF Paging/Coded Squelch • Selectable Channel Only Display • 10 Memory DTMF Auto Dialer • Backlit DTMF Mic • Power Output 50/25/5 Watts (FT-7200 35 Watts) • 50 Memory Channels • Remote Operation w/ Optional MW-2 • CTCSS Encode Built-in • Optional Digital Voice Storage System. Accessories: See your authorized Yaesu dealer.



"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
144-148 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-2 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-2 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

18 146.760 15 448.525

VHF/UHF

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UHF/UHF

18 146.760 15 146.520

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-2 Wireless Mic
with Remote Control.



be found anyplace else, so contact your nearest Yaesu dealer and tell him you want the "ultimate dual band". The FT-5100.

FT-5200 Dual Band Mobile.

Offers the security of a quick release front control panel (not available on the FT-5100), 32 memories, DTMF paging (w/optional FRC-4), Back-lit mic, built-in antenna duplexer and more.



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Specifications subject to change without notice. Specifications guaranteed only within amateur bands. Some accessories and/or options are standard in certain areas. Check with your local Yaesu dealer for specific details.

TEAM ICOM '94

An "All-Star" Line Up!



This year's "All-Star" Line Up includes (L to R):

Top row: IC-2340H, IC-Δ100H, IC-2700H
 Middle row: IC-2GXAT, IC-820H, IC-T21A, IC-281H
 Bottom row: IC-737A, IC-736
 (Not pictured: IC-T41A UHF handheld and IC-481H* UHF mobile)

Get Your Mitts on an ICOM "All-Star" this Season!

IC-2340H 144/440 MHz Mobile

- Independent Controls
- Large Display
- 110 Memories
- CTCSS Encode
- Auto Repeater Functions
- Built In Duplexer
- 2.4 W Audio
- True Dual Band

IC-Δ100H Triple Band Mobile

- Triple Band Flexibility
- 642 Memories
- Detachable Panel
- 8 Selectable Band Combinations
- Full Remote Cntrl. Mic.
- High Performance
- Voice Synth. (opt.)

IC-2700H 144/440 MHz Mobile

- Detachable Panel
- Full Remote Ctrl. Mic.
- CTCSS Encode
- Infrared Wireless Mic. (opt.)
- V/V, U/U or V/U
- Auto Repeater Functions
- Pager/Code Squelch

IC-2GXAT 144 MHz Handheld

- Tone Scan
- 350 mW Audio
- Selectable DTMF Speed
- Auto Repeater Functions
- 700 mAh Battery
- 7 W (opt.)

IC-820H 144/440 MHz All Mode Base Station

- Auto Satellite Features
- New DDS (I-Loop)
- 116 Memories
- High Stability Crystal
- 9600 bps Ready
- Compact Size

IC-T21A 2 M w/440 MHz Rx Handheld

- 114 Memories
- Tone Scan
- Selectable DTMF Speed
- 800 mAh Battery
- Auto Repeater Functions
- 6 W (opt.)

IC-281H 2 M Mobile w/440 MHz Rx

- 80 Memories
- 9600 bps Ready
- Plug & Play
- Large Display
- Auto Repeater Functions
- Tone Scan (opt.)

IC-737A 100 W HF Transceiver

- New DDS (I-Loop)
- Built In Tuner
- Dual Ant. Connectors
- 100% Duty Cycle
- Built In Keyer
- VOX

IC-736 100 W HF & 6 M Transceiver

- VOX, RF Gain
- New DDS (I-Loop)
- Built In Keyer
- Built In Power Supply
- Built In Tuner (6 M too)
- 4 Function Display



ICOM America, Inc.
 Corporate Headquarters
 2380-116th Ave. NE, Bellevue, WA 98004
 Technical Support (206) 454-7619

*This device has not been approved by the Federal Communications Commission. This device is not, and may not be, offered for sale or lease, or sold or leased until the approval of the FCC has been obtained.

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