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N2RM

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THE RADIO AMATEUR'S JOURNAL

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HF Transceiver

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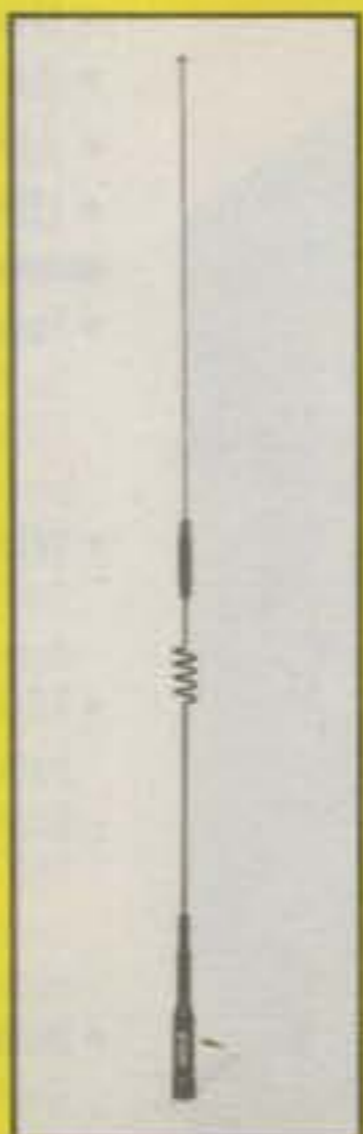
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446MHz 5.5dB 5/8 wave x 2
VSWR: 1.5:1 or less
Max Power: 120W FM
Length: 36"
Connector: PL-259 or
NMO style



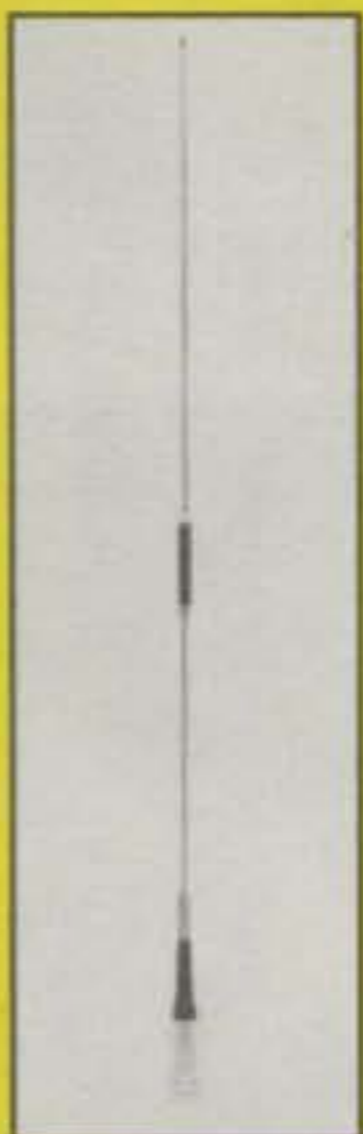
NEW
SB-7/SB-7NMO
Dual-Band 146/446MHz
Gain & Wave:
146MHz 4.5dB 6/8 wave
center load
446MHz 7.2dB 5/8 wave x 3
VSWR: 1.5:1 or less
Max Power: 70W FM
Length: 4' 7"
Connector: PL-259 or
NMO style



B-20/B-20NMO
Dual-Band 146/446 MHz
Gain & Wave:
146MHz 2.15dB 1/2 wave
446MHz 5.0dB 5/8 wave x 2
VSWR: Less than 1.5:1
144-148MHz, 440-450MHz
Max Power: 50 watts
Length: 30"
Connector: PL-259 or
NMO style
Construction: Black,
w/fold-over w/Fold-Over



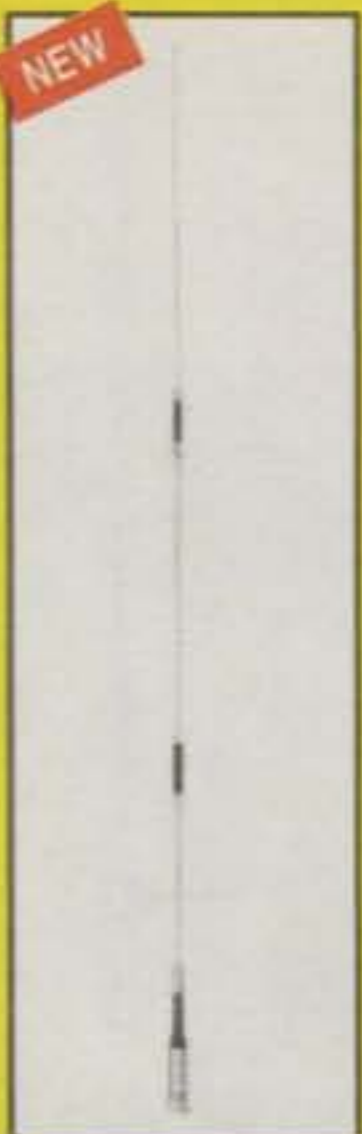
B-10/B-10NMO
Dual-Band 146/446 MHz
Gain & Wave:
146MHz -dB 1/4 wave
446MHz 2.15dB 1/2 wave
VSWR: Less than 1.5:1
144-148MHz, 440-450MHz
Max Power: 50 watts
Length: 12"
Connector: PL-259 or
NMO style
Construction: Black, cellular
look-a-like w/Fold-Over



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Tri-Band 146/220/446MHz
Gain & Wave:
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220MHz 3.8dB 5/8 wave
446MHz 6.0dB 5/8 wave x 2
VSWR: 1.5:1 or less
Max Power: 100 watts
Length: 3'
Connector:
CX-224 PL-259
CX-224NMO NMO Style



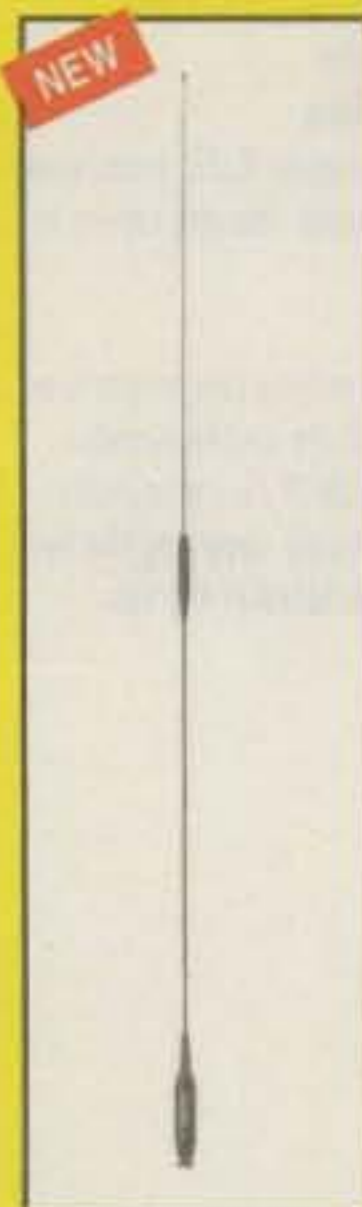
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HA4S
Quad-Band HF Mobile
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Wave: 1/4 wave
VSWR: Less than 2:1
Weight: 1 lb, 14 ozs.
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Connector: PL-259
Construction: Heavy Duty,
w/Fold-Over
*L-14HS: Optional 14MHz Coil



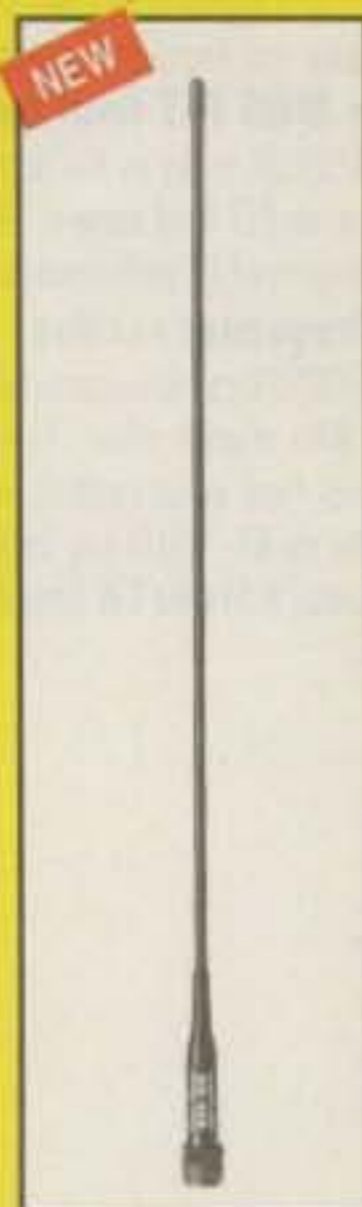
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50MHz 2.15dB 1/4 wave
146MHz 4.5dB 5/8 wave
center-loaded
446MHz 7.2dB 5/8 wave x 3
VSWR: 1.5:1 or less
Max Power: 120 watts FM
Length: 4' 10"
Connector: PL-259



CHL-185
146MHz
Gain & Wave:
4.1dB 5/8 wave
VSWR: 1.5:1 or less
Max Power: 200 watts
Length: 4' 8"
Connector: PL-259



NEW
CH-722SA
146/446MHz HT Antenna
Gain & Wave:
146MHz 3.0dB 1/2 wave
446MHz 5.5dB 5/8 wave x 2
Max Power: 50 watts
Length: 35' 4"
Weight: 3.9 ozs.
Connector: BNC



NEW
SH-55
146/446MHz HT Antenna
Gain & Wave:
146MHz 1.5dB 1/4 wave
446MHz 3.2dB 5/8 wave
Max Power: 10 watts
Length: 15.5"
Connector: BNC



CH-32
Miracle Baby 146/446MHz HT.
Antenna. Compact design, the
smallest HT antenna available!
Gain & Wave: 0dB
VSWR: 1.5:1 or less
Max Power: 10 watts
Length: 1.75"
Connector: BNC



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blazer, etc.) mount.
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protects vehicle
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coated base protects
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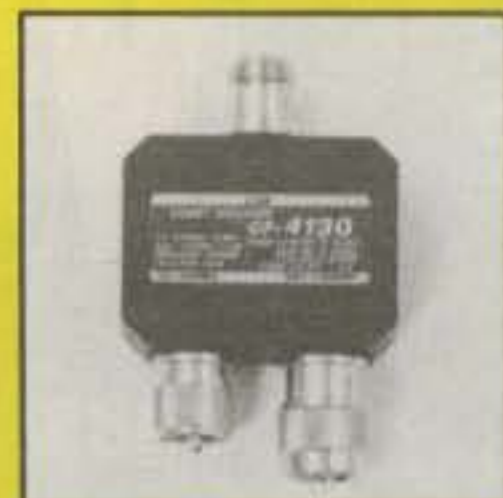
3D4M Standard Cable Assembly
13.5 feet of low loss coax. Gold plated
UHF (PL-259/SO-239) connectors.

3D5M Standard Cable Assembly
Same as 3D4M, but 17 feet of coax.



CK-5M Deluxe Cable Assembly
13 feet double shielded very low loss coax.
+ 12' RG-188 teflon coax. Gold-plated
UHF (PL-259/SO-239) connectors. Allows
easy entry from a lip-mount w/o causing
coax or weather strip damage.

CK-5M5 Deluxe Cable Assembly
Same as CK-5M, but 17 feet of coax.



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CF-4160J**
146/446 MHz
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400-540MHz, 0.2dB, 500w PEP
Isolation: 60dB
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CF-4160K CF-4160J CF-4160J
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Low In: PL-259 PL-259 SO-239
High In: PL-259 N-Male SO-239

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The Radio Amateur's Journal

ON THE COVER: From this neat setup at his Mays Landing, NJ QTH, Robert Moore, N2RM, enjoys DXing and contesting, proving once again that you don't need a 'mega station' to run with the big boys. (Photo by Larry Mulvehill, WB2ZPI)



SEPTEMBER 1993

VOL. 49, NO. 9

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ZERO BIAS

EDITORIAL

One end of my inverted-V no longer has a place to go. The big tree in front of my house which served as a tie-point is now a part of history, the result of a sudden storm. On the afternoon of July 10th a swift and swirling storm came out of the southwest and in 10 minutes wreaked havoc on the north shore of Nassau County, Long Island. In that short period over 75,000 homes lost power as trees and power poles shuddered and toppled. In effect, it was a "quiet" tornado.

At first the only universal on my street was a lack of power, a fact fairly common during storms, as most of the county is served by overhead power lines. The big tree sort of looked odd, though, and its massive trunk was now at a jaunty angle. The tree, a 110 to 120 foot Swamp Maple, had started to come down, and one of its large limbs had lodged itself into a pole transformer (shorting the primary and secondary) of an adjacent power pole. That limb was all there was holding the tree semi-vertical and keeping my house from being crushed. The seals on the transformer were broken and oil was leaking out—at this stage a minor consideration.

Due to the massive damage, it took almost 14 hours to get through on the telephone to the power company to explain my situation. Unfortunately, the person I finally reached did not speak English very well, but I did manage to report my damage on Sunday morning. By Sunday afternoon there were power company crews all over the area. I was again fortunate in that my house is fed from a power source on the street behind my house, and that was functional within 8 hours. The people across the street, however, are fed from the transformer that was damaged.

The first crew from the power company arrived at my house on Sunday afternoon and simply planned to remove the offending tree limb. When I pointed out that the tree would then come all the way down and crush my house, they told me that they were only "authorized" or empowered to free up the transformer. They simply did not want to consider any consequence beyond freeing up the transformer. At this point I went into the house and put on a recent fleamarket purchase, an old boony-cap with a "one shot one kill" emblem on it. They got the point, and my education on how American utility companies think began.

Clearly, even for a person with a rudimentary knowledge of electricity and a very fundamental grasp of how gravity works, the job at hand seemed simple. First, they needed to cut back the top of the tree so that it not only freed the trans-

former, but also presented no further danger of toppling. Then they needed to replace the leaking power transformer. It also would have been a good idea to check the transformer number to see that it didn't contain PCBs, thereby creating further problems. It just needed at least one person to oversee the job as a whole and to prioritize and assign tasks.

By Sunday evening the tree was indeed topped and power was temporarily restored to the people across the street. The transformer leaked on. There were mounds of tree parts from the street right up to my front door. To complete what was described so far and to finally change the transformer (which was a 15-minute job as I observed) took 12 crews of men almost 5 days, being paid at a double time rate. At least 24 men that I could count, plus numerous supervisors and foremen, worked on this problem for 5 days. In fact, they were so efficient that their Environmental Clean-Up Department took away part of my lawn and spread emulsifier down the day before they voted on changing the transformer. The oil continued to bubble on down to my newly created dirt patch and street for another 24 hours.

I now know exactly why we on Long Island pay the highest utility rates in the nation. It's not that it takes 20 to 30 men to do a job because there aren't enough skilled workers. From what I could judge from speaking to most of them was that they were pleasant, amiable, knowledgeable with considerable experience, and certainly well-equipped by the utility. The basic problem was that no individual, not even a foreman, could make a unilateral decision to take the entire job through to completion. It didn't matter that the job could have been completed on the first day, many thousands of dollars cheaper. The convoluted system is what was important, and that was what had to be protected regardless of the cost.

My neighbor saw it allegorically, as he waited almost 30 hours for power to return. He saw it for what it was, and said, "No wonder the Japanese are whipping our butts. They see a job and they just do it. Everyone focuses on the goal." In this particular instance he may be right, as no one had any inclination to examine the concept of efficiency, and everyone studiously avoided what could remotely be considered responsibility. The goal here was simply to cover one's posterior.

It's now a few weeks later, the insurance claims are settled, and I've pretty much calmed down. I still come home and park in front of what now amounts to a 35

to 40 foot tall brown cactus. The remnants of the tree should be gone this week, and by the time you are reading this I'll be looking at replacements. But that falls under village easement law along with sidewalks, which is a whole other educational process for another time.

The pole and transformer in front of my house, which I previously had always considered an eyesore, now has taken on a new beauty as the bullwark that saved my home. The 40-year-old utility pole (I checked the date tag) withstood the brunt of the swamp maple and remained tall and undaunted. I'm just wondering now if my "new pal" can also hold up the weight of the end of an inverted-V and how long it will be before the power company finds it and makes me take it down.

It's Contest Time

Judging from the CQ WW DX Contest results in this issue we appear to have had a record turnout. With the sunspot cycle heading towards siesta time, this year's effort may be ripe for another big push. We received just about 2000 pounds of logs for the 1992 contest and once again I can report that the CW contester tends to be more fixed in their appreciation of modes. Far more CW logs received (for any of our contests) are not marked as to mode. A few even go as far as not marking the summary sheet either. It must be a pride thing.

I still have plans for getting my new antenna up in time for the contest, but time is passing by. My garage is beginning to look like an antenna warehouse with all the stuff I've collected for the project. Recently I followed my own advice and even got some new coax for the project. Nema is offering a new combination that looks interesting. They take coax and rotor cable and enclose them in a single jacket (like a double covering) so that there is only one line to run. The cable looks good and should be easy to use.

How about you? Do you have everything squared away and checked out? Obviously the big gun stations work at this all year round, but without the rest of us participating at whatever level, there wouldn't be much of a contest. If you've never entered the CQ WW, this is the year to give it a try. Even if you don't win, you'll have a lot of fun, work plenty of countries, zones, and prefixes, and counties. It's everyone working everyone; no one is left out of the excitement. You can always clean the attic some other time.

73, Alan, K2EEK

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ANNOUNCEMENTS

•**Canada First National Convention Call for Technical Papers** – Papers concerning both technical and practical aspects of amateur radio in regard to HF, VHF, UHF, packet, AMTOR, RTTY, AMSAT, and EME are welcomed for the technical symposium of this convention to be held July 29–31, 1994 in Calgary, Alberta. papers will center on a 30–45 minute presentation and 15 minute question and answer period. Author's name, paper's title, introduction, and abstract are due no later than October 15, 1993. First draft due by March 1, 1994, and final copy by May 30, 1994. For more information, contact Gerry Shand, P. Eng., VE6BLI, phone 403-922-2099; FAX 403-438-4398.

•**The following Special Events are scheduled for September:**
KA10FN, from Oyster Festival and 125th anniversary

of Sheffield Island Lighthouse, Norwalk, Connecticut; Greater Norwalk ARC; 2100Z Sept. 10 to 2100Z Sept. 12; lower 25 kHz of General 80, 40, 20, 15 meter phone subbands, Novice 10 meter phone subband. For certificate send QSL and SASE to Greater Norwalk ARC, c/o Norwalk/Wilton Red Cross Bldg., 43 North Ave., Norwalk, CT 06851.

K2BR, from Miss America Pageant, Atlantic City, New Jersey; Southern Counties ARA; Sept. 13–18 from 10 AM EST; phone 25 kHz inside lower General Class band edge, CW 65 kHz inside lower General class band edge, Novice 28.100, 28.500 kHz. QSL with #10 SASE via SCARA, P.O. Box 121, Linwood, NJ 08221.

2-land, from Marconi Memorial Twin Lighthouse Radio Site, Highlands, New Jersey; Ocean-Monmouth ARC; 1600Z Sept. 11 to 1600Z Sept. 12; CW

10 kHz from bottom of Novice subbands and 10.145, 14.045, 18.080 MHz and bottom of General 80–15 and Novice 10 meter phone subbands. For certificate send 9 × 12 SASE (or \$1 US) to OMARC, P.O. Box 75, Bradley Beach, NJ 07720.

N3JPS, from 50th anniversary of flag raising, Eckley Miners' Village, Luzerne County, Pennsylvania; Down River ARC; 1400Z Sept. 25 to 1800Z Sept. 26; General subbands and Novice 10 meter subband. For certificate send QSL and 9 × 12 SASE to Rob Barnshaw, N3JPS, 540 Church St., Royersford, PA 19468.

KD3XN, from Fort Delaware, Pea Patch Island, Delaware; Tri-County Amateur Group; 1400–2100Z Sept. 24, 25, 26; General and Novice portion 10, 12, 15, 17, 20, 40 meters. For QSL send QSL and SASE to operator worked.

4-land, from 50th birthday of city of Oak Ridge, Tennessee; Oak Ridge ARC; Sept. 12 through Sept. 30 all bands. SASE to operator's home call.

WD6EAW, from Tulelake-Butte Valley Fair, Tulelake, California; Keno ARC; 1600–2400Z Sept. 10, 11, 12; lower portion General bands. For QSL send SASE to WD6EAW Special Event, P.O. Box 653, Keno, OR 97627.

W7LD, from Port Townsend Wooden Boat Festival, Port Townsend, Washington; Jefferson County ARC; 1700–2400Z Sept. 10, 11, 12; General bands 15 and 20 meters and 28440 on 10 meters. (Contacts will be made with marine nets.) For QSL send QSL and SASE to Olly Gardner, KA6OZZ, Box 65156, Port Ludlow, WA 98365.

W7WY, state line of Oregon and Idaho where it meets Nevada state line (work 3 states and 4 counties in one contact); Vancouver Mountain RC; 24 hours/day Sept. 4–14; CW and phone 160–10 meters in General portion of band, including WARC. For certificate or QSL send 8 × 12 SASE to Vancouver Mountain RC, W7WY, P.O. Box 1622, Vancouver, WA 98668. (If you would like to operate, contact W7WY.)

W7DK Loggers Party, sponsored by Radio Club of Tacoma; 1200Z Sept. 25 to 0700Z Sept. 26 and 1200–2400Z Sept. 26; exchange RST, call, name; CW 1.805, 3.560, 7.045, 14.060, 21.060, 28.060; Phone 1.865, 3.925, 7.260, 14.280, 21.380, 28.380; Novice/Tech 3.700, 7.125, 21.150, 28.160. Certificate to those who submit log of 10 (5 if outside 48 contiguous states) 2-way contacts with W7DK members. Log to include call and name of club members worked, dates of each contact, and applicant's name, call, and address. Submit logs to: Logger, Radio Club of Tacoma, P.O. Box 11188, Tacoma, WA 98411.

WD8DEA/N8LCS, from Lake Erie Commission Coastweeks projects, Kelleys Island, Ohio; Massillon and Canton ARCs; Sept. 18 to Oct. 11; General and Novice bands, phone 3.880, 7.280, 14.280, 21.280, 28.380 MHz; CW 3.685, 7.110, 21.110, 28.100 MHz; packet 145.07 and phone 147.475 MHz. Send QSL and SASE to Jack Wade, P.O. Box 537, Kelleys Island, OH 43438.

KB8GVW, from Newark of the World Celebration, Newark, Ohio; Newark ARA; 1200–0000Z Sept. 18; 20 or 40 meters in General phone portion of the band. For certificate send QSL and SASE to Tom Spence, KB8GVW, 29 Edgehill Road, Newark, OH 43055.

KB8BN, from 180th anniversary of Battle of Lake Erie, Put-In-Bay, Ohio; Oliver Hazard Expeditionary Force; Sept. 10–13; on 7.240, 4.240, 21.365, 28.365. For certificate send QSL and 9 × 12 SASE to Commodore Jim Yoder, KB8LDG, 11796 Shadybrook Dr. NW, Pickerington, OH 43147-9122.

KA9ETH, from 21st annual Warren's Cranberry Festival, Warrens, Wisconsin; Monroe County ARC; 1400–2200Z Sept. 25 and 1400–1900Z Sept. 26; on 14.270, 21.370, 28.370. For certificate send QSL and 9 × 12 SASE to Marshall Kiel, N9FVU, P.O. Box 344, Tomah, WI 54660.

9-land, from WAHM Day; Hamfesters RC 60th anniversary, members will call "CQ WAHM Day"; 1200–2400Z Sept. 18; lower 25 kHz of General bands, 28.410 MHz for Novice SSB, 146.43 MHz simplex, packet. Certificates for working Hamfester club members as follows: if you are in Illinois you must work 10 members, in US but outside Illinois work 5 members, outside US work 3 members. QSL to individual stations. For certificate send log info with contacted members noted and large SASE to William F. Koltz, KA9HDN, 3647 S. Damen Ave., Chicago, IL 60609.

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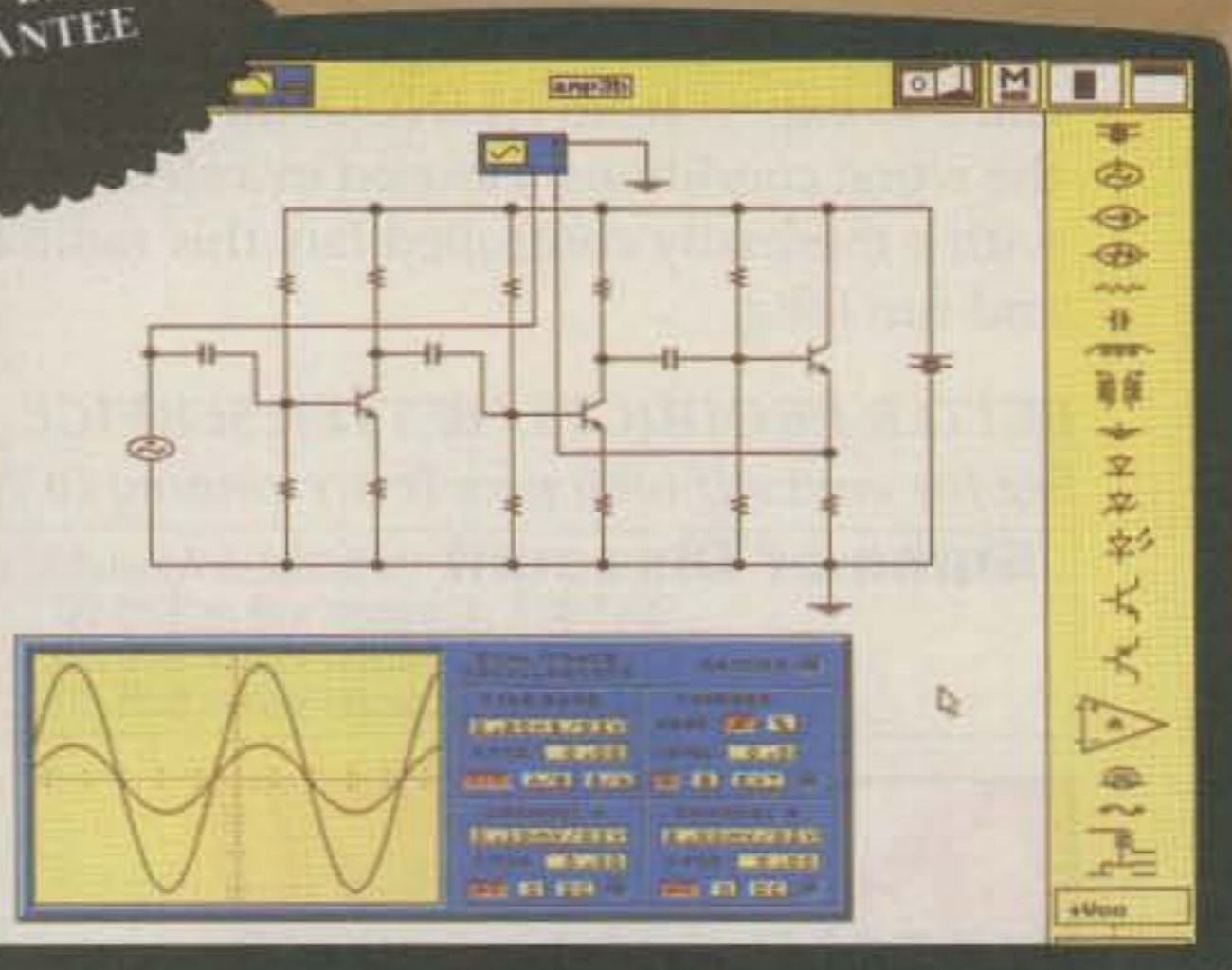
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(continued on p. 10)

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Announcements (from p. 8)

WA0HH/W100CS, from 100th anniversary of opening of Cherokee strip land rush into Oklahoma, Kiowa, Kansas; Salt Plains RC; Sept. 8-16; on 3.900, 7.235, 14.250, 21.325, 26.500 + or - 20 kHz. Contact A.L. Jacobs, WA0HH, 517 N. 8th, Kiowa, KS 67070.

NC0A, from world's highest suspension bridge over Royal Gorge, Colorado; Royal Gorge ARC; 1400-2100Z Sept. 25; lower portion General subbands phone and CW on 10, 15, 20, 40 meters. For 8.5 x 12 QSL send QSL and SASE to NC0A, 1011 Harrison Ave., Canon City, CO 81212.

ED8DDT, from Tourist Day, "Ure Chasna Sur," Tenerife, Spain; Sept. 25-26; all phone bands. To be eligible for a raffle that includes a trip for two for a week to the island, send QSL before 60 days after the date of the contact. QSL to "Ure Chasna Sur," P.O. Box 328, Post Code 38650, Los Cristianos, Tenerife (Spain), or to the manager, EA8BGY.

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

Sept. 3-4, **Alamogordo ARC Hamfest**, Otero County Fairgrounds, Alamogordo, New Mexico. Contact Bill Leehan, N5SUM, 505-437-9781. (VE exams Sat. 9 AM, contact Ole Jorgensen, WA5IPS, 505-437-5896.)

Sept. 5, **Burlington Hamfest 93**, Iowa National Guard Armory, Burlington, Iowa. Contact Chuck Gysi, N2DUP, Burlington Hamfest 93, P.O. Box 911, Burlington, IA 52601-0911 (319-752-3000). (VE exams.)

Sept. 11, **LaPorte County Summer Hamfest**, LaPorte County Fairgrounds, LaPorte, Indiana. Contact J. Lemley, 384 Hawthorne St., LaPorte, IN 46350 (219-325-0951).

Sept. 11, **Ballston Spa Hamfest**, County Fairgrounds, Ballston Spa, New York. Contact N2FEP, P.O. Box 41, Rock City Falls, NY 12863. (Exams.)

Sept. 11, **Erie Hamfest 93**, Franklin Twp. Firehall, Erie, Pennsylvania. Contact Radio Assn. of Erie, P.O. Box 844, Erie, PA 16512. (VE exams 9 AM, Franklin Center Methodist Church, 1 mile north of hamfest.)

Sept. 11, **Chanute Area ARC Hamfest**, North Malcolm Community Center, Chanute, Kansas. Contact Jon Wood, W0UHL, RR2 Box 163A, Chanute, KS 66720.

Sept. 11, **Flemington Fallfest**, Warren County Fairgrounds, Harmony, New Jersey. Contact Keith

Burt, KF5FK, P.O. Box 308, Quakertown, NJ 08868-0308 (908-788-4080). (Exams.)

Sept. 12, **Ozarks ARS Picnic & Swapfest**, Monett, Missouri city park. Contact Gary Meyers, 1201 S. Madison, Aurora, MO 65605 (417-678-3376).

Sept. 12, **Butler County ARA Hamfest**, Butler, Pennsylvania Farmshow grounds. Contact Joe Stahlman, WA3BVQ, 499 Keister Rd., Slippery Rock, PA 16057.

Sept. 12, **LIMARC Hamfest**, NY Institute of Technology, Old Westbury, New York. Contact Neil Hartman, WE2V, 516-462-5549.

Sept. 12, **SE Massachusetts ARA Hamfest & Fleamarket**, club grounds, South Dartmouth, Massachusetts. Contact Michael Enos, P.O. Box 79064, North Dartmouth, MA 02747.

Sept. 12, **Findlay Hamfest**, Hancock County Fairgrounds, East Sandusky at Fishlock, Findlay, Ohio. Contact Findlay Radio Club, P.O. Box 587, Findlay, OH 45840.

Sept. 12, **Shawnee ARA Hamfest & Computer Swapmeet**, Du Quoin State Fairgrounds, Kentucky. Contact Joey Helleny, KB9HNO, 618-457-8114. (Exams.)

Sept. 18, **Fall Foliage Hamfest**, National Guard Armory, Berlin, Vermont. Contact Tom Girardi, WA1YNU, P.O. Box 59, North Montpelier, VT 05666. (Exams 12:30 PM.)

Sept. 18, **Gonzales Hamfest 93**, Gonzales Recreation Center, Gonzales, Louisiana. Contact Wayne Russell, 504-622-3964.

Sept. 18, **Sonoma County Radio Amateur Inc. Fleamarket**, Holy Ghost Hall, Sebastopol, California. Contact Alan Bloom, N1AL, 707-538-7115. (Exams, walk-in okay.)

Sept. 18, **Berwick, Pennsylvania Hamfest/Computerfest**, Beach Haven Carnival Grounds, north of Berwick, Pennsylvania. Contact Dave, WC3A, 717-752-6851. (Exams, 1 PM, advance registration only.)

Sept. 18, **1993 Northern New Mexico Hamfest**, Glorieta Baptist Conference Center, southeast of Santa Fe, New Mexico. Contact Helenrose Burke, W5IXS, P.O. Box 73, Ojo Sarco, NM 87550 (505-689-2367). (Exams, preregistration preferred; contact Bonnie Griffiths, KD8JQ, 190 Manhattan Loop, Los Alamos, NM 87544 (505-662-9155).)

Sept. 19, **MIT/Harvard Wireless Fleamarket**, Albany and Main St., Cambridge, Massachusetts. Call 617-253-3776.

Sept. 19, **Candlewood ARA Hamfest**, Sandyhook Firehouse, Sandyhook, Connecticut. Call 203-438-6782 or 203-792-1845. (Handicapped accessible.)

Sept. 19, **L'Anse Creuse ARC Swap & Shop**, L'Anse Creuse High School, Mt. Clemens, Michigan. Contact Ted MacKinnon, NW8W, 313-647-1628. (Exams 11 AM, contact Don Olszewski, WA8IZV, 313-294-1567.)

Sept. 19, **Arizona Repeater Assn. Family Amateur Radio Event**, Rawhide, north of Scottsdale, Arizona. Contact Len Winkler, KB7LPW, 861-0303.

Sept. 24-26, **1993 Kansas State ARRL Hamvention**, Ramada Broadview Hotel, Wichita, Kansas. Contact Len Warren, N0QHZ, 6233 Millsboro, Wichita, KS 67219-1637 (316-744-1930).

Sept. 25, **Elmira International Hamfest-Computerfest**, Chemung County Fairgrounds, Horseheads, New York. Contact Dave, 607-589-4523. (Exams, call Bill, 607-962-1134.)

Sept. 25, **Danville/South Boston Hamfest**, National Guard Armory, Danville, Virginia. Contact Bonnie Manasco, AB4KO, 804-822-6070 work, or 804-822-5345 home. (Exams, preregistration only.)

Sept. 25-26, **York Hamfest & Computer Show**, York Fairground, York, Pennsylvania. Contact York Hamfest, P.O. Box 351, Dover, PA 17315. (Exams Saturday only, 9 AM.)

Sept. 26, **Adrian, Michigan Hamfest/Computer Show**, Lenawee County Fairgrounds, Adrian, Michigan. Contact Dennis Boydston, WE8Z, 2383 E. Clearview Dr., Adrian, MI 49221 (517-265-8054). (Exams, walk-in okay.)

Sept. 26, **Cleveland Hamfest & Computer Show**, Cuyahoga County Fairgrounds, Berea, Ohio. Contact C.H.A., P.O. Box 81252, Cleveland, OH 44181-0252. (Exams early.)

Sept. 26, **Metro 70cm Network Electronic Fleamarket**, Lincoln High School, Yonkers, New York. Contact Otto Supliski, WB2SLQ, 914-969-1053.

Sept. 26, **St. Peters ARC Swapfest**, St. Charles County Community College, St. Peters, Missouri. Contact Walt Franzer, WX0C, 314-278-1993.

Sept. 26, **Falls Lake ARC Swapfest**, NCNG Armory, Butner, North Carolina. Contact Fred, KC4VSO, Falls Lake ARC, P.O. Box 502, Butner, NC 27509 (919-575-4262).

Sept. 26, **Pasco County Hamfest**, New Port Richey Recreation Center, New Port Richey, Florida. Contact Mitch, KM4MU, 813-848-5526. (Exams.)

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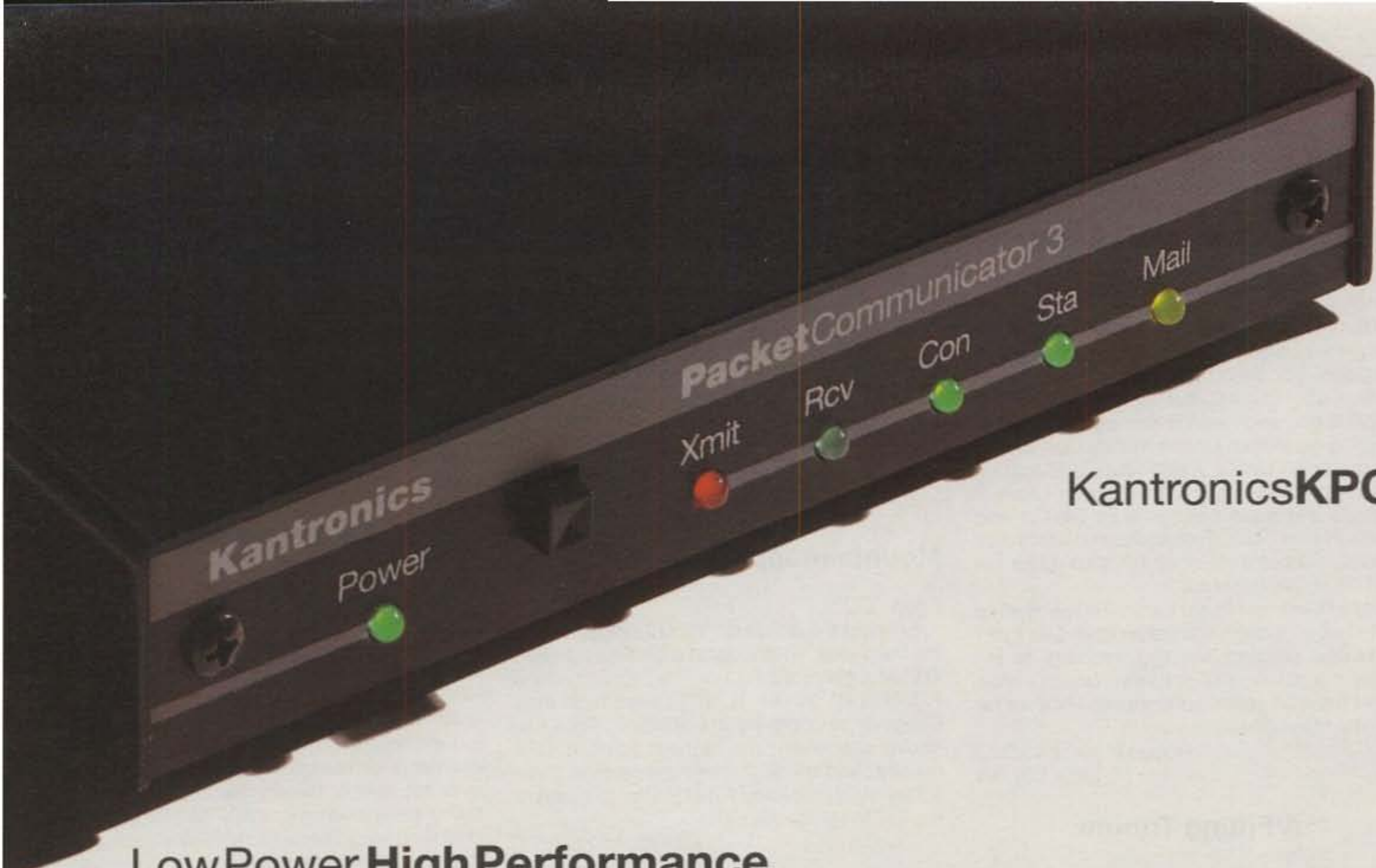
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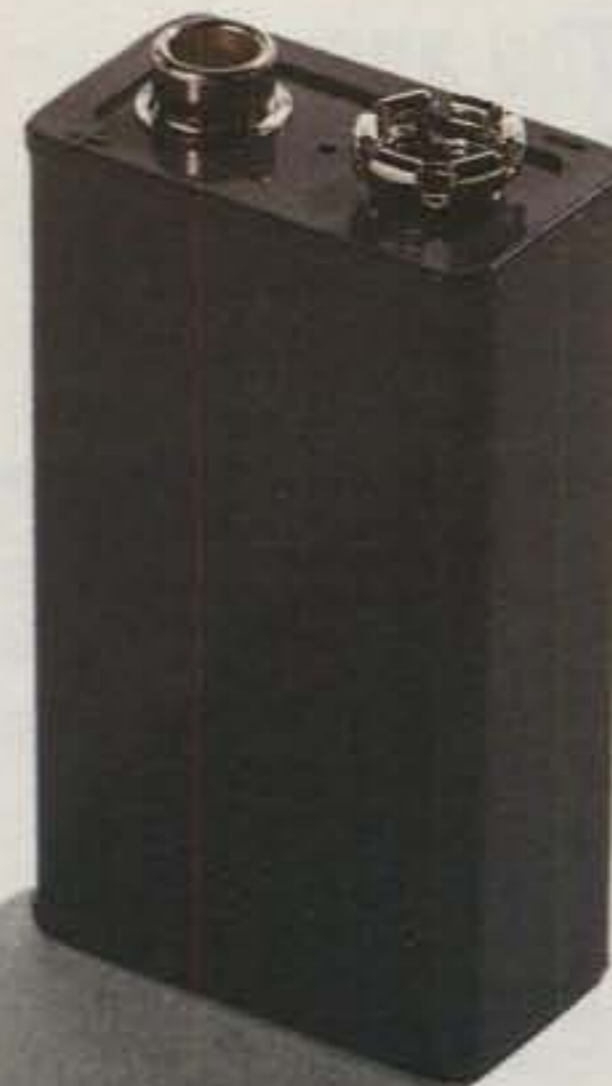
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OUR READERS SAY

Can't Wait For Next One

Editor, CQ:

I'm not a contest person, so when the first few issues came, I was ready to stop my subscription. Too many pages had nothing but contest after contest. But I sat down and read DXpeditions and awards stories. These were down to earth, real stories that stuck with me. Then articles by Bill Welsh and Dave Ingram were very interesting. Along came product reviews and good writings from Bill Orr and Chod Harris. The Propagation department actually started it all, since I'm a 10 meter fan and DX drives me nuts.

Now I can't wait to get the next issue. Seems that I get so much information from CQ, that I can't stop reading, reading, reading. Hi Hi! Hope my change of address doesn't slow down my next year's subscription. Thanks for a great magazine.

Robert Pryor, KA8ZHO
Lake City, MI

A Fitting Tribute

Editor, CQ:

Your July issue featuring Jim Rafferty, N6RJ, on the cover arrived seven days after Jim's death. I found the photo very poignant, having known Jim for more than 20 years both professionally and as a trusted friend. I had not seen him in a couple of years, but last spoke

to him on the phone about two weeks before his death. I also thought your brief cover "blurb" about Jim was nicely done.

I know that extraordinary measures were taken to allow Jim to see the magazine cover before publication, and I am sure that meant a lot to him.

Finally, I appreciate the help of the CQ staff in enabling me to write a suitable obituary for QST.

Jim Cain
ARRL Senior Editor

Mountaintopping in Tennessee

Editor, CQ:

Enjoyed the article on "mountaintopping" in the May issue, so I thought I'd give it a try! (See VHF Mountaintopping For The '90s," by John F. Lindholm, W1XX, p. 52.) I went high atop Clingman's Dome near Gatlinburg (6643 ft. above sea level), the highest point in Tennessee, and made 2 meter contacts in three states. And thanks to KB4ZBH for the loan of the ICOM HT for the trip!

Jay Swafford, KC4ZPE
Springfield, TN

Is Anybody Out There?

Editor, CQ:

Many times in my travels on business, I have been "talked in" to a hotel or meeting site in

what started out to be a strange city. Hams are great with helping other hams—in most places.

Not so in KH6-land! During the summer of 1991, the XYL and I visited Hawaii for the first time. Quite often during the week or so we were there I would ask for directions, or just say I was "listening." No reply.

This June we decided to visit KH6-land again. The XYL packed her clothes very sparingly, as did I, so we would not have too much to carry. When I packed my trusty ICOM 2AT, she said, "Why are you taking that thing along? You know nobody will talk to you!" I, ever the eternal optimist, said, "Last time we were on Oahu and Maui; this time we'll be on the Big Island and Kauai. Maybe it will be different."

It wasn't. I didn't even ask for directions. Occasionally I would get on a repeater and say "W3GXX listening." No response. Once in a while I would say, "This is W3GXX. Is anybody around?" No answer.

I average from 12 to 15 trips a year on the mainland for business. Nowhere has anyone ever refused to talk to me. On the contrary, hams have been extremely helpful and hospitable, giving directions, gratuitous advice on the location of restaurants and local sites, etc. I, and my fellow hams in this area, have provided the same advice and "talk-in" on the local repeaters for travelers in this area. But why won't KH6-ers talk to Mainlanders?

I would welcome a responsible reply.

Mayer D. Zimmerman, W3GXX
Randallstown, Maryland

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November 18, 1992
FROM: Anthony W. Deprato WA4JQS/VP8BZL
Team Leader, South Sandwich Island
Antarctic DXpedition VP8SSI
TO: GAP Antenna Products
6010 N. Old Dixie Hwy. Bldg. B
Vero Beach, Florida 32967



I would like to take this time on behalf of myself and the entire South Sandwich Island DXpedition Team to thank you for your support in making the VP8SSI Operation a success. I must say that the first time I saw the Voyager-IV was at the Dayton Hamvention and my first thought was that it would not stand up in a high wind area! Well, your antenna has made me take back those words. I was never so fooled by a product in my life! I was sceptical when I first learned from Ralph Koir that we would be taking this antenna along. It was new and I had not heard any reports on it good or bad. I was soon to learn a lesson.

We had been on Thule Island in the South Sandwich group and operating as VP8SSI for about four days before we were able to start setting up for low band operations. We unboxed the Voyager and about two hours later had it assembled on the ice and ready to raise. Two of the team raised the antenna and we used 3/16" Dacron rope to install one set of guy wires about mid way up the antenna. During the next ten days, we were pounded by storm after storm with constant winds of 50 to 70 mph. We clocked winds at over 132 mph during one very intense storm. During all this, the Voyager never once came down and the last site I saw as we departed Thule Island was your antenna standing where the VP8SSI camp had been!

Looking at the logs upon our return, we noted that we had logged 5,793 QSO's world wide on 40m, 745 QSO's on 80m and even though we only logged 3 QSO's on 160m, I have been informed by hams all over the U.S. that we were heard with a very good signal on 160m, but conditions were just not on our side for receiving. You can be proud of the fact that your antenna went to "the worst place on the earth" (quote from captain's log when Capt. Cook discovered the South Sandwich Islands) and withstood conditions very few hams are ever going to have to face.

At this time, the South Sandwich Antarctic DXpedition Group is working on plans for an operation from "Peter the First" Island and the Voyager will be on our packing list! I will also be installing one for use at my home Qth in Kentucky. It is hard to find outstanding products in this day and age, but the Voyager-IV is definitely one of those products

With best regards,

Anthony W. Deprato
A.W. (Tony) Deprato WA4JQS/VP8BZL
Team Leader, DXpedition VP8SSI

THE ANSWER IS GAP TECHNOLOGY

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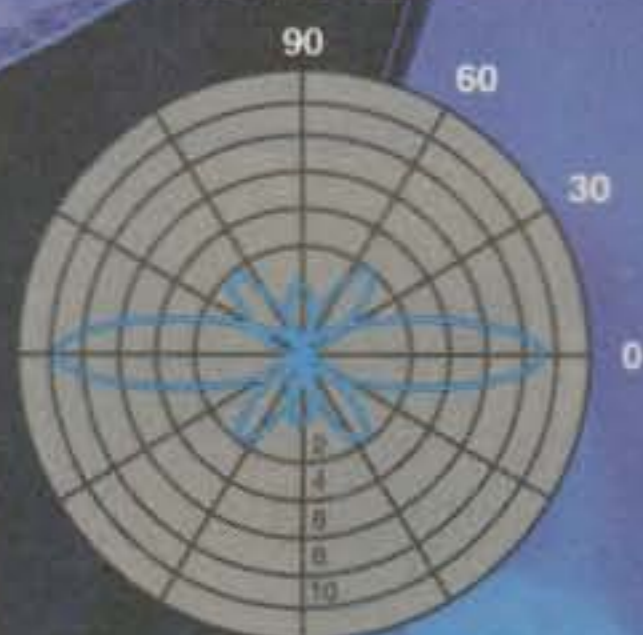
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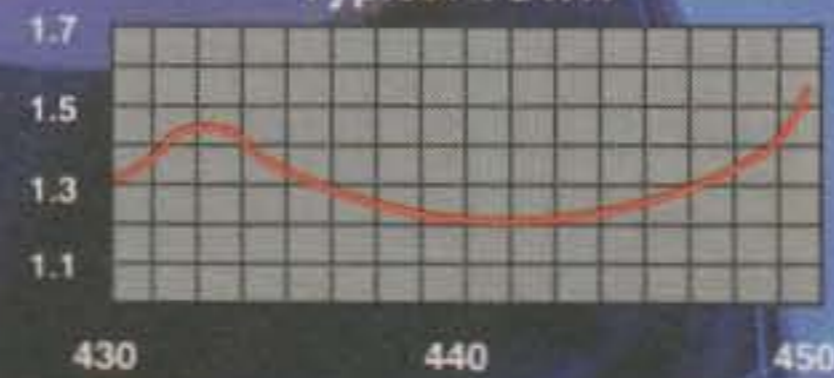
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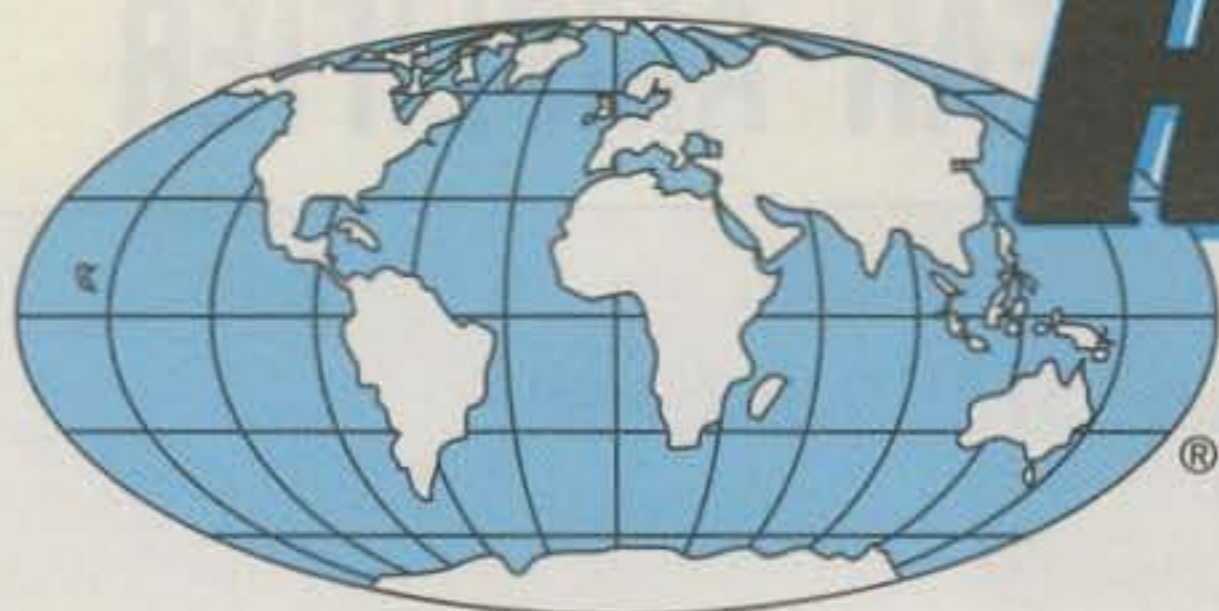
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- IC-W21A..... **50.00**

Results of the 1992 CQ World-Wide DX SSB Contest

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

Everyone kept their fingers crossed as the contest approached. Would the sun cooperate? The answer was not long in coming. The 1992 CQ WW DX SSB Contest experienced some of the best conditions in memory. The A index was 0 at one time! And the bands from 160 to 10 rolled open to allow some of the biggest scores in the history of the contest.

In this article it is impossible to pay tribute to all the many stories that took place to bring about the success of this CQ WW. There are literally thousands of operators who by their participation make the CQ WW a truly world-wide event. We receive many logs where the participant has made less than 100 QSOs—US Novices on 10 meters having their first experience with contesting, newly licensed IK and FD operators finding the thrill of the potential of the amateur radio fraternity. Each person looks for his or her call in the results. Are you looking to see how you did as compared to last year's score, against your buddy across town? It's easy to write about the top scorers and praise their accomplishments. They are only a few. I am sure that each top scorer would want to thank the guy who called him before having to go to work; the beginner who worked up enough courage to call that station who was sending so fast; the casual operator who decided to work a few before meeting his busy schedule.

Calling CQ on 20 you might find that operators from Finland have traveled far afield to answer you from PJ9P or FM/OH1MA and FM/OH3UU. XE1/AA6RX took time off from playing music for the Mexico City Philharmonic orchestra to give you zone 6. Three multi stations—HC0E, YS1X, and PU0F—brought together national teams to give you three good multipliers. You turned your beam to Africa and picked up Carl and Martha operating with the strange call 9ER1TA. They sure get around. There is Yoshi, 5U7M, who has given thousands of operators 5U7 while taking time off from work to help in the JA Peace Corp. And when was the last time a 5R8 called you! 5R8DF probably called you. What a thrill. You had a chance to work four HZ stations, three multi-singles, and Ahmed, HZ1HZ. Toshi, JA1ELY, took time off from publishing 59 magazine to help put S79J on the air. Jim, W7EJ, put 9M8R on, but first the towers had to be shipped down the river to his QTH in Sarawak. And who was that —SS station? Why, N6SS/MM in zone 34 calling. Preston sent a navigational chart with his log showing where he was at each hour of the test.

These are just a few of the colorful stories that took place. But let's get on with the results!



The great operators from IQ4A, The Monte Capra contest team. Standing left to right are I4IND, I4IKW, IW4ANU, IK4NPD, I4EWH, I4YRW, I4LCK, IK4JSI; kneeling IK4EWK, IK4CZF, I4LEC, I4VEQ, I4EAT, and IK4DCT.

Single Operator All Band

The top honors this year in this hard-fought category went to Rich, N6KT, operating HC8A. Rich seems to have located a QTH which propagationally plays very well. If you look at a map you will see that HC8 is exactly due south of the Mississippi river. But the QTH does not begin to tell the story. The real story is Rich, who broke the all-time record and set a new QSO record for a single operator. Looking at slides of the HC8A QTH it is hard to believe that it is on the equator, because the towers are almost always enclosed in a cool fog. Winning was not an easy task considering that Martti, OH2BH, operating at EA8BH, was pushing him the whole way. Martti's QTH has a beautiful 270-degree view of the ocean.

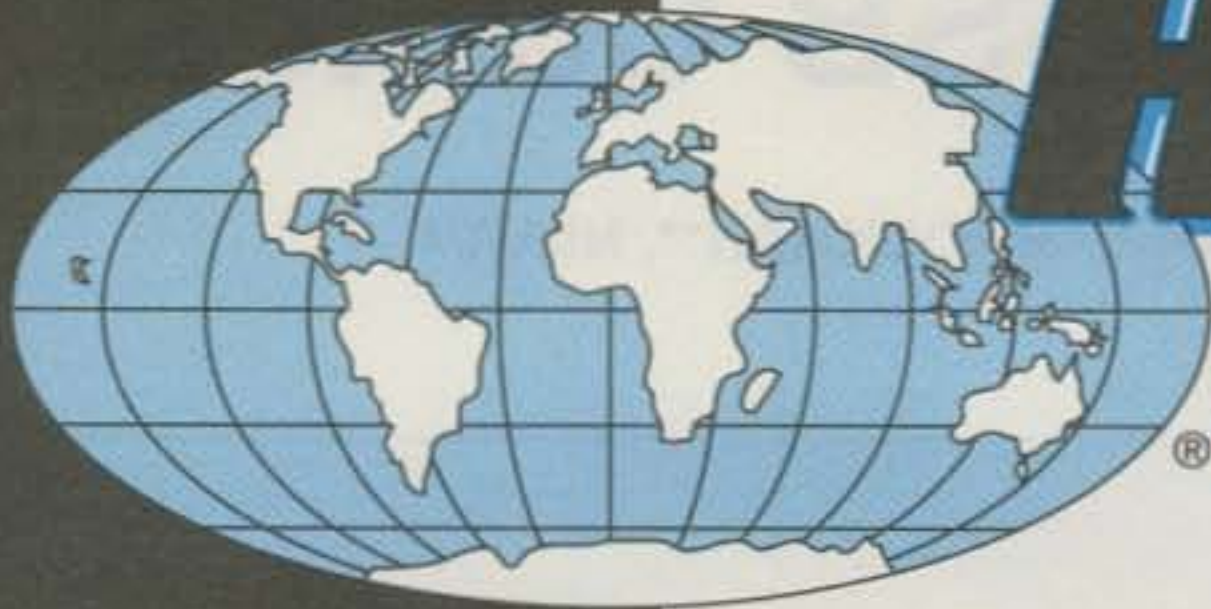
Third place was taken by Glenn, K6NA,



Long-time CQ contest expert CE6EZ.

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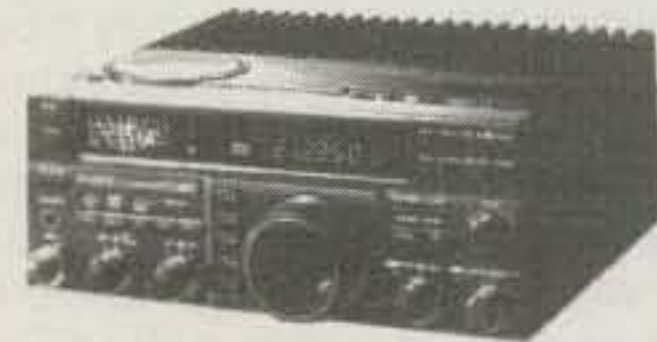


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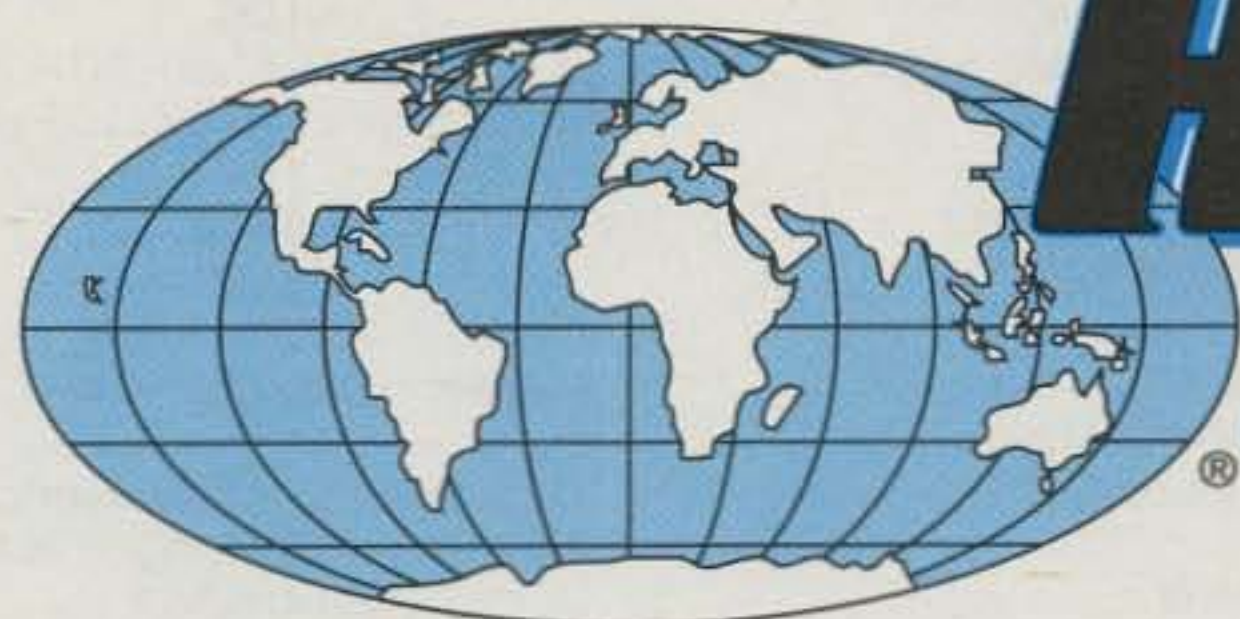
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Donor: Stanley Cohen, WD8QDQ

USA—3.8 MHz
Jeffrey Briggs, K1ZM
Donor: Arnold Tamchin, W2HCW

**Caribbean/Central America
NP2E** (Opr. Robert Hayes, KW8N)
Donor: CQ Magazine

Europe—28 MHz
IT9A (Opr. Fabio Grisafi, IT9GSF)
Donor: Chod Harris, VP2ML

Europe—21 MHz
Jiri Sanda, OK1RI
Donor: Robert Starling, N4GVF

Europe—14 MHz
OH2BH (Opr. Pasi Luoma Aho, OH2IW)
Donor: A.G. Anderson, GM3BCL

Europe—7 MHz
Drago Turin, S59UN
Donor: Roger Burt, N4ZC

Japan—28 MHz
Yuzo Hara, JA5ONK
Donor: Take Yokoyama, JL1BLW

Japan—21 MHz
Akira Minagawa, JAØJHA
Donor: DX Family Foundation

**MULTI-OPERATOR,
SINGLE TRANSMITTER
World**
VP2EC (Oprs. K5RX, KC5EA, N5AU)
Donor: Southern California DX Club
W6AM Memorial

**U.S.A.
K1DG**
(Oprs. K1DG, K1TR, KM3T, N1RC, WZ1R)
Donor: Carolina DX Association

**Europe
UW2F**
(Oprs. UA2FJ, UA2FM, UA2FX, UA2FZ)
Donor: Bob Cox, K3EST

**Caribbean/Central America
8P9Z** (Oprs. K3KG, K3ZR, K4FJ)
Donor: K3NA

**OCEANIA
NH2C** (Oprs. JF8FSI, JH7QXJ, JI3ERV,
JR7MZC, JR8PPG, WX8M, 7K1EHK)

**MULTI-OPERATOR,
MULTI-TRANSMITTER
World**
PJ1B (Oprs. K2SS, K3EST, KB2XZ, N3ED,
N7ZZ, NL7GP, W3UM, WA3LRO)
Donor: W6QHS and KK6QM

**U.S.A.
N2RM** (Oprs. N4HY, KA2AEV, WM2H, KZ2S,
K2TW, N2AA, N7BG, N2NT, KR2J, WC4E,
W2RQ)
Donor: Paul Hellenberg, KS9K

**Europe
GØKPW** (Oprs. G4BAH, G7ABQ, G3VHB,
G4BUO, G3XTT, G4FAM, G4VMM, GØCYB,
G4PIQ, G4BWP, G4WFR, G3ZAY, G4DQW,
GØRRC)
Donor: Finnish Amateur Radio League

**Japan
JA7YRR** (Oprs. JA7CEC, JA7CXV, JA7FDY,
JA7JUD, JA7LBY, JA7MQM, JA7OZW,
JH7MEV, JH7VHZ, JR7LVA, JJ1XGF)
Donor: Nippon Television Network Corp.

**CONTEST EXPEDITIONS
World—Single Operator**
TJ1GG (Opr. Giorgio Beretta, I2VXJ)
Donor: Stuart Meyer, W2GHK

World—Multi-Operator
CEØY (Oprs. AB6BH, HC1OT, N6AA, N6ZZ,
W6MKB, W6XD)
Donor: The German CDXG & SDXG
(DJ3NG & DJ4EI Memorial)

operating 9Y4H. Glenn has spent several years building up the station in Trinidad.

Special mention must be made of the all-band entry of ZD8Z operated by Jim, N6TJ. Jim worked 40 zones on 20 meters! Only 6 other stations accomplished this feat of 40 zones: PJ1B, N2RM, K1RU, W5FO, IR4T, IT9A, and LY5A. These stations were either multi or single band.

In the US John, K1AR, took top honors. He

did not win in a little way. He won in a big way. Setting a new US record, John caught the right waves on 10 to surge into a tremendous lead. Looking at the number of QSOs in K1AR's and HC8A's log leads one to the conclusion that they took the same QSO rate course at summer camp.

Second place went to Bob, KQ2M, operating KM1H. Bob was securely in second place above Dean's third-place finish. Special men-

tion should be made about N5RZ and W9RE. Both of these fine operators broke into the top ten even though they operated west of Pennsylvania. In the far west (the land that multipliers forgot), the super efforts of Bob, N6EK, operating from downtown Berkeley and John, N7TT, operating from Washington must be fully appreciated.

Over in Europe another new record was produced by Tine, S52AA. As you may have



Making friends in far-away places. Left to right are 9M8DB, Mayor of Miri, and 9M8R (W7EJ).

noticed, the S5 boys began using their new call signs at the beginning of the CQ WW! Tine, operating from his country house, took advantage of the great conditions to beat OE6MBG, who came in second place, while Steve, GW4BLE, came in just behind OE6MBG.

The low-power category has been very popular and from your letters is very appreciated. The number of entrants now about equals the high-power category. The winner with a wonderful log was I2VXJ, operating at TJ1GG. He is also the winner of the single operator DXpedition trophy. On the other side of the earth, Craig, WB7RFA (new call is KH8AL), jumped on a plane on Thursday, operated the test, and returned to Oregon on Monday! Congratulations to all the great operators in the all band category.

High Bands

The three high bands were dominated by South American entrants. On 28 MHz N5FA, operating ZW5B from southern Brazil, had a gigantic win. To win a highly contested single band by more than a million points is quite an achievement. Second place went to Chris, ZS6EZ. His log had a low unique rate. It appears that you had to be in the southern hemisphere to take advantage of the great north-south openings available on 10 meters. In the US N4RJ pulled out all the stops to run up a great score from Georgia over KS1L, who did a fine job. In Europe IT9A avoided the flows of Mt. Etna and grabbed first prize.

This was not so true on the other high bands. ZV5A, operated by Ohms, PY5EG, sure put his great station on the map by taking top honors on 21 MHz. Second place went to KW8N, operating from NP2E—a real accomplishment from North America. Special mention should be made of JA0JHA's score from a very northern latitude.

For many places in the world 20 meters was the place to start the contest. It was open everywhere at once. Out of all those stations you heard, the top score goes to Ari, OH6MW, operating PJ9P. He was followed by the new European record holder, Pasi, OH2IW, operating from OH2BH's QTH while Martti was at

EA8BH. Second place went to the northern Swedish operator, SM2EKM. In the US Bill, K4XS, put his super station to use by taking the 20 meter trophy home.

Low Bands

The low bands did not suffer because of the great high-band conditions. The biggest surprise was 40 meters. The band was really alive with action. Many operators topped 120 countries. Japanese stations experienced great conditions to the east coast of the US, working up to 80 QSOs to the 1 to 3 call areas. Signals to Europe were also strong. The top score on 40 was PJ9E operated by Tapani, OH5BM. This sets a new world record. Second place went to ZF2RJ operated by N6RJ. Jim, who became a silent key in June, was a competitor who was gracious as well as very talented. His influence on amateur radio will be missed by all of us.

In Europe, Drago, operating from a hilltop in beautiful Slovenia with his new call, S59UN, took advantage of the great conditions to set an all-time new European 40 meter record. Trying hard from Gibraltar was Jorma, OH2KI, operating ZB2X. The big difference in their two logs was the number of JA's worked by S59UN. In the US the big competition was in the northwest. W7XR operated by Danny, W7WA, edged out the old record holder, KC7EM, for a new US 40 meter record.

On 80 meters Carlos, TI2CF, pushed the mic button to top honors. His station sure laid down a strong signal. 108 countries worked on 80 seemed impossible just 5 years ago. Taking up second place was TM5C operated by F6CTT. What a great score, considering all the noise in Europe on 80. Second place in Europe went to LY3BS. Third place in the world and top US honors went to K1ZM. Jeff squeezed out a new US record by working about 400 VE(1-3) stations. Over on the west coast Bob, W6RJ finished second in the US. He also worked a lot of VE's (7-5). Both of these guys outfoxed the mults who were asleep at the switch on the VE front.

Looks like the place to be for 40 and 160 in the world was the top of the Adriatic Sea. Top-

TOP 5 SCORES PER BAND (Regardless of Category)

Log	Band	Score	Pts/Q
9A1HCD	160	56,550	1.25
PJ1B	160	54,103	2.91
OH0W	160	43,476	1.06
DL0CS	160	42,106	1.00
4X4NJ	160	39,984	2.87
TI1C	80	498,037	2.11
PJ1B	80	355,819	2.92
TM5C	80	286,368	1.55
K1ZM	80	223,971	2.48
G0KPW	80	179,622	1.43
PJ9E	40	1,028,104	2.95
9A1A	40	919,710	1.92
ZF2RJ	40	917,316	2.46
S59UN	40	875,875	2.08
FM5CD	40	776,556	2.37
PJ1B	20	2,526,805	2.95
PJ9P	20	1,878,376	2.97
OH2BH	20	1,870,870	2.42
OH0W	20	1,522,422	2.33
IR4T	20	1,481,522	2.31
PJ1B	15	2,511,627	2.94
CE0Y	15	2,038,478	2.97
ZV5A	15	1,830,445	2.93
NP2E	15	1,725,360	2.53
G0KPW	15	1,596,672	2.75
ZW5B	10	2,828,202	2.96
PJ1B	10	2,381,535	2.95
ZS6EZ	10	1,805,714	2.97
HC8A	10	1,785,351	2.97
LU6ETB	10	1,729,195	2.96

band world honors went to 9A1HCD operated by 9A2LH from a mountaintop in northern Croatia, while second went to Luis at IV3PRK with his fine vertical. Third place in the world went to Riki, 4X4NJ. In the US, WB9Z from out in the midwest took all the marbles home. A special mention should be made of SM5AQD and OZ3SK. Both finished in the World top six running low power!

QRP

The QRP category got shook up a little in the standings. When the dust settled AA2U won the 5 watt category. The other side of the continent produced the second world high score of K7RI. Both stations were able to run pileups at certain times, believe it or not. Timing their calls and persistence paid off with good multipliers on all bands. This category traditionally has the lowest unique rate of any—about 0.5%. Just as in the US the two top Europeans came from opposite ends of the continent. First place went to SM3CCT followed by IK1GKE.

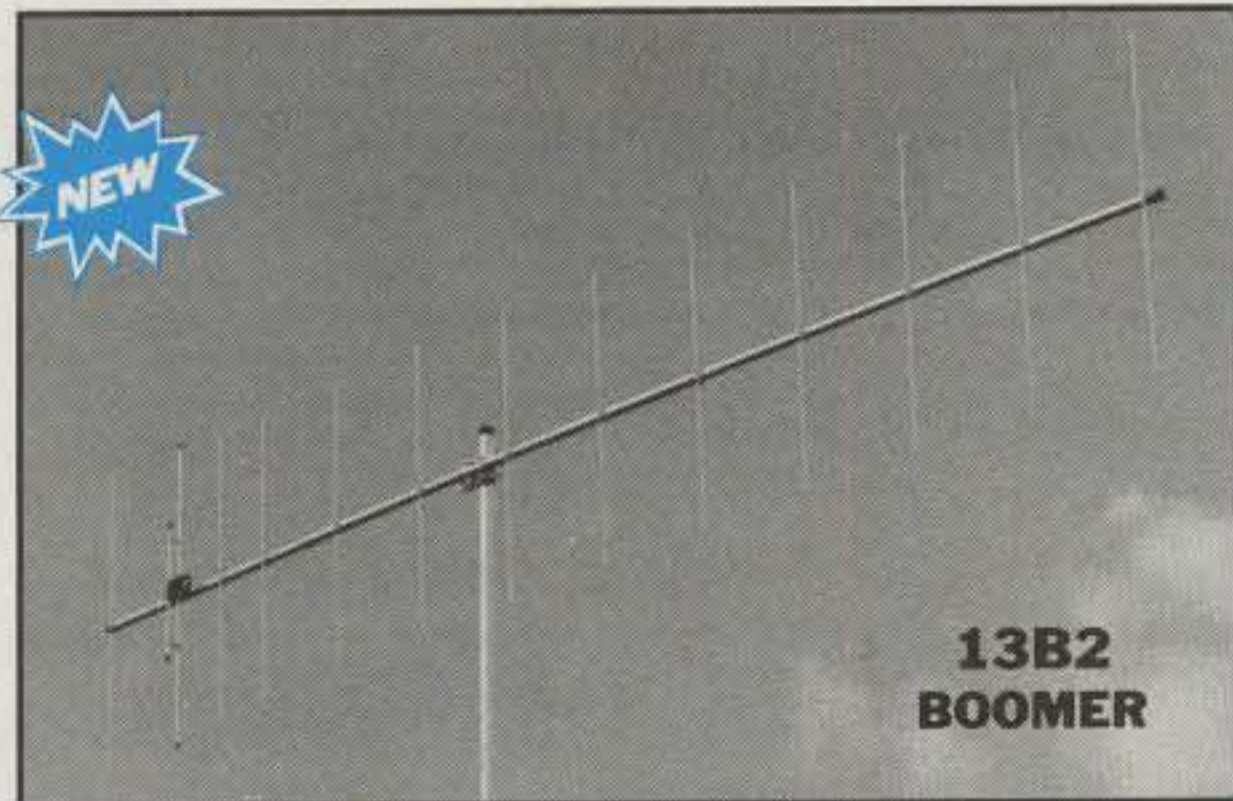
Assisted

As packet clusters spread like spider webs over the world, more and more people are enjoying this category. Clusters now tie together most of Europe, the US east coast, the US west coast, and parts of Japan. There were thousands of call outs during the contest. This category continues to grow in popularity. In your enthusiasm, remember that when you

Cushcraft

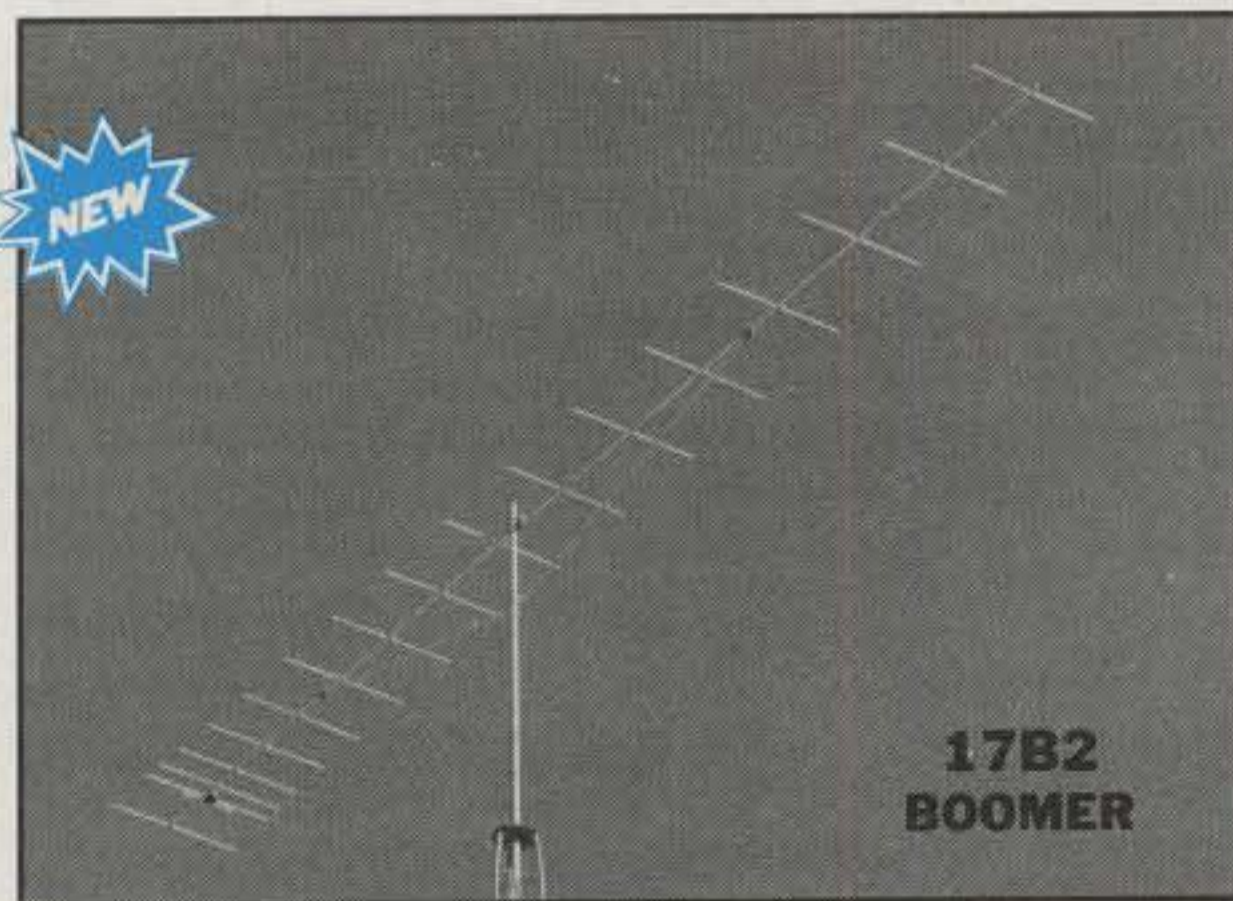
WHERE PERFORMANCE IS A TRADITION

Cushcraft is the leader in new and innovative antenna designs to make your amateur radio operation more satisfying. Whether you are new to the hobby or have many years of experience there is a Cushcraft antenna for you. Call or visit your local dealer. He has Cushcraft antennas in stock.



**13B2
BOOMER**

BOOMERS. Two new models. The contest winning 17B2 for EME, Tropo, SSB, CW or the 13B2 for FM, Packet or SSB over the whole 2 meter band. Both models have the new UltraMatch balanced feed system. Computer aided design gives you the cleanest pattern and the highest gain available.

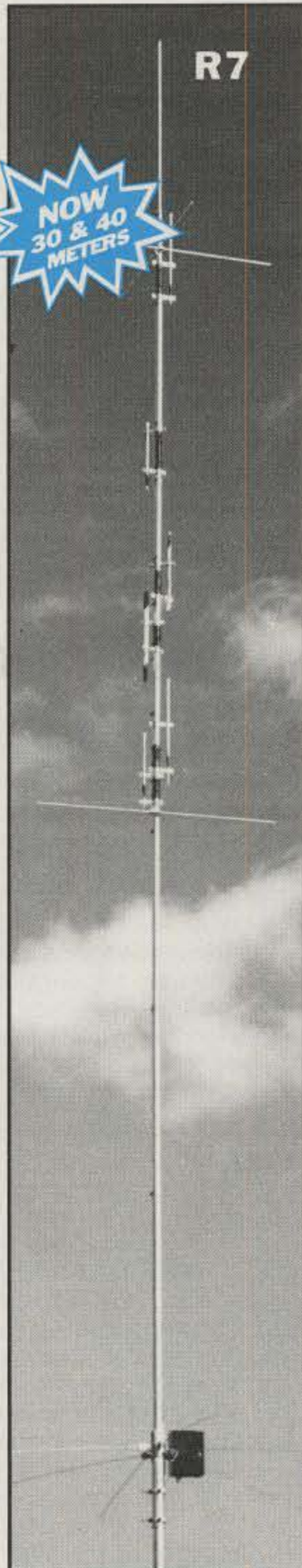


**17B2
BOOMER**

SKYWALKER MONOBANDERS. 10, 15, 20 and 40 meter Yagis for more contacts, less waiting and a better signal. Preferred by contesters and DX-peditions worldwide.



**15-4CD
MONOBANDER**



R7

**NOW
30 & 40
METERS**



LAC-4



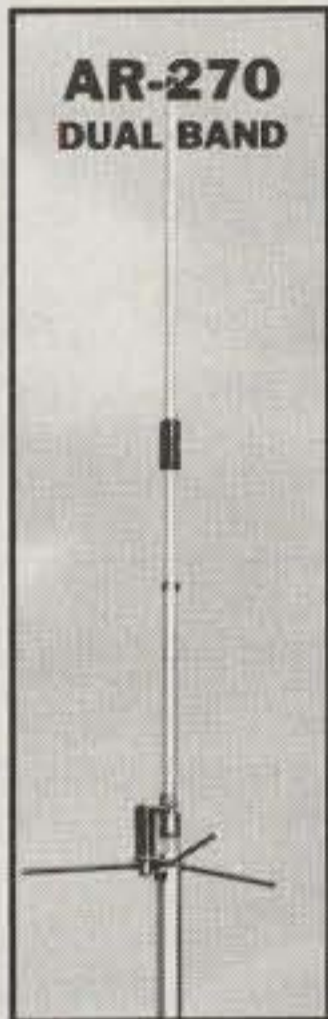
**A3S
HF TRIBANDER**

HF TRIBAND BEAMS. A3S - The most popular compact 10, 15, 20 meter beam. A4S - A high performance 18' long wideband beam. Both models come with stainless steel hardware and have optional 40 meter add-on kits.



**QUARTERWAVE
MOBILES**

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**AR-270
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DUAL BAND RINGO. Only 45 inches tall! A must for the new dual band transceivers covering 70 cm and 2 meters. Model AR-270.

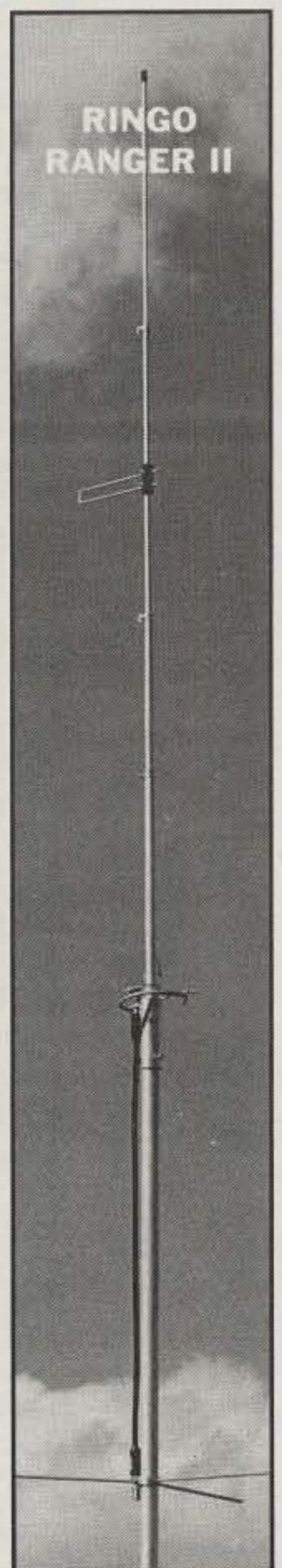
CUSHCRAFT/SIGNALS QUARTERWAVE MAG-MOUNT. These commercial grade high quality mobile antennas are factory tuned to give you quick and easy coverage of the 2 meter or 70 cm band. We offer a full line of high performance mobiles for 1-1/4, 2, 6, 10 meters and 70 cm.

**R7 10, 12, 15, 17, 20, 30 & 40 METERS
HALFWAVE VERTICAL**

Amateur radio's most popular vertical design now gives you 7 band performance including 30 & 40 meters, without ground radials. Only 22 feet tall, R7's small footprint and ground independence give you "mount anywhere" flexibility. R7 will make ham radio more fun.

RINGO RANGER II. Still the worlds favorite 2 meter, 70 cm or 220 MHz omni antenna, with more gain. A must for your FM or packet station.

FAST ACTION GAS TUBE LIGHTNING ARRESTERS. Protect your valuable radio equipment. High and low power models with SO-239 or N-connectors.



**RINGO
RANGER II**

AVAILABLE THROUGH DEALERS WORLDWIDE

BAND-BY-BAND BREAKDOWN—TOP ALL BAND SCORES

Number groups indicate: QSOs/Zones/Countries on each band

WORLD TOP SINGLE OPERATOR, ALL BAND

Station	160	80	40	20	15	10
HC8A	125/11/25	357/20/51	638/28/74	1166/34/111	2031/36/127	4001/31/120
EA8BH	82/11/41	263/21/58	591/27/81	2234/37/117	1531/31/110	2393/31/112
9Y4H	174/11/25	251/15/59	538/24/82	1750/35/105	1147/33/102	2326/29/104
ZD8Z	16/10/16	88/17/47	330/30/84	1285/40/139	1424/38/135	2090/36/126
KP2A	198/12/35	397/16/61	740/29/93	1414/33/98	1269/35/96	2959/31/103
P40W	147/9/23	233/14/45	640/26/83	1026/30/89	1169/32/101	2523/29/95
VD3EJ	240/12/20	477/15/60	546/28/94	741/39/116	1601/35/118	978/30/114
K1AR	24/10/21	239/15/73	311/26/88	969/39/133	913/33/125	1292/32/119
ED8TK	4/3/4	156/13/46	129/22/69	1401/36/124	1080/31/109	1556/29/118
8R1K	76/9/24	109/12/40	546/24/72	955/26/83	1111/30/91	2115/27/92

WORLD MULTI-OPERATOR SINGLE TRANSMITTER

VP2EC	137/16/49	281/23/90	920/33/122	1389/39/130	2522/38/151	2185/34/143
VP9AD	119/8/24	430/20/76	615/27/93	2662/39/150	2260/37/150	2052/32/148
8P9Z	83/11/28	276/13/61	521/28/102	3238/36/138	2189/35/136	1340/32/130
P48J	57/8/17	254/15/42	854/29/88	1507/33/112	637/32/124	3881/31/110
V31DX	119/8/24	370/19/94	1054/29/78	1401/30/107	1681/33/120	3286/33/122
ED9DX	158/11/44	227/12/62	756/27/96	1470/35/121	1234/33/110	1720/36/113

WORLD MULTI-OPERATOR MULTI-TRANSMITTER

PJ1B	332/14/42	952/27/101	1631/33/127	4118/40/168	4381/37/158	4140/34/161
G0KPW	358/9/57	1185/20/86	1725/38/137	2489/38/153	3072/38/151	2188/39/161
9A1A	431/10/56	1045/19/75	2737/36/132	2684/39/152	2896/39/136	2877/39/142
CE0Y	19/9/9	331/19/37	1088/29/68	2869/37/136	4063/37/132	3804/30/101
OH0W	631/10/55	1123/22/87	2074/34/130	3630/39/141	2360/37/124	1852/37/123
N2RM	95/14/41	485/23/98	721/32/128	1654/40/178	2367/40/178	1688/36/170

USA TOP SINGLE OPERATOR, ALL BAND

Station	160	80	40	20	15	10
K1AR	24/10/21	239/15/73	311/26/88	969/39/133	913/33/125	1292/32/119
KM1H	26/8/17	189/18/65	193/29/82	830/39/139	785/38/133	989/30/112
N6BV1	29/8/13	262/16/67	137/21/74	831/34/118	849/31/110	764/27/103
N2LT	26/7/18	83/16/50	126/23/78	568/35/109	657/33/102	1190/30/122
W3BGN	42/12/25	182/13/57	184/24/72	602/34/100	561/34/91	932/27/92
N5RZ	31/8/19	79/17/45	229/25/78	284/35/108	590/34/114	1071/31/136
W9RE	24/8/17	112/15/63	117/26/73	356/29/115	712/33/114	771/31/122
K3ZO	17/7/11	192/15/61	205/26/85	356/31/102	590/32/106	857/26/103
K2DM	5/4/3	144/16/58	157/16/58	696/33/114	721/31/106	652/27/84
W2HPF	15/6/11	90/13/48	146/22/62	515/32/111	591/33/109	831/28/108

USA MULTI-OPERATOR SINGLE TRANSMITTER

K1DG	39/14/33	206/18/62	312/30/117	940/39/161	1105/37/152	786/32/156
N3RS	34/12/27	110/18/71	145/30/105	725/40/153	832/37/162	1095/34/157
KS9K	24/9/23	89/18/66	195/33/111	745/39/149	1150/38/137	695/34/156
KC1XX	11/5/8	172/17/73	256/30/110	847/38/150	844/35/146	850/30/148
K4ISV	26/9/24	99/20/68	132/33/101	413/39/139	1125/38/143	998/36/151
K8AZ	28/10/23	135/17/69	149/29/98	657/39/143	1048/36/149	664/32/155

USA MULTI-OPERATOR MULTI-TRANSMITTER

N2RM	95/14/41	485/23/98	721/32/128	1654/40/178	2367/40/178	1688/36/170
W3LPL	76/14/37	487/23/99	579/33/122	1588/40/178	1762/37/173	1581/36/167
K2TR	113/12/38	511/21/89	479/32/111	1547/39/164	1715/38/158	1435/34/157
K3LR	124/13/32	392/21/82	492/31/109	1436/40/166	1750/28/157	1626/35/164
N5AU	65/11/28	188/23/68	393/35/115	1095/40/166	1989/37/166	1416/34/167
NX1H	33/11/20	522/22/85	327/33/108	1636/39/167	1215/36/147	1334/34/155

work a call, which you copied off the screen, make sure you confirm that the call is correct. Sometimes it isn't.

The big winner was Jeff, KR0Y, operating from WM5G station east of Dallas, Texas. Jeff took advantage of his skip to VE by working many stations. Second went to K3WW, a driving force in the Frankford Radio Club. Taking time off from teaching, Ulli, DJ2YA, took home the top DX score, while JA8RWU from Hokkaido was second.

Multi-Single

After careful analysis of this hotly contested category, and making sure the ten-minute rule was adhered to, VP2EC emerged as the big winner. The crew from Texas really got those calls correct, as their log was very free of mis-copied calls. Demonstrating an equally fine job with copying was the Frankford Radio Club DXpedition to VP9AD's QTH. The top score in Europe was UW2F, followed by Y34K, now of the Bavarian Contest Club.

Taking this highly competitive category in the US was K1DG. Second place went to perennial top scorer N3RS of the Frankford Radio Club. Far from the east coast KS9K put together a super effort to place, while still farther west W6GO from near Sacramento gathered in enough QSOs to take top honors for the far west.

Multi-Multi

The winner in the goliath category was PJ1B. Except for the towers, this perennial team sets up their station "field day" style every year—one solid week of eight guys working from 7 AM to 5 PM each day to get ready for 48 straight hours of waking hours followed by taking down the entire 11 beams and wires on Monday. Wow, that's motivation! Second place went to G0KPW. This fine team amassed a great QSO total to edge out the 9A1A boys from Croatia.

The SCCC boys went to zone 12 this year to put CE0Y in many logs.

In the US, N2RM and W3LPL battled it out for control of the multi plaque. N2RM from his NJ coast QTH once again beat Frank's team. N2RM worked 40 zones on two bands, the only station in the contest to accomplish this feat. Farther out west AA6TT/0 down in SW Colorado turned in the top score west of Texas. What a great job they did! The second highest score from the west was NK7U. Joe, besides being a retired professional baseball player, has assembled a great station and is giving enthusiastic new contesters an opportunity to experience the CQ WW from eastern Oregon. And everyone thought they were working Father Paul when they worked W0AIH/9, but he was far away taking part along with W4ETO in the first US-UL multi-multi from RL0L.

Comments

We sure appreciate all the disks that we received for last year's contest. No matter how small your score, please send it to us. We made extensive use of many scores to cross check the validity of top competitors. Please send us a disk of your log no matter how small your score. Of course all top scores (potential box scores) are required to submit a computer disk. The formats we would like to have are: If you use CT we want your .BIN file; if you use N6TR we want your .DAT file; if you use D-Base we want your .DBF file. Of course, there are many other formats we receive such as W2HPF, NA, K7RI, etc. The generic form we want is a single, vertical column of calls in chronological order for each band.

Remember that your disk file should be the same as your paper log. Which brings us to another question that several people have asked: "Why don't you guys allow us to submit only disks?" Here is our reason. The CQ WW is a fun and/or serious event for tens of thousands of people. We have an obligation to cer-

tify winners and record holders. You cannot check logs thoroughly with just a computer. If you have ever tried writing a long paper or a book on the computer, you know that in order to understand the flow of words and to get a feeling for your document it is *always* necessary to print out a hard copy to edit. You can't flip pages with a computer like you can with a hard copy.

We are looking for your suggestions of ways to increase the activity and a feeling of competitiveness in areas (100 or more log submissions) which traditionally produce few national or world winners (areas such as the midwest and far west US).

Obeying The Rules

The rules that are printed in this issue are the ones you should obey. Please review them. We feel it is necessary to remind the multi stations that they must obey the distance rule as described in rule III.3. We have received several letters regarding certain European multi stations that are scattered all over their country. Come on, fellows; that's not right. One of the problems that a multi has to solve is cross station interference. It can be done. It just takes some thinking. Several multi-multis have even solved the interband problem. They can look for mults up to 5 kHz from their running station! This is perfectly okay, but it breaks the rules to have 20 meters in one city and 40 meters in another 50 km away.

For Your Information

It was a great pleasure to find so many rare countries on the air in the contest. The multi-single efforts of ZA1A, KC6WW, HS0AC, 7Z1AB, 7Z2AB, HZ1AB, and 4J1FW were a welcome surprise to many people. In a world with increasing tensions, it is a tribute to amateur radio that people can come together, have fun, and go away satisfied that they tried their



Here are some faces with those familiar callsigns. Left to right: KW8N (NP2E Op.), KP2A, and CT1BOH (KP2A Op.).

best, that they talked to old friends or made new ones. The S5 boys for various reasons timed the debut of their proud new callsigns for the beginning of the CQ WW.

Since the last contest several new countries have come into existence. Here is a list of new countries to put in your country files: T9 Bosnia, Z3 Macedonia, OK, OL Czech republic, OM Slovakia. Here are new PX's for the former USSR: Armenia (UG)EKA-EKZ; Azerbaijan (UD)4JA-4JZ; Belarus (UC)EUA-EWZ; Georgia (UF)4LA-4LZ; Kazakhstan (UL)UNA-UQA; Moldova (UO)ERA-ERZ; Kirghizstan (UM)EXA-EXZ; Russia (UA1-6)UAA-UIA, all R, 4K; Tadjikistan (UJ)EYA-EYZ; Turkmenistan (UH)EZA-EZZ; Ukraine (UB,UT,UY)URA-UZZ, EMA-EOZ; Uzbekistan (UI)UJA-UMZ. Some guys are using these new prefixes already and some are not. When in doubt, ask, "What is your country?"

Have you ever wondered who really had the top score on a particular band regardless of category? Then check out the "Top 5 Scores Per Band" box. The top 5 scores without regard to category are shown along with their point/QSO average.

And case you wondered what percentage QSOs of a log from various QTHs are from Europe, Asia, or somewhere else, check out the "Average Percentage..." box. As you can see, the percentages vary greatly depending on where you are on the planet. Nothing is intuitively new here, but it's nice to see real data. It looks as if everyone has more or less the same shot at Oceania, Africa, and South America, while Europe, Asia, and North America vary greatly. Differences in Oceania percentages are entirely due to the number of VK/ZL's worked. In the coming years, speaking Spanish, Russian, or Japanese at certain times will increase your QSO totals on certain bands.

Here and There

Another important issue has surfaced along with the OG1M single band entry. It's a matter of the final authority over the use of a license exercised by the licensee over the "guest operator," in today's popular contesting scenario. While the OG1M entry has its own merit,

it may prompt another rule clarification; it is reasonable that the station licensee will always have the final word concerning the use of his license. So watch out, guys, and make sure your host is always happy with a complete understanding of your contest effort.

This year we received several complaints about SSB operation too low in the 40 meter band. SSBers should respect the CW boys and stay above 7040. Of course, it is quiet at 7010. That is because it is respected as the CW band!

This year marks a watershed of sorts. We compiled the largest database ever constructed. On SSB it consisted of 900,000 log entries representing 378 different logs (1550 "band logs"). Every geographical area was well represented. The 900,000 log entries represented 84,779 different log entries (including typos). This can be further broken down to 48,765 calls worked by just one person in our data bank and 36,014 worked by more the one person. Most of those 48,765 calls are bad calls, believe it or not! And some of the 36,014 are likewise no good.

We estimate that the number of real calls on for the SSB test was 30,000, give or take a couple of thousand. Almost two thirds of the dif-

ferent calls in the data base represent errors of some sort. Transmitting, copying, or typing errors all contribute to the bad calls. Here is an example of some representations of HC8A in the data base: HC8A (255 people in data base worked HC8A—our max is 255), HC8E (4), HC8A (2), HC5A (1), IC8A (1), HC8D (1), HC8I (1), HC2A (1), HC8S (1). All the calls are wrong except for HC8A! As you can see, one call gave rise to at least eight bad calls!

The opinion of those of us who check such things is that the logs we are receiving are showing far fewer errors than three or four years ago. Operators are trying to get calls right. Congratulations to all who have increased their copying ability. Remember the old adage: "To err is human; to ask for a repeat of a call is divine." If your score has a chance of making the Top Box scores in any category, it will definitely be checked carefully.

If you are interested in receiving a list of uniques in your log, send your request to K3EST. For a more detailed, personalized report on your log send \$6.00 (mailing costs plus disk plus time). You must send a disk (see rules for the format we want), if you have not done so already, for such information. We will make such information available to entrants beginning in June (SSB) and July (CW) for the previous year's contest.

Every year we come to count on hearing friends in the CQ WW. This year as we tune the band some familiar calls will be missing. In addition to Jim, N6RJ, we lost two Hall of Fame members when G3FXB and W3GRF passed away. We will miss these fellows.

Thanks

Last year we forgot to thank K5ZD for helping as a log checker for several years. We wish Randy the best in his new job and hope to welcome him back someday.

Your log checkers were K3EST, KR0Y, W9RE, WA8YVR, N3ED, K1DG, W2RQ, W7EJ, K6NA, N6AW, KR2Q, and N6AR. Our database was compiled by N6AA using N6TR's software. Our DX advisors are JE1CKA, I2UIY, G3SXW, OH2BH, OH2MM, OH2KI, S52AA, EA5RS, CT1BOH, OK2FD, and PY5EG. Our special advisors are N2AA, K3ZO, and K1AR.

Congratulations to all the winners and see you in the '93 contest!

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

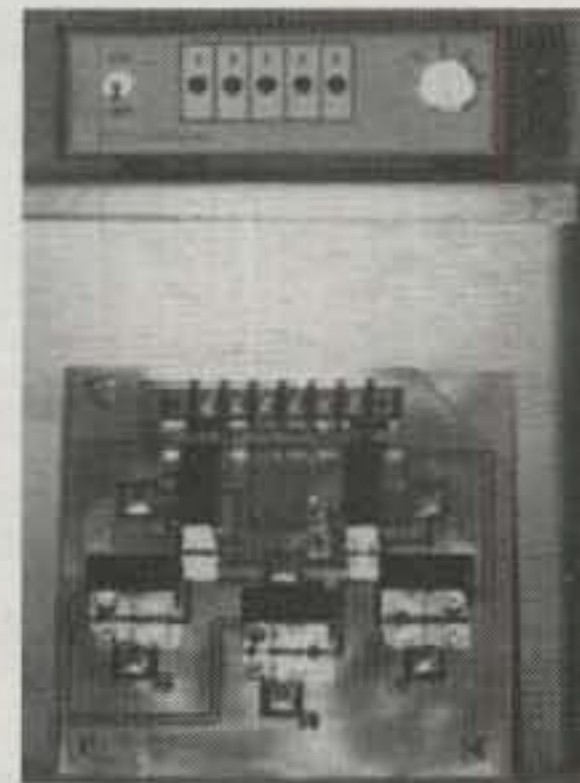
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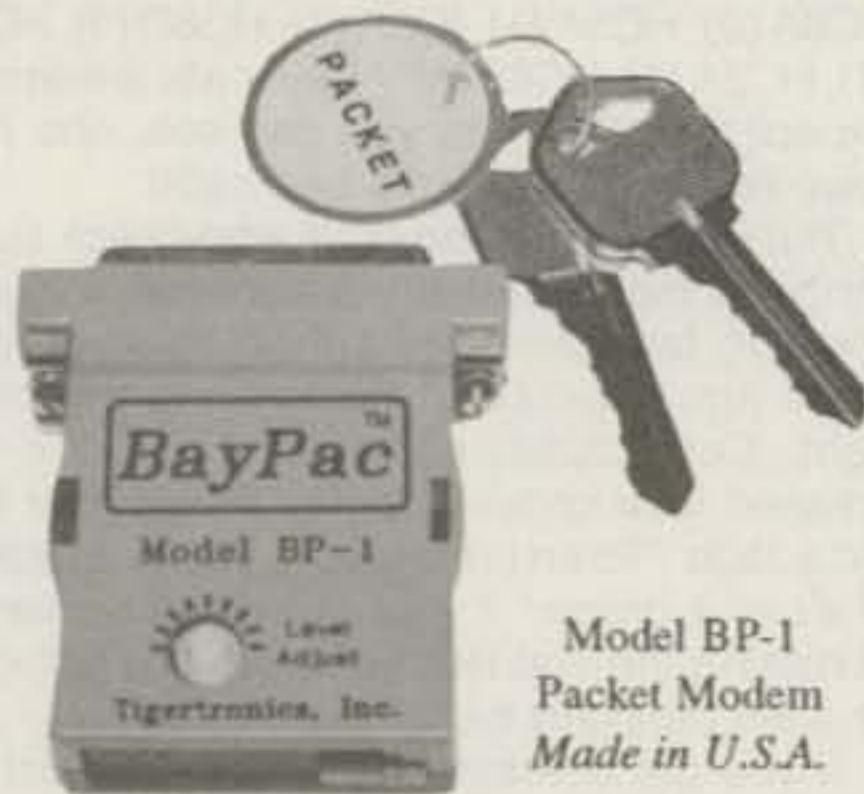
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DX QRM

Somebody stole my 40m vertical-radials!? Copper is very expensive here, but my SWR was too high! . . . *UT2L*. My first entry *SO/15m*. Broken ant for 80m put me to single band category . . . *UT4UX*. Look for me next year with a new antenna farm in the mountains of Puerto Rico . . . *WP4U*. This was the very best contest I have been in to date, the conditions were great, and I learned some new tricks about propagation. I also found that the new tower made a big difference to the effectiveness of my old and weathered *TA33jr*. Now if I could only figure out how to beat my two contest buddies, *VE3ZD* and *VE3WSM*, without using an amplifier . . . *VE3RRH*. We had great fun—three multi-singles from HZ land. WOW! . . . *7Z2AB*.

I was excited in this contest! It was hard to contact to Caribbean and Africa! . . . *JK6ISK*. I enjoyed DX QSOs and contest very much from Mongolia. Tnk you for all of call! . . . *JT1/JI2MED*. Great problems with US stations. They used big power and bad receivers, or perhaps they don't care about weak signals from abroad? . . . *LA4KGA*. Hawaii is a nice place to have fun. *KH6UU*'s B&B was charming . . . *KH6/NY6Y*. Wish folks operating other than their zone would have to sign portable at the zone they are in . . . *KH6GMP*. After the typhoon, we had many troubles to build antennas but fortunately no blackout during the contest . . . *NH2C*. The high band saga: the states were HOT and Europe, NOT! . . . *KL7Y*. Not bad considering all the troubles—American Airlines smashes one amp, one computer blows 30 mins into test, AC line voltage slightly low—95 instead of 220! We shall return . . . *J68DX*.

Conditions to the south were very poor this year. But over the pole propagation was quite good. . . . *NL7KJ*. Murphy strikes! Twenty meter RF hung up computer constantly, local cluster node died, buggy version of CT. Oh well, we had fun for 32 hours! . . . *6D2X*. Propagation was poor from here. The great absent: JAs. But, as every year from 1977, enjoyed the test . . . *LU4MEE*. Nice contest even though I didn't work "like blood taste in my mouth" . . . *OG7MMY*. Very narrow bands only on 28 MHz is enough room. Hi! Very good signals from USA . . . *OK2KMR*. Sorry I couldn't spend more time in contest. It was a real struggle with low power and the tall mountain . . . *3A/K4UEE*.

My new QTH in Singapore was a total disaster. I have spend 2 days in the contest and got just over 100 QSOs. Even had a problem to get 9V1 to copy me on 75 meters. I have just activated my old 9V1XE call after 4 years but cannot repeat my 1987 signal. In CQ WW CW '87 over 2 mega points and all rig is the same, just different place on the island. This place must be under Murphy's spell . . . *9V1XE*. It was the only time I can use AM3 prefix in Spain, only in 1992, my first contest monoband in 3.8 MHz, very beautiful work USA . . . *AM3FQV*. Very high wind, ten hour power shut down . . . *F6AQJ*. My HB9cv 28 MHz suffered because of the wind . . . *FD1RAB*. Conditions seemed good but no luck working anyone in Zone 23, 24, 26. One highlight was a 305 JA run Saturday afternoon . . . *FS/AI7B*.

Conditions were fair. Plenty of stations to work. Europe was hard to work as it seemed that the only way to work Europe was on back scatter, as most contacts with Europe were on the back off the beam. . . . *G0NKL*. This was our first entry in multi-multi category. There can be no return to multi-single! . . . *GW8GT*. "Contest"—the ultimate "test" of skills equipment and knowledge. My score was limited only by my need for sleep, food, and stretch breaks . . . *VE3WSM*. The bands were HOT! This made it very hard to sacrifice 6 hours of prime operating time Saturday night to watch the world series! . . . *VE3ZD*. Work commitments and "Murphy" into my low-band antenna didn't allow me to work as much as I wanted to. Started off as single as all-band low-power, but a friend gave me spots on 2m for 9ER1 TA and 3X0HLU, I couldn't resist, but it was worth changing categories for them . . . *VE6JAJ*.

I wish when stations call CQ they would listen longer than one-half a second . . . *VK3SM*. Wanted to operate longer, but had heavy noise from power lines. Hey—point your beams to zone 29; we are here . . . *VK6BHL*. Have trouble with 160 meters first night (RF arcing), but enjoyed and break my own record! Thanks K1EA! . . . *XE2BEU*. I am very glad with this program. I received in Indonesia very high QRM . . . *YC8SBB*. Propagation was not so good. We use this special call-sign, and hope we enjoyed some people with a new prefix from Romania! . . . *YR6F*. *ZL2IR* was heard to say in a loud excited voice on a believed dead band "turning his beam round to us" next we had worked a station on four bands! . . . *ZM2K*.

First time we could run high power in CQWW! All worked well, except when a lightning strike hit us just before the contest, destroying four transceivers, an amplifier, and two computers. Next year we will use the call OT3A for all contests . . . *OT2C*. We will ever witness the A and K index to be so low during CQWW SSB contest A=1, K=1? Contesting under these conditions is the limit! . . . *PI4TUE*.

Condx weren't good, but I appreciated the contest very much. *PU1Z* was a special call for CQWW contest . . . *PU1Z*. Amazing propagation on Sunday evening. When the band was almost dead I worked 9ER1TA, Martha, on the pile-up between big pistols from "W" . . . *SP5XAR*. After 32 years of activity I found how fine is contesting! Will continue . . . *I2CMA*.

Good propagation at day. Not very excellent on night—nothing from Africa and South America, but good condition for U.S.A and Japan. Not many DX stations on band! . . . *IN3XUG*. First 40m experience in this contest. Very bad weather, immediately broken rotor most of time spent up and down the tower, the cubical quad worked only six hours in all! I hope next year will be better . . . *IT9BLB*.

Very hard to have QSOs after 1930 GMT of second day! . . . *IT9JWV*. Twenty meters was very bad. But how happy we are that we could get more multipliers than any other years, especially 20m in heavy QRM! . . . *JE6ZIH*. I'm very happy to y QSO with zone 2, *VO2BC* in the contest. This was the first zone 2 in 20m SSB . . . *JF3LOP*. ARS since 1937 and my age is 78 years old . . . *CT1QF*. Fantastic propagation on all bands! . . . *DL0BY*.

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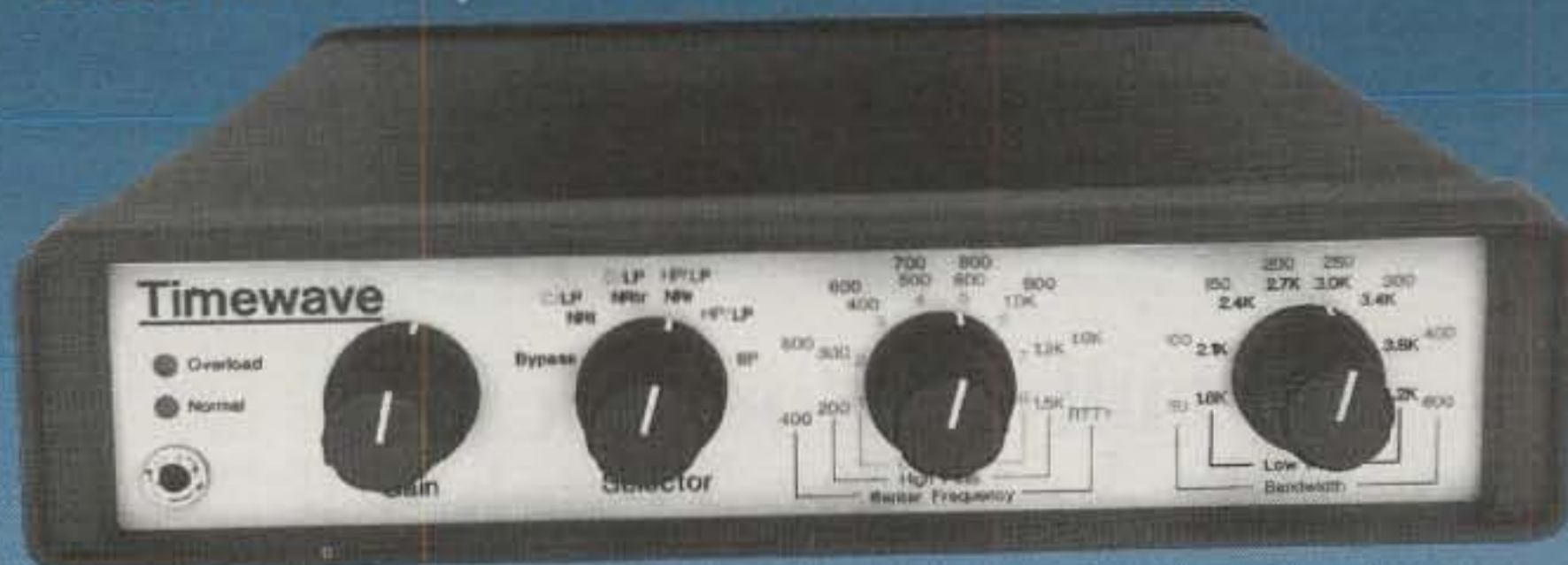
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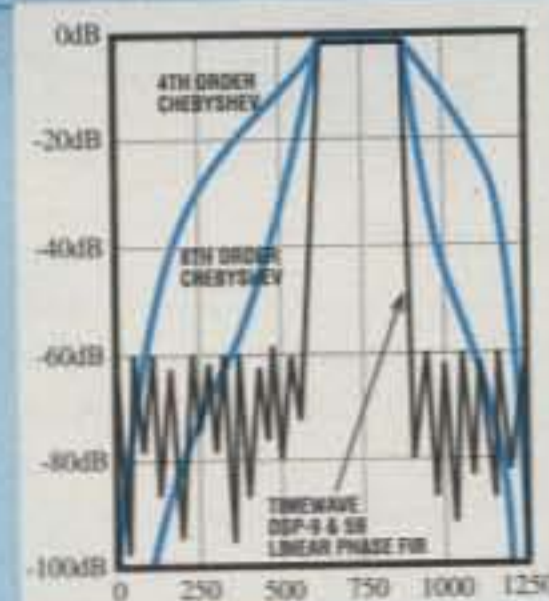
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USA QRM

Fabulous conditions, wall-to-wall Euro's on 10/15/20m, went looking for YU new DX countries, only found S5... K6MA. Worked S79J on 20m at 2359Z on Sunday afternoon!... K6XO/7. Trying to convince an AP2 STN that MT is in zone 4! There are hams living in MT!... K7ABV.

Better than expected propagation for decline of cycle 22, but little from the Pacific... K9DN. XYL stung, allergic reaction to bees, had to spend 5 hours in hosp. Next test XYL in shack with me!... KA1YY. I had a dream was walking around for three days after test saying 5905!... KA2ZIU.

After a disappointing start Friday evening, I was shocked to have Europe coming in so good Saturday morning... KA8WEO. Five new countries—TJ, VQ9, 5Z, 6W, and 7Z—all with 80W and a vertical... KB1GN. Electric storm the 24th wiped me out, dog got jealous and hid my log sheets... KB2DQE. First time assisted. Confusion!... KB2SE. My first CQ WW (we call it World War—Hi!). Age is 14, heard a lot of zone 14, hope to do this again despite the terrible score... KB3ADQ. I just got my license 10 months ago. I will definitely participate again... KB8NNU.

Good propagation, but heavy lightning crashes cut out at least 10 hours of operating time... KC7DB. Better prop. this year. First time worked a YO station in contest... KE8NH. Breaking own QSO record... KE8UI. Forty over 9 static crashes here Friday night, much better Saturday (80m)... KG6AO.

Biggest thrill working zones 36, 37, 38, and 40 on only 75 watts and 40m ant. Definitely need better ant. I could hear lots of JAs, but few could hear me... K14HN. I got so excited when 15m opened up to Africa, I blew up my beam tuning up!... KM6XX. Blew the front end of the 40/10m rig and missed lots of QSOs before I realized it. Still best one yet. Good conditions!... KM8L.

When trying to reach VQ9 through a big pileup, Gary, KD4JQV, called "KQ4AX BEGGING." We made the contact... KQ4AX. Many hi-power stations with poor radio = excessive splatter!... W1GOU. Phooie on packet spotting cluster networks. It's more fun the old fashioned way—pencil, paper, and wits!... W1OP. My first serious DX test ever. Contest software makes it more fun than ever! But I forgot to work USA on 40 + 80!... W2CRS. Forty meter phone very disappointing, too much QRM from foreign B.C... W2OAE. I worked every station I called. I didn't have the time to work longer, and I am slower in my old age!... W4WJ.

Logging/duping program crashed three times. Continued twice, lost last 8 hrs... W6MFC. I worked HC8A again and PR0R for country number 145 while "mobile"... W9CNF/M4. Hearing a VU on 40m, hope next year, working a VU on 40m, wish they would listen up... W9GXR. Best conditions ever heard after four sunspot cycles of contesting... W3BGN. 5Z4 begging for contacts in last hour of contest. Nailed him first call... WO1N. Our best contest yet; probably had the happiest operator in this test—NU3Y back after his second heart transplant... WT3Q. First home contest. Fun all over!... WP4DLX/W3. Finally worked VR6BX after almost two years of trying. Very happy to work eastern Is... WA1UOL.

The ZS9A pileup was not funny. However, I did fall off my stool listening to it! Really enjoyed operating during this contest... WA2ALY. Working zone 31 meters before the contest was over... WA2LMC. Only put in half the contest but had fun. Had 7Z1AB stop pileup to say he knows me from 2m AM days!... WA2UDT. Trying to figure out what all the special prefixes were and where?... WA6RNF. Conditions were fantastic! Worked 97 countries with 100 watts and a vertical antenna... WA7BNM. Enjoyed the single unlimited class... WA8ZZA. Working contest with my daughter for first time... WA0ZBL. In 31 years first contest I've operated in that was interrupted by a thunderstorm, flu attack, two out-of-town visitors on separate days, and an XYL who likes to do her own contesting... WB2ABD.

Messed up wiring in my remote antenna box caused me to operate with the 10m dipole instead of the beam for the first 30 minutes of test! What a Bozo!... WB2ULI. Fifteen minutes before contest start we had an outrageous electrical/rain storm. Delayed over 1 hour while storm dominated this "dry" area! Band propagation were extremely good. Forty was better than I've heard it for a long time!... WB6NFO. Thrill: Working Kuwait when he didn't seem to hear much of anything stateside. Biggest blunder: not getting in on the "end of contest" rush to pick up some easy 10 meters. Also, didn't get U.S. for multiplier!... WB8FVB.

I worked VK6YS via crooked path over the north pole; couldn't hear him short path... W19H. Bands sizzling!... K1WJL. This is the last year with a vertical and low power! There is a 4 ft. by 4 ft. by 5 ft. hole in my backyard as I write this! My tower is about to be vertically polarized after 6 years of rest... K2UVG. Worst test—two amps blew up (one caught fire), third amp had bad fil. xmfr. Ahhh!... K3SME. Tremendous signals on 40m LP from zone 17!... K3TW.

Managed to work 5R8DF just 3 minutes before long-path propagation dropped out... K4UVT/6. VQ9IO comment "what a booming signal you have in here"... N2INN. I was surprised at the good conditions on 10 meters considering we are on the downward swing of Cycle 22. last year... N2LDU. Working 6V6U with a lot of QRM... N2LSJ. The Russian prefixes are out of control!... N2MR. I earned my Novice HF privileges only four days prior to your contest. The operating experience I gained, was unlike anything I've ever done in this hobby. CQ WW should be a requirement for all amateurs!... N2QNN. First CQWW from the States in many years. Wires worked fine on 20 through 160. Missed operating from PJ1B... N4RV. Still too many operators not repeating calls. Low bands are tough... N4XXM. More brews, more Q's, less blues... N4YKD.

Excellent propagation entire weekend! Also pleased to work 5R8DF for all time new country... N6HK. Eight times last year's score. Upgrading paid off! Glad I got a new radio, as well!... N6TPT. Was a thrill to work about 45 countries in 12 hours after being off the air for 30 years... N7WWQ. Hearing this incredibly loud signal only to find out it's FR5DX!... N10G. Not expecting much on 80m because I can't split freq's. Worked T1 on first try... AA2GS. I think this was the highest-ever USA multi-multi score "West of N5AU"... AA6TT. My first CQ WW. Now I'm hooked!... AA0Z.

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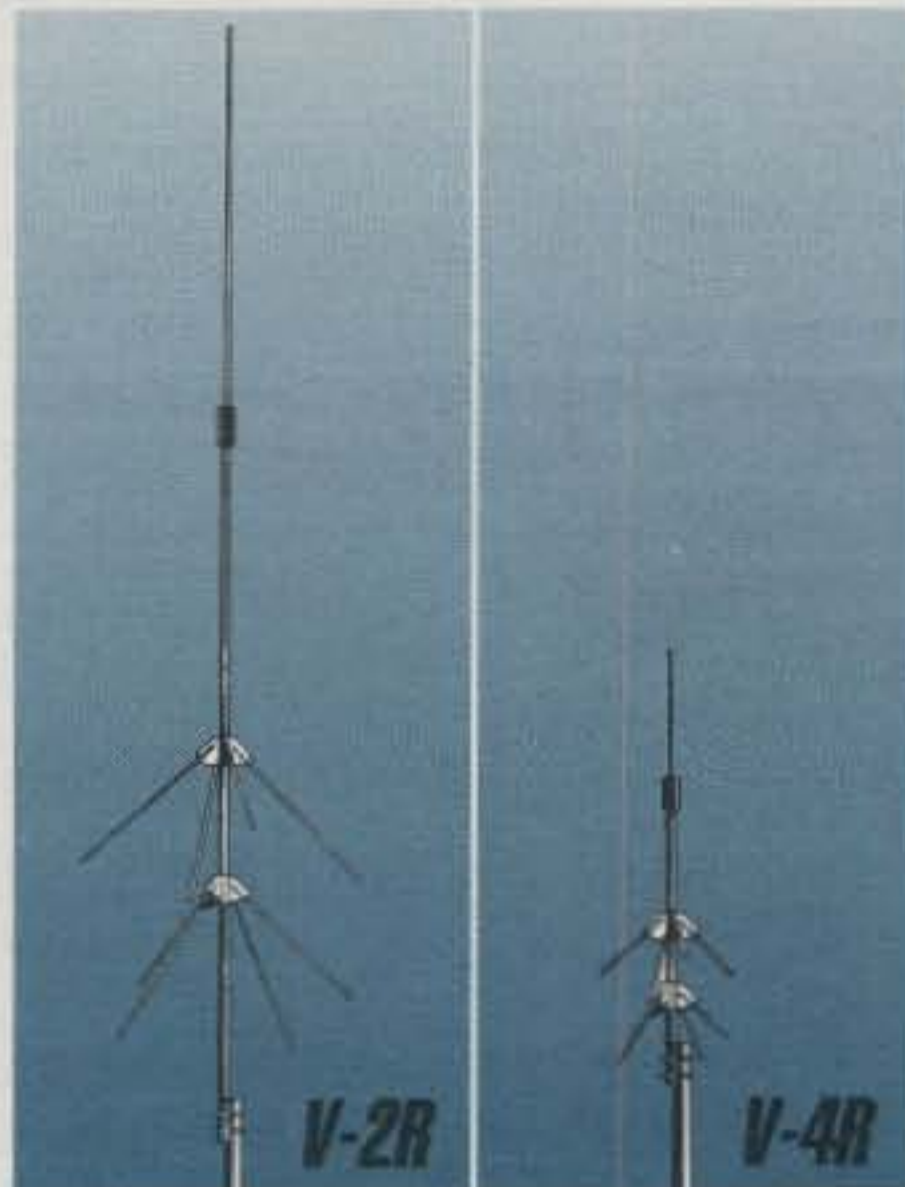
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Telex Hy-Gain antennas first raised the standards for amateur performance. Now our new dual-band antenna has doubled them. Independently tunable at 144 MHz and 440 MHz, the double duty V-42R is fed through one coax cable and delivers an impressive gain. The radiating collinear elements are two 5/8 wave (2M) and three 5/8 wave (440). The 2M band has a 2:1 VSWR bandwidth of 5 MHz minimum and a tuning range of 143 - 153 MHz; the 440 band has a 20 MHz minimum bandwidth, and a tuning range of 435 - 455 MHz. The V-42R handles 200 watts continuous power with 100 MPH wind survivability, and features stainless steel hardware and a Type "N" connector.



V-2R 2-meter 138-174 MHz

V-4R 440 400-475 MHz

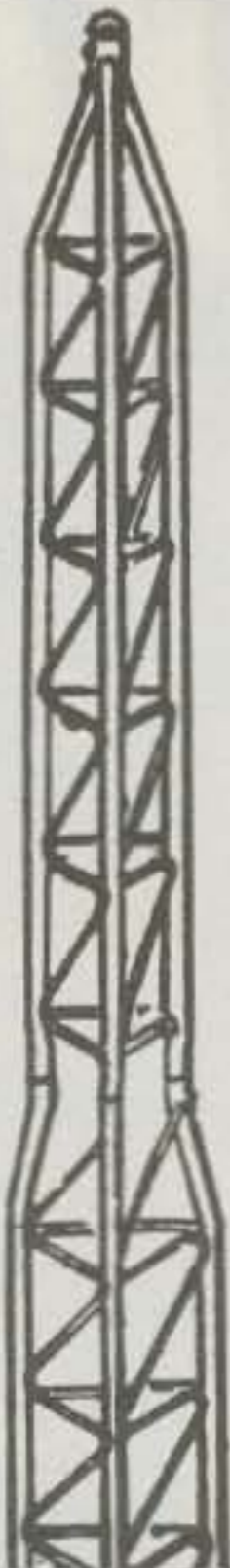
Hy-Gain's extended double zepp antenna design is the hallmark of these popular V-series antennas. The radiating elements are two collinear 5/8 waves fed in phase. Two sets of 1/4 wave radials properly decouple the lower radiator from the mast. V-4R features a Type "N" connector.



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The crew of NH2C poses with KG6DX and son. Left to right back are JH7QXJ, JE8XRF, KG6DX, JR8PPG, JR7MZC, and in front JI3ERV and JF8FSI.

JA2YAF: JA2JAO, JA2KFZ, JA2POT, JI2RFS, JK2NQE, JR2VOC, JL2ONQ, JN2ALI, JN2IYG, JN2QZZ, JO2AXB, JS2NCK, JS3VEX, JG4IQG, JI4UWD, JI4BKK, JE5NYZ, JJ60AA. **JA3YKC:** JG3MRT, JG3WDN, JL3HEY, JE9GMX, JM3FUL, JO3UGI, JP3AIK, JE5DTS, JG4LSR, JK4PLM, JF5BUA. **JA7YRR:** JA7CEC, JA7CXV, JA7FDY, JA7JUD, JA7LBY, JA7MQM, JA7DZW, JH7MEV, JH7VHZ, JR7LVA, JI1XGF.

JK1ZHH: JE1HXZ, JA1LNA, JA8GP, JK1SZX, JK2LNR, JA7SYG, JR3QZS, JR1BTG. **K1GW & KC1EO:** K2TD & K3GYS, WB2VCV, KE2OP. **K2TR & K2XA:** K2WR, K2ONP, NJ1F, NQ2D, N2DU, N2MG, N1CC, WK2H, KB2HPX, WB2LXC, WA4VKD, WA2SPL. **K3ANS & NU3L:** KU3K, WU3M, KF2BH, WA2MKM. **K3II & NA3K:** K3IE. **K3LR & WR3G:** N3BJ, N1BL, WM3I, K8CX, WR3D, WA8YR, K3UA, K5ZD, W8CG. **K4VX & N9JF:** K4XU, W9WI, K3ZO, NS8Z, AA8CR, K9BGL, AI9B, WV9Q. **KB9FIN & N9KUT:** KC6WW: KC6DX/JH2BNL, KC6YU/JH2BIM, KC6FM/JI2UAY, KC6NM/JH2BCN, KC6YH/JH7JLU, KC6IN/JR7DEF, KC6OH/JR7GYC, KC6YN/JF2XJE. **KN8Z & N280:** WX8T, N8JEC, WU8A. **KY1H & AK4L:** WA1ZAM, AA1AS, WT2Q, KB1W, NJ1T, WK1Q, NU1P, KY1K. **KY3N & N3ADL:** WB3FZ, WB3HAZ, WB3LFZ, NK3LI. **LA1K:** LA1BFA, LA2RY, LA2ZHA, LA40FA, LA5GIA, LA5IIA, LA6MGA, LA6NGA, LA6PGA, LA7HFA, LA7IHA, LA7VV, LA8AEA, LA8RGA, LA8UGA, LA9IY, LA9NGA, LA9RGA.

LU4FM: LU6FAZ, LU1FJH, LU8FDZ, LU2FFD, LU4FBQ, LU5FAO, LU7FW, LU2FYU, LU9FOG, LU6FEC, LU7FN, F6GSM, LU4FGV, LU2FYA, LU5FFG, LU5FDQ, LU4FYP, LU1JRL, LU9FIO, AZ8FAD, LU2FID, LU5FAU. **LY7A:** LY2NK, LY2BFN, LY2BMX, LY2BUH, LY3B8C, LY3BN, LY1DF, LYR-346, LYR-1751, LYR-1853. **N2RM & N4HY:** KA2AEV, WM2H, KZ2S, K2TW, N2AA, N7BG, N2NT, KR2J, WC4E, W2RQ. **N5AU:** KY5N, W5XZ, N5CR, KM5X, NM5M, WN4KKN, KA5WSS, WB5VZL, N5TR, KISNE, NA4M, AA5BL, N50AO, W5DN. **N6AW & N6AV:** NC6U, NF6H, W6HT, K7JYE, N7QQ, KA7CQQ. **NF2L & KY2T:** K2TCK, WY2X, WB2DIN, WB3X. **NK7U & K1DQV:** WA6QDF, WB6LMN, KM6VD, KG6LF, KN6BP, KE7UH, WZ7J. **NX1H & K1FWE:** K1XM, NX1P, NW1U, K1MNS, K1BG, NX1G, KC1Q.

OH8W: OH1JD, OH1MDR, OH1NOA, OH2MM, OH6MFN, OH6YF. **OT2C:** DL1SBR, ON1AEI, ON1ARZ, ON1AWB, ON1BCB, ON1GL, ON2AAC, ON2AJC, ON2ALD, ON2ALY, ON4ADO, ON4AFZ, ON4ALC, ON4AME, ON4ANT, ON4ANV, ON4AOI, ON4ASB, ON4AWU, ON4AZL, ON4BI, ON4DB, ON4GG, ON4HZ, ON4OE, ON4WW, ON5DH, ON5FF, ON5OT, ON5SH, ON5UM, ON5WL, ON6BY, ON6JF, ON6LK, ON6MR, ON6PU, ON6SV, ON6TT, ON6UL, ON6VK, ON6WU, ON7BD, ON7CS, ON7KB, ON7SF, ON7TK, ON7ZM. **OZ4HAM:** OZ2JZ, OZ2ADY, OZ1KWB, OZ4FZ, OZ1LUS. **PJ1B:** K2SB, K2SS, KB2XZ, K3EST, N3ED, WA3LRO, W3UM, NL7GP, N7ZZ, PJ9EE. **PT4A:** PY4AEJ, PY4BA, PY4BH, PY4NL, PY4OY. **PU1Z:** PY1NEZ, PY1NEW, PY1MGM. **RL8L:** UL7LEZ, UL7LDO, UL7LO, UL7LEG, UL7LT, UL7LZ, RL7LW, UL7FZ, UL7LA, UA9MA, UW9AR, W4AIH, W4ETO, W4EWF, UL7LAD, UL7-026-796.

RY1I: RB4IZ, UB3IO, UB3IM, RB4II, UB5IUA, UB5IKW, RB1IA, RB4IH. **S59DBQ:** S52CI, S52OK. **VD10H:** AC4MP, K2NJ, NR2H, VE1DH, VE1GJ, VE1W, VE1NH, VE1WF, VE1WH, VE1YY. **VD2ZV & VE2VMS:** VE2SPY, VE2GSX, VE2MAM, VE2JPD, VE2ALW, VE2GP, VE2DZS, VE2PZ. **VE7COR & VE7SGW:** VE7AV, VE7CV, VE7RK, VE7SK, VE7BKD, VE7BUX, VE7DRS, VE7EAP, VE7EME, VE7ENS, VE7EJ, VE7EQN, VE7EQZ, VE7JNM, VE7JWK, VE7LKM, VE7MKA, VE7NNN, VE7OLE, VE7PHA, VE7RBL, VE7STV, VE7WJA, VE7XYL, VE6EZ, VE5FN. **W3LPL & KH2F:** ND3A, W3EKT, KC3EK, N3GB, K3NA, KF3P, WZ3Q, WA3VUQ, K3RA, K3SO, W3ZZ, KN5H. **W4MYA & KB4DI:** WB4GVZ, K4GM, WK4Y, WA4PGM, K04PI, WU4G, KC4URI, K04MF, W4DR, KD4HEL, WA4DAI, N4EHJ, KB1GW, WB4BVY, WA4HMV, KB6GHQ, N4YSI.

WB4IH/9: K8FVF, W8UC, KA9FOX, AA9D, WB9EEA, N9KAU, N8AXL. **WB5OE:** AA8FB, KB8JCB, KC8ZW, KD8AY, KG8AP, N8PDL, N8MEH, N8BT, N8BY, NSPEF, KA8UQ. **Y88ZCE:** YC8JBE, YC8FTE, Y88NM, YC8VM, YD8FTD, YC8YTL, YF8ANK, YG88XX, YG8BEU, YD8NIX, YD8GOF, YG8ANF. **ZF2J:** K4HF, W66OKK, KJ6HO, W8AEH, WB4TIN. **ZM2K:** ZL2BI, ZL2MF, ZL2IR, ZL2IQ, ZL2TT, ZL2AMI, ZL2BSJ, ZL1AZ, ZL40Y, ZL2ASD, ZL2ULG, ZL2TIQ, ZL2TJG, ZL2UDF. **ZSSHAM:** Z55JM, Z55JR, Z55NK.

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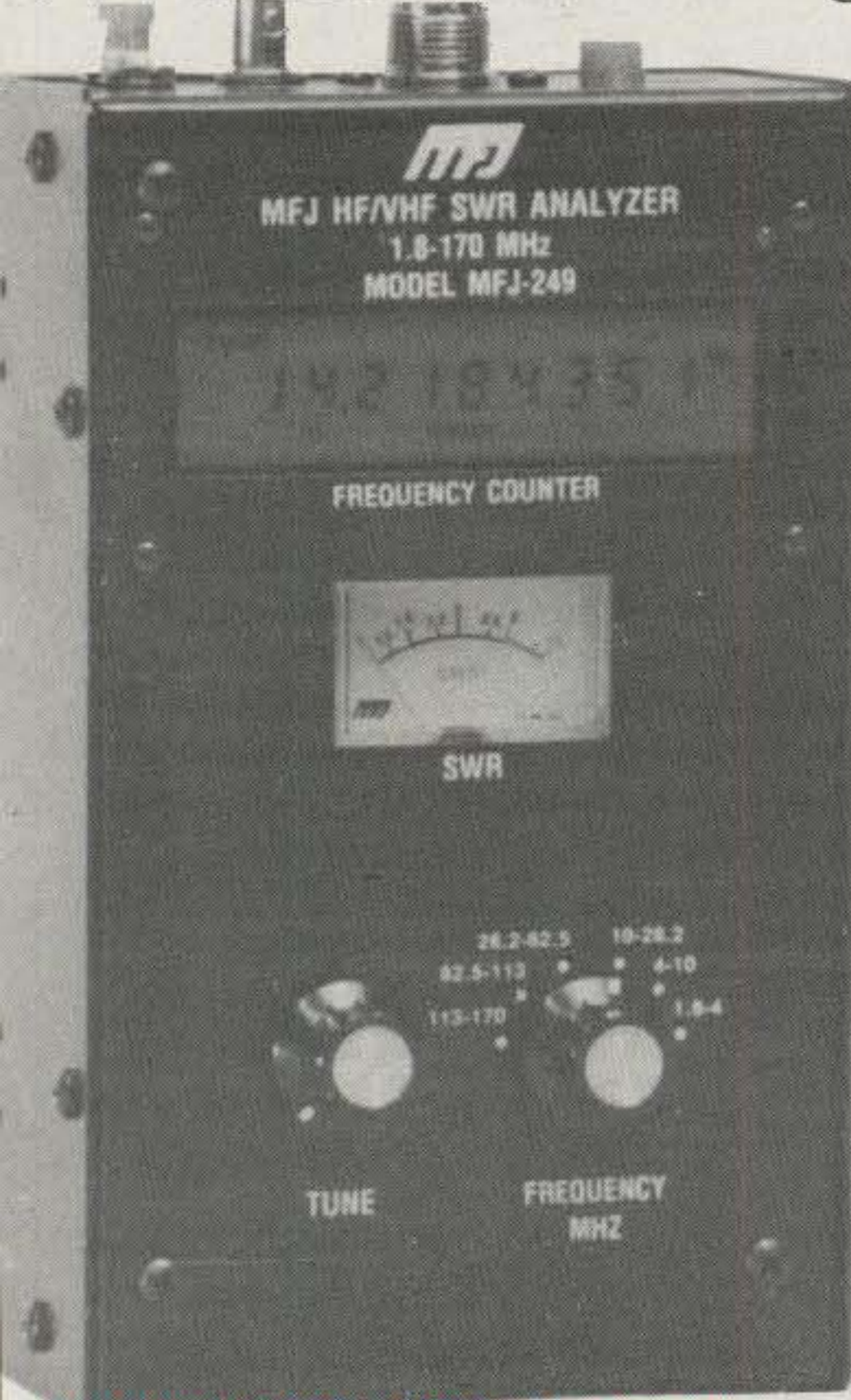
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1	KL7Y	5,091,840	21	AP2MYC	298,352
2	AH9B/VO2	2,767,660	22	VU2NTA	237,046
3	VD7SV	1,685,502	23	JT1/JI2MED	922,680
4	VD3EJ	8,440,314	24	BV2CR	158,485
5	K1AR	7,810,446	25	JA8QNJ	3,907,467
6	XE2BEU	2,501,871	26	HS1BV	879,010
7	TG9AJR	395,488	27	DU9RG	3,509,568
8	KP2A	10,430,993	28	9M8R	7,639,030
9	9Y4H	11,351,808	29	VK8AV	251,340
10	HC8A	16,391,450	30	VK2BIR	983,235
11	ZW5B	2,828,202	31	WR6R/KH6	4,615,380
12	3G3R	4,463,500	32	YJ8C	2,035,770
13	LU6ETB	1,729,195	33	EA8BH	14,307,041
14	GW4BLE	5,806,410	34	N6SS/MM	110,888
15	S52AA	7,134,192	35	5U7M	3,924,387
16	RO8F	3,697,505	36	ZD8Z	11,065,098
17	UA9KW	267,287	37	C9RJJ	1,826,064
18	RV8AR	377,671	38	ZS6EZ	1,805,714
19	UA8LCZ	204,108	39	5R8DF	615,042
20	LZ5W	1,234,135	40	JX3EX	709,320

MFJ HF/VHF SWR Analyzer™

... covers 1.8-170 MHz continuously ... built-in 10 digit LCD frequency counter
 ... smooth vernier tuning ...



MFJ-249
\$199⁹⁵ MFJ's newest, most versatile SWR Analyzer™ covers more frequencies than any MFJ SWR Analyzer™ -- 1.8-170 MHz continuously. It has smooth vernier tuning and a built-in 10 digit, high accuracy, high contrast LCD frequency counter that makes reading SWR in the sun easy.

This wide range MFJ-249 covers all frequencies between 1.8-170 MHz including all ham bands from 160 Meters to 2 Meters, commercial 2-way radio, police, fire, FM broadcast, military, marine and shortwave.

A velvet smooth vernier reduction drive makes it easy to set frequency precisely. It's battery powered and handheld size. You can take it right to your antenna and work on it until it's just the way you want it.

Here's what it does ...

The MFJ-249 SWR Analyzer™ gives you a complete picture of your antenna SWR over an entire band -- without a transmitter, SWR meter or any other equipment!

Reading SWR is automatic. All you do is plug in your antenna, set your MFJ-249 SWR Analyzer™ to the frequency you want and read your SWR -- it couldn't be easier!

Here's what you can do ...
 You can instantly find your antenna's true resonant frequency right at your feedline -- that's something a noise bridge just can't do.

You can shorten or lengthen your dipole or mobile whip and see the effect immediately.

You can monitor how SWR changes as you adjust your beam or vertical -- you'll know right away if you should lengthen or shorten it.

You can see how SWR varies over an entire band ... find 2:1 SWR bandwidths ... adjust mobile antennas in seconds ... find all resonant frequencies of multiband verticals, dipoles and beams ... tune up your antenna tuner without transmitting.

You get three instruments in one

You get three instruments in one ... an RF signal generator ... a sensitive high accuracy 170 MHz frequency counter ... an SWR Analyzer™.

Has BNC connector for use as high accuracy frequency counter. Counter has four gate times, .1 Hz resolution, 1 ppm 10 MHz crystal time base with adjustable calibration.

Use 8 AA cells or 110 VAC with MFJ-1312B, \$12.95 4x2 1/2x6 3/4 inches.

MFJ-29, \$19.95, Padded carrying case with strap for MFJ-249 and MFJ-209.

1.8-170 MHz SWR Analyzer™

MFJ-209
\$109⁹⁵ If you don't need a built-in frequency counter but want 1.8-170 MHz continuous coverage and smooth vernier tuning, choose the MFJ-209.

It'll help get your antennas in tip-top shape.

Same as MFJ-249 without LCD frequency counter. Has jack for external frequency counter. Use 8 AA cells or 110 VAC with MFJ-1312B, \$12.95. 4x2 1/2x6 3/4 inches.

10-160 Meter HF SWR Analyzer™

MFJ-207
\$79⁹⁵ If you're an HF man, this compact MFJ-207 HF SWR Analyzer™ will help you build antennas that'll make working DX almost routine.

Just plug in your coax to find the SWR of any HF antenna on any ham band 10-160 Meters. Has jack for external frequency counter. Use 9 volt battery or 110 VAC with MFJ-1312B, \$12.95. 7 1/2x2 1/2x2 1/4 inches.

2 Meter VHF SWR Analyzer™

MFJ-208
\$79⁹⁵ MFJ-208 2 Meter VHF SWR Analyzer™ finds the SWR of any antenna from 138-156 MHz.

Jack for external frequency counter. Use 9 volt battery or 110 VAC with MFJ-1312 B, \$12.95. 7 1/2x2 1/2x2 1/4 inches.

For Commercial VHF Radio Same as MFJ-208 but for commercial VHF. MFJ-217, \$79.95, covers 30-50 MHz and MFJ-218, \$79.95, covers 150-170 MHz.

MFJ Bandswitched Dip Meter™

MFJ-203
\$99⁹⁵ The MFJ-203 is a sensitive Bandswitched Dip Meter™ that covers all hams bands from 160-10 Meters. There are no plug-in tuning coils to keep up with or break.

It's the easiest dip meter you'll ever use -- just tune for a dip. There's no sensitivity control to constantly adjust.

Saves time and takes guesswork out of winding coils, measuring inductance and capacitance, measuring velocity factor and electrical lengths of coax. Determine resonant frequency of tuned circuits. Measure Q of coils. Also use as signal generator.

Has detachable coupling coil, dual FET oscillator, op-amp meter amplifier and jack for external frequency counter. Use 9 volt battery or 110 VAC with MFJ-1312B, \$12.95. 7 1/2x2 1/2x2 1/4 inches.

MFJ Antenna Resistance Analyzer™

MFJ-205
\$89⁹⁵ Need to measure the feedpoint resistance of your antenna at its resonant frequency?

Simply plug your coax into the MFJ-205 Antenna Resistance Analyzer™, find your antenna's resonant frequency by tuning the frequency control for minimum or maximum meter reading depending on your antenna. Then read your feedpoint resistance directly from its calibrated resistance meter.

It's great for designing impedance matching networks for your antenna.

Reads up to 500 ohms RF resistance and covers all ham bands 160-10 Meters.

With a conventional antenna bridge you have to constantly alternate between adjusting the null and frequency controls until you find the best null.

Jack for frequency counter. Use as signal generator. 7 1/2x 2 1/2x2 1/4 inches. Use 9 volt battery or 110 VAC with MFJ-1312B, \$12.95.

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MFJ-346
\$189⁹⁵ Add this handy MFJ-346 frequency counter to your station and get high accuracy frequency measurements to 600 MHz with 10 digit precision. Easy-to-read 1/4 inch LCD digits don't wash out in bright sunlight like LEDs.

Compatible with MFJ SWR Analyzers™, Dip Meter™, Antenna Resistance Meter™ and Antenna Bridge™.

Four gate times, .1 Hz resolution, high accuracy 1 ppm 10 MHz crystal time base.

Use 9 volt battery or 110 VAC with MFJ-1312B, \$12.95. 4x1 1/2x5 1/4 inches.

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MFJ halfwave vertical Antenna

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

Operate 40, 20, 15, 10, 6, 2 Meters with this MFJ-1796 ground independent halfwave vertical antenna -- no radials or ground ever needed!

It's only 12 feet high and has a tiny 24 inch footprint! You can mount it anywhere from ground level to the top of a tower -- on apartments, condos, small lots, even on a motorhome. You can take it anywhere -- vacations, field day, DX-pedition, camping, nearly anywhere you go.

Frequency selection is fully automatic -- there are no moving parts, nothing to adjust -- all you do is transmit. It handles up to 1500 watts PEP. You'll work your share of DX because its *low angle of radiation* really reaches out and brings in DX.

During a contest, you'll love being able to quickly work one station after another from all directions because of its omni directional pattern.

It's so easy to put together that you can have it on the air in an afternoon.

How does MFJ achieve maximum efficiency in such a compact multiband antenna?

The key is *end loading* -- the most efficient form of loading known. The *entire length* of the antenna is always radiating power. There are no lossy traps to reduce effective length.

End loading provides multiband and full electrical half wavelength on each HF band. An *optimum* combination of capacitive hat and inductive end loading delivers a close 50 ohm match without a lossy impedance matching network.

Efficient high-Q loading coils are wound on low loss ceramic forms. Large 1-inch diameter aluminum radiators are used to keep losses to a minimum.

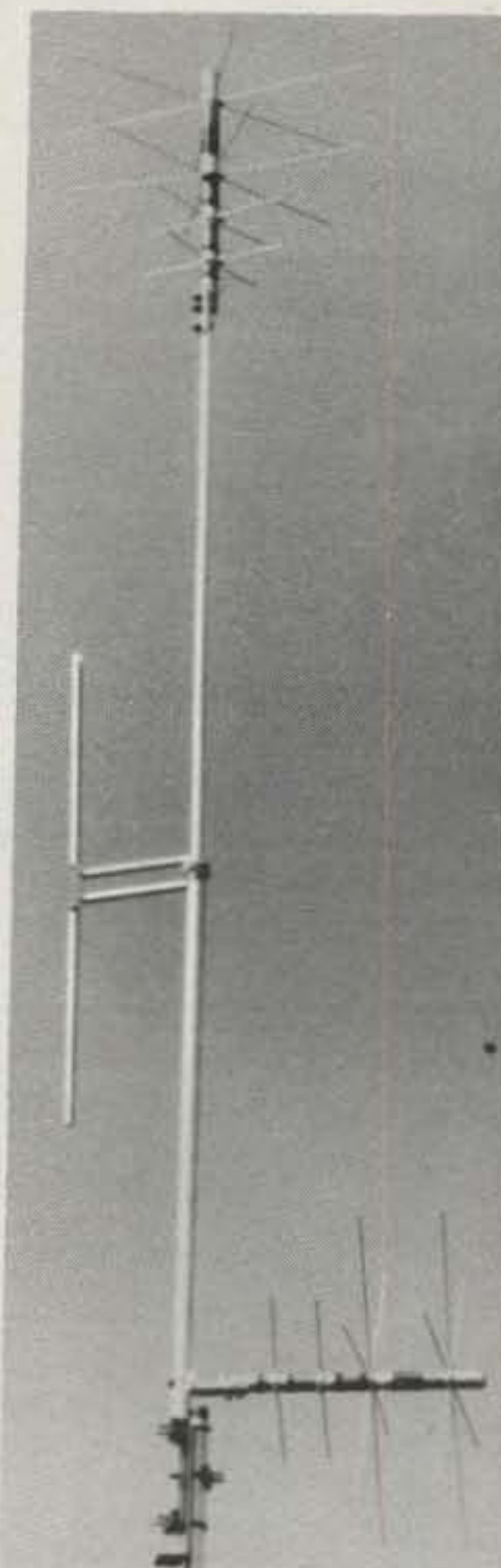
No Radials or Ground ever Needed!

The MFJ-1796 is balanced and center fed to totally eliminate the need for radials, counterpoises or a groundplane -- you don't have the kind of ground losses that's common with a quarter wave vertical.

No Feedline Radiation

There is no feedline radiation that causes pattern distortion and wastes power. The 50 ohm Teflon[®] coax feedline exits through the bottom radiator from a low impedance point -- the loading unit is mounted at right angles to decouple the feedline and to provide a low impedance point.

The feedline is further decoupled and isolated from the



MFJ-1796

\$199⁹⁵

antenna with a highly efficient *air-wound* choke balun. This decoupling attenuates RF on the outside of the coax and minimizes feedline radiation that waste useful power.

Easy to Adjust

It's very easy to optimize the MFJ-1796 for your favorite part of the band. Frequency adjustments are nearly independent -- adjusting one band has minimum effect on the resonant frequency of the other bands -- unlike most other multiband antennas.

Built to Last

You get an antenna built with heavy duty, extra thick wall aluminum radiators, machined aluminum parts and stainless steel hardware.

The coils are wound on tough *low loss* ceramic forms using durable *Teflon[®]* covered wire that's highly weather resistant.

Full halfwave on 2 and 6 Meters

On 2 Meters and 6 Meters, MFJ's unique stub decoupling and efficient full size halfwave elements really get you out with low angle radiation for lots of DX.

The most for your Money

For \$199.95, the MFJ-1796 gives you the most for your money -- no other multiband, automatic band-switching, ground independent DX antenna even comes close.

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-1796 halfwave vertical antenna *no matter what* for a full year.

Continuing Service

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

Made in USA

MFJ halfwave verticals are made in the USA. Help our fellow Americans by keeping our money here -- buy Made in USA.

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Enjoy DXing and ragchewing on six bands from your apartment, condo or anywhere. Call your favorite dealer for your best price and order your MFJ halfwave vertical today!

Shortwave Regenerative Receiver Kit



MFJ-8100K

\$59⁹⁵

Don't you wish you could relive some of this fun and excitement of your youth -- share some of it with your kids and grandkids?

Well, you can -- with the MFJ-8100 World Band Shortwave Radio Kit.

Spend a fun evening with your child or grandchild and help him put this simple kit together. When you two finish, watch him glow with excitement as he tunes the world bands -- just like you did -- and remember for life.

This baby performs. It has an RF stage to really pick up the weak ones and it goes into regeneration smoothly without pops or dead spots. Stations all over the world will come in loud and clear with just a 10 foot wire antenna.

Listen to international shortwave broadcasts, hams on SSB and CW, WWV, RTTY, packet and much more. Covers all or part of 75/80, 49, 40, 30, 31, 20, 25, 22, 19, 17, 16, 15, 13 Meters in five bands.

It has vernier reduction drive, bandswitch, volume and RF gain controls, uses a 9 volt battery and is built into a rugged aluminum cabinet.

Two earphone jacks let you and your child or grandchild listen together with your Walkman style earphones or plug-in speakers. 7x6x2 1/2 inches.

Order one as a gift for your child or grandchild . . . or for yourself.

MFJ-8100K, \$59.95 kit; MFJ-8100W, \$79.95 wired and tested.

Teflon[®] is a registered trademark of Dupont.

300 KHz-200 MHz Active Antenna

Wish you could hear everything your expensive general coverage transceiver or receiver is capable of receiving?

Your ham band only antenna does great in the ham bands . . . but plug this new MFJ all band active antenna into your general coverage transceiver or receiver and you'll hear strong clear signals from all over the world from 300 KHz to 200 MHz--including low, medium, shortwave and VHF bands.

You'll enjoy up-to-the minute international shortwave newscast, ship-to-shore, airline, commercial RTTY and even military traffic. Use your data controller to receive FAX news photos, weather maps, Navtex and more.

Take it on trips and use it with your mobile or QRP rig to listen. Also improves weak noisy scanner radio reception from low band to high band VHF -- hear signals you couldn't hear before.

A J-310 FET handles strong signals and a new *noiseless feedback* circuit gives you excellent low noise reception. A 4.5 GHz MRF-901 transistor lets you receive weak signals well into VHF.

Detachable 20 inch telescoping antenna. Uses 9 volt battery or 110 VAC with MFJ-1312B, \$12.95. 3 1/2 x 1 1/4 x 4 inches.

MFJ-1022

\$39⁹⁵



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New enhanced MFJ-1278B



MFJ-1278B Multi-Mode
\$299⁹⁵
MFJ-1289 MultiCom™
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New features for MFJ-1278B

- New PACTOR Mode
- 32K bytes Enhanced Packet mailbox Allows separate callsign, auto forwarding and reverse mail forwarding, Remote Sysop access, Sysop paging, chat mode, mailbox C-text "Has-mail" LED indicator, Mailbox is expandable to 128K or 512K.
- New COLOR SSTV VIS tones. Allow other SSTV receiver to auto start picture
- 1 Megabit system EPROM
- 64K bytes battery backup RAM
- European RTTY tones selectable
- External reset, optional scope tuning output
- Selectable 19,200 baud terminal operation

Transmit and Receive Color SSTV

- Robot Color: 36, 72 Seconds
- Robot B/W: 8, 12, 24, 36 Seconds
- Scotty Color: 1 and 2
- Martin Color: 1 and 2

16 Gray Levels FAX/SSTV Modem

- 16 Gray Levels Weather/AP Wire FAX

Real-Time Packet Pictures

- SVGA, VGA, EGA, CGA Color Packet Pictures

Standard Features

- Auto terminal baud rate: 300, 1200, 2400, 9600, 19,200
- Built-in 300 and 1200 baud packet modem
- Two software selectable radio ports
- Threshold control
- KISS interface for TCP/IP, MSYS compatible
- Anti-collision technology gets packets through faster, Host mode
- True DCD circuit designed for HF
- Normal or reverse FSK output
- RS-232 and TTL serial ports
- Fast-Start™ Manual

More Exclusive Features

- Automatic Signal Analysis™ for HF packet and AMTOR as well as RTTY and ASCII
- Built-in printer port
- Built-in sidetone amplifier with volume control
- TAPR internal modem header for high speed modem--2400 or 9600 baud
- 20-LED precision tuning indicator
- Automatic Digipeater™ Routing
- QSO and transfer files simultaneously
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- Individual radio port level control
- Stored parameters for each mode
- CW iambic paddle input
- 10-user programmable message memory buffers
- Call Alert Beeper™
- Built-in packet connect bell
- IC sockets used throughout
- A/C power supply included
- One year unconditional guarantee



16 Gray Levels WeFAX map received on 16.410 MHz. MFJ-1278B & MultiCom™ transmit and receive 16 Gray Levels FAX.



16 Gray Levels AP Wire Photo FAX received on 20.738 MHz. See tomorrow's news today.



Full Color SSTV pictures received on 14.230 MHz. Robot 72-Second format. Transmit and receive color and B/W SSTV.



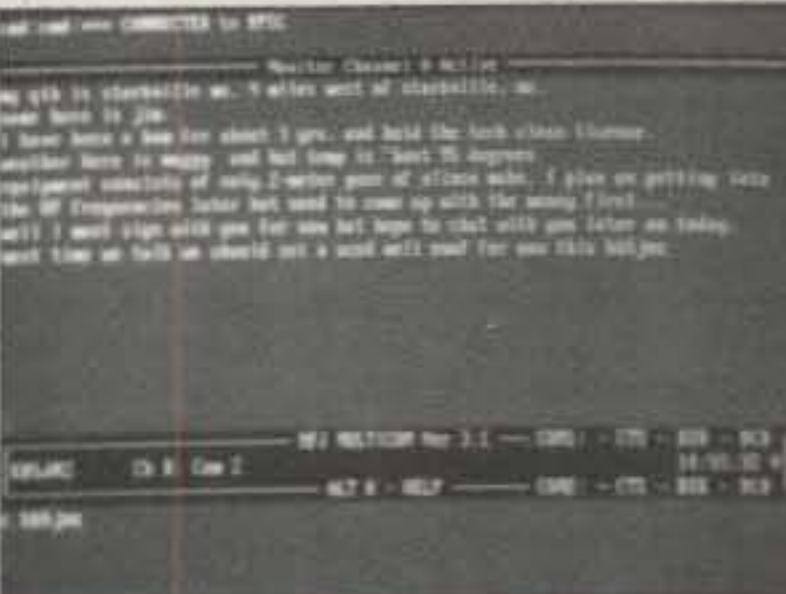
256 Color VGA Packet Picture received in real-time packet. Only MFJ-1278B and MultiCom™ has this feature.



Easy and simple ... MultiCom™ Operating menu--each mode gives you 10 programmable function buffers.



Dedicated MultiCom™ FAX menu. Getting on FAX and SSTV is as simple as pressing one or two keys.



MultiCom™ lets you carry on two digital QSO's simultaneously using two multi-modes or TNC's and two comm ports.



Need help? Ali-H brings up the on-line Help Menu that makes the MFJ-1278B very easy to use.

New MFJ-1278BT Turbo



Only the MFJ-1278BT, \$369.95, gives you a built-in 2400 baud modem. Runs high speed packet without modifying your radio. Get the MFJ-1278BT and operate 300, 1200 and 2400 baud packet. The 2400 baud modem is also available separately. Order MFJ-2400, \$89.95, for any MFJ TNCs and MFJ multi-modes.

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Upgrade your MFJ-1278 to include PACTOR and the enhance mailbox--MFJ-56A (32K), \$69.95; MFJ-56B (128K), \$89.95; MFJ-56C (512K), \$229.95. New MultiCom™ upgrade Release 3.1. New features: Simultaneous dual multi-mode or TNC operation for DOS. New FAX module with auto receive, color FAX, PCX format compatible. YAPP binary file compatible. Order MFJ-49B for MultiCom™ 3.1 upgrade, \$29.95. *Upgrade available for current MFJ-1278 and MultiCom user with proof of purchase.

Exclusive Optional Items

- Real-time clock, MFJ-43 \$29.95
- Plug-in Scope tuning adapter, MFJ-44 \$29.95
- 2400 baud internal modem, MFJ-2400 \$89.95
- 9600 baud internal modem MFJ-9600 \$109.95

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SINGAPORE
9V1YC A 1,190,958 1658 105 232

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UJ8JMM A 216,108 354 87 174
UJ8RA 14 217,571 877 28 69

TAIWAN
BV2CR A 158,485 679 45 100
*BV2WA 28 73,233 505 23 56

THAILAND
HS1BV A 879,010 1389 97 208

TURKMENISTAN
UH880 21 9,450 109 28 48

UZBEKISTAN
UI8ZAA 3.8 29,298 196 11 46

WEST MALAYSIA
*9M2AX 1.8 35 4 1 4

EUROPE ALAND IS.
*OH1MTT 28 67,548 393 24 54

AUSTRIA
OE6MBG A 5,888,818 4039 146 465
OE6CLD " 1,004,696 1190 95 297

AZORES
*CU3LF A 1,196,085 1507 87 276
*CU3 " 50,215 212 35 86

BALEARIC IS.
EA6ZS A 34,629 181 29 90
EA6LB 14 35,997 336 19 52

BELGIUM
ON4SS A 833,519 1202 76 237
*ON9CJM A 979,600 1442 96 304

BELORUS
*UC2AB A 57,851 289 26 57
*UC2WDX 21 39,200 293 21 59

BULGARIA
LZ1KBB A 344,077 526 80 257
LZ2FQ " 5,714 113 10 48

*LZ1OJ " 249,547 672 59 198
*LZ1KNP " 152,902 469 51 127

CORSICA
TK5MH 21 248,160 1001 28 92

CRETE
*SV8AB/9 28 27,280 239 23 57

CROATIA
9A3IJ A 1,925,770 2125 101 274
9A1AKL 28 382,466 1241 29 90

CZECHOSLOVAKIA
OK3CFA 28 368,676 921 38 109
OK1ARI " 89,100 303 32 78

DK3KFF 14 770,553 1977 39 150
OK3RM " 552,288 1461 40 136
OK1AYP 7 251,724 1138 32 100

DENMARK
OZ5EV A 791,136 980 92 277
OZ7ADP 28 1,196 23 11 15

ENGLAND
G3LZQ A 1,156,974 1124 116 373
G3IAR " 226,008 465 64 155

G3FVB 14 1,125,168 2646 37 139
G8KKZ " 24,771 164 20 49

ESTONIA
ES1AR 28 595,580 1454 37 126
ES5RY 14 772,342 2216 39 139

EUROPEAN RUSSIA
UA4NC A 540,330 826 102 313
RA1ACM " 49,950 370 44 91

UA4LCQ 21 503,150 1405 33 112
RA3XA " 128,908 567 33 101
UA4LJ " 23,577 153 32 55

FAROE ISLANDS
OY6A A 3,015,354 2574 133 481
OY1A A 25,643 173 33 74

FINLAND
OG8LQ A 3,216,160 3370 124 334
OG6NIO " 3,066,866 2665 106 331

*OH5TE " 20,382 117 17 69
*OG7MMY " 13,806 94 28 50
*OH2AC " 783 17 12 15

*OG7NRW " 117,696 625 26 70
*OG8LRN " 113,652 624 28 71
*OG3MFP " 91,756 302 28 88

FRANCE
F6HLC A 2,801,470 2482 106 328
F6A0J " 1,400,832 1377 110 346

F6AML 1.8 8,352 173 6 42
F3NG " 272 20 2 15
*F6FGZ A 1,223,964 1357 94 284

GERMANY
DJ4PT A 4,683,290 3282 137 401
DL8PC " 3,505,320 2597 125 410

DL3RDR/P " 167,580 412 54 136
DL1BFZ " 165,627 386 64 167
DK5WQ " 164,956 370 65 188

DL5AUJ " 1,920 20 32 60
DL4DBU 28 116,259 309 37 106
DF5WN " 10,125 95 17 28

*DJ9ZB 28 96,514 322 32 75
DJ3GE " 81,213 302 32 75
DL6KY " 67,528 279 26 66

GIBRALTAR
ZB2X 7 554,140 2063 33 127

GREECE
SV1IG A 56,826 272 39 115
*SV1BLY A 152,227 390 59 132

HUNGARY
HA5AGS A 1,329,716 1659 91 310
HATTM " 427,040 1143 38 98

I.T.U. GENEVA
4U1ITU A 5,570,040 4372 144 426

ICELAND
TF3CW 7 454,580 1624 31 109

IRELAND
*E15DI 28 223,768 974 23 60

ISLE OF MAN
GD4GWQ 14 56,964 377 22 72
*GD4EIP A 488,348 1018 57 157

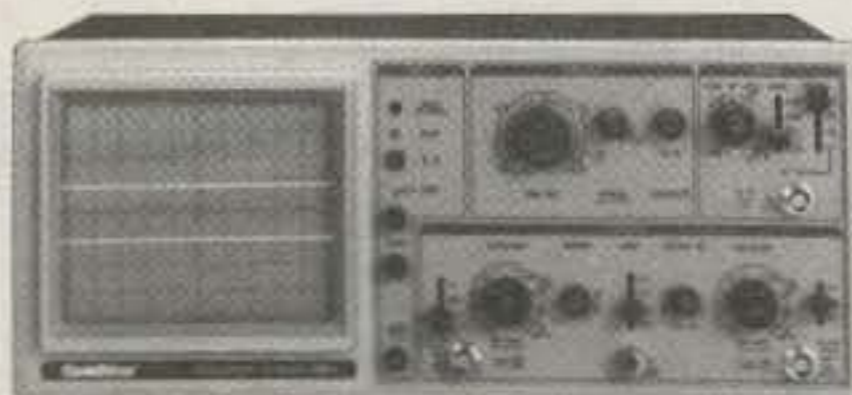
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ELECTRONICS & COMPUTERS

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NEW ITEM**

GOLDSTAR OS-9020A OSCILLOSCOPE \$379

The Goldstar OS-9020A oscilloscope provides both high quality and performance with lower cost to fill the requirements of schools, industry, service shops and hobbyists. This 20 MHz oscilloscope is loaded with features such as automatic focus, variable hold-off, TV sync circuit, X-Y operation, and a 6-inch rectangular CRT with internal graticule. Basic specifications include a vertical deflection bandwidth of DC to 20 MHz, (7 MHz magnified), modes of operation are CH1, CH2, add, dual/chop. Deflection factor of 5 mV/div to 5V/div in 10 calibrated steps. Accuracy in normal operation is $\pm 3\%$. Time base of 0.2 μ S/div to 0.2 S/div in 19 calibrated steps. Trigger system modes of auto, norm, TV-V, TV-H with source of CH1, CH2, line and external. The OS-9020A meets IEC-348 safety requirements. The OS-9020A is sold factory new and includes a 2 year warranty. For an economic choice with high quality the Goldstar OS-9020A can't be beat.



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TEKTRONIX 1L40 ANALYZER PLUG-IN \$650

Covers 1.5 to 12.4 GHz and to 40 GHz with optional mixers. Calibrated dispersion of 1 kHz to 10 MHz. Bandwidth of 1 to 100 kHz. 51 dB IF attenuator in 1 dB steps. Maximum sensitivity of -95 to -10 dBm. For 530-, 540-, 550-, or with adapter, 580-, series scopes.



TEKTRONIX 1L20 SPECTRUM ANALYZER PLUG-IN \$449

- Operating frequency range of 10 MHz to 4.2 GHz
- Internal phase lock, calibrated dispersion to 100 MHz
- Resolution from 1 to 100 kHz
- Sensitivity of up to -100 dBm
- Fits 530, 540, and 550, or (with adapter) 580-series scopes



TEKTRONIX 132 PLUG-IN UNIT POWER SUPPLY \$125

The model 132 provides a regulated power supply and amplifier for operation of Tektronix letter series plug-ins (sold separately). This enables the use of many Tek plug-ins with or without a large mainframe scope. Frequency response of the amplifier unit is

DC to 15 MHz. Both push-pull and single-ended output terminals are provided. Provisions are also made for dual-trace operation. If you are using letter or 1 series plug-ins, such as the Tek 1L-series analyzers, this is a must have unit. Order yours today while supplies last.

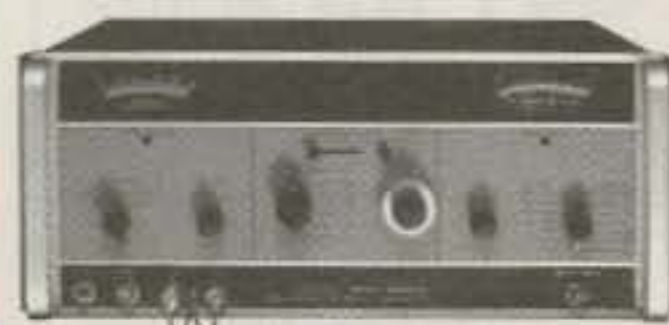
**EXTRA
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PRICES**

HP 1720A 275 MHz OSCILLOSCOPE \$995

The 1720A is a high performance oscilloscope with a 275 MHz bandwidth. For maximum measurement flexibility, the 1720A has a switch-selectable 50 Ω or 1 M Ω input. For general purpose probing, the 1 M Ω setting offers minimum circuit loading. The fully compensated 50 Ω setting provides full use of this oscilloscope's high bandwidth for pulse displays. Includes Delaying Timebase, Hold-Off, Scale Illumination, X-Y Display, Auto Focus and Intensity features. The 1720A comes equipped with 90-day warranty and operating manual.



LOGIMETRICS 925/S125 RF SIGNAL GENERATOR \$695



The Logimetrics 925/S125 is a solid-state RF Signal Generator providing outstanding performance at an economical price. The RF generator supplies -127 dB to +23 dB from 50 kHz to

80 MHz (7 bands) and also has a vernier fine tuning, capable of controlling the frequency to 1 ppm! Frequency readout is provided on a 6-digit visual display with selectable resolutions of 10 kHz, 1 kHz, and 100 Hz on all ranges. RF amplitude output is monitored on three different scales, 0 to 1 V rms, 0 to 3 V rms, and -15 to +3 dB (referenced to 0 dBm, 50 Ω). This is a superb unit, quite capable of handling a wide range of applications.



HP 250A RX METER \$550

Self-contained bridge, 500 kHz to 250 MHz in eight ranges. Measures resistance (15 Ω to 100 k Ω), capacitance (0.20 pF), and inductance (0.001 μ H to 100 mH) with $\pm 2\%$ accuracy.

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60,000
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RF CONCEPTS VHF/UHF POWER AMPLIFIERS

All Include Transistor Finals, Require 13.8 VDC Supply, Have One Year Warranty, Made In USA In Lawrence, Kansas

MODEL	FREQ.	PWR IN	PWR OUT	MAX IN	CURRENT	PRICE
2-23	2M	2-5W	2W=30W	5W	5A	\$134
2-417	2M	2-50W	45W=170W	50W	22A	\$269
2/70G	2M/440	5-7W	5W=30W	7W	6A	\$259
4-110	450	2-15W	10W=100W	18W	22A	\$369
VHF1-60	2M	1-8W	60W	8W	14A	\$239

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AEA



YAESU FRG-100 COMMUNICATIONS RECEIVER **\$529**

This new offering from

Yaesu is one of the most exciting receivers to hit the market in quite a few years. It offers communications - grade performance and features at a portable price! 50 kHz to 30 MHz receiver coverage is standard along with 2.4, 4 and 6 kHz filters. A 500 Hz CW filter is optional. There is also a noise blanker, selectable AGC, two attenuators, two clocks, on-off timers, 50 tunable memories, several scanning modes and squelch. This one is destined to be a hot seller - get yours today!



MFJ-249 SWR ANALYZER WITH LCD FREQUENCY COUNTER **\$179**



MFJ's newest, most versatile SWR Analyzer covers more frequencies than any MFJ Analyzer before: 1.8 to 170 MHz continuously. It has a built in 10-digit frequency counter that makes reading SWR in the sun easy. You get three instruments in one... a low distortion RF signal generator, a high accuracy 170 MHz frequency counter and an SWR Analyzer. Measures 4" x 2 1/2" x 6 3/4".



HUSTLER 5-BTV 10,15,20,40 AND 75/80M VERTICAL FIXED STATION ONLY **\$119**

This time-tested vertical from Hustler features full band coverage on 10 to 40 meters and up to 100 kHz bandwidth on 75/80 meters. Solid one inch fiberglass trap forms and heavy gauge aluminum with stainless steel hardware construction allow the full legal limit on CW and SSB. Total length is 25' 1" and it will ground mount or mount on any vertical support to 1 3/4" O.D. DX performance is outstanding. Get yours today at our low Tucker price!

VALOR PRO-AM GM270 DUAL-BAND GLASMASTER GLASS-MOUNT ANTENNA

WAS \$49.95, NOW ONLY \$39.95

This great new through-the-glass mount antenna offers gains of 2.6 dB on 2m and 6.3 dB on 70cm with a typical VSWR of less than 2.0:1 across both bands. It features a compact 26" whip and 14' RG-58 cable with a PL-259 connector. Instructions on field tuning and complete mounting hardware included. This is the easiest way to get mobile dual-band!



YAESU ROTORS

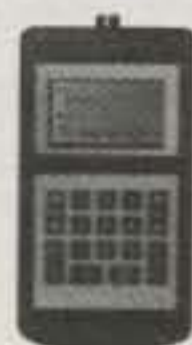
G-800SDX.....\$347
G-1000SDX...\$398
G-540OB.....\$449



BEARCAT BC 2500 XLT 400 CHANNEL PORTABLE SCANNER- WITH 800 MHZ! **\$375**



This new one from Bearcat has coverage from 25 MHz to 1.3 GHz with 400 channels to put those frequencies in! It even includes a VFO knob for up-down frequency control. Other features include weather search, turbo scan, reception counter, step select, rechargeable NiCad battery with AC adapter and an illuminated LCD display. 20 priority channels and 20 separate channel banks complete today's best handheld scanner.



AEA SWR-121 SWR ANALYZER

WAS \$399, NOW \$349 RS-232

This brand new product gives you a graphical display of your HF antenna's performance over its operating spectrum. The result is a graphical display of SWR versus frequency. Its SWR scaling is automatic, resulting in high resolution. The display also gives SWR and return loss at the center frequency and the current scale factor. An RS-232 interface allows for remote control, remote display, and saving of plots. Internal keypad beeper also gives audible indication of SWR, and self-test and calibration functions are built in. Requires 6 AA batteries or DC adapter.

ALINCO DJ-560T DUAL BAND (2M/440) HT **\$299**



The DJ-560T combines superb performance and features with an incredibly low price in a dual band HT. This unit allows simultaneous reception of both bands for full duplex operation. 40 normal memories and a call channel allow full storage of all local repeaters. Three scanning modes let you easily find repeaters when traveling. All of this combined with code squelch, DSQ, 3 paging functions, an auto-dialer, 5 W output with 12 VDC or optional 12 V battery and much more make this your best choice in a dual band HT.

EBP-12NA 12 V BATTERY.....\$54.95
ESC-11 SOFT CASE.....\$19.95

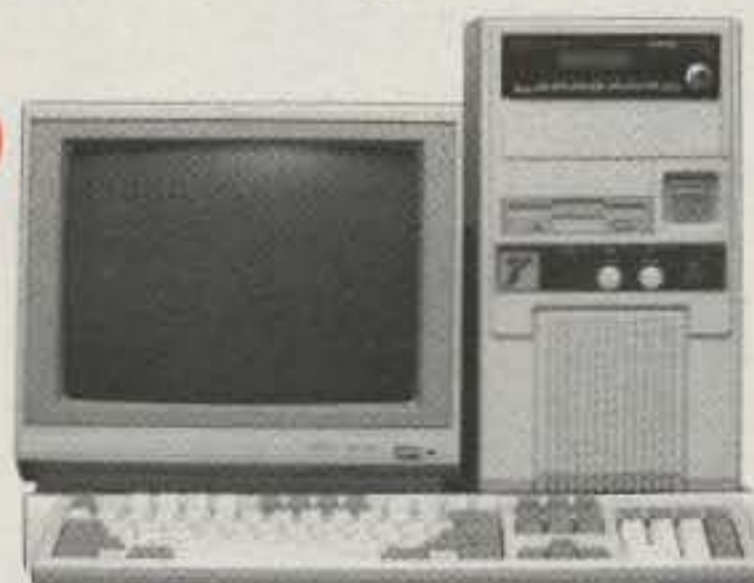
NEW TUCKER PACKET COMPUTERS

New from Tucker Electronics, your complete source for computers and amateur radios comes a product that combines our expertise in both fields, the Tucker Packet Computer. The Tucker Packet Computer combines a Tucker PC compatible computer with our line of amateur radio equipment to form a complete, ready-to-operate 2m packet radio setup. No longer do you have to worry about buying separate TNC's, radios and a computer, we at Tucker Electronics have done the work for you! Two systems are available. Both combine a Tucker XT compatible computer with 640k, a mono monitor, 3 1/2" 720kB floppy drive, serial and parallel ports, and a keyboard. Packet control for both systems is provided by the DRSI PC Packet adapter 1 which fits inside the case and includes software for easy control. RF is provided by the Alinco DR1200T 2m Data Radio which features 25 W RF output, 14 memory channels and much more. System 1 has the radio mounted internally and features our standard mini-tower case style. It is completely self-powered, just plug in an antenna and go! System 2 has the radio and an Astron RS-10A power supply external to the computer. The case in System 2 is our unique sub-mini desktop case which measures only 3" x 12" x 14"! Custom configurations are listed below. Get into the exciting world of Packet Radio without all the hassle—order a new Tucker Packet Computer today!

Prices:
SYSTEM 1 ONLY **\$699**

Custom Configurations

Upgrade to 286-12 with 40MB HD, 1MB RAM: add \$200 to either system

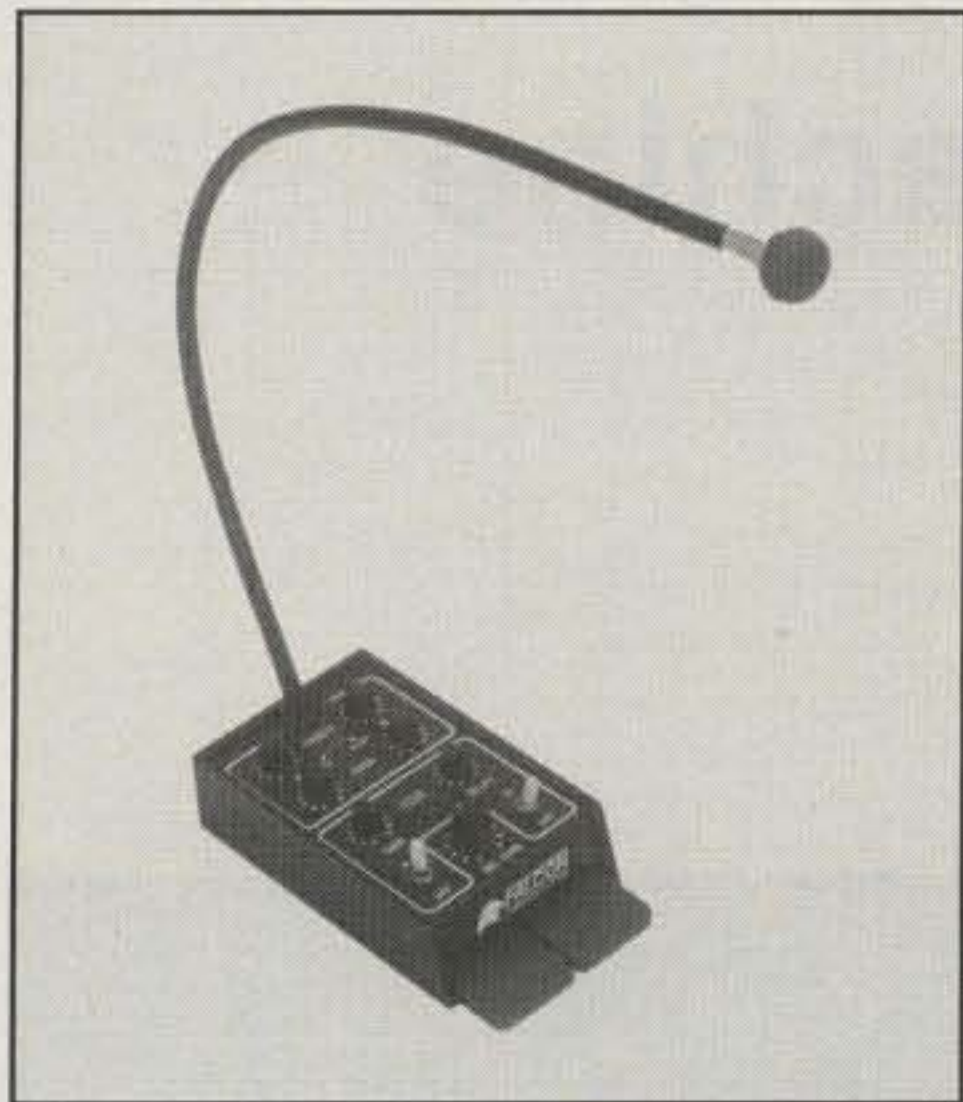


SYSTEM 2 ONLY **\$795**



Corporate Offices: 1717 Reserve Street • Bargain Store: 1801 Reserve Street
Garland, Texas 75042 • P.O. Box 551419, Dallas, Texas 75355-1419
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HORIZON EXPANDERS



F261A DUAL CHANNEL DESK MIKE Improves your rig's performance with clean transmitted audio and numerous features for convenient operations.

Dual Channels for operation with one or two connected radios. Separate equalizers, PTT paddles, and output cables for each channel.

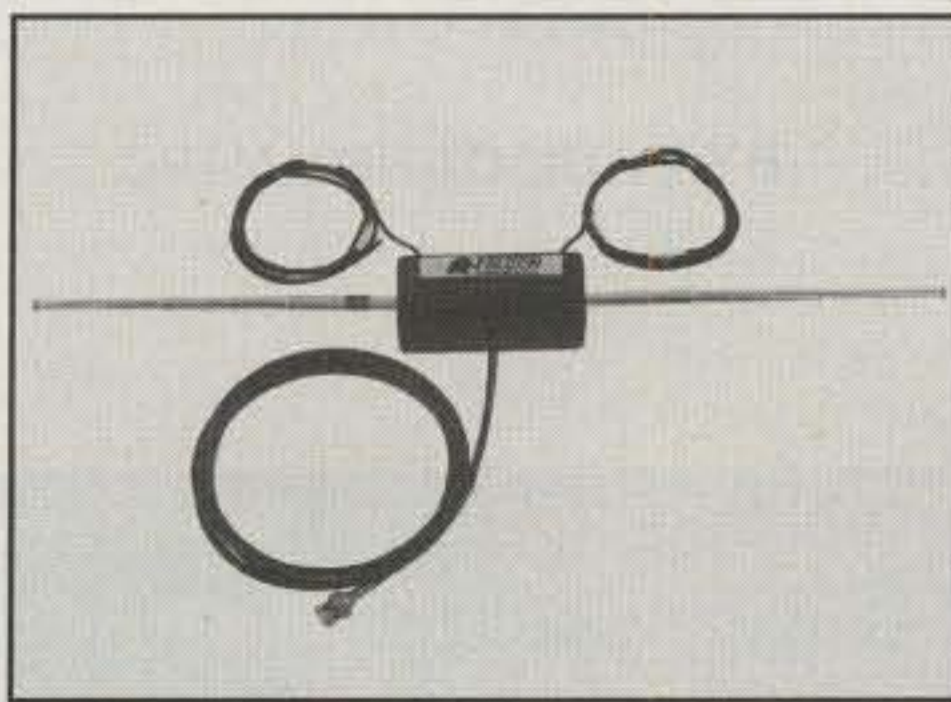
Built-In Equalizers with individual bass and treble controls for each channel. Easily set to produce full-bodied sound or emphasize highs for penetrating DX pileups. Noticeably superior to factory-supplied mikes.

Built-In VOX has adjustable gain and delay. On/off switches allow one channel to operate on VOX, one on PTT, or both on VOX or PTT. Ideal for rigs without VOX!

Electret Mike Element on 20-inch gooseneck. Flexes to fit every operating need.

Ready To Plug In And Use! Supplied complete with two preinstalled mike plugs and cables that fit all HF, VHF & UHF transceivers with 8-pin mike connectors. Wiring is field changeable using only a screwdriver! Requires 4-1.5v cells or 6-25 VDC ext. power. A super mike you will enjoy year after year, rig after rig!

Whether your interests are HF DXing, contesting, VHF/UHF FMing or operating portable, Falcon expands your horizons with today's hottest accessories. They are built in the U.S.A. and represent excellent value in every respect. Why settle for less!



F121A PORTATENNA The ideal portable VHF/UHF antenna for FM handhelds and scanners! Retracts to only 8.7 inches long for carrying, yet extends into full size, ground-independent half-wave dipole for 2 meters, 222MHz, 70cm, and all frequencies in between. Produces significantly greater range than "ducky" antennas.

Band Markers on the hang-up cords eliminate measuring and make band changing a snap. A chart for non-ham frequencies is also included for high band monitoring enthusiasts. Easily set to any frequency from 144 to above 470MHz. A perfect mate for modern dualband FM rigs!

Mount Vertically or Horizontally. Positions vertically for FM activities, horizontally for SSB or angled for working "RS" satellites while portable.

Super Handy for Vacationing and/or Emergencies. Just pull out the telescoping elements to markers and hang it from a door, window, etc. and you are ready to operate!

Ready To Use. Supplied complete with preinstalled 6 ft. 50-ohm cable and BNC connector to fit all popular FM handhelds. A real gem!



F251A AND F252A AUDIO DISTRIBUTION AMPLIFIERS The quick and easy way to switch audio from up to 7 rigs or other audio sources to a number of speakers inside or outside the shack. Great for combining outputs from several transceivers to a master station speaker, switching that signal to audio filters, packet TNCs, kitchen speaker, etc! Avoids cable swapping confusion!

Dozens of Combinations. Independently locking pushbuttons let you mix and match any combination of inputs (1-7) with a variety of outputs (1-4 or 1-8, depending on model).

Internal Amplifier. Inputs are highly isolate and maintain a constant 10 ohm impedance. Volume remains steady when adding or removing an input or an output. Low output Z. Gain internally adjustable from 0-12dB. Requires 13.8 VDC power. Inputs are RCA phone jacks. Outputs are screw terminals on a plug-in terminal strip.

Two Models. F251A has single amplifier with 7 switch-selectable inputs and 4 switch-selectable outputs. Dual Channel F252A has 2 amplifiers, each with 7 inputs and 4 outputs. "Brings your shack together" in a neat and effective manner!



P.O. Box 8979, Newport Beach, CA 92658, (714) 760-0340
FALCON products are available at your favorite dealer!

With this installment we are halfway through our project. This month we add the VFO and a push-push doubler. The transceiver is starting to take shape.

The 40 Meter Fun Machine Part III—The VFO

BY PAUL CARR*, N4PC

Thus far we have built two parts of our ultimate project—a 40 meter superhet QRP transceiver. Each of these projects will stand alone and provide a useful function in the ham shack. This month's project is designed to work in conjunction with the transmitter we have just developed. It will provide the versatility we need to travel around the band and hunt those calling CQ. Again, "the modified ugly technique" is used in building the project.

VFO Design Philosophy

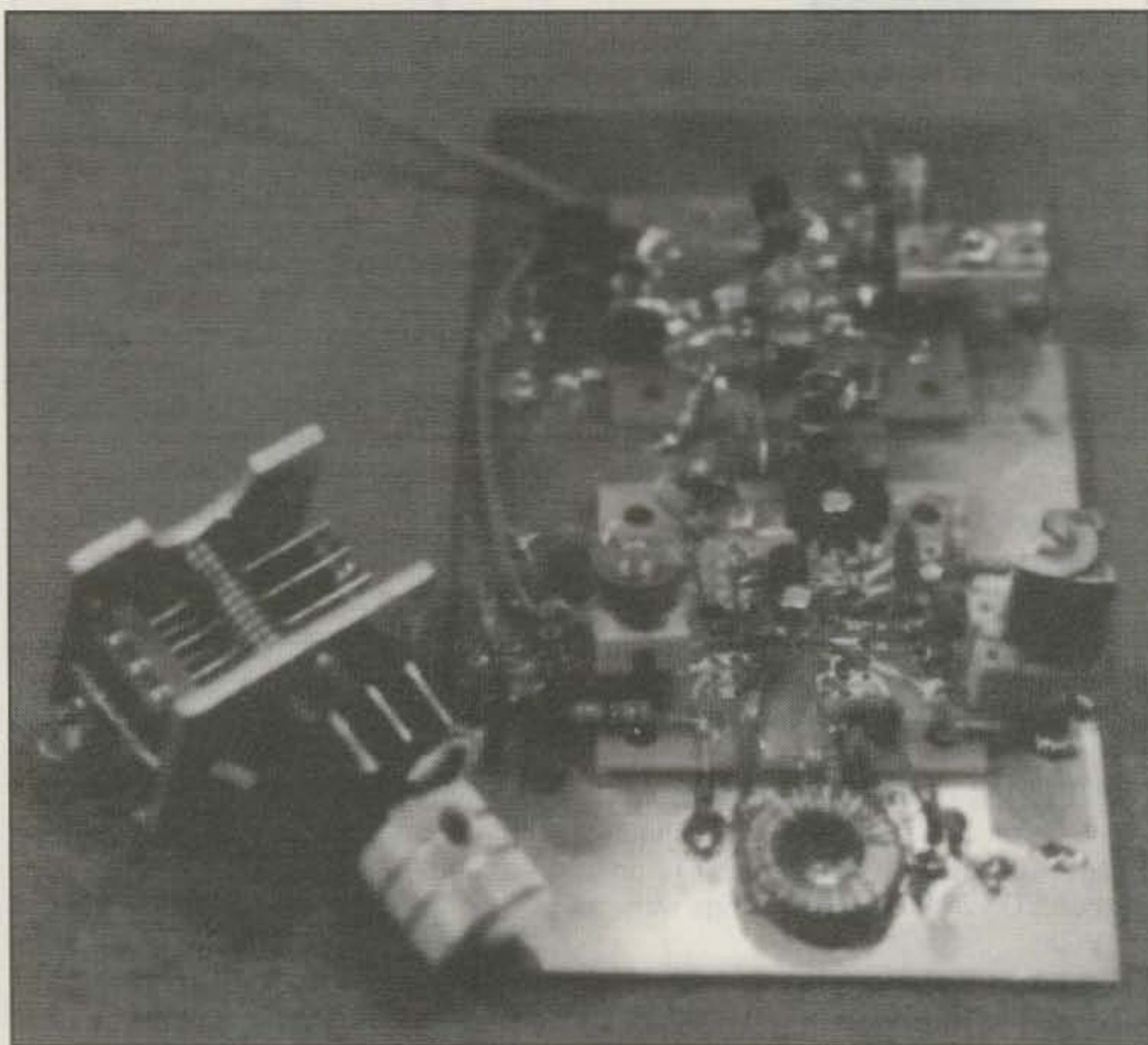
Through the years many excellent VFO designs have been developed. I have chosen the Hartley oscillator for this project. It is easy to build, has good output, and provides excellent stability when designed and built properly.

Just a few words about stability are in order here. When we design a VFO, there are three problems that ruin the stability: mechanical vibrations, electrical variations, and heat build-up. The first problem can be addressed by thinking "rugged." Be sure that all components are mounted firmly and no vibrations of wires or components can occur. The second problem can be managed by proper choice and application of components (more about this later). The third problem is heat. Always think about where heat build-up can occur and take proper precautions to dissipate this heat. These steps can ensure that you will have an excellent VFO that will provide the desired frequency control, and it will "stay put."

Specifics of Design And Construction

The VFO and frequency doubler will be

*97 West Point Road, Jacksonville, AL 36365



The VFO and doubler circuit boards. The main tuning capacitor for the VFO is at the left. It will be mounted on the front panel.

built using "the modified ugly technique." The VFO, source follower, and the amplifier will occupy a Radio Shack experimenter's board, and the push-push frequency doubler will occupy a second experimenter's board. Both these boards will be mounted on a 3" x 6" piece of single-sided printed circuit board, which will provide a foundation and ground plane. This ground plane will then be mounted

on the plywood base that serves as a chassis.

The VFO will be built using the same concept as our transmitter. We will start at the frequency generation stage and work toward the output.

Prepare an experimenter's board as we have done before by first cleaning the pads with fine steel wool. Next turn over the board and cover the holes with two

M²

Your HF antenna edge

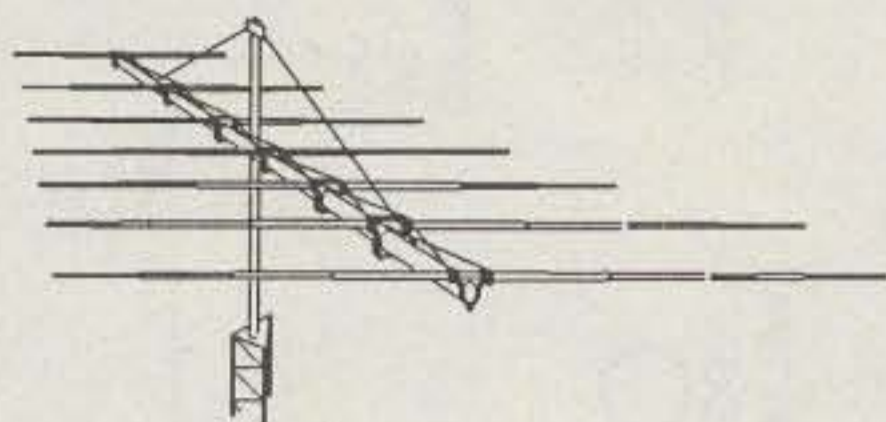
Sunspot cycle aside, there's always action on HF and M² has the antennas to make your voice (or key) heard: monobanders from the monster 80M3 to the 40M4L to the 20M6...or perhaps you'd prefer the whole enchilada on one boom with the 7-10-30LP8: action on 40 meters and all the bands from 10 to 30 meters!

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40M2L	40 meters	4.2 dBd
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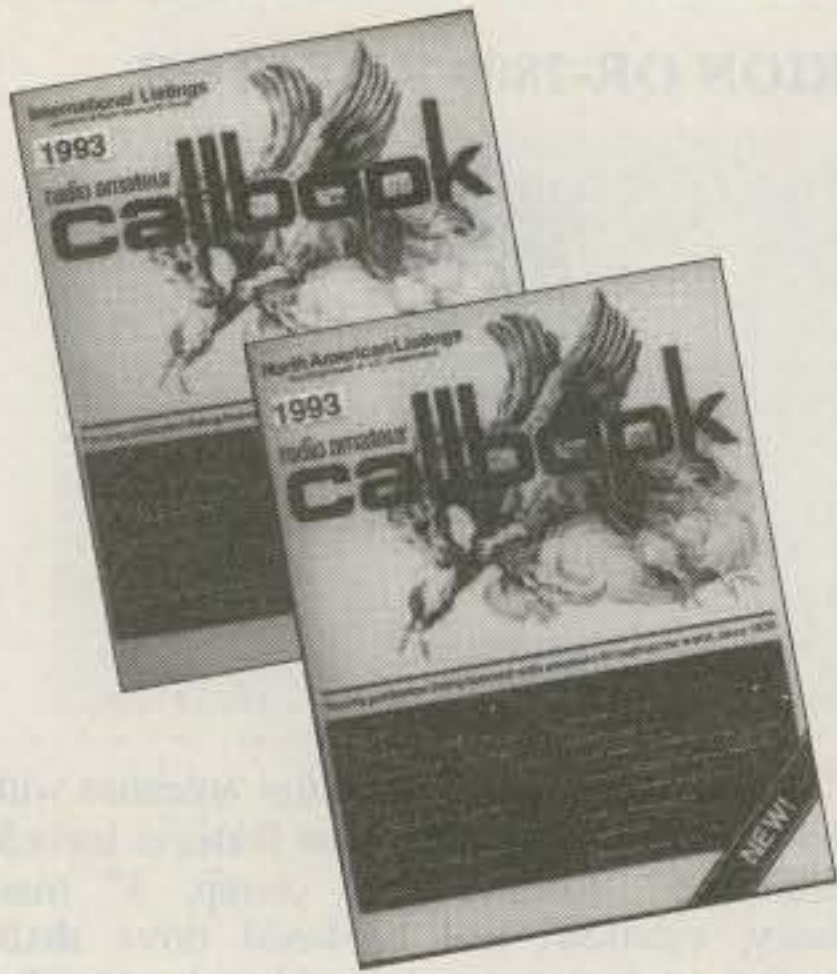
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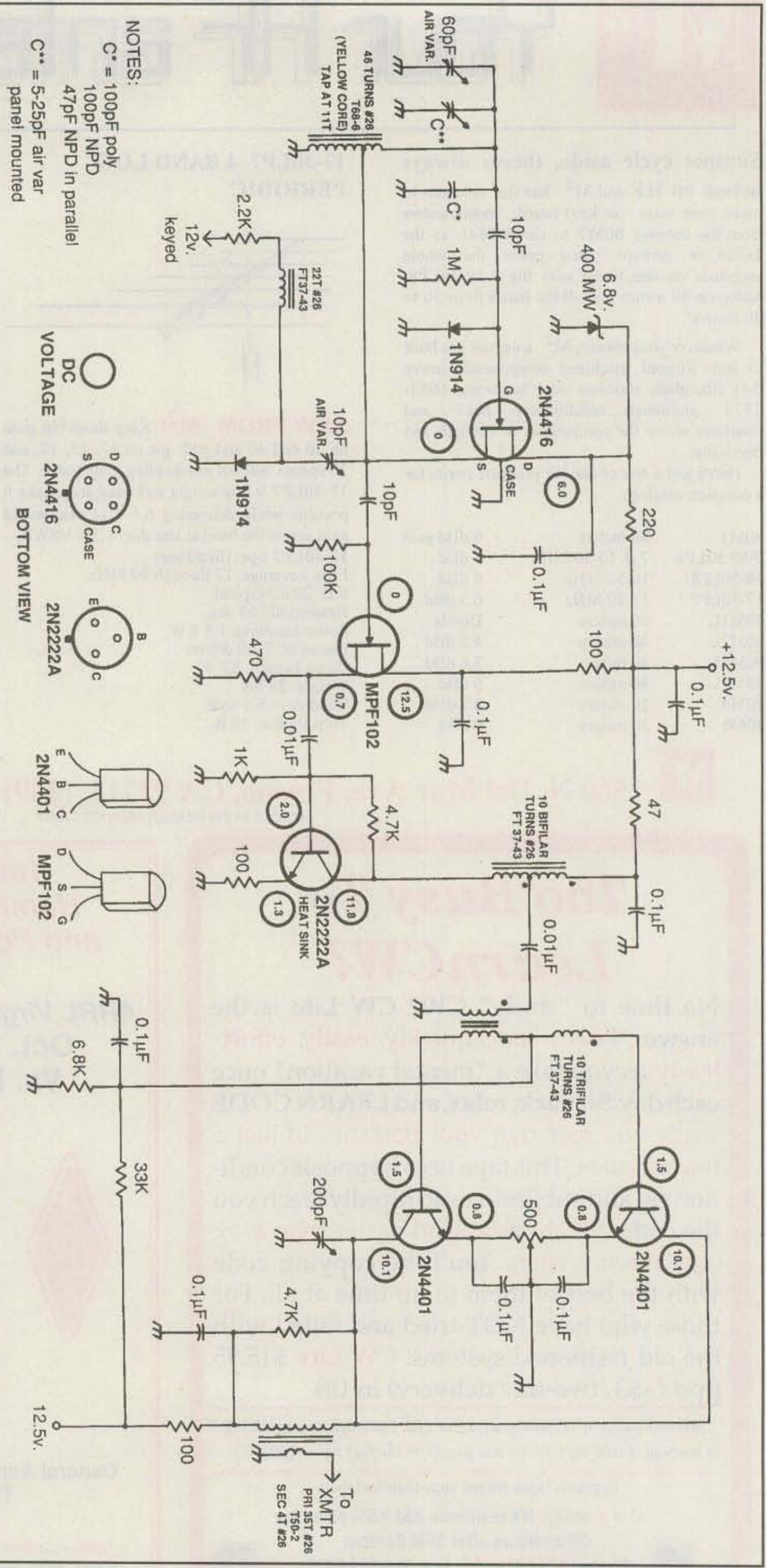


Fig. 1— Schematic diagram and details of the VFO and push-push doubler circuit.

Parts List

- Resistors (1/4 W composition)
- One 220 ohm
- One 1 meg ohm
- One 100 K ohm
- One 2.2 K ohm
- Three 100 ohm
- One 470 ohm
- One 47 ohm
- One 1 K ohm
- Two 4.7 K ohm
- One 500 ohm var. thumbwheel pot.
- One 33 K ohm
- One 6.8 K ohm

Capacitors

- Two 10 pF SM or poly
- Two 0.01 uF disc cer.
- Eight 0.1 uF disc. cer.
- One 60 pF air var. PCB mounted
- One 10 pF air var. PCB mounted
- One 25 pF air var. panel mounted
- One 200 pF compression trimmer

Diodes

- Two 1N914
- One 6.8V 400 mw zener

Toroids

- Three FT 37-43
- One T68-6
- One T50-2

Transistors

- One 2N4416
- One MPF 102
- One 2N2222A
- Two 2N4401

layers of electrical tape to ensure that no solder from the opposite side of the board can flow through and contact the ground plane. Now the board is ready for you to mount the components.

Bend the legs on the leads on the 2N4416 transistor so that the base of the transistor will be about 3/8 inch above the circuit board. The leads should be bent so that it lies flat on the printed circuit pad. Do not place the transistor leads into the mounting holes. This can cause problems by having solder flow through the holes and then penetrate the electrical tape. Mount the components in a logical manner, assuring that the components are rigid so that no mechanical vibration can occur. (Remember, mechanical vibration is an enemy of frequency stability.) To ensure a firm mounting for the coil, I glued the coil to the circuit board using silicon rubber cement. There are two small air variables mounted on the board. The 60 pF variable determines the lower frequency limit, and the 10 pF variable provides frequency offset during transmit. Mount both of these components so that you can reach them with a screwdriver after the final shields are in place. The remaining components are mounted using good construction practices. The remaining air variable is the tuning control

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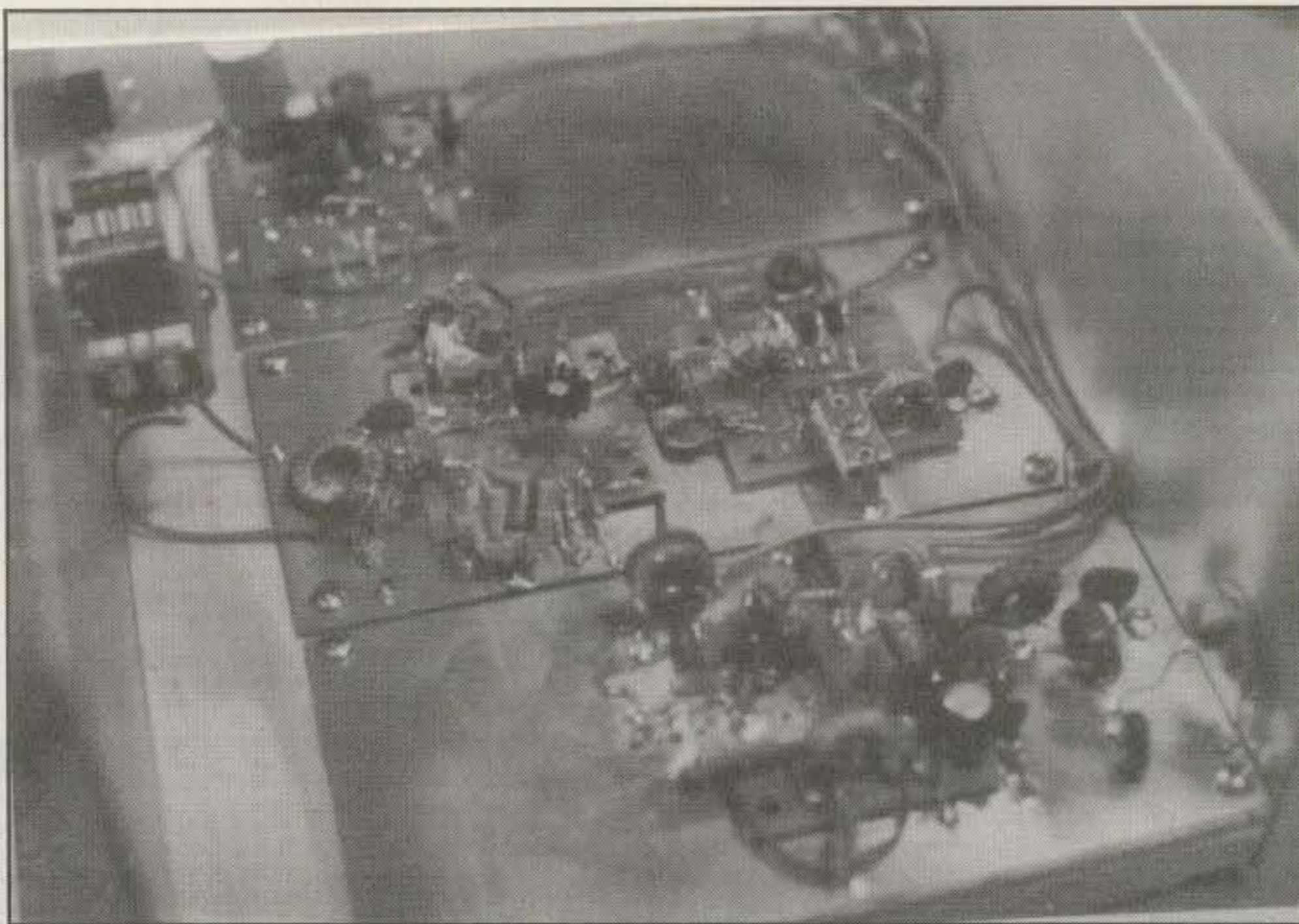
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and will eventually be panel mounted, but for the initial testing it can be connected by clip leads.

Now we are ready for the initial test of the oscillator. Visually check the board for any wiring errors or solder bridges that may have occurred. Next take an ohmmeter and check for any short circuits. (The output that we are looking for is definitely not smoke.) Okay so far? Good. Connect a clip lead to the source of the 2N4416. Place this near the antenna of a receiver. Tune the receiver to 3.5 MHz. Now connect 12.5 VDC as indicated. If all is working well, you should be able to adjust the 60 pF capacitor and hear the output on the station receiver. Do you hear the signal? Sounds great! If you do not hear a signal, stop and find out why.

The remainder of the construction and

testing is very easy. Build and test the source follow (MPF102) stage and the amplifier stage (2N2222A). Perform visual and electrical tests along the way. This completes the VFO section. Now on to the doubler output stage.

Push-Push Doubler

The push-push doubler is built on a separate experimenter's circuit board. Prepare a second board as you did the first. The bases of the two 2N4401 transistors are driven in push-pull through the trifilar wound transformer. Be sure to observe proper phasing for the transformer. Balance of the two transistors is ensured by the use of a 500 ohm variable resistor in the emitters. The collectors are wired in parallel, and the output from the circuit

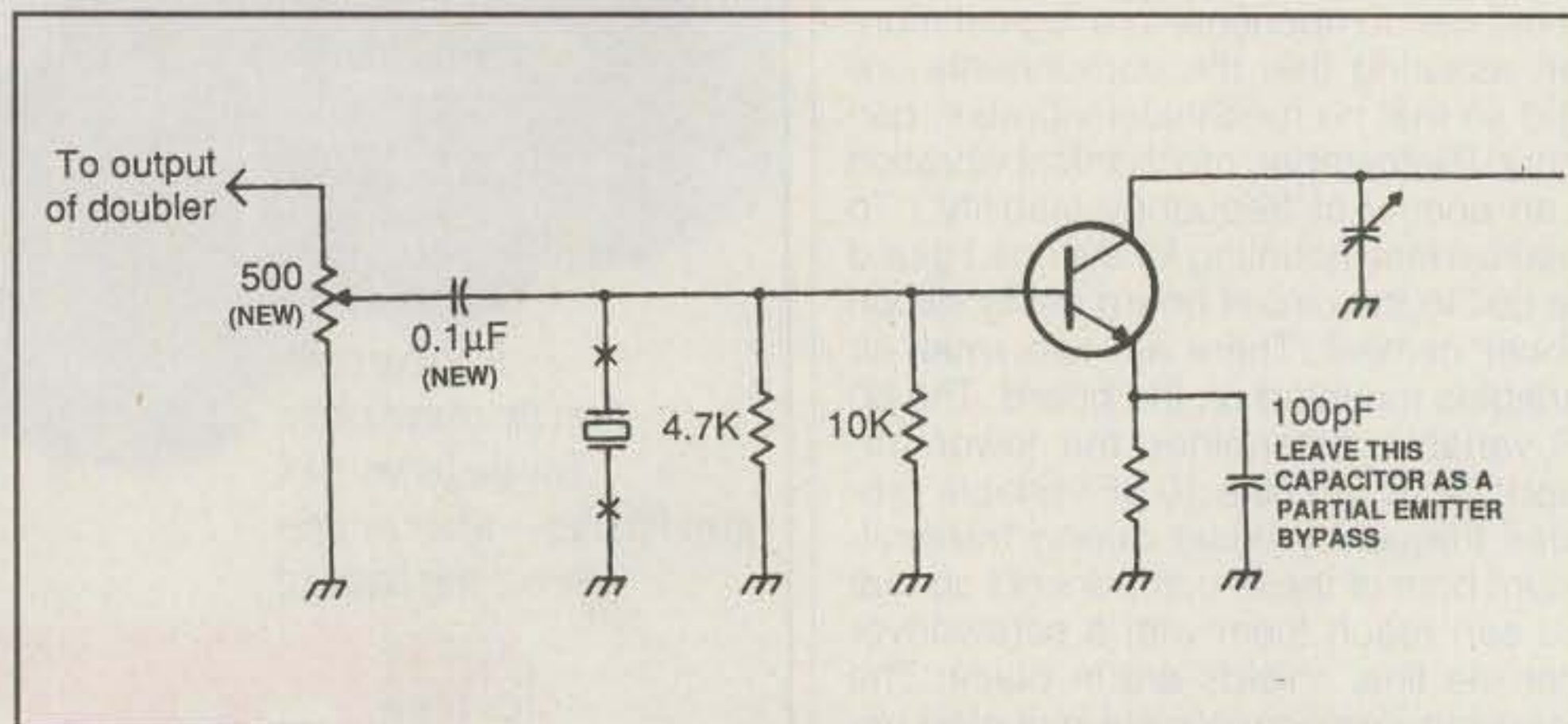


Fig. 2—Modifications to the transmitter circuit (last month) to allow use with the VFO.

is obtained by a link-coupled tank circuit. This tank circuit is tuned to 7 MHz with the associated capacitor.

Perform visual and electrical tests as before. If everything checks, connect the input of the doubler to the output of the VFO and connect a clip-lead to the link of the output circuit. Place the clip-lead close to the receiver and tune the receiver to 7 MHz. Adjust the variable capacitor in the doubler output for maximum signal. If you have an oscilloscope, adjust the emitter resistor so that the peaks of the output sine wave will be the same. This ensures that both transistors are doing their share of the work. You may have to readjust the emitter resistor. If everything checks out, you are ready for final assembly.

Final Assembly

Place the VFO/doubler board on the plywood base adjacent to the transmitter section. Leave enough room to place a printed circuit board shield between the boards later in the project. I attached the printed circuit board bases to the plywood with small wood screws. Mount the tuning capacitor to the front panel using standard construction practices. Be sure that the front panel is electrically connected to the VFO circuit board. This ensures a proper return path for the ground side of the tuning capacitor. I glued the wire from the tuning capacitor to the base with silicon rubber cement to minimize mechanical vibration.

Next run a wire from the junction of the 10 pF air variable and the 1N914 switching diode through the coil to the output of the 2N4036 keying circuit in the transmitter. This is to move the VFO off frequency during key-up conditions. Initially set the capacitor for maximum capacity. Next replace the crystal holder in the transmitter with a small variable capacitor and connect the output of the doubler to the transmitter as shown in fig. 2. Make any final adjustments you may need to make and you are ready to go on the air.

Afterthoughts

When you construct anything, always keep in mind the conditions that can cause problems. Build the circuit in a very sturdy fashion. Use good-quality components. Always remember heating will occur and you must allow for that. If you keep these factors in mind, a good, stable VFO can result.

Remember, if you have questions, let me know (SASE please). Next month we will continue our journey by adding circuits to turn our project into a direct conversion transceiver. See you then!

(To Be Continued)

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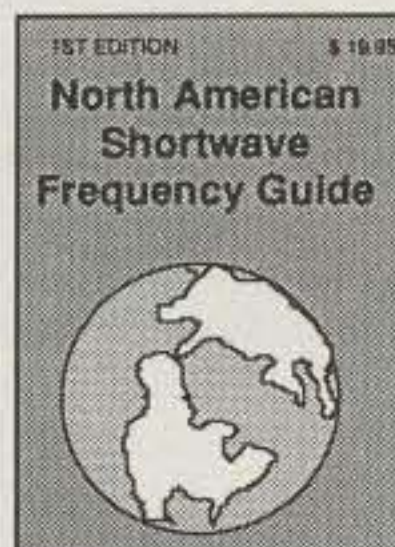
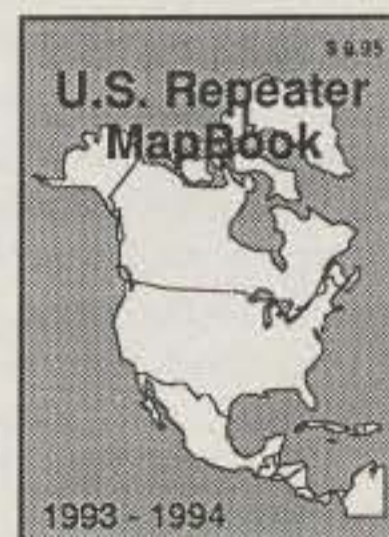
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ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

BY KARL T. THURBER, JR., W8FX

New Antenna Stuff '93

To keep this column interesting, we need new and unique antenna ideas. This month we start off with just such an idea.

N-PAM Roof Mount. KD4JBY and KD4ENQ have developed the N-PAM™ roof mount system (patent pending). The units (see photos) were first built by William Gamble, KD4JBY, for OSCAR satellite operation, and now are produced commercially by G & P Engineering.

The N-PAM mount should accommodate most roof structures. According to the designers, the only type of roof that can't use the N-PAM system is one which has Spanish or Oriental style curved tile. All other roof types should work, including slate roofs. The system can also be installed on a flat roof or used as a temporary or emergency antenna mount on the ground.

The key feature of the N-PAM system is that since it uses gravity and ballast to hold it down, no holes in the roof are required. To install the unit, you simply move all parts to the roof, bolt together the N-PAM unit, adjust the angle of the trays so that the support pole is vertical, tighten down all hardware and the support tubes, and install the ballast. Standard 8" x 8" x 16" concrete or cinder blocks may be used as ballast.

Two basic models are available (see figs. 1 and 2). The N-3ST (\$169.95) is a 3 ft. high single tray mount designed for verticals and/or small- to medium-size beams. Its maximum wind load is 4.5 sq. ft. at a height of 5 ft. The N-3DT (\$199.95) is a 3 ft. high, dual tray system designed for most other antenna types with up to 10 sq. ft. of wind loading at a 7 ft. height. No guying is required with either model unless longer masts are used. The units have a claimed wind survival of 85 mph (entirely adequate in many areas, but probably not in others).

Other models are available, as are a variety of accessories such as single-tray to dual-tray converters, height extension assemblies, and roof protection mats. For more information and specs, contact G & P Engineering, 4943 Finch Court, Stephens City, VA 22655-2461 (703-869-4530).

ASA Antennas and Accessories. ASA offers an interesting catalog of VHF/UHF antennas and supplies. Billing itself as "your antenna and accessory alternative," ASA offers a healthy mixture of its own products and those of other sellers. Included in its offerings are slimline HF series of "Fiberwhips" and the popular WD4BUM HF "Ham Sticks"; VHF/UHF mobile and fixed-station antennas, including multiband units; crossband duplexers; CB cellular, cordless telephone, marine, and business band antennas; and a broad selection of mobile and fixed station mounts, adapters, springs, and connectors.

289 Poplar Drive, Millbrook, AL 36054

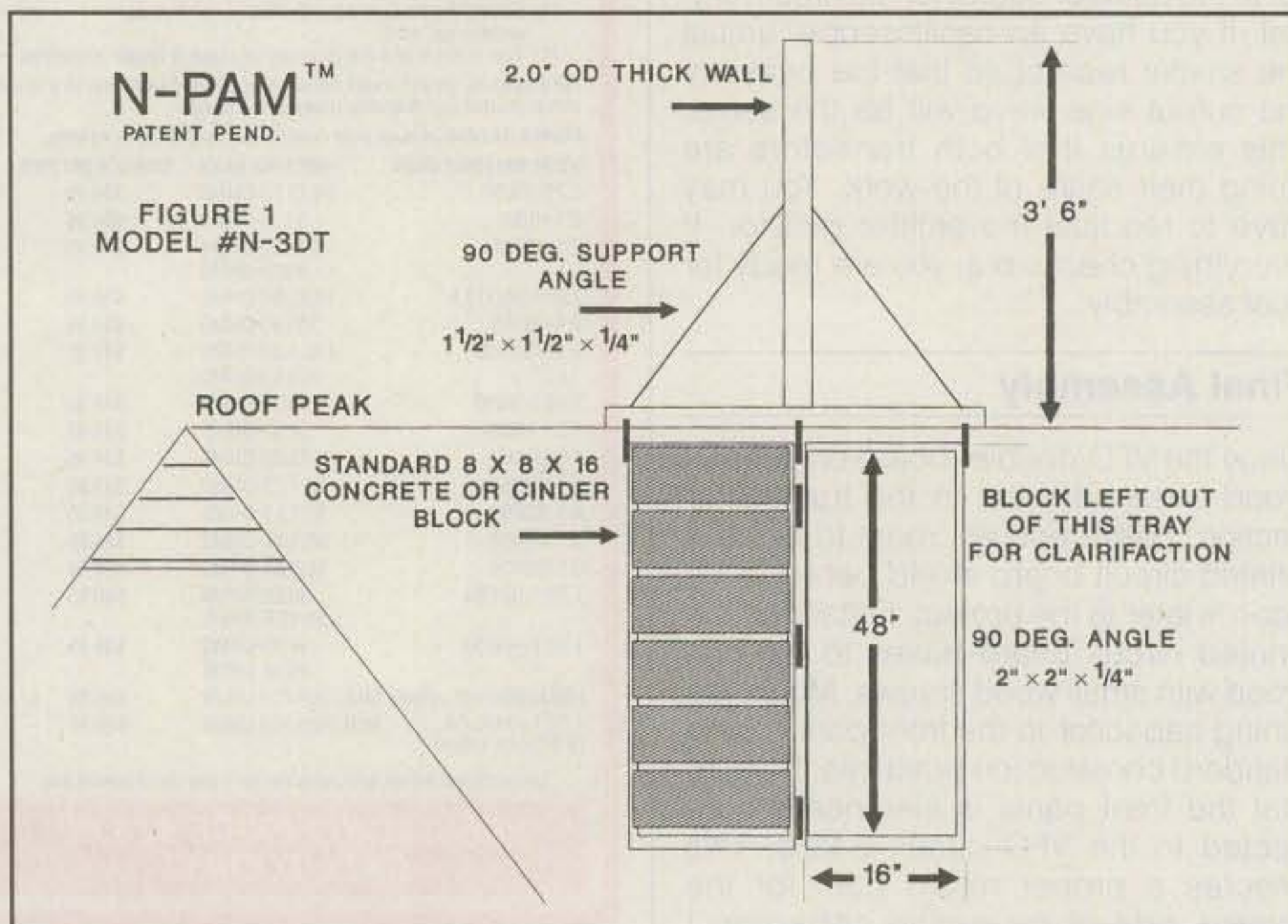


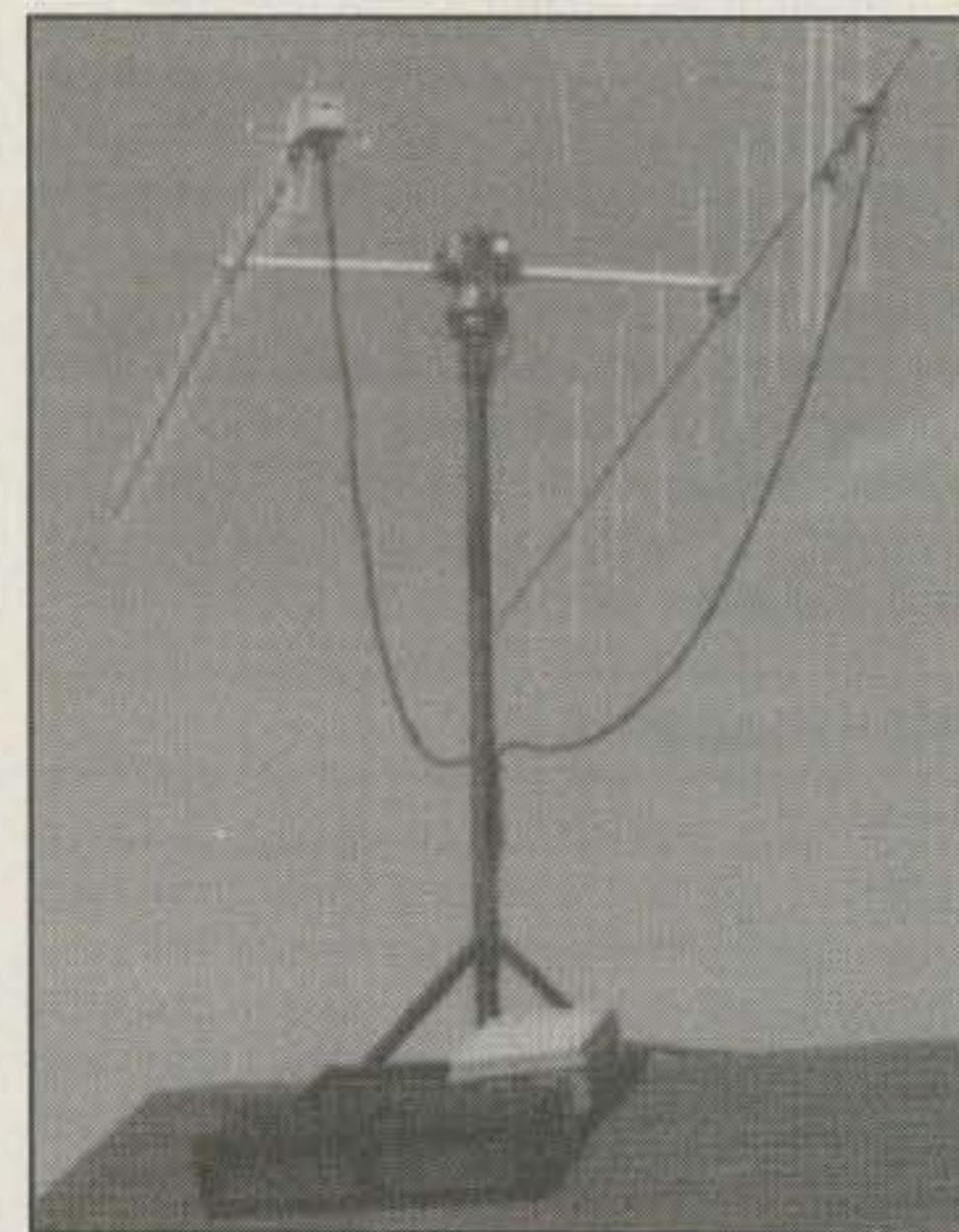
Fig. 1- Shown here is the G & P Engineering Model N-3DT mount. The N-3DT is a dual-tray N-PAM system designed to support most antenna types with up to 10 sq. ft. of wind loading at a height of 7 ft. Standard 8" x 8" x 16" concrete or cinder blocks are used as ballast. (Drawing courtesy G & P Engineering)

Among the more popular ASA designs is the 10 ft. long, Model 9209 two meter collinear MultiWave™ base station antenna. It's a double $\frac{5}{8}$ over $\frac{1}{4}$ -wave, high-gain design. The antenna is of all fiberglass and aluminum construction; it's \$32.43. Models also are available for 220 MHz and 440 MHz, as are single $\frac{5}{8}$ over $\frac{1}{4}$ -wave and $\frac{5}{8}$ -wave designs for 2 meters.

A 13-page catalog is available from ASA, P.O. Box 3461, Myrtle Beach, SC 29578-3461.

EUR-AM Electronics. EUR-AM is an importer that specializes in the distribution of high-quality, European-made amateur antennas and antenna accessories. Most of their antennas, mounts, and connectors are interchangeable, a feature of EUR-AM's unique "modular antenna system" design.

At the heart of the modular system is the rotatable "Nipple Connector." Developed for the Swedish military, the connector has been widely accepted in Europe because of its ingenious design. Mechanically, the Nipple Connector is excellent for mobile connections, since its diameter is only slightly larger than the cable it terminates. Its use also makes it easy to change end connectors and mounts, without soldering or cutting. The Nipple helps maintain the cable impedance, since it keeps the inner and outer conductor diameters uniform throughout, effectively creating a nearly invisible connection for RF.



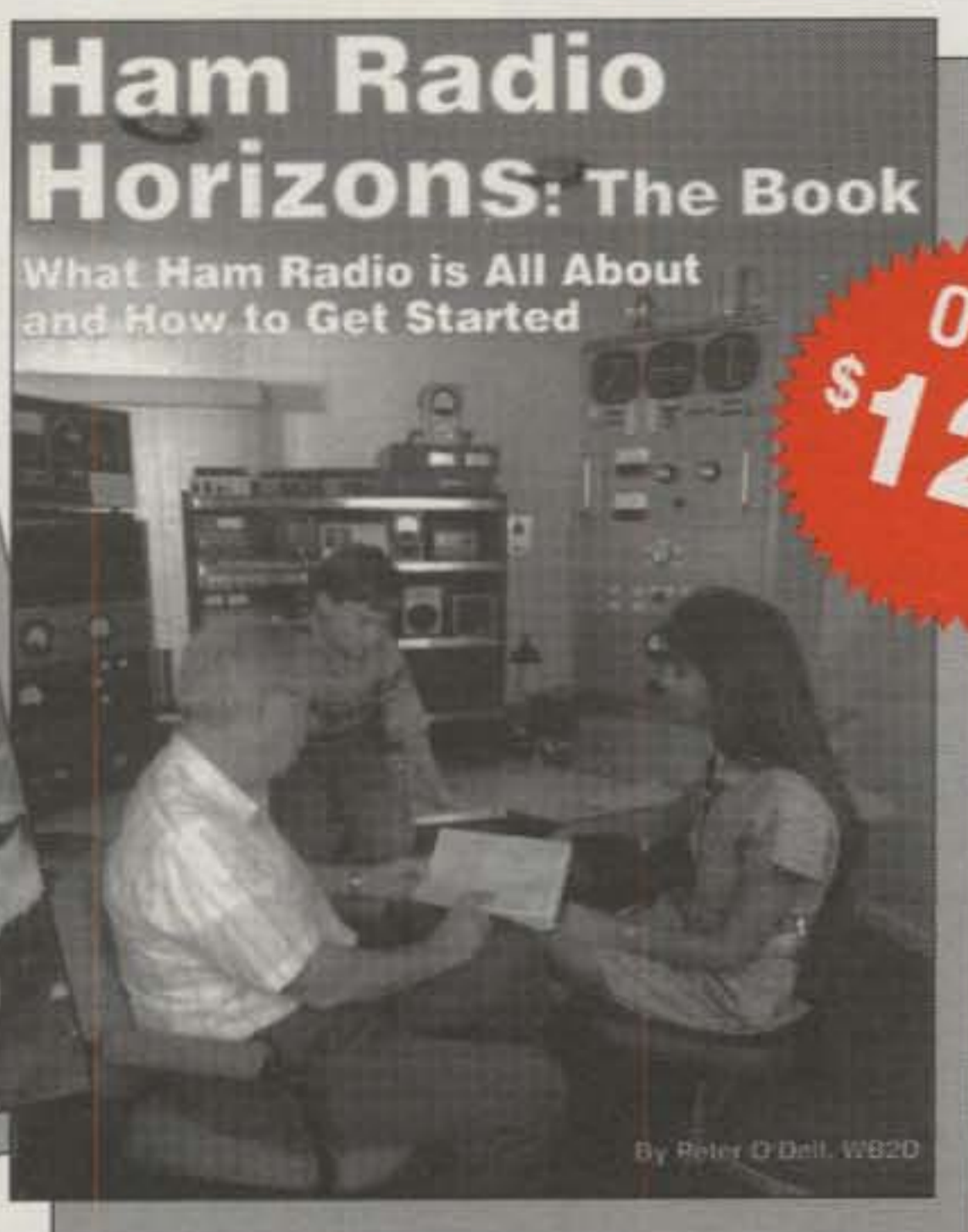
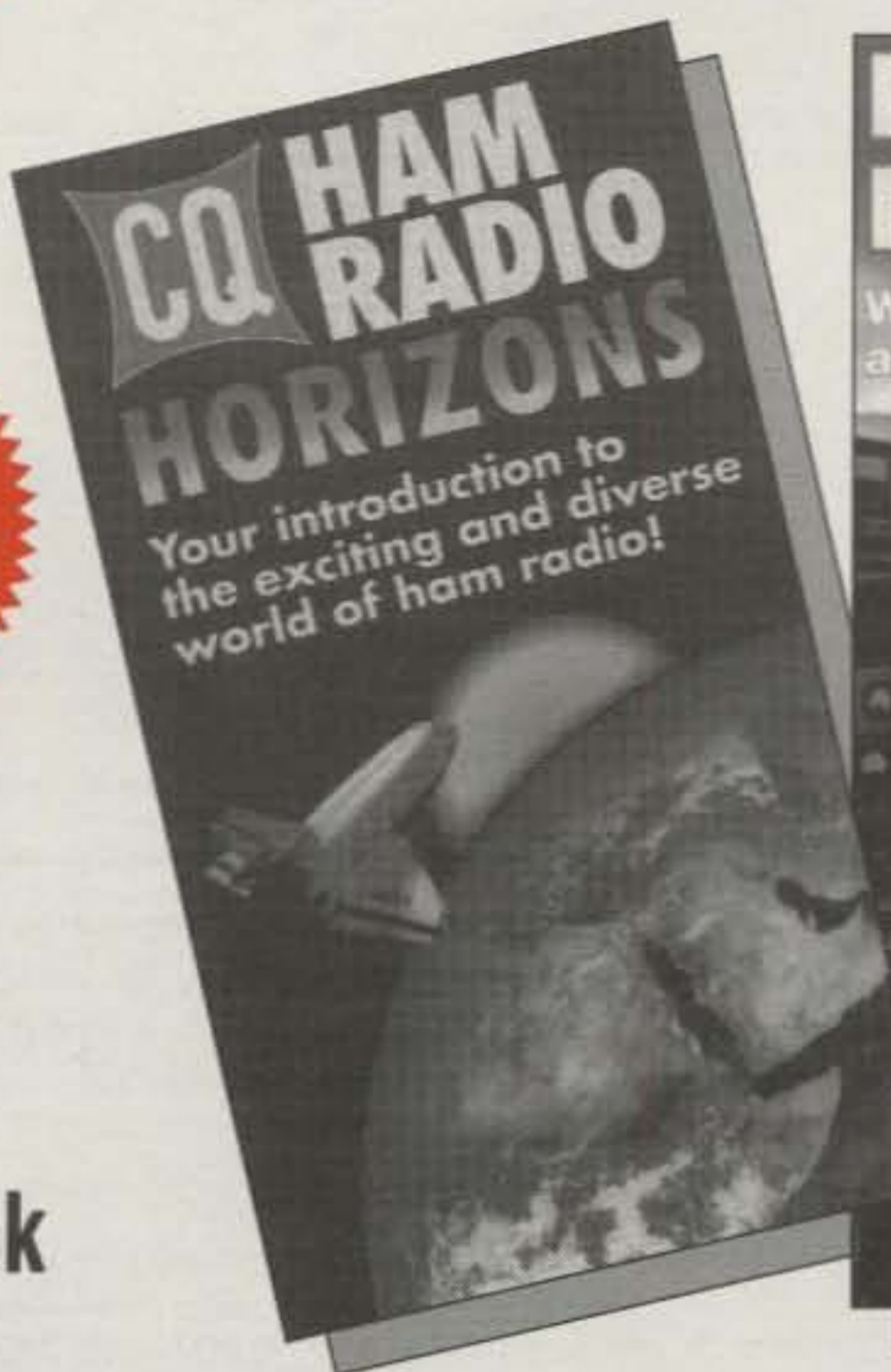
The N-PAM Model N-3DT (\$199.95) is a 3 ft. high, dual-tray roof mounting system designed for most antenna types with up to 10 sq. ft. of wind loading at a height of 7 ft. No guying is said to be required unless longer masts are used. The units have a claimed wind survival of 85 mph. (Photo courtesy G & P Engineering)



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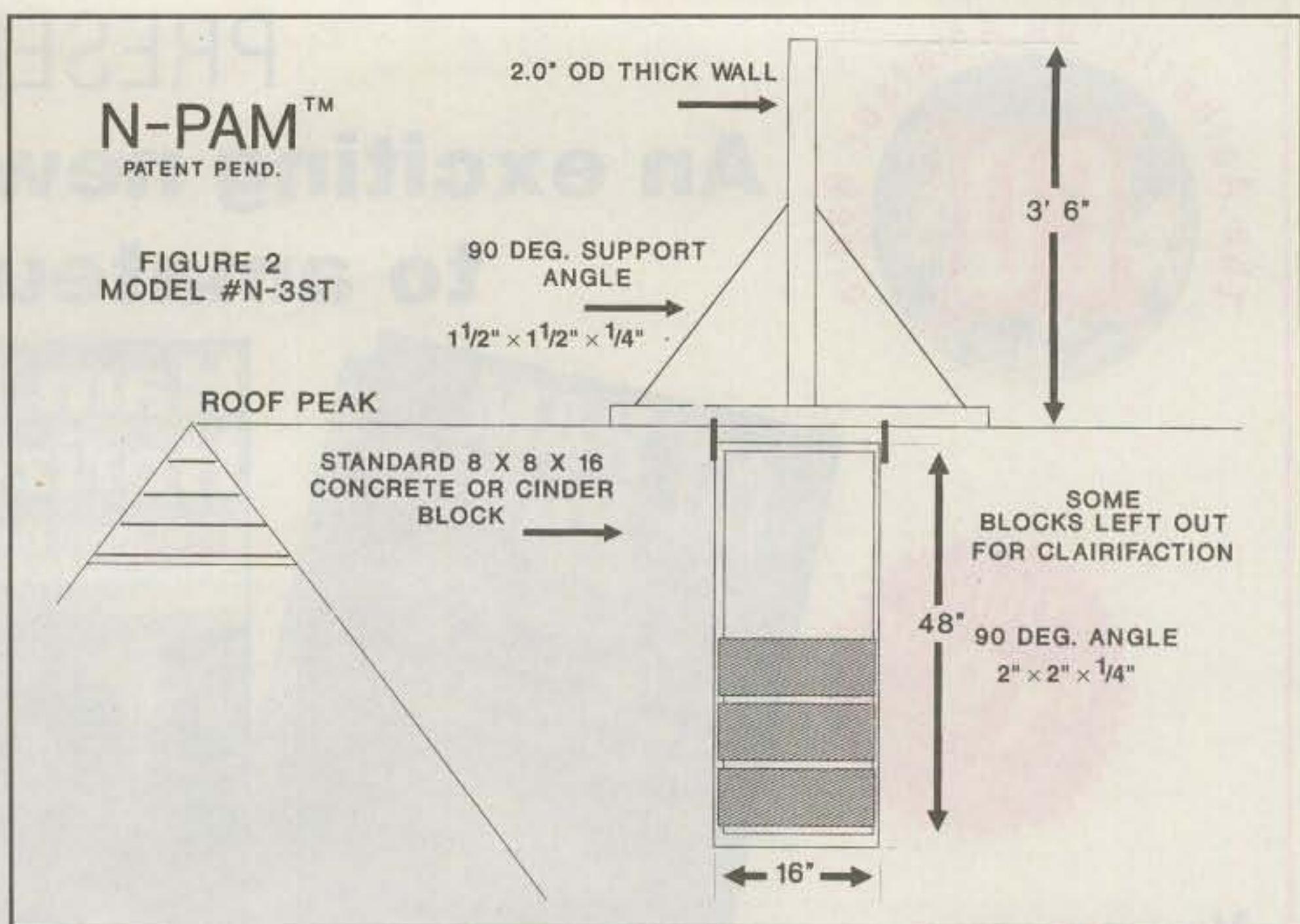


Fig. 2- Here's the G & P Engineering Model N-3ST single-tray mount. Similar to the N-3DT dual-tray system, but with only single trays, the N-3ST is for vertical antennas and small- to medium-size beams. Its maximum wind load is 4.5 sq. ft. with a 5 ft. high mast. (Drawing courtesy G & P Engineering)

A recent EUR-AM catalog shows a variety of modular-based mobile vertical antennas covering 70-1000 MHz in various frequency ranges, a selection of Nipple Connectors and adapters, and mounts and brackets. Also offered are several base-station verticals covering 26-470 MHz; three VHF/UHF Discones; VHF/UHF rubber duckies; various apartment-style antennas, including a novel, 2 meter, window-mounted quad and a collapsible 2 meter beam; and cutting, stripping, and crimping tools and connectors.

For a free catalog, contact EUR-AM, P.O. Box 990, Meredith, NH 03253-0990 (FAX 603-476-5113).

Startek International Frequency Counters. Most of us are familiar with the frequency counter, an amazingly precise measuring instrument with digital readout in wide use today. Not the least of the reasons for the growing hamshack popularity of counters is price.

Startek offers several inexpensively priced counters, including the new BG series of high-sensitivity bar graph display handhelds. These counters have 2 inch, 10-segment LED bar graphs used as field strength indicators. This feature makes them handy for adjusting, testing, repairing, and even locating RF devices. The Model 15-BG (\$199) covers 1 to 1500 MHz, while the Model 35-BG (\$265) covers 1 to 3500 MHz (see photos).

High in the Startek line is the Model ATH 15. It's an ATH™, or "Auto Trigger and Hold," bar graph display, handheld counter priced at \$235. The ATH 15 features almost completely eliminate random counting and false readings over the counter's range of 1 to 1500 MHz. With it you can accurately read an input signal, display the frequency, and automatically switch to "hold" status, all in .08 second.

All of the Startek counters may be used with the MFJ SWR Analyzers and other RF instruments that don't have built-in counters for pre-

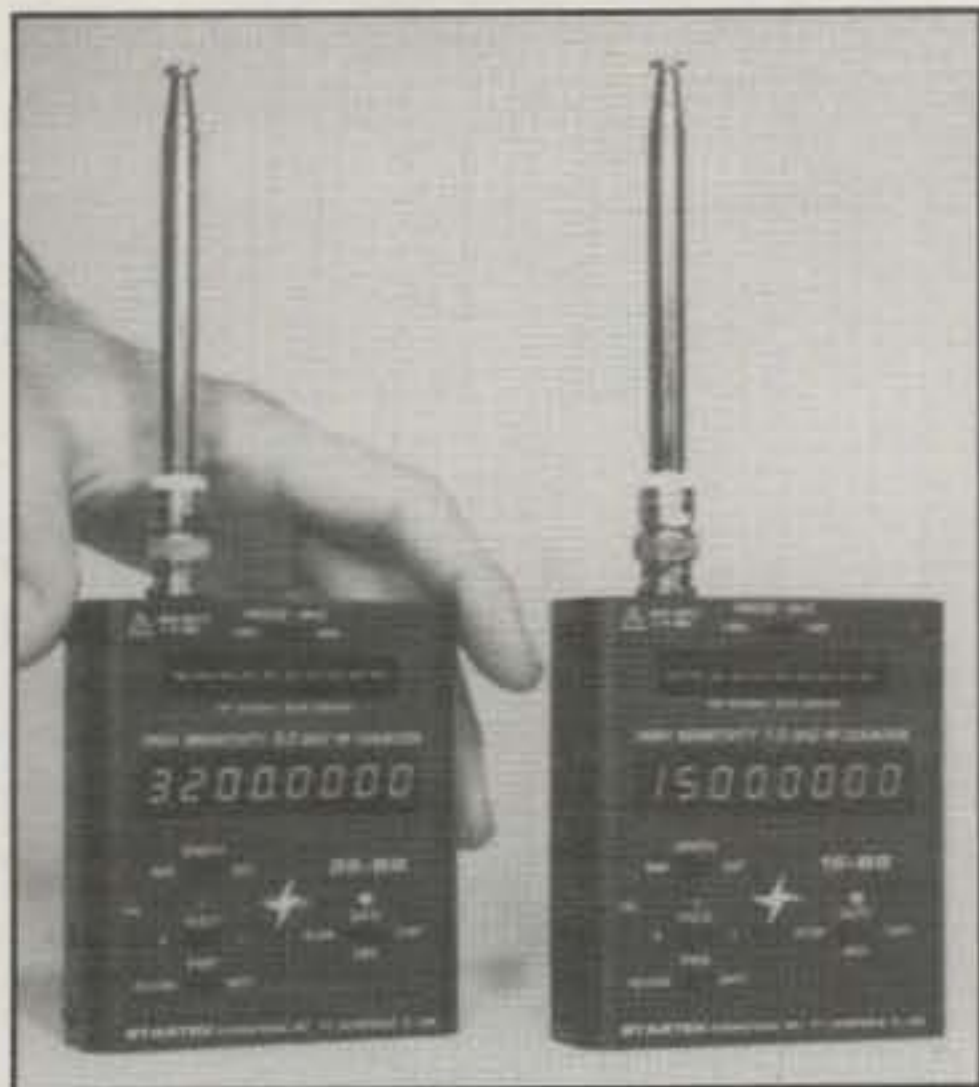
cision frequency readout. Various accessories are available, including a cable for the MFJ-207 and MFJ-208 SWR Analyzers. Contact Startek International, Inc., 398 N.E. 38th St., Ft. Lauderdale, FL 33334 (1-800-638-8050).

TranSel Technologies Flyer. TranSel offers a variety of "made in the U.S.A." mobile antennas and accessories. Products include VHF/UHF mobile antennas; amateur and scanner handheld radio antennas; base-loaded and slimline mobile HF radiators; dual-band VHF/UHF verticals; and a variety of brackets, mounts, cable assemblies, springs, and other accessories. Some of the more unique products include a slimline mobile window mount with BNC connectors designed for handhelds, "duckie clips" to relocate a handheld unit's antenna away from the radio, and a suction-cup mounting kit to attach a handheld radio's antenna to a window.

TranSel also offers the PACK-IT, used to protect your HT and other devices you carry from damage. PACK-IT is said not to wear the radio as leather can, while it protects the radio from the small falls that occur in everyday usage. The unit is made of non-fraying, 1/4 inch neoprene material that's safety-belt sewn to the nylon protective backing. The strap, a 2 inch belt loop, is made of commercial-grade webbing and is secured in the front with a Velcro hook and loop assembly. Several PACK-IT versions accommodate a variety of handheld radios; all models come with a foam bumper pad and a spacer in the bottom of the case. You can remove the bumper pad to accommodate a larger battery or a longer radio. PACK-IT is \$15.95.

A four-page flyer is available from TranSel Technologies, 123 East South St., Harveysburg, OH 45032 (1-800-829-8321).

WACOM Products Catalog. WACOM offers a 14-page catalog and price list showing their extensive product line of cavity filters, iso-



Startek International offers a number of inexpensive counters, including the BG series of bar-graph-display handhelds. They have 2 inch, 10-segment LED bar graphs useful as field strength indicators. This feature makes them handy for adjusting, testing, repairing, and even locating RF devices. The Model 35-BG covers 1 to 3500 MHz, while the Model 15-BG covers 1 to 1500 MHz. (Photo courtesy Startek International, Inc.)

lators, and tower-top receiver amplifier systems covering amateur and commercial bands from 30 to 1300 MHz. Also offered are receiver multicouplers and accessories, load terminations, couplers, combiners, and related equipment.

According to President Kit M. Parsons, WACOM offers a 25 percent discount to amateur radio clubs and MARS groups, if the product is for club use and not for resale. Shipments are normally made to order and not from stock.

For more information, contact WACOM Products, Inc., P.O. Box 21145, Waco, TX 76702 (817-848-4435).

Hamtronics Catalog. Hamtronics is another upstate New York firm that's been around a long time; like Ramsey, they're helping to fill the "radio kit void" left by Heathkit's absence from the amateur market. Hamtronics offers a free, 40-page catalog of amateur and commercial VHF and UHF radio equipment. Many of the items are available both as kits or in wired-and-tested form.

Some of the items shown in their 1993 catalog include VHF/UHF FM exciters, a weather satellite receiver, VHF FM receiver, subaudible tone encode/decoder, repeater autopatch, selectable calling module, digital voice recorders, repeaters, receiving and transmitting converters, and receiving preamps.

For a free catalog, contact Hamtronics, Inc., 65 Moul Rd., Hilton, NY 14468-9535 (716-392-9430).

New Software '93

FFTDSP. Mike Cook, AF9Y, has introduced a unique class of hamshack software that's of special interest to the weak-signal VHF/UHF DXer. FFTDSP is a sophisticated Digital Signal Processing (DSP) program that can detect very weak signals from a radio receiver using Fast Fourier Transforms (FFT).

With FFTDSP, the amplitude levels for each FFT frequency are converted to color and are displayed as a continuous spectrograph. The resulting screen (see fig. 3) simultaneously shows the output of 640, 2 Hz wide filters between approximately 300 and 1500 Hz. Each horizontal line represents the output of all 640 filters during a half-second period. Over time, as each line is added to the screen, the eye can begin to see weak signals emerge from the darker background—signals that may not be audible during a short listening period. You

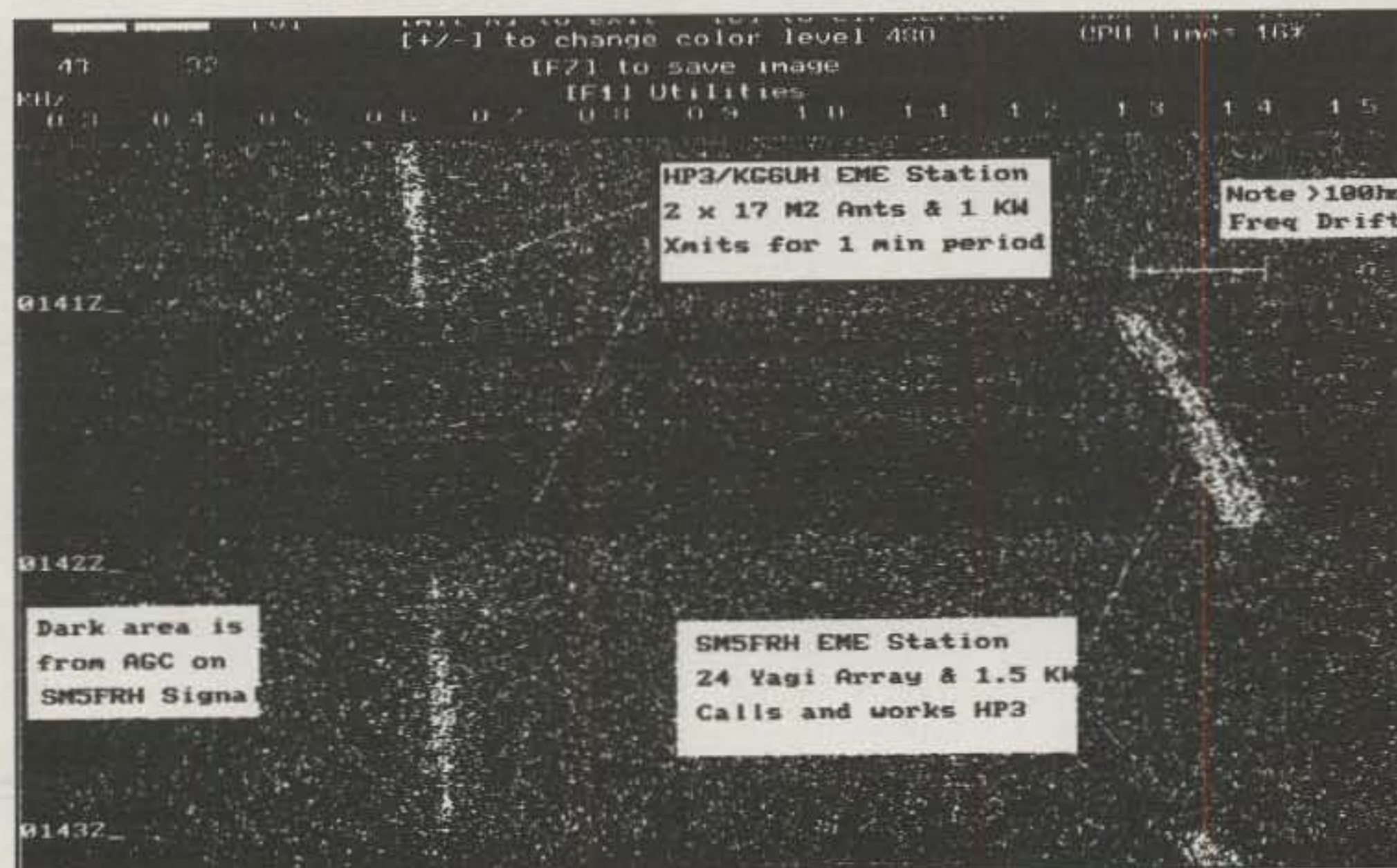


Fig. 3- The FFTDSP software detects weak radio signals in real time. An example of the program's screen output is shown here. During this recording, the HP3 station was copyable for only 15 seconds during his second transmission; the program clearly detects the signal for all transmit periods. Although this black-and-white print doesn't show it, the white signal areas change from light blue to green to red on the monitor screen as the signal level increases. Note the audio signal level meter at the upper left corner of the screen.

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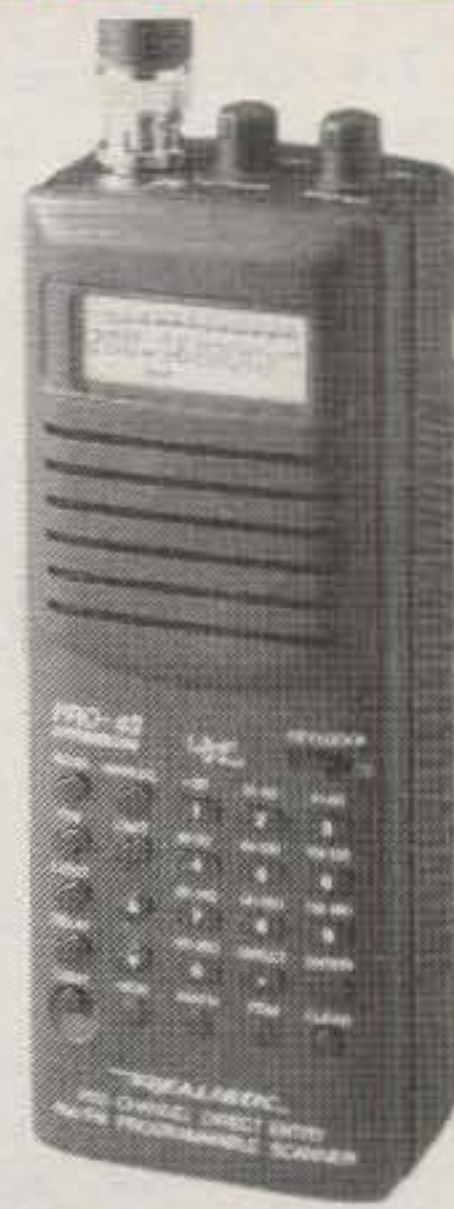
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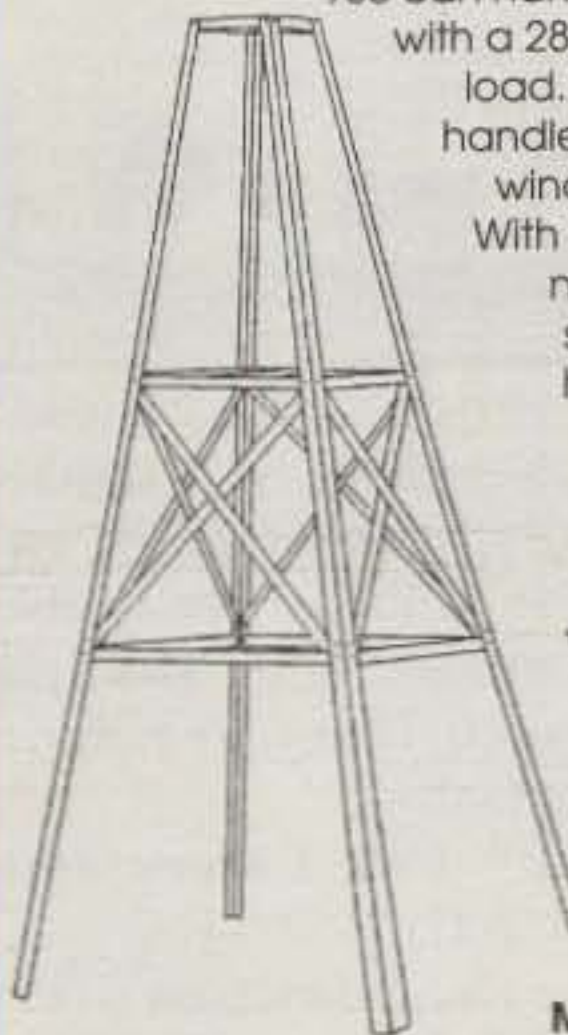
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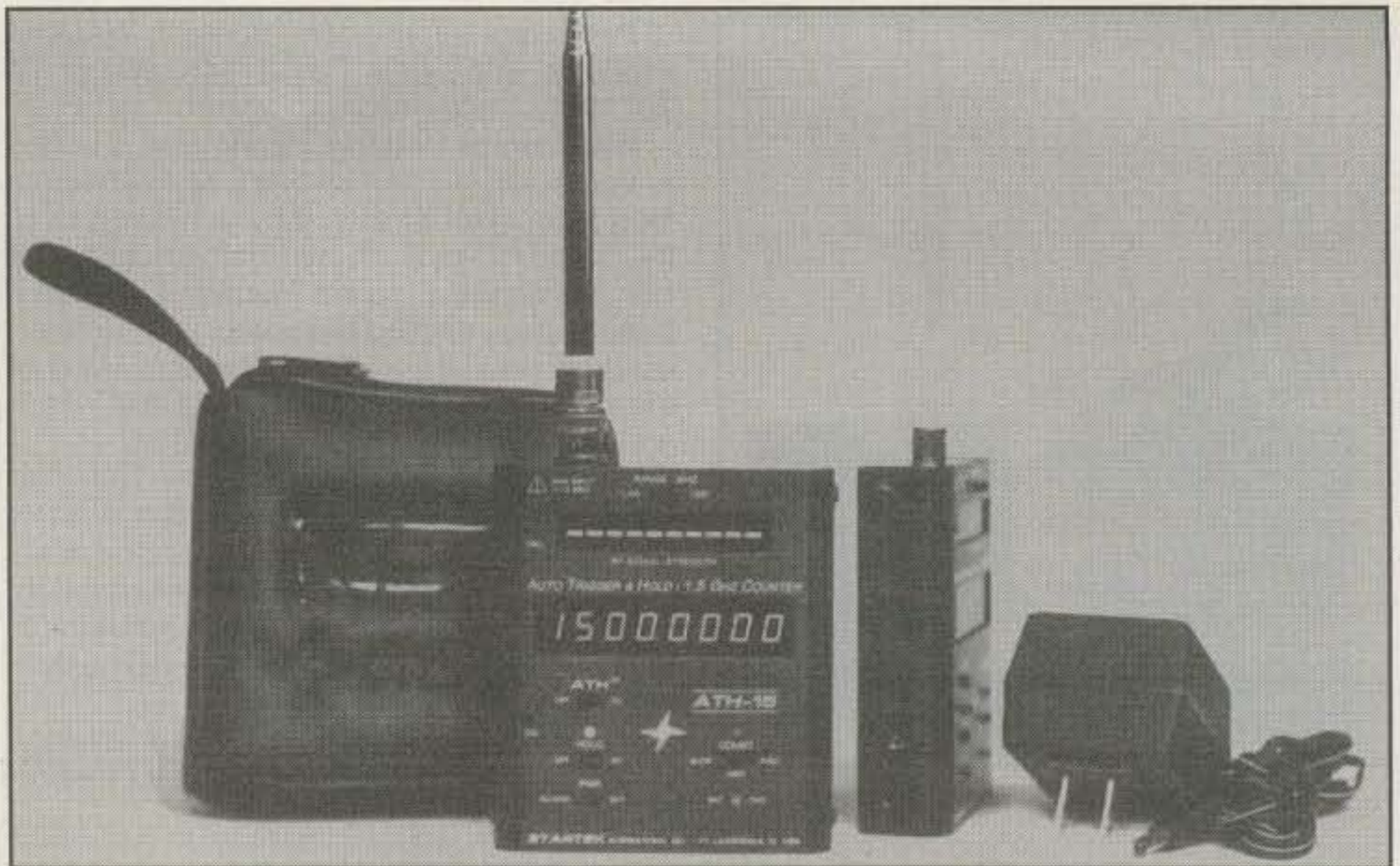


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A new Startek development is the Model ATH 15, an ATH™, or "Auto Trigger and Hold," bargraph-display, handheld counter. Its features virtually eliminate random counting and false readings over the counter's range of 1 to 1500 MHz. With it you can accurately read an input signal, display the frequency, and automatically switch to "hold" status, all in a fraction of a second. (Photo courtesy Startek International, Inc.)

also can store full screen images to disk as GIF graphics files, viewing them later using standard GIF viewer programs.

Some key FFTDSP features include an on-screen audio signal strength meter for setting the level from the receiver, signal amplitude conversion to color, mouse point-and-click operation for frequency measurement and offset, color-level adjustment, and more. However, you need a well-equipped PC to handle FFTDSP. You first need a 386, 20 MHz system with a coprocessor (a 486 is recommended); and second, you need a sound card, such as a SoundBlaster, ProSpectrum-16, or ThunderCard. You also need an audio line from the radio to the sound card's record (line) input.

Mike has distributed a fully functional but time-limited FFTDSP program demo to various public BBSes. You can use the demo, but without the registration file, program operation stops after 30 seconds. FFTDSP registration is \$20 (\$25 foreign), including shipping and handling.

For more information, contact Mike Cook, AF9Y, 501 E. Cedar Canyon Rd., Hometown, IN 46748 (219-637-3399).

EASY-PC Professional. A powerful yet easy to use software package for producing printed circuit board (PCB) layouts and schematic diagrams has been introduced by the British firm Number One Systems, Ltd. EASY-PC Professional provides a relatively low-cost route to computer assisted design (CAD).

EASY-PC offers .001 inch resolution over a 32" x 32" area, as well as the ability to handle up to 16 layers, full schematic capture, design rule checking, and a seamless link with the firm's two separately sold simulation programs. Priced at \$375 (U.S.), the program also has available for it two optional design libraries. A free demo disk and a mini-manual are available.

The firm also distributes two simulation programs—ANALYSER III for linear circuit analysis, and PULSAR for high precision digital logic simulation. Also offered is QUICK PLOT for producing a graphics screen dump to an HPGL

or compatible personal plotter. The company also sells an RF design and analysis Smith Chart program, Z-MATCH II; it provides all of the graphical advantages of the original Smith chart while incorporating many features to eliminate repetitive calculation and make the chart more accessible to the occasional user.

Contact Number One Systems, Ltd., Harding Way, Somersham Road, St. Ives, Huntingdon, Cambs., PE17 4WR England.

HamCall Update. In last December's column we reviewed HamCall. To recall, HamCall is a CD-ROM based computer database of all FCC-licensed amateur stations in the U.S., including club, military, and RACES calls, plus many international listings. With HamCall you can retrieve data by callsign, name, address, city, state, ZIP code, or license class; copy output to disk, a database, or printer; generate labels and ASCII text files; and compile specialized databases.

Updates are issued in October and April. The updates not only reflect newly issued FCC callsigns, but also expand the international listings. According to the publisher, a recent canvas of worldwide licensing sources has generated more than 200,000 overseas listings. Although some countries are pending settlement of political boundaries, or are otherwise unwilling to release their data (especially in machine readable form), these countries are included in the updates when and if the data become available. The CD-ROM also includes more than 15,000 public domain programs and various datafiles.

Both the IBM PC and Mac can access the CD-ROM for callsign lookup. The CD-ROM is \$50 plus \$5 shipping from Buckmaster Publishing, Route 4, Box 1630, Mineral, VA 23117 (703-894-5777).

Book Notes

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 - R4 Rotator 8 conductor (2x14, 6x18) 48¢
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 - #14 Silky 19-strand, Cu-clad, strong, flexible 11¢
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 - #14 CW Stranded (7x22) copper-clad 9¢
 - #13 Insulated 19-strand, Cu-clad, tough jacket 15¢
 - 450 Ladder #18 solid Cu-clad, poly, windows 13¢
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sell, and trade radio and electronics equipment; the ads themselves also serve as guides to current market prices. The newsletter is published twice monthly and is mailed first class so that ads circulate quickly. A 1-year subscription is \$16.50. Contact the Ham Trader Publishing Company, P.O. Box 2057, Glen Ellyn, IL 60138.

RSM Communications Books. In past columns we reviewed Ray Moore, ex-K1DBR's *Communications Receivers*, in both the 1st and 2nd editions. Ray's book is a fairly complete guide to American communications receivers and covers the famous manufacturers, such as RME, National, Hammarlund, Collins, Morrow, and many others. The latest edition shows photos of 375 receivers by 58 companies. Including variations on the 375 illustrated receivers, over 700 sets are covered. The 115-page book is still \$17.95 plus \$2.50 postage and handling from RSM Communications.

Mrs. Marty Moore of RSM Communications recently told me that Ray is now working hard on the companion transmitter book and plans to do it in two volumes. Volume One will cover

the period 1930 through World War II and will include a section on transmitting tubes as well as the transmitters themselves. The first volume is expected to be available sometime this year.

RSM also offers several specialized receiver monographs and fact sheets. These are available for the Hallicrafters DD-1 Dual Diversity Receiver (\$4.95), Hallicrafters S-1 Skyriders (\$2.00), and Echophone EC-2 (\$2.00). The monograph prices are postpaid.

For more information, contact RSM Communications, P.O. Box 1046, Key Largo, FL 33037-1046 (305-853-0379).

Tandy's Money Machine. This 1992 book, by newspaperman and public-relations executive Irvin Farman, explains how super-salesman Charles Tandy built Radio Shack into the world's largest electronic store chain. The 464-page book starts off with the company's roots in his father's leather shop and the Tandy Leather Company. The book goes on to recount how Tandy gained control of the "original" Radio Shack, a floundering local Boston electronics retailer with nine stores, and shows how he built it into one of the great success

stories of American retailing.

Although the book was published by Chicago's Mobium Press specifically for Radio Shack to sell in its stores, it generally tells the Radio Shack story with all the warts left on. Farman shows how Tandy could be a whip-cracking tyrant, depending on the particular mode of motivation he chose to employ at a given time. The author also reminds the reader that Tandy reportedly created more than 60 millionaires by pressuring associates into buying Tandy stock. The book is \$19.95 list price in Radio Shack stores.

Hot Links: The Guide to Linking Computers. *Hot Links* is all about the various ways to tie computers together. The 254-page book, by Mark Eppley and David Hakala, begins with the basics by explaining ports, cables, and connectors, including how far and how fast these links can be pushed. The authors cover topics such as alternatives to local area networks (LANs) in transferring files and sharing peripherals; exploring the possibilities of modems and online services; making the most of laptop, desktop, and palmtop computers; and staying in touch on the road with pocket modems, cellular telephones, and packet radio networks. The Macintosh, DOS, Windows, mainframes, and satellite communications are all addressed.

The book is bundled with a 3.5 inch disk containing several popular programs from Traveling Software. *Hot Links* is \$29.95 in bookstores, or contact Osborne McGraw-Hill, 2600 Tenth St., Berkeley, CA 94710 (510-549-6600).

Cygnus-Quasar Update. Some good things bear repeating. *Antennas*, the definitive McGraw-Hill text and reference book by Dr. John D. Kraus, W8JK, is into its second edition (1988). The 917-page, 18-chapter hardcover covers theory and its application to practical systems; design formulas, tables, and references are included. The book has more than 1000 illustrations.

Some of the topics covered include loop and helical antennas, dipole arrays, slots and horns, broadband and frequency-independent antennas, biconical and cylindrical radiators, and measurements. The book also includes appendices of reference tables, computer programs, books and videotapes, and problems. It's \$57.95 plus \$3 shipping.

If you're interested in learning more about radio astronomy and the antennas used in the field, one of the classics is W8JK's *Radio Astronomy*. The latest (second) edition includes material on holographic measurements, low-noise FET amplifiers, interstellar molecular clouds, comets, and pulsars. The 719-page, 1986 softcover book includes hundreds of illustrations, worked-out examples, and references. It's \$39.95 from Cygnus-Quasar Books, P.O. Box 85, Powell, OH 43065 (614-548-7895). Shipping is \$3.

Wrap-Up

That's all for this time, gang. Next time more Antennas & Accessories topics of current interest. See you then.

Overheard: Having trouble with "buggy" software? With some dubious software firms, rather than fix the bugs they just rewrite the user's manual and call them features.

73, Karl, W8FX

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		EB104 600W	\$371.65

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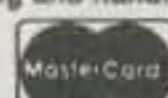
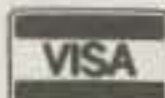
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NEWS OF CERTIFICATE AND AWARD COLLECTING

Our featured county hunter for September is:

Duane E. Traver, WV2B USA-CA All Counties #773

"My interest in amateur radio began at the age of 12. I bought a portable shortwave radio for \$5.00 at an auction and discovered 40 meter AM amateur operators in addition to the broadcast stations. I would listen to them for hours on end, and after reading articles about amateur radio in various shortwave listening magazines, I decided that this was the hobby for me.

"Soon thereafter I spotted a TH6 on a tower in a nearby town and concluded that it must be an amateur antenna. After getting up my nerve, I stopped to ask if it was an amateur radio antenna and how could I find out more about getting a license. The antenna belonged to Dane, W3KXR, and his son Mark, WB3JIS. They were happy to demonstrate their then state-of-the-art TR4C and teletype stations. I was very impressed by all the QSLs on the wall from so many different countries and by the RTTY printouts which had the characters arranged to form different pictures.

"Through the years they helped me get licensed, provided equipment, and helped me erect the antennas to get my station on the air. In recent years Duane has allowed me to use his station for my contesting efforts, since I haven't been able to get much of a station up and running because we have lived in rented homes.

"My interest in county hunting grew because of all the SASEs I received requesting me to confirm my rare Sullivan County (PA). Sullivan County is a small county in northeast Pennsylvania, one third of which is made up of state forest and game lands. The population is approximately 6000 and is declining by about 4 percent every 10 years. No major roads pass through the county, thus making it quite rare for county hunters.

"For a time my county hunting efforts were sidetracked by things such as starting a license class in my high school, graduating school, DXing and contests, getting a job, and getting married. However, after a few years of marriage and getting somewhat settled, I came across the net on 14.336. My station was good enough for the United States, and

Box 76, Pleasant Mount, PA 18453-0076



Here is Duane E. Traver, WV2B, CQ's USA-CA All Counties Award #773. (Photo by Charles Johnson)

my job cleaning airplanes at night left me plenty of time during the day to work counties.

"On December 4, 1989 I set out in earnest to work all the counties, and began by working WG4P in Saluda County, South Carolina for my first county contact. My last county for all 3076 was McKenzie, North Dakota on May 26, 1992, when Jack, K7DZE, was in the right place at the right time. These contacts were all with mobile stations on 20 meters SSB. All contacts were made with either a dipole at a maximum height of 25 feet, or with a mobile bumper mount Hustler and a bare-foot IC-730. The only exception was Kalawao, Hawaii, which I worked from W3KXR's shack.

"During my pursuit of USA-CA I've enjoyed the privileges of earning a net control award for spending 200 hours as a net control station, transmitted from 171 different counties, writing articles for 'The County Line Roadrunner' newsletter, and sponsoring The Native American Counties Award for contacting all the counties with names inspired by Indian subjects. I truly appreciate all the help and encouragement received from so many county hunters, and I hope I've been able to contribute something to help others enjoy their pursuit of CQ magazine's USA-CA Award.—73 Duane, WV2B"

CQ extends its congratulations to Duane for his achievement and also for contributing so much to the hobby.

Awards Issued

Joseph Gardner, N2ARE; Al Keiser, N1API; and Red Robert, AA7CP, all completed the requirements for USA-CA and were awarded their complete certificates,

USA-CA Special Honor Roll

Joseph D. Gardner, N2ARE
USA-CA All Counties #805
All 20M Mobile SSB, 6-7-93

Al Keiser, N1API
USA-CA All Counties #806
SSB Mixed Bands, 7-1-93

Joseph "Red" Robert
USA-CA All Counties #807
CW Mixed Bands, 7-3-93

USA-CA Honor Roll

3000		1500	
N2ARE	830	N2ARE	1074
N1API	831	N1API	1075
N7OTR	832	PS8YL	1076
AA7CP	833	N7OTR	1077
2500		1000	
N2ARE	907	N2ARE	1279
WA2ITJ	908	N1API	1280
N1API	909	PS8YL	1281
N7OTR	910		
PS8YL	911	500	
		N2ARE	2686
		N1API	2687
2000		OX3JF	2688
N2ARE	983	PS8YL	2689
N1API	984	JH1IED	2690
PS8YL	985	KA3TLE	2691
4X4RE	986	AAØIP	2692
N7OTR	987		

The total number of counties for credit for the United States of America County Award is 3076. The basic award fee for subscribers is \$4.00. For nonsubscribers it is \$10.00. Initial application must be submitted in the USA-CA Record Book, which may be obtained from CQ Communications, 76 North Broadway, Hicksville, NY 11801 for \$2.00. To qualify for the special subscriber rate please send a recent CQ mailing label with your application. To be eligible for the USA-CA, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated June 15, 1991. A complete copy of the rules may be obtained by sending an SASE to Norm Van Raay, WA3RTY, USA-CA Custodian, Star Rt. 40, Box 76, Pleasant Mount, PA 18453-0076 USA. DX stations must include extra postage for airmail reply.

and are eligible for the plaque from CQ magazine.

The following also earned their place on our Honor Roll by achieving the levels indicated. Congratulations to all!

USA-CA 500: Joseph Gardner, N2ARE; Al Keiser, N1API; Etsuro Sudo, JH1IED; Fred Lamberti, KA3TLE; and Arden Fonda, AAØIP.

USA-CA 1000: Joseph Gardner, N2ARE; Al Keiser, N1API; and Tessy Vidal Nobre, PS8YL.

USA-CA 1500: Joseph Gardner, N2ARE; Al Keiser, N1API; Tessy Vidal Nobre, PS8YL.

USA-CA 2000: Joseph Gardner,

N2ARE; Al Keiser, N1API; Egon Ron, 4X4RE; William Baxter, N7OTR; and Tessy Vidal Nobre, PS8YL.

USA-CA 2500: Joseph Gardner, N2ARE; Al Keiser, N1API; Robert C. Bruno, WA2ITJ; William Baxter, N7OTR; and Tessy Vidal Nobre, PS8YL.

USA-CA 3000: Joseph Gardner, N2ARE; Al Keiser, N1API; William Baxter, N7OTR; and "Red" Robert, AA7CP.

New Awards

This month we feature three new awards designed to increase a particular activity on the amateur radio bands. One is sponsored by the Japan Amateur Radio League (JARL) and the other two by individual American amateurs. It is encouraging to see this kind of activity occurring. It gives award collectors new goals to work toward.

Worked All Square Award. JARL's new award "WASA" is characterized by the use of a grid square locator system, which is becoming more and more popular worldwide. This system enables us to clearly determine a location both at sea and on land. Therefore, QSL cards obtained through communications with locations at sea can also be used for this award. This is their first attempt at this new system, and therefore they ask for the cooperation of the amateur community

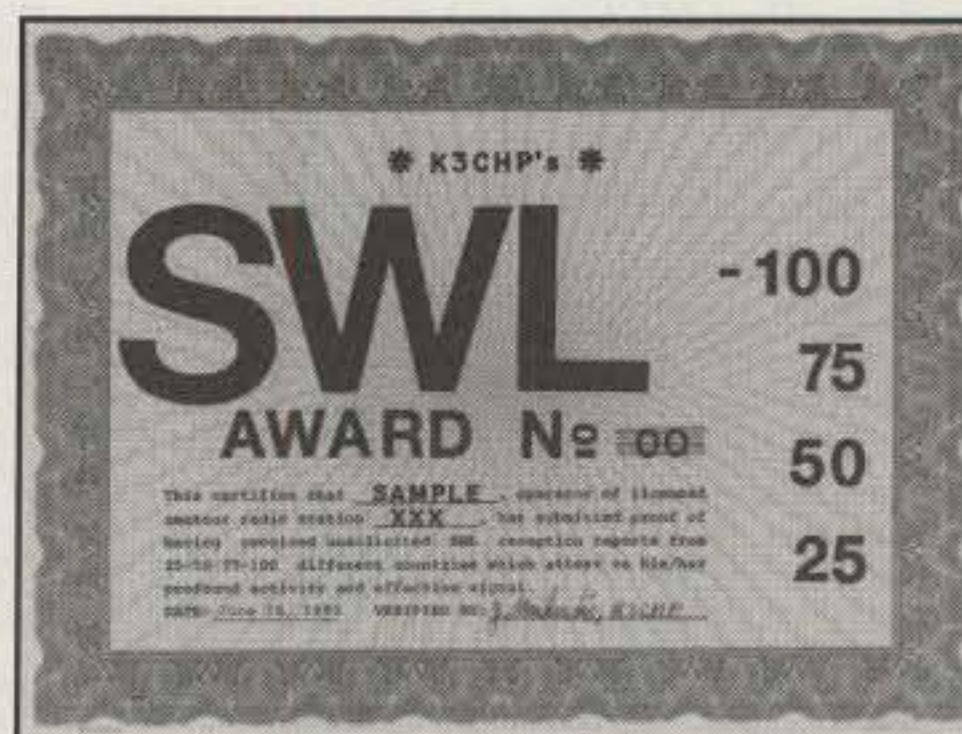
and look forward to receiving your applications.

There are two WASA awards with no endorsement/specialty.

WASA-V.U. SHF (50 MHz and above). The goal is to achieve communication with amateur radio stations in 100 different squares using amateur bands on and above 50 MHz and or amateur satellite. An award is issued for 100 squares, and a sticker which can be affixed to the award is issued for each additional 50 squares. (SWLs qualify on a heard basis.)

WASA-HF. The goal of this award is to achieve communications with amateur radio stations in 100 different squares using amateur bands on and below 28 MHz. An award is issued for 100 squares, and a sticker which can be affixed to the award is issued for each additional 50 squares. (SWLs qualify on a heard basis.)

Requirements for QSL cards. QSL cards dated on or after 1 July 1992 are valid. Each QSL card should clearly show the callsign of the award applicant; the callsign of the station which issued the QSL card; and various data on each QSO such as date, time, frequency, mode, RS(T), and location (the square) of the station which issued the QSL card. The longitude and latitude from which the square can be calculated will also be valid if clearly shown on the QSL card. The location from where applicants oper-



The SWL Award sponsored by K3CHP is available in 25, 50, 75, and 100 country increments.

ate should be within one square.

QSL cards should be obtained through communication by crossband except in the case of communication by amateur satellite. In cases where the station communicated with is situated in a different square or communication is made on different bands, each communication is counted separately. Communication (or reception) by amateur satellite is treated as communication on one band.

Applications for this award should include the following:

1. Application form.
2. QSL cards (return postage of 2 IRCs)



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YAESU



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New 2 Meter
FT-816, 440 MHz

FT-411E, 2 Meter
FT-811E, 440MHz
FT-911E, 1.2GHz
FT-415, 2 Meter
FT-815, 440MHz
FT-26, 2 Meter
FT-76, 440 MHz
FT-23R, 2 Meter
FT-33, 220 MHz
FT-470, 2M/440MHz

FT-5200
2 Meter/440 Mobile



FT-2400
2 Meter Mobile

FT-2200H NEW,
2M Mobile

FT-7200H NEW,
440MHz Mobile

FT-212RH, 2 Meter
FT-712RH, 440MHz
FT-7400H, 440 MHz
FT-912RH, 1.2 GHz
FT-6200, 440/1.2GHz

FT-1000
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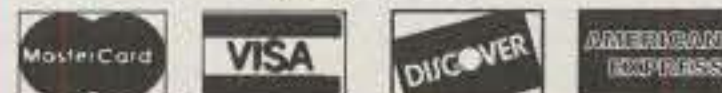
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812-422-0231

FAX 812-422-4253

required) or GCR signed by two licensed amateurs or an award manager of the IARU member society.

3. QSL card list showing the squares and the callsign of the stations worked (or heard), the dates, the bands, and the modes.

4. Application fee—award 8 IRCs, stickers 5 IRCs.

Application should be sent to: The Japan Amateur Radio League, Inc., Award Desk 14-2, Sugamo 1-Chome, Toshima-ku Tokyo 170, Japan.

SWL-100 Award. A new amateur radio award has been announced by Joe Mikuckis, K3CHP. The award is based on the reception of unsolicited SWL QSLs/reports from different countries and is intended to stimulate QSL exchange and an interest among shortwave listeners in becoming active radio amateurs.

The award is intended for radio amateurs and represents the reception of unsolicited SWL QSL/reports from different countries in 25, 50, 75, and 100 country increments. The award is free. There is no starting date. All past, present, and future ARRL countries count (for example, the Czech Republic, the Slovak Republic, and Czechoslovakia count; Germany counts, as well as the former West Germany and East Germany).

To apply for the award send SWL QSLs

indicating your call, date, time, frequency, reception report, and a sample of the transmission data (station worked, calling CQ, etc.). If you operated under different calls, send a copy of backup documentation.

Send applications to Joe Mikuckis, K3CHP, 6913 Furman Pkwy, Riverdale, MD 20737 USA. Enclose an appropriate amount to cover shipping cost of the award (in USA, send an amount equal to four times the price of first-class letter postage). Enclose an appropriate amount if you want your cards returned. A permanent record of submission will be kept for upgrading to a higher country increment.

The award is administered by K3CHP. If for some reason K3CHP is unable to administer this program in the future, arrangements will be made with a reputable and established amateur radio club for its continuation.

WARC 500 Award. James E. Mackey, K3FN, is sponsoring a new award to encourage activity in the new WARC bands. The new award, known as the WARC 500 Award, is a self-sustaining award which recognizes significant country totals on the three WARC Bands (24, 18, and 10.1 MHz). The basic award is issued when 500 countries have been successfully QSOed on the three bands. Endorse-



WARC 500 Award sponsored by K3FN to encourage activity on the WARC bands.

ments are issued for additional QSO levels in multiples of 100 above the 500 country plateau. No mode distinction is made. QSOs may be made on phone or CW, but no endorsement is offered for mode.

The award consists of a plaque which would be an attractive addition to any operating position. Endorsement tabs are attached to the plaque as the country totals increase. The fee for the award is \$50.00, or 100 IRCs. This is a one-time fee and includes all additional endorsements.

Further information—including an application blank, a comprehensive country checklist, and a small photo of the award—is available by sending \$2.00, or 4 IRCs, to: James E. Mackey, K3FN, P.O. Box 270569, West Hartford, CT 06127-0569.

Reminder

Effective July 1, 1993 we are requiring submission of confirmation for five counties chosen by the USA-CA Awards Manager. To expedite the processing of your award contact WA3RTY for your five counties.

In addition, I have installed a FAX/modem in my computer to expedite correspondence. I usually have it on when in the shack. Use 717-448-9024. This is new to me, so it will take time to get the bugs out. Try it.

73, Norm, WA3RTY

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MODEL VS-50M

ASTRON POWER SUPPLIES

• HEAVY DUTY • HIGH QUALITY • RUGGED • RELIABLE •

SPECIAL FEATURES

- SOLID STATE ELECTRONICALLY REGULATED
- FOLD-BACK CURRENT LIMITING Protects Power Supply from excessive current & continuous shorted output
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- MAINTAIN REGULATION & LOW RIPPLE at low line input Voltage
- HEAVY DUTY HEAT SINK • CHASSIS MOUNT FUSE
- THREE CONDUCTOR POWER CORD except for RS-3A
- ONE YEAR WARRANTY • MADE IN U.S.A.

PERFORMANCE SPECIFICATIONS

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

SL SERIES



• LOW PROFILE POWER SUPPLY

MODEL	Colors		Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
	Gray	Black				
SL-11A	•	•	7	11	2 5/8 x 7 1/8 x 9 3/4	12
SL-11R	•	•	7	11	2 5/8 x 7 x 9 3/4	12
SL-11S	•	•	7	11	2 5/8 x 7 1/8 x 9 3/4	12
SL-11R-RA	•	•	7	11	4 3/4 x 7 x 9 3/4	13

RS-L SERIES



• POWER SUPPLIES WITH BUILT IN CIGARETTE LIGHTER RECEPTACLE

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

RM SERIES



MODEL RM-35M

• 19" RACK MOUNT POWER SUPPLIES

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

RS-A SERIES



MODEL RS-7A

MODEL	Colors		Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
	Gray	Black				
RS-3A	•	•	2.5	3	3 x 4 3/4 x 5 3/4	4
RS-4A	•	•	3	4	3 3/4 x 6 1/2 x 9	5
RS-5A	•	•	4	5	3 1/2 x 6 1/8 x 7 1/4	7
RS-7A	•	•	5	7	3 3/4 x 6 1/2 x 9	9
RS-7B	•	•	5	7	4 x 7 1/2 x 10 3/4	10
RS-10A	•	•	7.5	10	4 x 7 1/2 x 10 3/4	11
RS-12A	•	•	9	12	4 1/2 x 8 x 9	13
RS-12B	•	•	9	12	4 x 7 1/2 x 10 3/4	13
RS-20A	•	•	16	20	5 x 9 x 10 1/2	18
RS-35A	•	•	25	35	5 x 11 x 11	27
RS-50A	•	•	37	50	6 x 13 3/4 x 11	46
RS-70A	•	•	57	70	6 x 13 3/4 x 12 1/2	48

RS-M SERIES



MODEL RS-35M

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
• Switchable volt and Amp meter				
RS-12M	9	12	4 1/2 x 8 x 9	13
• 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 1/2	48

VS-M AND VRM-M SERIES



MODEL VS-35M

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

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

RS-S SERIES



MODEL RS-12S

• Built in speaker

MODEL	Colors		Continuous Duty (Amps)	ICS* Amps	Size (IN) H x W x D	Shipping Wt. (lbs.)
	Gray	Black				
RS-7S	•	•	5	7	4 x 7 1/2 x 10 3/4	10
RS-10S	•	•	7.5	10	4 x 7 1/2 x 10 3/4	12
RS-12S	•	•	9	12	4 1/2 x 8 x 9	13
RS-20S	•	•	16	20	5 x 9 x 10 1/2	18
SL-11S	•	•	7	11	2 3/4 x 7 1/8 x 9 3/4	12

"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

A Potpourri of Opportunities

This month we have an array of topics that should be of interest to the newcomer to amateur radio and old timer alike.

New Books

Ham Radio Horizons: The Book. Peter O'Dell, WB2D, has authored a 155-page soft-cover book which serves to introduce newcomers to amateur radio and to help them get a good start in the amateur radio service. *Ham Radio Horizons: The Book* includes coverage of licenses and related operating privileges, radio fundamentals, getting licenses, equipment and accessories, antennas, additional sources of information, plus a glossary and index. This book is published jointly by the ARRL and CQ Communications, and is available from CQ for \$12.95 plus \$2.50 shipping and handling.

The Packet Radio Operator's Manual. Buck Rogers, K4ABT, has written a 165-page soft-cover book which covers all aspects of packet radio equipment and operation. The table of contents and index of *The Packet Radio Operator's Manual* make it easy to locate desired subject matter in this book. Some of the subjects covered are antennas, backbones, bauds, bridges/gateways, computer communications, conference nodes, digital modes, dual ports, interference causes/cures, networking, solar power, switches, TNC, trunks, and video. Also included are 101 transceiver-to-TNC interface diagrams, 30 COMPort-to-TNC diagrams, and 16 special application diagrams. This book is published by CQ Communications, 76 North Broadway, Hicksville, NY 11801, and is available from them for \$15.95 plus \$2.50 shipping and handling.

The Quad Antenna. Bob Haviland, W4MB, has authored a 162-page soft-cover book entitled *The Quad Antenna*. The subjects covered in Bob's book include circular loops, concepts, Delta loops/arrays, design variations, ground elements, mechanical design, multi-band quad feed systems, multi-element quads, octagonal loops, optimizing quad design, rectangular loops, square loops,

45527 Third Street East, Lancaster, CA 93535-1802



Fifteen-year-old Adam Schaaf, KF8XL, of Galena, Ohio is the son of Randy Schaaf, W9ZR, who is understandably very proud of him. Adam upgraded from Novice to Extra class in about 9 months. He earned the 5-band DXCC (100 countries on each of 5 bands), plus the 160 meter DXCC awards his first year on the air. Adam has already worked more than 280 countries.

and two-element arrays. The text is well supported by 250 line-drawing figures and 21 tables. This book is published by CQ Communications, and is available from CQ for \$15.95 plus \$2.50 shipping and handling.

Aerials Book. This 95-page book contains 53 of the best articles which Kurt N. Sterba wrote for *Worldradio*, one of amateur radio's most popular publications. The book provides a nice mixture of information and humor which should appeal to all amateurs. The price is \$12 and \$14 (including postage and handling) to domestic (U.S.A.) and foreign (DX) addresses, respectively. California residents also pay the state tax, of course. The address to use to order this book is *Worldradio*, 2120 28th Street, Sacramento, CA 95818.

All About Ham Radio. Harry Helms, AA6FW, has written this 291-page book which is useful to prospective and new amateurs. It covers what amateurs do. Activities, benefits, costs, and interests are explained in simple terms. Operating privileges are detailed for each class of amateur license, including the code-free Technician license. *All About Ham Radio* is published by HighText Publications,

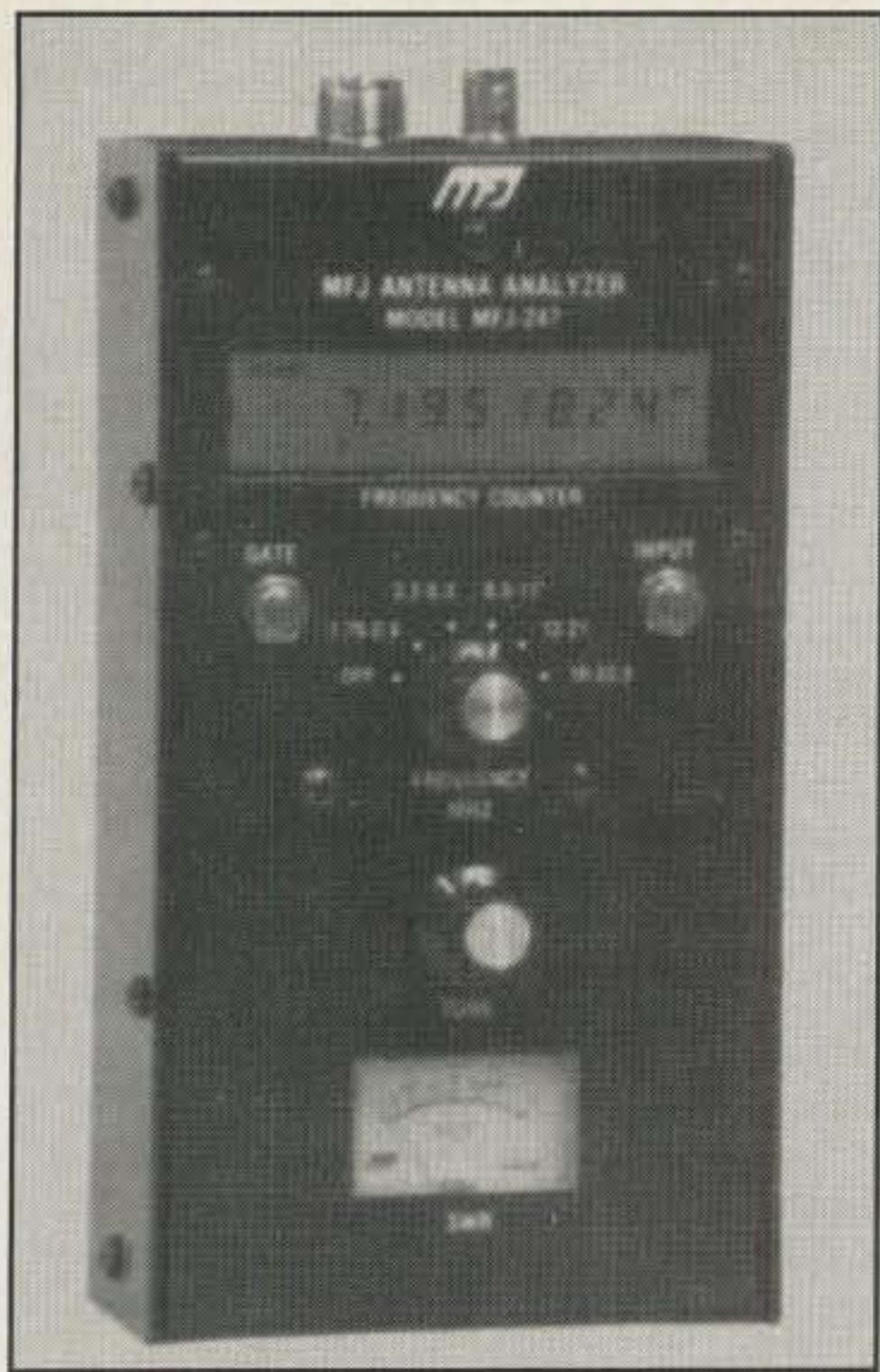
Inc., 7128 Miramar Road, Suite 15, San Diego, CA 92121 (telephone 619-693-5900, FAX 619-693-3225). The price per book is \$22.95, which includes shipping charges to domestic (U.S.A.) addresses. A sales tax applies to Californians.

QSL Routes Book. DGØZB offers a *QSL Routes* book each year. These books virtually eliminate any need to search through amateur radio publications to determine the QSL managers of DX amateurs one has contacted. The 1991 and 1992 editions of this book listed 38,000 and 45,000 QSL managers, respectively. A free copy of the 1992 issue of *QSL Routes* is available to anyone who requests it and provides two IRCs. The current (1993) issue of *QSL Routes* lists 60,200 QSL managers; it is priced at 20 IRCs for surface delivery and 30 IRCs for airmail delivery. The 1994 issue of *QSL Routes* will be available after December 1993. It will list about 70,000 QSL managers, and it will sell for the same price as the 1993 issue. Their address is *QSL Routes-DGØZB*, Box 73, O-1020 Berlin, Germany.

Radio Shack New Books. If you intend to study to pass the FCC Element 4A Advanced Class License Examination, Radio Shack offers a 176-page, soft-cover manual which covers everything you need to know to upgrade. This Advanced Class FCC License Preparation manual includes 49 line drawings, 11 photographs, and 8 tables; in addition, there is a 6-page glossary, a 2-page index, and 10 lists. This book is based on the FCC question pool that is valid until July 1995.

Mobile 2-way Radio Communications is a 128-page, soft-cover book which provides a good introduction to the mobile radio services used by amateur radio, business, citizens band, general, marine, and mobile telephone. Antenna and equipment installations, frequency spectrum, modes and emissions, operating, and transceiver coverages are good. This book includes 19 line drawings, 11 lists, 22 photographs, and 18 tables, plus a 4-page appendix, a 3-page glossary, and a 2-page index. Both of these books should be available at local Radio Shack outlets.

K1BV DX Awards Directory. This 280-page directory lists 2179 awards from a



The MFJ-247 antenna analyzer.

ments and addresses in amateur radio publications, club bulletins, and stickers attached to QSL cards. Ted Melinosky, K1BV, has gathered the required information for you, and he has compiled it in a form that is consistent and easy to use. The price to domestic (U.S.A.) amateurs is \$19, which includes shipping charges. Add \$5 for airmail shipment to Europe, Central America, or South America. Add \$9 for airmail shipment to countries in other areas. The ordering address is Ted Melinosky, K1BV, HCR 10, Box 837A, Spofford, NH 03462.

Software

Amateur Radio Graphics. Jerry Scherkenbach, N9AW, offers a set of amateur-radio-related graphics for use with Microsoft Windows 3.X on IBM (or compatible) PCs. The windows ICONs are in color and they look much better than the plain MS-DOS ICONs which are supplied with Windows. The types of ICONs provided cover all major amateur radio contest, DX, and logging programs, in addition to antenna modeling, packet radio, propagation prediction, and satellite programs. ICONs are also included for the most popular HF transceivers and packet radio TNCs. The Windows ICONs and Windows Wallpaper are priced at \$8 ppd each; the pair can be purchased for \$15 ppd. The

disk size (3.5 or 5.25 inch) must be specified. The address is N9AW Software, 5952 South Elaine Avenue, Cudahy, WI 53110.

New Products

Antenna Support Rope and "N" Connector. The Radio Works is offering a new military-specification olive drab Dacron® ^{3/16} inch diameter rope to supplement their line (^{3/32}, ^{3/16}, and ^{5/16} inch sizes) of Synthetic Textile's double-braided Dacron® rope. Newer amateurs frequently make the mistake of using heavy twine, clothesline, or Nylon line to support their antennas. The best of these three items is Nylon, but exposure to sunlight quickly shortens its useful service life. It is advisable to use this military specification rope, since it has a much longer service life. It sells at eight cents per foot.

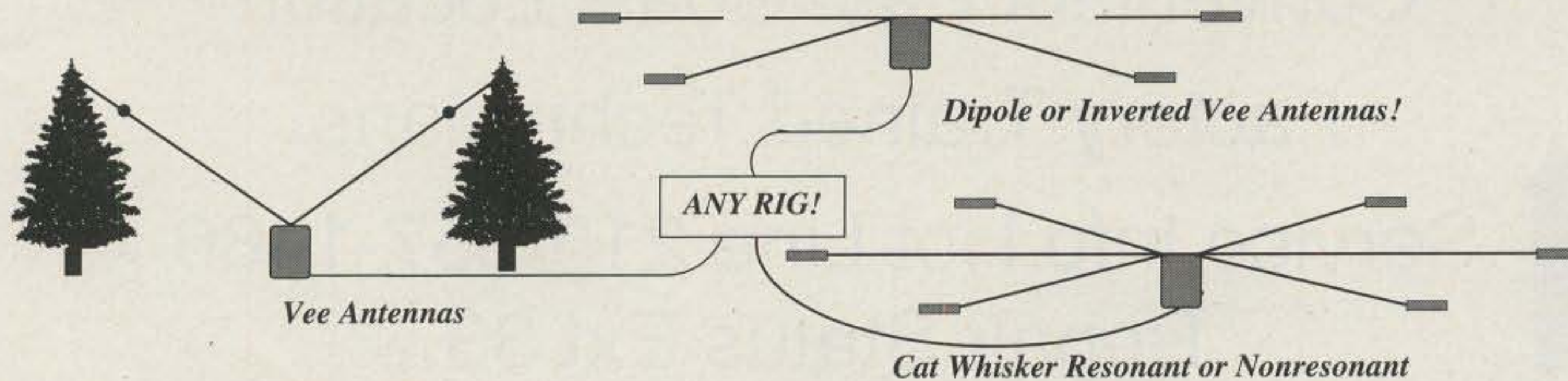
The Radio Works also offers a new "N" connector (N-200) that is easy to attach to RG-8, RG-213, 9086, 9913, and similar types of coaxial cables. The N-200 is as easy to install as a standard PL-259 connector. The N-200 is silver-plated; it features a gold-plated center pin and Teflon™ insulation. It functions well from below the high-frequency range (3-30 MHz) up to about 3 GHz. The price per connector is \$3.25.

Additional information can be request-

total of 122 countries. If you are interested in collecting operating awards, this book should be of interest to you. It is extremely difficult to locate award require-

3 to 12 dB MORE FROM YOUR DIPOLE, VEE OR LONGWIRE BASE STATION ANTENNA!

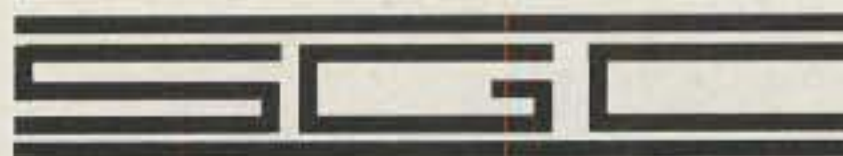
SGC's SG-230 computer controlled coupler works with any radio and any antenna system - fixed or mobile, marine or aircraft.



SGC's SG-230 Smartuner™ will outperform any built-in antenna coupler on any radio. The reason? The SG-230 mounts AT THE ANTENNA! This means you're matching the precise condition of the antenna - not just loading up a feedline and shunting power to ground. Ask any Smartuner user - this unit delivers great performance on any frequency from 1.8 to 30 MHz. Call for a free package of information from SGC, 1-800-259-7331 or circle our Reader Service number.



**SG-230
SMARTUNER™**



P.O. Box 3526
Bellevue, WA 98009 USA
Tel: 206-746-6310
Fax: 206-746-6384



The MFJ-1116 DX power outlet.

ed from Jim Thompson, W4THU, President, The Radio Works, Box 6159, Portsmouth, VA 23703 (phone 804-484-0140, FAX 804-483-1873). Their "General Catalog" is free to anyone who requests it. Their 128-page "Radio Works Reference Catalog" costs \$4 each, and I consider it to be a bargain at twice the price!

Call Identifier. A recent issue of this column mentioned the availability of an electronic device which can be used to identify the telephone number of each caller. The Model 125CR 14-call memory call identifier is priced at \$63.45, and the Model 125CRX 50-call unit is priced at \$73.45. Shipping and handling charges are included in the stated prices.

A surveillance/countermeasures catalog costs \$5. Their address is Eavesdropping Detection Equipment, P.O. Box 337, Buffalo, NY 14226 (telephone 716-691-

3476, FAX 716-691-0604).

The approval status varies from state to state, with these units slowly being approved in additional states as time passes. The current status is as follows:

Approved without blocking: GA, IN, MS, NJ, TN, VA, and WV.

Approved with blocking: AL, DE, FL, IA, ID, IL, KY, LA, MD, ME, MI, NC, NE, NV, NY, OH, OK, SC, and VT.

PUC request filed but no decision: AZ, CA, CO, CT, MA, NH, NM, and WY.

Tentative PUC approval appealed: PA.

Intention to file for approval disclosed: ND.

If you have questions, it is advisable to contact your Public Utilities Commission (PUC) to obtain desired information.

MFJ-247 Antenna Analyzer. The MFJ-247 consists of a low-power signal generator and a precise digital frequency

counter in a single cabinet. You simply select the frequency at which the SWR is desired. The signal is fed to the antenna being tested, causing the SWR to be displayed on the MFJ-247. This handheld instrument can be used anywhere with all home and mobile antennas. An antenna connects to the SO-239 atop the MFJ-247. SWR is read directly from 160 through 10 meters. A BNC input connector enables you to use the MFJ-247 as a frequency counter with good accuracy up to 150 MHz. This unit costs about \$190. Details can be requested from MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, MS 39762.

MFJ-1116 DC Power Outlet. This deluxe power outlet has eight terminals which can be used for connecting to clocks, keyers, lights, TNCs, transceivers, tuners, and any other device that is powered by 12 VDC. The outlet includes a 15 amp fuse, a heavy-duty power switch, and a voltmeter. The eight outlets are RF bypassed. This outlet is easily mounted on a desk or table. It measures 2.75" H x 13.5" W x 2.5" D and it is priced at \$44.95, plus s&h. The MFJ address is P.O. Box 494, Mississippi State, MS 39762 (toll-free order number 1-800-647-1800).

Multi-Use Link Enhancer. The Link Plus Corporation sells a Multi-Use Link Enhancer (MULE) which uses advanced

KENWOOD Amateur Radio Service Center

Convenient East Coast Location

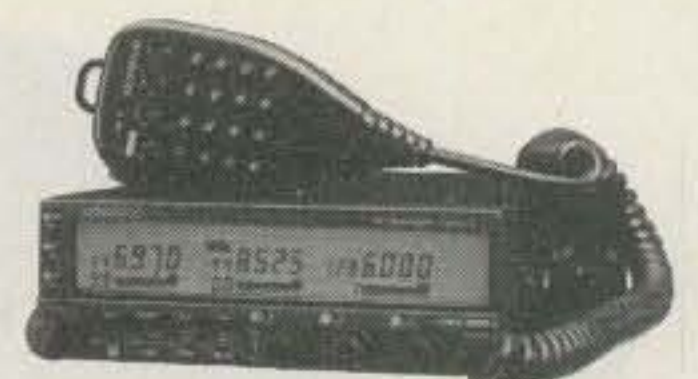
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Repair Status Ext 33

Tech. Info Ext 66

Hours 9-5 M-F



**4033 Brownsville Rd.
Trevose, PA 19053**



KENWOOD

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BACK
SPECIAL OFFER!**
See Kenwood dealer for details.
(expires September 30, 1993)

3-Way Split

Mobile transceivers with stylish
sophistication

Kenwood's new TM-742A (144MHz/440MHz) and TM-942A (144MHz/440MHz/1200MHz) FM multibanders offer prime performance plus unparalleled freedom of choice for installation (optional kit).

- **High power**
Maximum RF output is 50 watts (144MHz), 35 watts (440MHz), and 10 watts (1200MHz).
- **Wideband receiver coverage**
The TM-742A receives from 118 to 174MHz and 410 to 470MHz; transmit ranges are 144-148MHz and 438-450MHz. The TM-942A adds the 1240-1300MHz range.
- **New & improved detachable front panel**
The display and control sections can be separated for 3-way convenience. (with DFK-3,4,7)
- **100 memory channels**
The 100 multi-function memory channels (all available for split operation) can be grouped into 5 banks for added convenience.
- **Multiple scan modes**
Choose from 8 scan modes per band, plus CO (carrier-operated) and TO (time-operated) scan stops.
- **Tri-band receive/display**
The TM-942A can receive/display all three bands (144MHz/440MHz/1200MHz) simultaneously. For the TM-742A there are four optional band units: 28MHz (50 watts), 50MHz (50 watts), 220MHz (25 watts), and 1200MHz (10 watts).
- **Cross-band repeater, dual-in repeater, fixed-band repeater**
- **Single-bander simplicity**
Independent SQL and VOL controls for each band enable rapid response.
- **S meter squelch and auto squelch**
Weak signals can be shut out. Noise squelch is also available.
- **Supplied multi-function microphone**
Enables direct frequency entry.
- **Clock and timer**
Includes stopwatch, alarm and on/off timer functions.
- **Wireless remote control function**
A DTMF transceiver can be used to control various settings on the TM-742A/942A.
- **Built-in DTSS and pager function**
The TM-742A/942A offers DTSS (Dual-Tone Squelch System) for selective calling and paging using standard DTMF tones. Elapsed time is shown by the tone alert system.
- **Supplied accessories**
Mounting bracket, DC cable, fuses, mic, mic hook.
- **Choice of accessories**
A full line of mics, speakers, and other accessories is available. See your authorized Kenwood Amateur Radio dealer for details!

Specifications guaranteed for Amateur band use only.



TM-742A/942A Mobile Transceivers

KENWOOD COMMUNICATIONS CORPORATION
AMATEUR RADIO PRODUCTS GROUP
P.O. BOX 22745, 2201 E. Dominguez Street
Long Beach, CA 90801-5745
KENWOOD ELECTRONICS CANADA INC.
6070 Kestrel Road, Mississauga,
Ontario, Canada L5T 1S8
93ARD-0703

LINK-PLUS signal processing technology to boost the effective strength of SSB signals, and to eliminate transmission-induced noise and interference. The MULE uses audio path digital signal processing to increase transmitter efficiency. This processing is used to rebuild the audio envelope in the receiver, producing an exact replica of the speech pattern at the output of the microphone.

Optimum effectiveness exists between stations using MULE. However, by itself, MULE effectively boosts signal strength 10 to 15 dB. Tests conducted for our DOD disclosed an average 22 dB improvement over non-MULE stations when communications were conducted between a pair of MULE stations.

Their address is 9052 Old Annapolis Road, Columbia, MD 21045 (telephone 301-982-1585, FAX 410-997-3485). The MULE is priced at about \$3000.

Eyeball QSO Cards. Vaso Nagl, KD4WVK, offers a variety of mini-QSL and eyeball QSO cards. One-thousand card orders range in price between \$17 and \$51, including shipping charges. Vaso also offers magnetic vehicle signs, posters, and tickets that could be of interest to individual amateurs and radio clubs. Details can be requested from Artist Printer, P.O. Box 23325, Nashville, TN 37202 (telephone 615-731-7469).

Technician Class Video Course

If you find it difficult to attend a licensing course but you want to become a licensed amateur radio operator, here is good news for you. The American Radio Relay League (ARRL) now offers a Technician class home-study course that allows you to study when and where it suits you. Three VHS tapes provide five hours of instruction which cover everything you must know to pass Novice and Technician written examinations. Every current FCC test question is covered, along with the correct answers and supplemental explanations. The taped instruction is supplemented by a 164-page book that provides detailed explanations of the subjects covered by the tapes. Six practice tests help you check your progress and preparedness towards passing the "real thing" when the "big day" arrives. A computerized test review program is also available to provide additional assurance that you are ready to pass the FCC test.

The cost of the basic course is \$99. The \$49 value computerized examination review program is being offered at just \$20 more. The course book costs an extra \$19. If ordering the computerized test review program, state your preference for IBM compatible or Macintosh, and specify the required disk size.

You have nothing to lose except time and effort. A free 20-day examination period allows you to evaluate the course material at your leisure. If you return it to the ARRL, you will receive a full refund of the purchase price with no questions asked. If you fail to pass the FCC written test within one year after purchasing the course, a full refund is available to you. Naturally, you must provide a dated proof of purchasing the course, plus the date and location of the VEC administered FCC test wherein you failed the examination.

An extremely important added feature of this ARRL course is the staff of experts at the ARRL who are available to answer any questions you may have and to provide desired information and advice. The ARRL address is 225 Main Street, Newington, CT 06111 (telephone 203-666-1541, FAX 203-665-7531). If you are in a hurry to obtain this training material, you could get it quickly by calling the toll-free ARRL telephone number 1-800-32-NEW-HAM.

A Note To Club Bulletin Editors

If you edit a bulletin/newsletter for your amateur radio club, you should consider the possibility of joining the Amateur Radio News Service (ARNS). ARNS is par-

ticularly helpful to new editors. Their monthly bulletin is filled with useful ideas supplied by their many members who are professionals in the writing and public-relations fields. If you want more information about ARNS, mail your request to Pam Myers, N8IAK, ARNS Secretary, 510 W. Harrison, Alliance, OH 44601. ARNS was founded during 1965. Include a self-addressed, stamped envelope.

VU2AGR Club Seeks Help

The Agra Radio Club, VU2AGR, has 150 members with 29 of them being licensed amateurs. Their location is near Delhi, the capital of India. Agra is the site of the beautiful Taj Mahal. The secretary of the Agra Radio Club is Dr. Anil K. Agarwal, VU2TRI. His mailing address is 144 New Adarsh Nagar, Balkeshwar Road, Agra 282 004, India. This club is trying to promote amateur radio by demonstrating it in their local schools. If you have code practice devices (oscillators, keys, records, tapes, etc.), leaflets, magazines, station equipment, textbooks, or anything else which might help get a few more VU amateurs on the air, please send such material to the Agra Radio Club in care of their secretary's address. Your assistance would be appreciated.

Correction

The following letter was received from the Custom Plate Unit, State of New York Department of Motor Vehicles:

In the May 1993 issue of *CQ The Radio Amateur's Journal* you featured an article entitled, "Bills Basics—How To For the Newcomer to Amateur Radio." The article was intended to provide information on how to obtain ham operator license plates throughout the United States.

Unfortunately, the information pertaining to New York State contained some inaccurate information. First, New York State only allows one set of plates per licensed operator, not 2 or 3 as the article indicates. (For your information, the plate contains the call letters of the operator, and this combination can only be used once on one vehicle.) Second, it does not take 7 or 8 months to receive a set of plates. If all paperwork submitted is in order, there should be no more than a 4 to 6 week wait for the plates. The last item applies to the spacing of the letters on the plate. A number of years ago all plates were made in the style referred to in the article. However, we received many requests to have the combinations centered. We advised our plate manufacturer and told them all plates are to be made centered unless they are advised otherwise. After reading your article, we reaffirmed that request with the manufacturer.

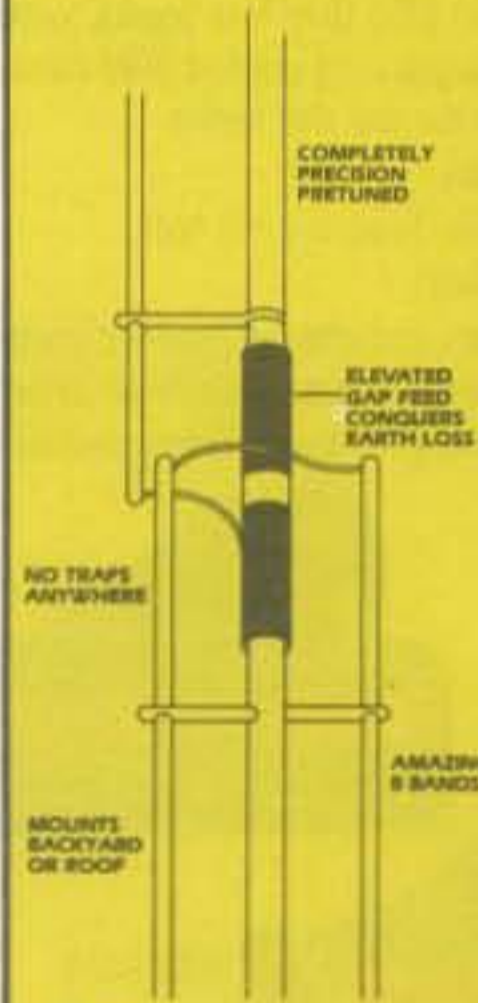
If anyone else has any corrections or further information about obtaining amateur radio license plates, please let us know.

73, Bill, W6DDB

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BY BUCK ROGERS, K4ABT

A User's Guide For TheNet X-1J

In last month's column we covered most of the SYSOP information, giving a description of how the SYSOP could program the EPROM and build the X-1J node. While the information in the August column is complete with respect to the implementation of the X-1J node, there is another feature that can be added to the node. This feature requires the X-1J node SYSOP to employ a hardware application.

Because last month's column was long, I've included the hardware feature option this month. But before I go directly to the user's guide for the X-1J node, let's look at the "deviation meter" hardware feature of the X-1J.

Adding The Deviation Meter Option To The X-1J Node

The deviation meter is actually a peak audio level meter. It is the first of a series of applications built into TheNet X-series firmware that makes use of an analog to digital converter (ADC). The ADC can be added quite simply to a TNC-2. The following portion of this column describes the circuit, its configuration, and its operation.

Circuit Overview. The audio input is amplified and converted to a DC peak representation. This voltage is read by the ADC, which has a range of 0 to 3 volts, and converted into an 8-bit binary value in the range 0 to 255.

The software is configured to read the ADC at the end of each valid packet. A packet is considered valid if its CRC is correct. As soon as a valid CRC is detected, the ADC is instructed to start converting on the deviation meter channel, this conversion taking 30 microseconds. Just before the formatted frame is linked into the chain of pending received frames, the ADC is read and the value stored with the frame. The reading therefore corresponds to the peak audio level at the end of a packet. If there are no non-linear elements between the receiver's discriminator and the meter input, this will correspond fairly accurately to the peak deviation. Care must be taken over its interpretation. It does not measure independently the two tone levels; it is as-

sumed that the local standards that relate to pre-emphasis (i.e., use it or not) have been implemented. If used for 9600 baud FSK operation, this is not a problem.

The meter will give the wrong answer on the following conditions: a badly distorted audio signal; badly off frequency; incorrect adherence to local pre-emphasis standards if used for AFSK; and a very noisy signal.

Software. The deviation meter is activated on receipt of a valid packet. The software interrupt routine, upon detecting a valid CRC, whether the deviation meter is installed or not and whether it is enabled or not, will instantly write the "start channel conversion" command to the ADC (I/O address 0x20) as soon as the interrupt is serviced. It will also be signalled when other errors such as framing or invalid CRCs are detected.

If the CRC is correct, then about 50 to 100 microseconds later the Z80 will read the ADC and will store the corresponding value with the packet. Again, this happens whether or not the function is enabled (it is quicker to do it than to test whether to do it or not)! The value received is transferred to the internal HEARD list format without conversion. It is still therefore the 8-bit count (0 to 255).

When a user displays the HEARD list, the deviation meter parameter (as set with the METER command) is used to control the display. If it is zero, the deviation details are not displayed in the HEARD list. If it is non-zero, then the 8-bit count value is multiplied by the METER value to give a deviation reading in Hertz. This is displayed as kiloHertz in the HEARD list. If the METER setting is "1" it will have a full-scale range of 0.2 kHz (not very useful). If it is set to 10, it will have a full-scale range of 2.5 kHz. If set to 255, it will display up to 64 kHz. A typical setting will therefore be in the range 15 to 30, depending on the analogue setting. The objective is to set it such that the maximum possible audio level from the receiver, given its filters, corresponds to just under the 3 volt maximum input to the ADC.

The deviation is displayed to a resolution of 100 Hz, but it should not be assumed to be this accurate. Small fluctuations in the reading can be expected.

Finally, to guard against an unnoticed overrange, the display in the HEARD list will precede the deviation reading by a

chevron (>) if the value read from the ADC is 254 or 255.

Detailed Circuit Description. All of the signals necessary for this circuit are found on the Z80 CPU chip located on the TNC motherboard, with the exception of a -5 volt power supply and the audio signal to be measured.

We therefore decided to base the circuit around the Z80 CPU. We knew from experience that people are reluctant to attack the insides of their TNCs with a hot soldering iron, so we settled on the socket idea as the least intrusive way of gaining access to the required signals. The circuit was designed with the junk box in mind, with the only required "specialist part" being the ADC itself.

The input is first amplified ($\times 100$) by **U2A**, a quarter part of the LM324 quad op-amp. The output of this is then rectified and smoothed by **C2**, and then **R3** provides a user-adjustable control for the DC representation of the received audio level into the ADC.

The second part of the quad op-amp (**U2B**) provides a low-impedance voltage reference drive for the ADC. **R6** should be adjusted such that the DC level on pin 8 (VREF) on the ADC is equal to 3.0 volts.

The address decode for the ADC is performed by two parts of the 74HC00 (**U3**). The ADC is mapped to the I/O address 0x20 and is selected by the X-1J software when required.

Parts List. The following parts are needed to complete the circuit:

- C1—0.1 μ F
- C3—1 μ F at 10 volts
- C2—22 μ F at 10 volts
- R1,R5—1K
- R4—2K
- R3,R6—10K min pots
- R2—100K
- D1—IN4148 diode
- D2—2V5 zener
- U1—ADC0844 (Nat/Semi) A to D converter
- U2—LM324 quad op-amp
- U3—74HC00
- 40-pin wire wrap socket

Construction. For those SYSOPs who would like a copy of the X-1J software, and drawings which describe all the modifications and hardware options, then follow these instructions to the letter.

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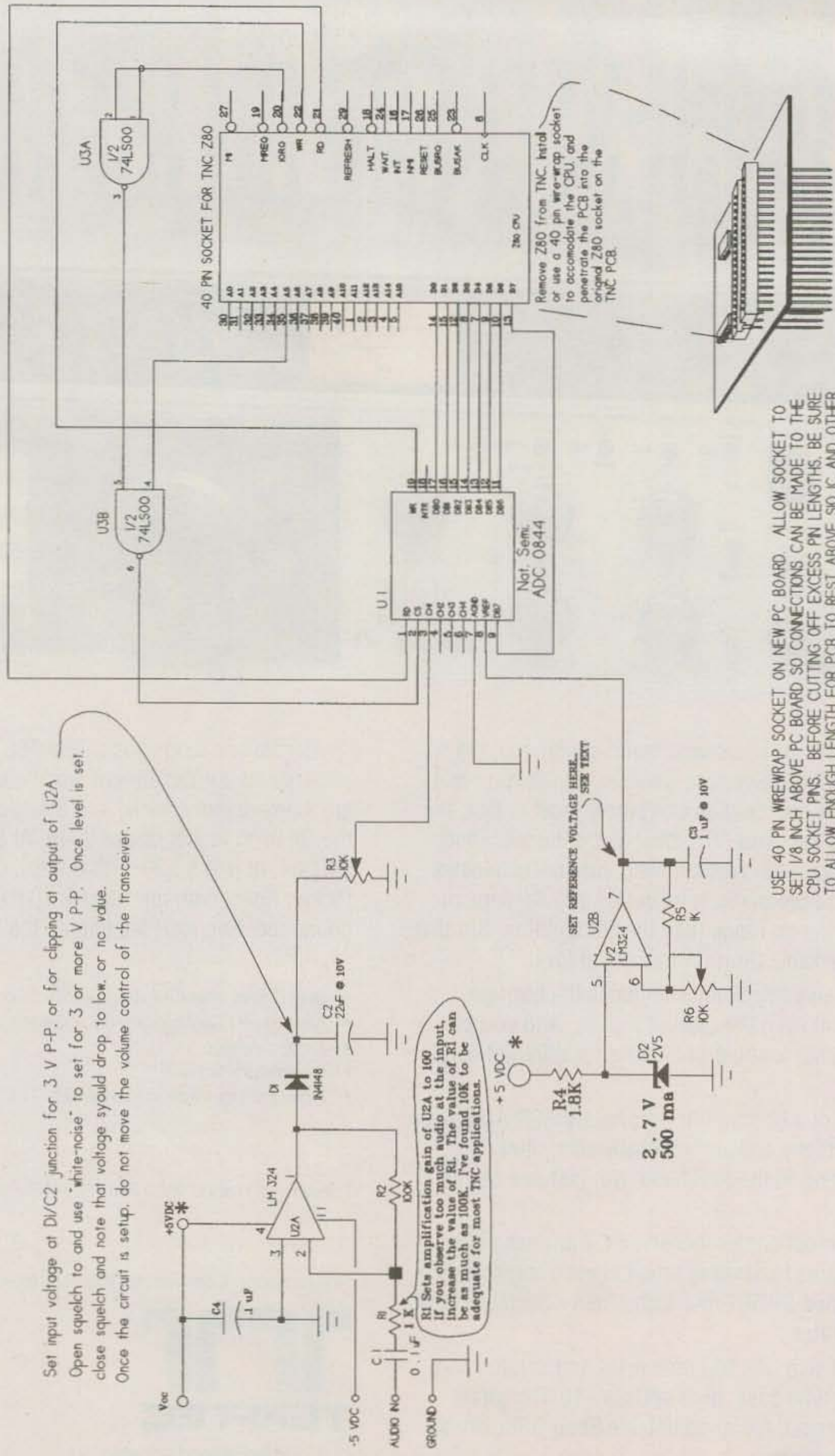
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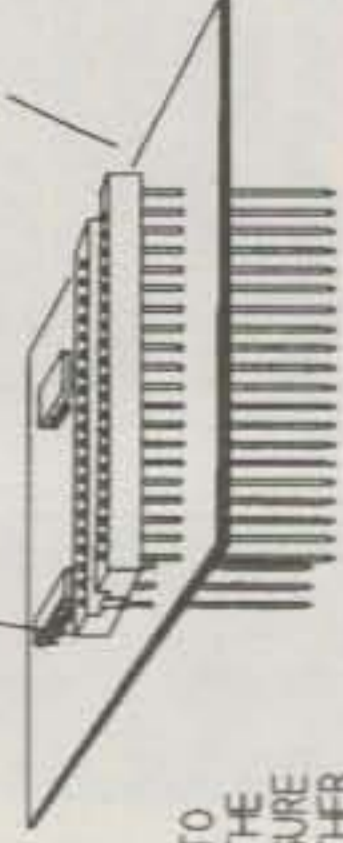
Set input voltage at D1/C2 junction for 3 V P-P, or for clipping at output of U2A. Open squelch to and use "white-noise" to set for 3 or more V P-P. Once level is set, close squelch and note that voltage should drop to low, or no value. Once the circuit is setup, do not move the volume control of the transmitter.

R1 Sets amplification gain of U2A to 100. If you observe too much audio at the input, increase the value of R1. The value of R1 can be as much as 100K. I've found 10K to be adequate for most TNC applications.

SET REFERENCE VOLTAGE HERE. SEE TEXT

2.7 V
500 ma

Remove Z80 from TNC. Install or use a 40 pin wire-wrap socket to accommodate the CPU, and penetrate the PCB into the original Z80 socket on the TNC PCB.



USE 40 PIN WIREWRAP SOCKET ON NEW PC BOARD. ALLOW SOCKET TO SET 1/8 INCH ABOVE PC BOARD SO CONNECTIONS CAN BE MADE TO THE CPU SOCKET PINS. BEFORE CUTTING OFF EXCESS PIN LENGTHS, BE SURE TO ALLOW ENOUGH LENGTH FOR PCB TO REST ABOVE SIO IC AND OTHER COMPONENTS ON THE TNC CIRCUIT BOARD.

Fig. 1- When the TNC-2 or clone is equipped with the X-1J EPROM, adding this circuit will enable the use of the METER command and allow users of the node to determine their modulation (deviation).

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Let's Get Busy. The circuit is not complex, and for the more adventurous a small circuit can be built up (without the need for a 40-pin socket) and then wired to the solder side of the TNC motherboard. In fact, the original prototype built on veroboard measured 1 inch by 2 inches.

The 40-pin socket on the DEV PCB is intended to be a wire-wrap type soldered to the DEV unit PCB with long legs extending down, cropped so that the PCB can be "plugged" into the 40-pin Z80 socket on the TNC motherboard (see inset in fig. 1). The previously removed Z80 CPU is then re-inserted in the socket on the DEV PCB.

If your TNC's Z80 is not socketed, you may want to consider adding one now! Otherwise you will need to work out some other way of getting the necessary signals to the DEV board.

If there is not enough clearance in the TNC box for the extra PCB, you could consider using a header socket, with the necessary signals being transferred to the DEV board, mounted elsewhere, via a short cable.

There are three other connections that need to be made from the DEV PCB to the TNC motherboard: cable shield for audio signal (ground), audio input from rig (5-pin DIN inside TNC), and -5 volts (from TNC motherboard).

Solder the components in the usual way, taking care not to damage the board. Be sure that the chips and polarized components are the right way up, and take the usual precautions when working with CMOS devices.

Alignment. There are four adjustable controls that will need to be set up for correct operation: (1) the radio's audio drive signal into the TNC (volume control); (2) the deviation signal level control (R3); (3) the reference voltage for the ADC (R6); and (4) the METER parameter within X-1J.

We suggest the following set-up sequence:

1. Adjust R6 on the DEV board to give 3.0 volts input into pin 8 of the ADC.

2. Attach an oscilloscope (if available) to pin 1 of the LM324. Turn the rig's squelch control such that the squelch noise is driving the input of the DEV circuit. Adjust the rig's audio drive signal into the DEV circuit so that the output of the op-amp is just clipping the power rails. This will be seen as a 10 volt peak-to-peak signal.

3. Adjust R3 to give the maximum DC signal into pin 3 of the ADC. This should be 3 volts maximum.

Note: The function of R3 is to scale the input voltage into the ADC. The maximum signal available from the circuit is approximately 3 volts, which corresponds to the full range of the ADC. A 3 volt input into the ADC will enable the circuit to present the widest possible range of values to the X-1J software. However, significant "unexplained" variations in the reported deviation (MHeard list) can be reduced by lowering the input voltage to the ADC. If you do need to adjust this voltage, then you will also have to adjust the METER parameter within the X-1J software again.

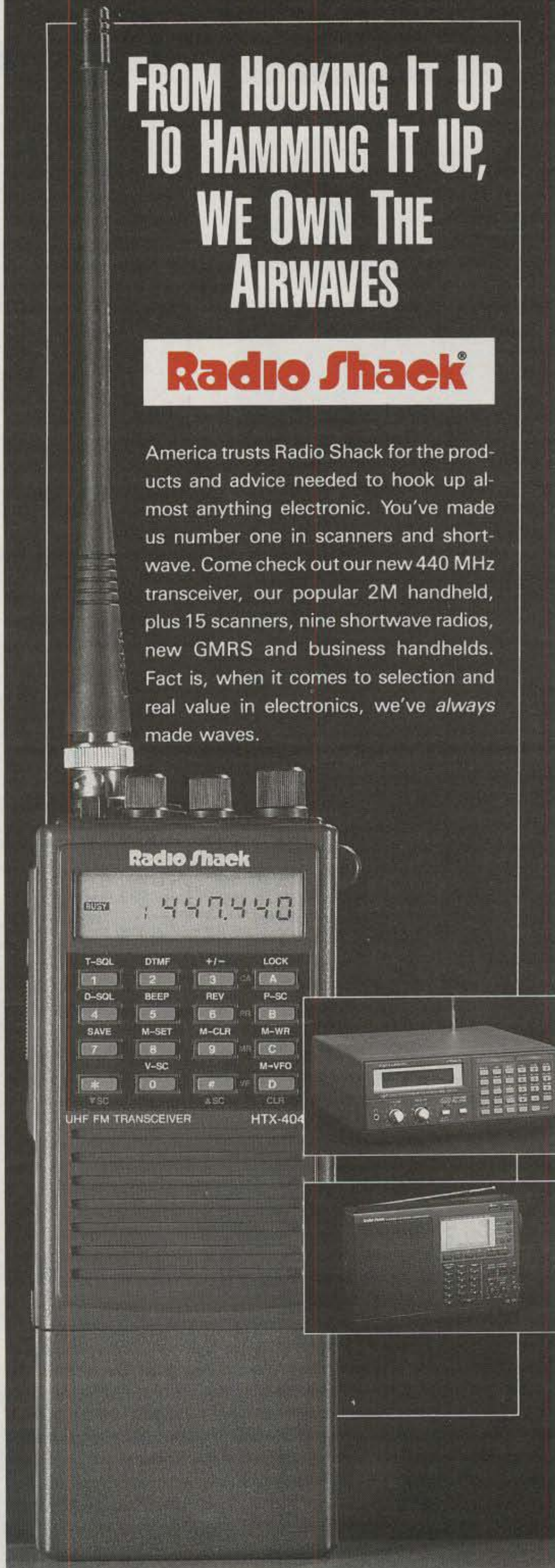
4. The METER parameter within X-1J gives the final adjustment to the circuit, converting the received binary number into a meaningful deviation in kHz.

In practice, with the unit operating as described above, a value of 47 was found to provide a true representation of the displayed deviation to the measured deviation. To ensure an accurate measurement is given to the user, you will need to calibrate the function using a signal with a known deviation!

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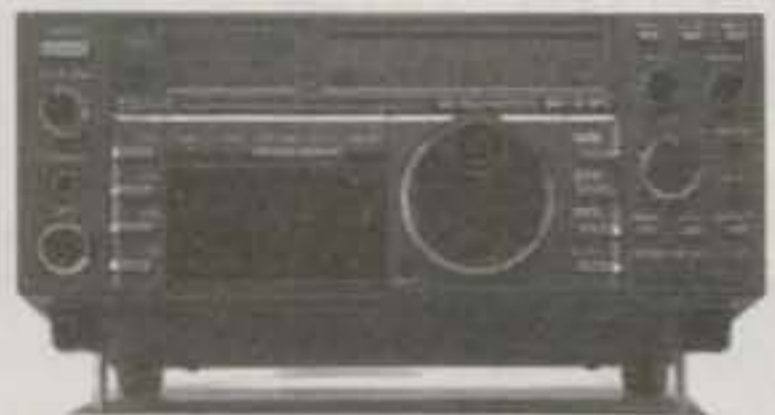
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As you can see from the above set-up procedure, *if you change the setting of the volume on the rig afterwards, all will be lost!* It is preferable to take the audio from before the audio amplifier sections of the receiver (ideally, directly from the discriminator) and to adjust the parameters or op-amp gain accordingly.

Credits. This month's "Packet User's Notebook" addresses the use of the X-1J nodes. Before I proceed with the X1J user documentation, there are some other "movers and shakers" I wish to thank for their efforts. Without their contributions, we might not have any networks at all.

There are persons I wish to thank for their help with the implementation of the X-1 code. Dave Roberts, G8KBB, is the author of the X-1 code and is employed as an engineer with British Telecommunication. Dave has been a licensed amateur since 1976. His address is 7, Rowanhayes Close, Ipswich, IP2 9SX, England.

For his contribution of the DEV hardware option, thanks to Neville Pattinson, GØJVU. Neville supports the hardware option shown in fig. 1 of this column. His address is 10, High Hall Close, Trimley St Martin, Felixstowe, Suffolk, IP10 0TJ.

In addition, I wish to thank the members of Suffolk Data Group (SDG/ England); Tad Torborg, KA2DEW, of the New England Digital Association (NEDA); and the Nord><Link group. The foundation of the new X-1 code is built on the early TheNet 1.01 platform.

The X-1J User's Guide

The following is intended to be a guide for users of the X-1J. Here is the documentation and explanations to support the basic X-1 commands.

The switch provides the following user commands: CONNECT, INFO, NODES, ROUTES, USERS, TALK, CQ, BBS, HOST, MHeard, BYE, DXcluster, IProute, ARP, and QUIT. Not all commands may be available on every node, as certain commands might have been disabled. If a command has been enabled, it will be displayed when you type an invalid command such as ?. In addition, there are some commands that are available but are not displayed. The main ones of interest are: LINKS, MODE, PARMs, STATs, IPAddress, DXCAlias, BBSAlias, HostAlias, and MTU.

CONNECT. If the CONNECT command is given on its own, then assuming the SYSOP has set it up correctly, you will get connected to the local BBS. If you give another callsign, either of a local station or a node, the node will attempt to connect you to that station either by a level 4 connection or by downlinking. In either case, you get a connected message or a message telling you of the failure to connect. If you enter any other command at

this stage, the connection attempt will be aborted. If you attempt to downlink with digipeating, or attempt to downlink to an invalid callsign such as a node alias with an SSID, you may get an error message, depending on how the SYSOP has configured the node.

Finally, if you connect to the node, then connect to another station and that station disconnects you (e.g., connect to a BBS and use the BYE command of the BBS), you will either get reconnected to the node or disconnected completely, depending on the configuration of the node.

INFO. This command gives information about the node as a combination of a message stored in the EPROM and a message entered by the SYSOP.

NODES. This command gives information about the distant nodes this node thinks it can get to. With no parameter, it shows the alias and callsign of all the nodes except those starting with a # character. If a parameter of * is given, those "hidden" nodes will also be shown.

If a callsign or alias that the node does not know is given, it gives an error message. If the callsign or alias of a known node is given, the node gives details of the routes it knows about that lead to that destination. The display shows one option per line, each of which consists of the path quality, obsolescence count, and port, followed by the callsign of the neighbor. If any route is in use, a chevron is shown against the appropriate entry.

If so configured by the SYSOP, "slime trails"—i.e., nodes without aliases, which have not been the subject of a valid node broadcast—may be omitted from the nodes list.

ROUTES. This command gives information about the neighboring nodes that can be heard. For each neighbor, the display shows the port number, the callsign, the path quality, and the number of nodes accessible through this neighbor. If a route has been "locked" by the SYSOP, then a ! character is shown after an entry.

The SYSOP may have configured the node to display nodes as callsign or as alias:callsign. If so configured, then if a node is shown as a callsign alone, it means that it is not currently reachable, as its node broadcasts are not being received.

USERS. This shows who is using the node. It does not show other nodes that are using the node as a level 3 relay, nor does it show those users who have connected to the node, but otherwise have done nothing.

The display shows the through connections, followed by those users who are connected to the switch and "idle." It also shows those users who are connected to the conferencing facility. The latter stations are shown connected to a destination called "Talk"; in the case of connections, the two endpoints are shown. For

connections, two symbols are used, <--> and <..>. The former is used for established connections, while the latter is used for connections being established.

TALK. The TALK command allows a group of users to hold a conference call. It also allows a user to send a message to another user of the node provided that user is connected to the switch but is not patched through to another station and is not currently trying to connect to another station.

A user enters the conference by giving the command TALK. The user gets a message informing him of this and reminding him that the command to escape from the TALK command is /EXIT. Any other users currently in the conference get a message from the node telling them of the callsign of the user who has joined them.

At this point, every line sent by a user in the conference is copied to all other users in the conference, preceded by their callsign.

To exit from the conference, the command /EXIT is used. This causes a response message to be sent to the user, and at the same time all of those left in the conference get a message from the node telling them of the station who has left the conference. If you force a disconnect, the other stations are not told of your departure.

A string of text may be entered on the same line as the TALK command when the command is given. If this is done, before the user is connected to the conference, that string of text is sent to all the other users of the node who appear in the USER list but are not connected to anything else. For example, if while I'm connected to the node as a user, W4WWQ connects to the node and types:

TALK, Hello Buck can we have a chat? If so, PSE type TALK

Then I would receive the following on my screen (additionally, other users connected to the node and not connected through would see the following):

W4WWQ > K4ABT>> **TALK, Hello Buck can we chat? If so, PSE type TALK**

The only exception to this is that SYSOPs are not sent the message.

CQ. This command is used to broadcast a CQ message. In addition, the fact that you are calling CQ is indicated in the USER list. The callsign will be your own with a different SSID, and anyone else can connect to you by connecting to the callsign with the appropriate SSID. The CQ remains "primed" for a while, and if any other command is given to the node, the CQ will be cancelled.

BBS. When you issue the BBS com-

mand, assuming that the SYSOP has configured it, you will be connected to the local BBS. If you enter the command **BBS ?**, then the current setting of the BBS will be displayed.

HOST. The HOST command operates just like the BBS command. It may have been disabled by the SYSOP, it may have been set to connect to the same station as the BBS, or it may have been set to connect to another host system. If you enter the command **HOST ?**, then the current setting of the HOST will be displayed.

MHeard. If enabled, the Heard list shows the last few stations heard. The number of entries is limited and set by the SYSOP, so any stations not heard for a while may get pushed out of the list by others heard. Assuming that a station is not pushed out in this manner, the display shows the number of packets heard from that station since it appeared in the list and the time since it was last heard. The time is hours, minutes, and seconds. The list also shows the port on which the station was heard (port 0 is the radio port), and if it hears IP frames or Net/Rom frames, it adds a note to show that the station is a node and/or a TCP/IP station.

If the list is long enough so that a station is not heard for 12 hours, it will get deleted anyway.

The list may also show a column headed DEV. This will only be present where the SYSOP has added to the node a small hardware add-on that measures the received signal audio level. Specifically, it gives an indication of the peak audio level. By means of a software configuration control and prior calibration, this gets converted into an indication of the transmitting station's signal deviation. It does this by sampling the audio level after every valid packet.

Often, packet stations are set up and the audio level tweaked until it appears to work reasonably error-free. The idea of this add-on is having done that, you then connect to the node and display the MHeard list to see an indication of your actual deviation.

When the METER command is activated by the SYSOP and the hardware modification has been made to the node, the MHeard list will contain a new heading which reads DEV. In addition to seeing the last 10 or 20 stations that were heard by the node, the node also displays the node or TCP/IP and DEVIATION.

You will see your own callsign in the MHeard list, and under the DEV heading you will see your modulation level expressed in kHz.

The SYSOP can fine-tune the METER command to set the reading correctly. Local advice must be taken over the correct setting, as it depends on the channel spacing being used (e.g., 12.5, 25, or other kHz).

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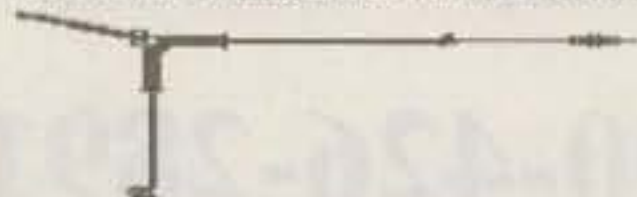
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Once the SYSOP has put the node at the final site, the METER command may be used to tweak the DEVIATION for the final reading that corresponds to the deviation from a known source. Again, care must be taken over its interpretation. It does not measure independently the two tone levels; it is assumed that the local standards that relate to pre-emphasis (i.e., use it or not) have been implemented.

If you connect, then correct your deviation to the correct display and find performance has deteriorated, it indicates one of the above problems. It is not that the meter doesn't work. It is an indication of a fault elsewhere.

It is in your own interest for those around you to use the correct deviation. The list also allows you to see the deviation of others, so apply peer pressure if someone over or under deviates. Remember, it is *not* a case of the higher or the lower the better. It is having the setting *right*.

You may construct the three IC circuit shown in fig. 1 on perf-board or circuit construction stock from your local electronics supplier. Neville (G0JVU) says the PC boards may soon be available from him.

LINKS. The LINKS command shows the level 2 connections to the node. This is usually of academic interest, but I use it in testing. The display shows the links, one per line, with the two callsigns, the link state, the port number, and the current number of retries.

BYE and QUIT. These commands disconnect you from the node, closing the

link. They say goodbye before disconnecting you, if it has been so configured by the SYSOP. QUIT does just the same as BYE does.

DXcluster. If there is a local DXcluster, this command may have been configured by the SYSOP to connect you to it. It therefore operates in a manner very similar to the BBS command.

STATS. The STATS command gives data about the node operation. A description of the information is contained in the overview document.

IProute. This command is used by the SYSOP to configure the IProute table. It may also be used to display the router table.

ARP. This command is similar to the IProute command, but shows the ARP table. The ARP table provides a translation from IPaddress to callsign.

IPaddress. This command is used to set or display the current node IPaddress.

BBSAlias, HostAlias, DXCAlias. These commands are used to set additional aliases for the node. It can be configured by the SYSOP to accept connect requests (uplinks) to the node callsign, the node alias, or the three aliases shown by these commands. When the node accepts a connection to one of these aliases, it will immediately invoke the BBS, DXC, or HOST commands for you.

For more details on the IProuter and IPaddressing, consult last month's column.

Until next month, Happy Packeting!
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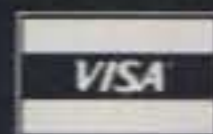
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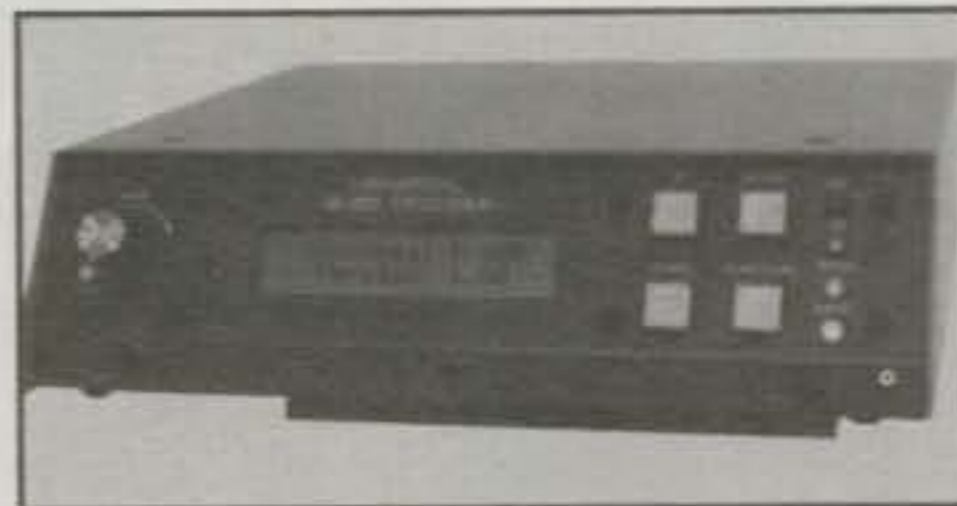
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The P.C. Electronics model TX70-1b 1.5 watt 70 cm (420-450 MHz) ATV transmitter combined with the TVC-4G tunable down converter allows the user to receive and transmit ATV pictures. The 7.3 x 4.7 x inch, 1 lb. 11 oz. die-cast aluminum cabinet of the TX70-1b is small enough for portable operation. The unit comes with one crystal, but has provisions for switching between two frequencies. RCA phono jacks accept the standard composite video and line audio found in most home camcorders, cameras, or VCRs. The line and mic gain controls are independent, which enables voice over commenting while running home video tapes. External power requirement is 12 to 14 VDC at 500 ma.

The photo shows both the TX70-1b transmitter (\$279 for single frequency; \$15 additional for the second crystal) and the TVC-4G down converter (\$89). For more information and a 10-page catalog, contact P.C. Electronics, 2522 Paxson Ln., Arcadia, CA 91007 (818-447-4565), or circle number 101 on the reader service card.

Universal M-400 Data Decoder and Tone Reader

The self-contained Universal M-400 from Universal Radio Inc. is a data decoder and tone reader able to decode many forms of RTTY including Baudot, SITOR A & B, FEC-A, ASCII, and SWED-ARQ. Text is displayed to the 40-character, two-line, super-twist LCD and sent to the printer port. No computer or monitor is required. Weather FAX can also be decoded to the printer port only. The VHF-UHF



listener will be able to copy the ACARS VHF aviation teletype mode plus GOLAY and POC-SAG digital pager modes. Off-the-air decoding of DTMF, CTCSS (PL), and DCS is also supported. The M-400 can also be programmed to pass only the audio you want to hear based on CTCSS, DCS, or DTMF codes of the user's choice.

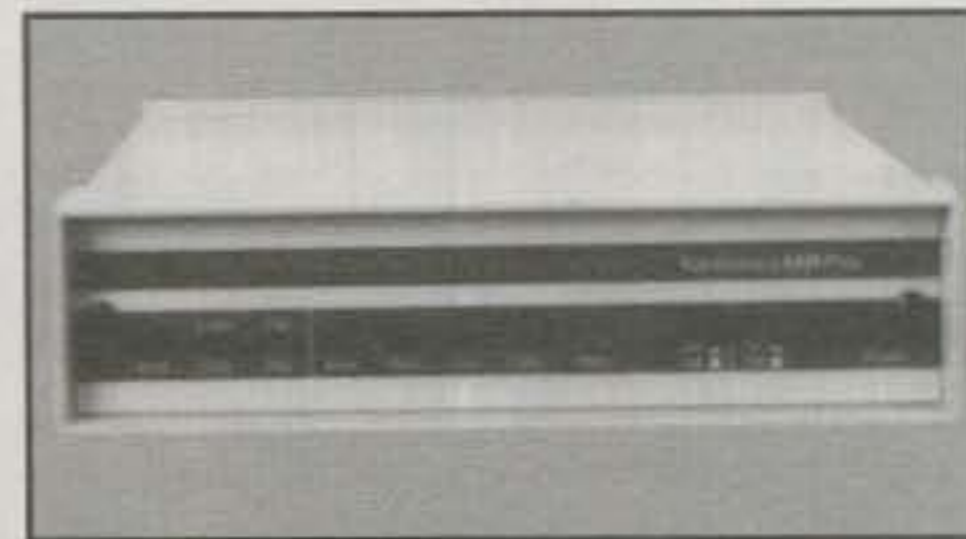
The M-400 can run from 12 VDC or with the supplied wall adapter. The unit is available for \$399.95. For more information, contact Univer

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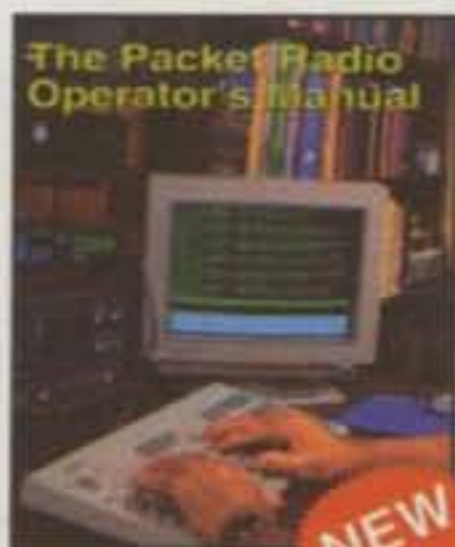
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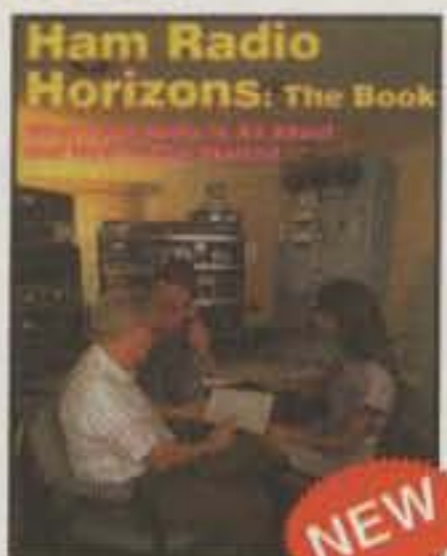
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WHAT'S NEW AND HOW TO USE IT

This month I would like to describe two new components from Texas Instruments that should be of interest to the many experimenters who read this column.

The first device is a new RS-232 interface chip designed for low-power high-speed operation. It can convert the full RS-232 protocol to and from TTL without a negative supply. The SN75LBC187 operates from a single +5 volt supply and generates the negative voltage required by RS-232 with an internal charge-pump circuit using a 0.1 uF external capacitor. As shown in fig. 1, all of the common signals used by the RS-232 port are accommodated. The chip will operate at data rates of up to 100 Kb/s, more than five times the rate allowed by the specification, and a shut-down mode input is provided for low-power stand-by operation. Cost is indicated as approximately \$2.50 in large quantities (1000 pieces) and somewhat higher for single pieces.

The second device is one that is truly ideal for the experimenter. The TSL260/1/2 is a series of light-to-voltage converters designed for optical switches, flame monitoring sensors, and low-speed data transmission applications. Fig. 2 is a block diagram of the internal circuit of the device, and fig. 3 is a proximity detector using an external LED. The proximity detector is usable from 6 to 18 inches, depending on the reflectance of the object being sensed.

As can be seen from the diagram, the unit consists of an op-amp and silicon photodiode. The op-amp is connected as a current-to-voltage converter, and the output is a voltage that varies linearly with light level. When operated from a 5 volt supply, the TSL260/1/2 produces output voltages in the range of 50 millivolts to 3 volts, depending on light level, making it directly compatible with logic gates and voltage comparators. Fig. 4 shows how you might connect the device to an LM-311 to act as a light level trigger. The various suffixes reflect the sensitivity of the three versions. The TSL260 offers high sensitivity, the TSL261 medium sensitivity, and the TSL262 low sensitivity.

The TSL260 is optimized for use at wavelengths of 925 to 950 nm and is provided in an IR transmissive plastic TO-92 package that allows those wavelengths to pass while blocking visible light. Since

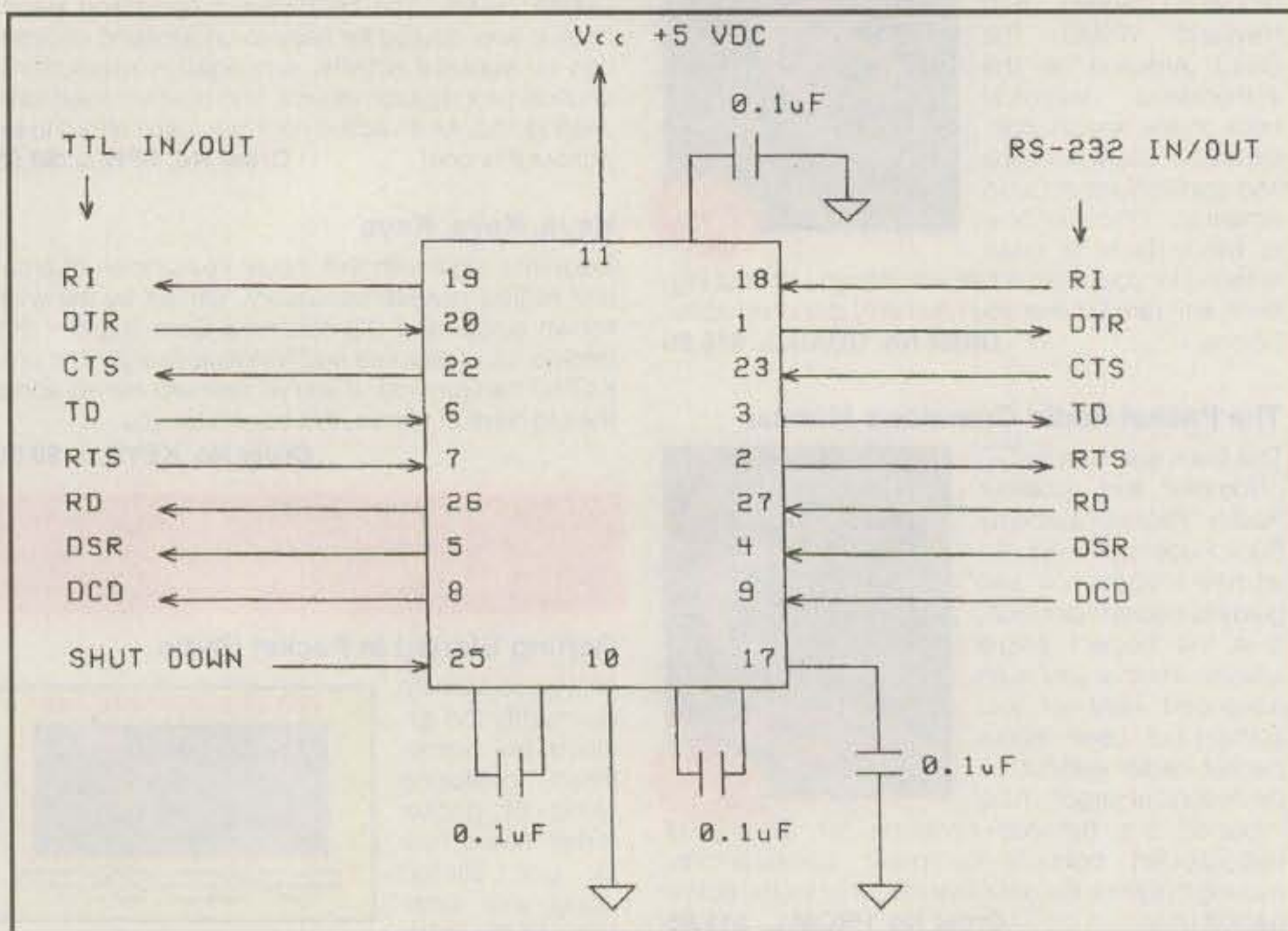


Fig. 1- SN75LBC187 interconnections.

all sensitive elements are contained within the package, operation is simple and straightforward. Cost for the TSL series is \$1.95 each in 1000 quantities and somewhat higher for single pieces.

A data sheet and additional informa-

tion is available from Texas Instruments at P.O. Box 172228, Denver, Colorado, or by calling 800-477-3453.

It should be noted that manufacturers usually publish 1000-piece prices for reference purposes, as most semiconduc-

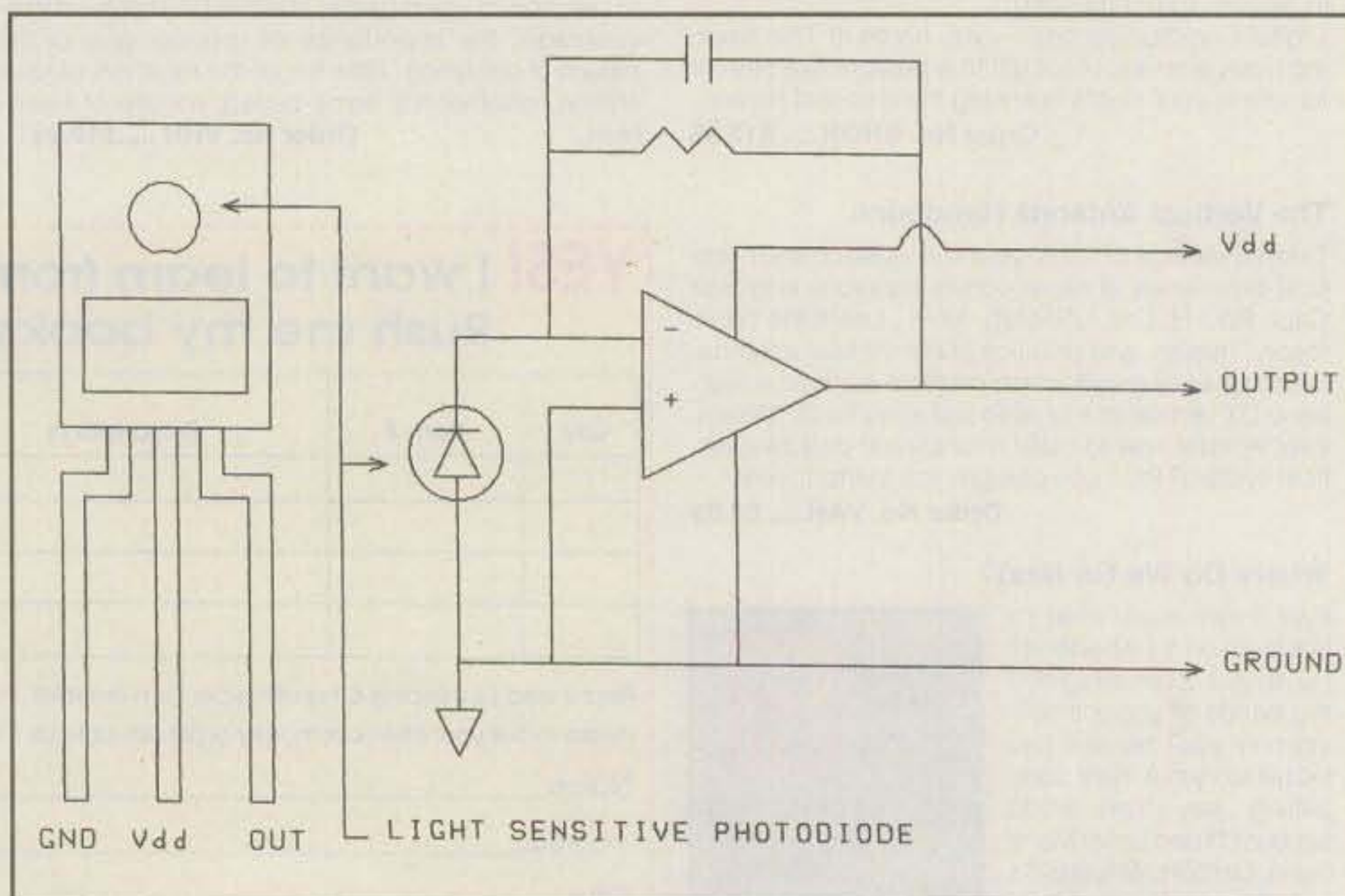


Fig. 2- Internal circuit of the TSL260.

c/o CQ magazine

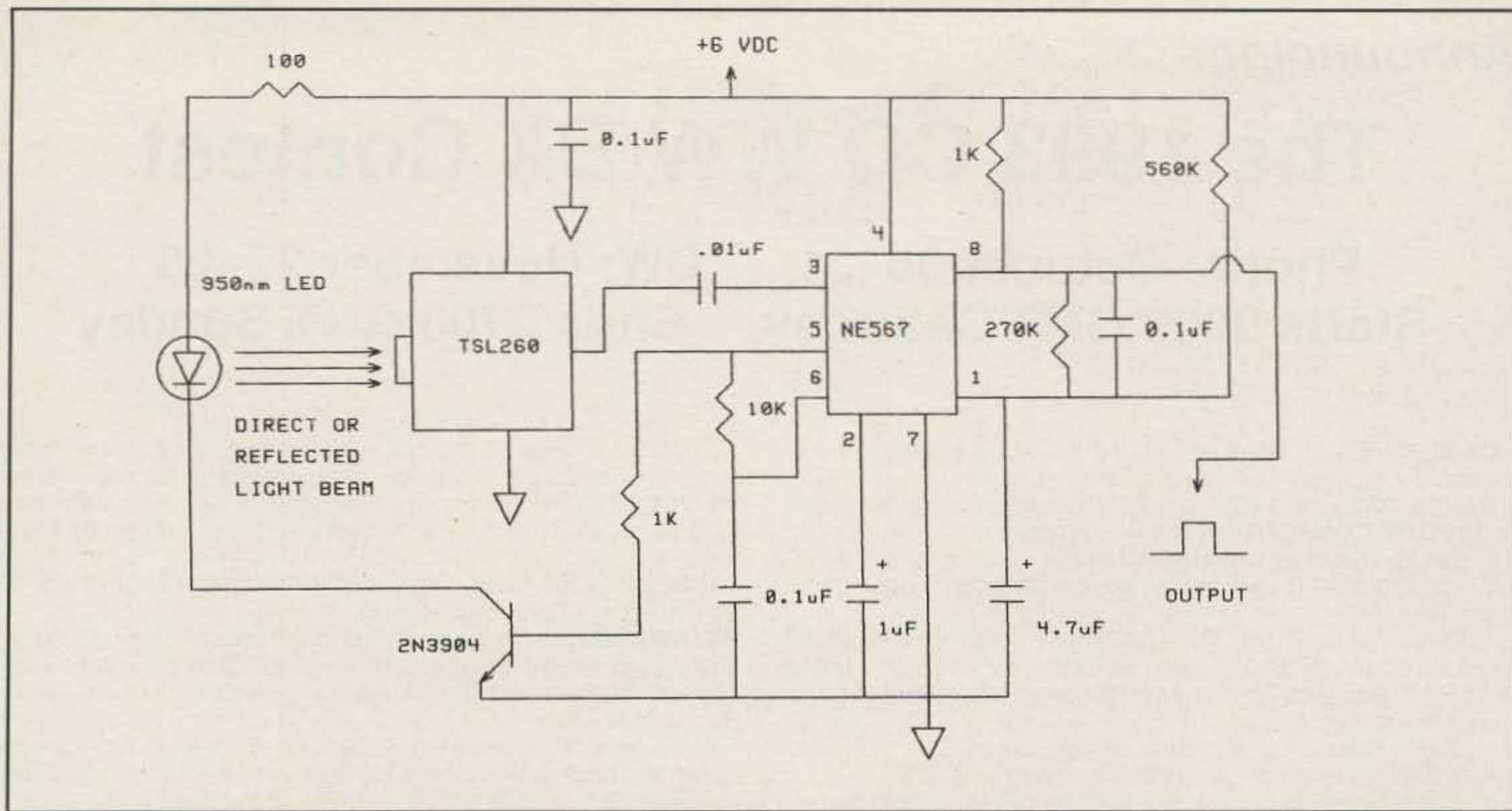


Fig. 3—Proximity detector using the TSL260.

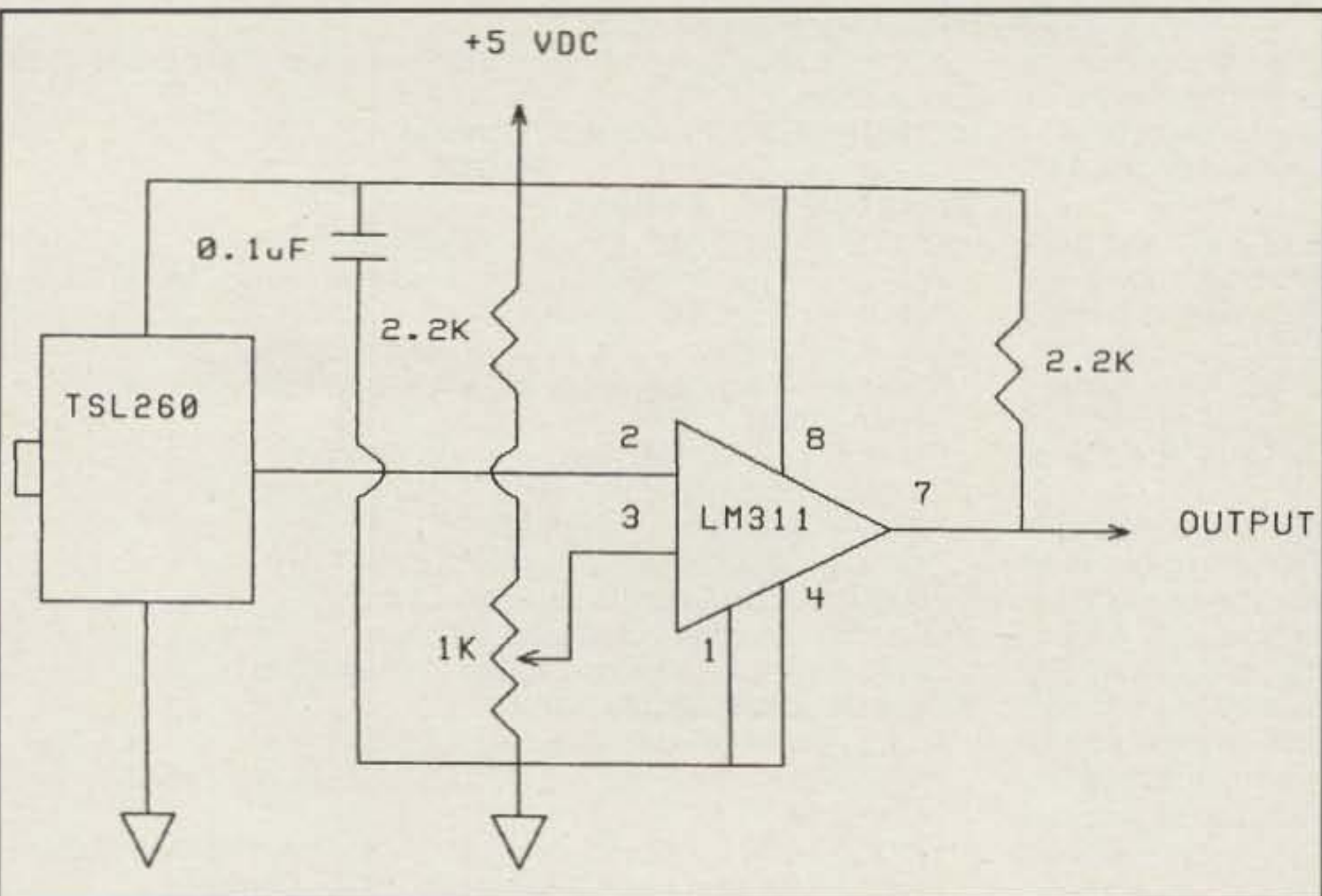


Fig. 4—Light sensor using the TSL260.

tor devices are usually geared for high-volume industrial users. Single-quantity prices can often be as much as twice the 1000-piece price. However, qualified industrial users can sometimes get a free sample or two. If you are in the electronic industry designing such circuitry, you might contact the local TI representative and try this approach.

If you are an experimenter, and the cost of the device is a dollar or so, you might also try the above approach. Manufacturers who will cater to experimenters,

however, should not be taken advantage of. Don't ask for a sample unless you really have a current use for it and cannot obtain it any other way. Also don't be afraid to tell a manufacturer what you will be using their component for. Often your application may be of interest to the manufacturer, prompting a free sample offer. Too many samples, however, with no follow-on quantity purchases will quickly cut out the sample program.

See you next month.

73, Irwin, WA2NDM

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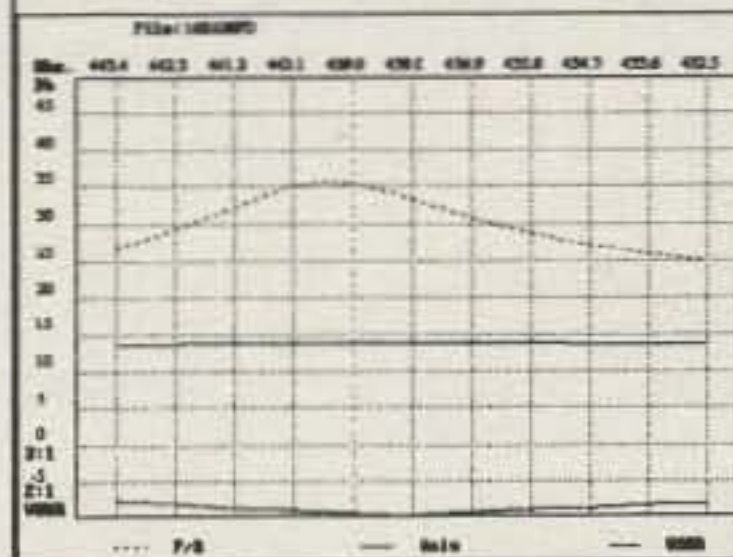
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Announcing:

The 1993 CQ WW DX Contest

**Phone: October 30–31
Starts 0000 GMT Saturday**

**CW: November 27–28
Ends 2400 GMT Sunday**

I. OBJECTIVE: For amateurs around the world to contact other amateurs in as many zones and countries as possible.

II. BANDS: All bands, 1.8 through 28 MHz, except for WARC bands.

III. TYPE OF COMPETITION (choose only one):

1. **Single Operator Categories:** Single band or all band; only one signal allowed at any one time; the operator can change bands at any time.

a. **Single Operator High:** Those stations at which one person performs all of the operating, logging, and spotting functions. The use of DX alerting assistance of any kind places the station in the Single Operator Assisted category.

b. **Single Operator Low:** Same as 1(a) except that the output power shall not exceed 100 watts (see rule XI. 11).

c. **QRPP:** Same as 1(a) except that the power output must not exceed 5 watts (see rule XI.11).

2. **Single Operator Assisted:** Single operator stations are those at which one person performs all of the operating and logging functions. The use of DX spotting nets or any other form of DX alerting assistance is allowed.

3. **Multi-Operator** (all band operation only): All transmitters must be located within a 500 meter diameter or within the property limits of the station licensee's address, whichever is greater. All antennas must be physically connected by wires to the transmitters and receivers.

a. **Single Transmitter:** Only one transmitter and one band permitted during any 10-minute period. Exception: One—and only one—other band may be used during any 10-minute period if—and only if—the station worked is a new multiplier. Logs found in violation of the 10-minute rule will be automatically reclassified as multi-multi.

b. **Multi-Transmitter:** No limit to transmitters, but only one signal and running station allowed per band.

4. **Team Contesting:** A team consists of any five radio amateurs operating in the single operator category. A person can be on only one team per mode. Competing on a team will not prevent any team member from submitting his personal score for a radio club. A team score will be the sum of all the team member scores. SSB and CW teams are totally separate. That is, a member of an SSB team can be on a totally different CW team. A list of a team's members must be received at CQ Headquarters by the time the contest begins. Mail or FAX the list to CQ, Att: Team Contest, 76 North Broadway, Hicksville, NY 11801 U.S.A.; FAX 516-681-2926. Awards will be given to the top teams on each mode.

IV. NUMBER EXCHANGE: Phone: RS report plus zone (i.e., 5705). CW: RST report plus zone (i.e., 57905).

V. MULTIPLIER: Two types of multiplier will be used.

1. A multiplier of one (1) for each different zone contacted on each band.

2. A multiplier of one (1) for each different country contacted on each band.

Stations are permitted to contact their own country and zone for multiplier credit. The CQ Zone Map, DXCC country list, WAE country list, and WAC boundaries are standards. Maritime mobile stations count only for zone multiplier.

VI. POINTS: 1. Contacts between stations on different continents are worth three (3) points.

2. Contacts between stations on the same continent but different countries, one (1) point. *Exception:* For North American stations *only*, contacts between stations within the North American boundaries count two (2) points.

3. Contacts between stations in the same country are permitted for zone or country multiplier credit but have zero (0) point value.

VII. SCORING: All stations: the final score is the result of the total QSO points multiplied by the sum of your zone and country multiplier.

Example: 1000 QSO points × 100 multiplier (30 Zones + 70 Countries) = 100,000 (final score).

VIII. AWARDS: First-place certificates will be awarded in each category listed under Sec. III in every participating country and in each call area of the United States, Canada, European Russia, Asiatic Russia, and Japan.

All scores will be published. To be eligible for an award, a Single Operator station must show a minimum of 12 hours of operation. Multi-operator stations must operate a minimum of 24 hours. A single-band log is eligible for a single-band award *only*. If a log contains more than one band it will be judged as an all-band entry, unless specified otherwise.

In countries or sections where the returns justify, 2nd and 3rd place awards will be made.

All certificates and plaques will be issued to the licensee of the station used.

IX. TROPHIES & PLAQUES (Donors) PHONE

Single Operator, All Band

World—Dave Rosen, K2GM—WA2RAU Memorial
World—Single Operator Assisted—Snake River Contest Club
World—QRPP—Doc Sayre, N7AVK
U.S.A.—Potomac Valley R.C.—KC8C Memorial
Canada—Niagara Frontier Int'l DX Assoc.—VE3WT Memorial
Carib./C.A.—Alex M. Kasevich, VP2MM/W4
Europe—Potomac Valley R.C.—W4BVV Memorial
Africa—Gordon Marshall, W6RR
Asia—Japan CQ Publishing Company Ltd.
Japan—Japan Crazy Contesters Club
Oceania—Northern California DX Club
South America—Yankee Clipper Contest Club

Single Operator, Single Band

World—28 MHz—Joel Chalmers, KG6DX
World—21 MHz—French 21170 DX Net/LNDX—FY5AN Memorial
World—14 MHz—North Jersey DX Assn.—K2HLB Memorial
World—7 MHz—Fred Laun, K3ZO—K7ZZ Memorial
World—3.8 MHz—Fred Capossela, K6SSS
U.S.A.—28 MHz—Donald Thomas, N6DT
U.S.A.—21 MHz—Bill Gioia, K2EK
U.S.A.—14 MHz—Southern California DX Club
U.S.A.—7 MHz—Stanley Cohen, WD8QDQ
U.S.A.—3.8 MHz—Arnold Tamchin, W2HCW
U.S.A.—1.8 MHz—J. Bruce Siff, W2GBX
Carib./C.A.—Snake River Contest Club
Europe—28 MHz—Chod Harris, VP2ML
Europe—21 MHz—OH6JW Memorial
Europe—14 MHz—A.G. Anderson, GM3BCL
Europe—7 MHz—Roger Burt, N4ZC
Japan—28 MHz—Take Yokoyama, JL1BLW
Japan—21 MHz—DX Family Foundation

Multi-Operator, Single Transmitter

World—So. Calif. DX Club—W6AM Memorial
U.S.A.—Carolina DX Association

Europe—Bob Cox, K3EST
Carib./C.A.—K3NA
Oceania—Junichi Tanaka, JH4RHF

Multi-Operator, Multi-Transmitter

World—W6QHS and KK6QM
U.S.A.—Paul Hellenberg, KS9K
Europe—Finnish Amateur Radio League

Contest Expeditions

World—Single Opr.—Stuart Meyer, W2GHK
World—Multi-Opr.—The German CDXG & SDXG
(DJ3NG & DJ4EI Memorial)

Special—Single Operator Award

World—All Band Under 18 years old—Ham Radio Bookstore

CW

Single Operator, All Band

World—Albert Kahn, K4FW—W9IOP Memorial
World—Single Operator Assisted—Snake River Contest Club
World—QRPP—Gene Walsh, N2AA
U.S.A.—Frankford Radio Club
Canada—Canadian DX Association
Carib./C.A.—Larry Brockman, N6AR
Europe—Edward Bissell, W3AU
Africa—Gordon Marshall, W6RR
Asia—Japan CQ Publishing Company Ltd.
Japan—Japan Crazy Contesters Club
Oceania—Maui Amateur Radio Club
So. Amer.—Venezuela DX Club

Single Operator, Single Band

World—28 MHz—Joel Chalmers, KG6DX
World—21 MHz—Don Busick, K5AAD—N5JJ Memorial
World—14 MHz—North Jersey DX Assn.—W2JT Memorial
World—7 MHz—Alex M. Kasevich, VP2MM/W4
World—3.5 MHz—Fred Capossela, K6SSS
World—1.8 MHz—Kenneth Byers, Jr., K4TEA
U.S.A.—28 MHz—Robert Clark, K6JYO
U.S.A.—21 MHz—Wayne Carroll, W4MPY
U.S.A.—14 MHz—Northern Illinois DX Association
U.S.A.—7 MHz—Jan Perkins, N6AW—W6AM Memorial
U.S.A.—3.5 MHz—CQ Magazine
U.S.A.—1.8 MHz—Peter Hutter, WW2Y
Canada—Radio Amateurs of Canada
Carib./C.A.—Snake River Contest Club
Europe—28 MHz—Southern New England DX Club
Europe—21 MHz—Robert Naumann, KR2J
Europe—14 MHz—Maud Slater—G3FXB Memorial
Europe—7 MHz—Ivo Pezer, 5B4ADA/T93A
Europe—3.5 MHz—Frankford Radio Club—K3VW Memorial
Japan—21 MHz—DX Family Foundation

Multi-Operator, Single Transmitter

World—Anthony Susen, W3AOH
U.S.A.—Douglas Zwiebel, KR2Q
Canada—Eastern Canadian DX Assn.
Carib./C.A.—Ralph Bellas, Jr., K9ZO
Europe—Friends of K3AO—K3AO Memorial
Oceania—Junichi Tanaka, JH4RHF

Multi-Operator, Multi-Transmitter

World—Hazard Reeves, K2GL Memorial
World—SSB/CW Combined—Ehrhorn Technological Operations
U.S.A.—Bob Ferrero, W6RJ—N6RJ Memorial
Europe—Finnish Amateur Radio League

Contest Expeditions

World—Single-Opr.—Yankee Clipper Contest Club
World—Multi-Opr.—Bill Schneider, K2TT

Special—Single Operator Award

World—All Band—Under 18 years old—Ham Radio Bookstore

Club

World—SSB/CW—CQ Magazine, W1WY Memorial
Non-USA—SSB/CW—No. Calif. Contest Club—N6AUV Memorial
A station winning a World Trophy will not be considered for a sub-area award. That trophy will be awarded to the runner-up of that area.

X. CLUB COMPETITION:

1. The club must be a local group and not a national organization.
2. Participation is limited to members operating within a local geo-

graphic area defined as within a 275 km radius from center of club area (except for DXpeditions especially organized for operation in the contest; club contributions of DXpedition scores are percentaged to the number of club members on the DXpedition).

3. To be listed, a minimum of 3 logs must be received from a club and an officer of the club must submit a list of participating members and their scores, both on phone and CW.

XI. LOG INSTRUCTIONS:

1. All times must be in GMT.
2. All sent and received exchanges are to be logged.
3. Indicate zone and country multiplier only the FIRST TIME it is worked on each band.
4. Logs must be checked for duplicate contacts, correct QSO points and multipliers. Submitted logs must have duplicate contacts clearly shown.
5. DISKS: Please send us your computer disk. IBM, MS-DOS compatible disks are encouraged: The format we prefer is your CT.Bin file, for example HSØAC.BIN or your N6TR.DAT file or your .DBF files. If you use a different program than mentioned above, the generic format we want is a separate file, for each band, containing a vertical single column of calls in chronological order. The committee will require a disk for any possible high score on request, provided that the paper log or dupe checking material as originally submitted was a computer printout. The outside of the disk should be labeled clearly with the Call of the entrant, the files included, the mode (SSB or CW), and the category. Disks **must** be accompanied by a paper log satisfying all logging instructions.

6. Use a separate sheet for each band.

7. Each entry must be accompanied by a summary sheet showing all scoring information, category of competition, contestant's name and address in BLOCK LETTERS, and a signed declaration that all contest rules and regulations for amateur radio in the country of operation have been observed.

8. Sample log and summary sheets and zone maps are available from CQ. A large self-addressed envelope with sufficient postage or IRC's must accompany your request.

If official forms are not available, make up your own 80 contacts to the page on 8½" × 11" paper.

9. All entrants are required to submit cross-check sheets (an alphabetical list of calls worked) for each band on which 200 or more QSOs were made. All other entrants are encouraged to submit cross-check sheets.

10. Duplicate contacts and broken calls penalty: up to 3%, three (3) additional contacts removed; over 3% is grounds for possible disqualification.

11. QRPP and low power stations must indicate same on their summary sheets and state the actual maximum power output used, with a signed declaration.

XII. DISQUALIFICATION: Violation of amateur radio regulations in the country of the contestant, or the rules of the contest; unsportsmanlike conduct; taking credit for excessive duplicate contacts; unverifiable QSOs; or unverifiable multipliers will be deemed sufficient cause for disqualification. Incorrectly logged calls will be counted as unverifiable contacts.

An entrant whose log is deemed by the Committee to contain a large number of discrepancies may be disqualified from eligibility for an award, both as a participant operator or station, for one year. If an operator is disqualified a second time within 5 years, he will be ineligible for any CQ contest awards for 3 years.

The use of non-amateur means such as telephones, telegrams, etc., to elicit contacts or multipliers **during** a contest is unsportsmanlike and the entry is subject to disqualification. Action and decisions of the CQ Contest Committee are official and final.

XIII. DEADLINE:

1. All entries must be postmarked NO LATER than December 1, 1993 for the Phone section and January 15, 1994 for the CW section. **Indicate phone or CW on the envelope.**

2. An extension of up to one month may be given if requested by letter or other means. The granted extension must be confirmed by letter sent to the contest director, must state a legitimate reason, and the request must be received before the log mailing deadline. Logs postmarked after the extension deadline may be listed in the results but will be declared ineligible for an award.

Both Phone and CW logs should be sent to CQ Magazine, 76 North Broadway, Hicksville, NY 11801.

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

A High-Gain Dipole!

Holy Batman! Imagine a special dipole having a gain of 5.38 dB over a common dipole! Gain for nothing! Exciting, isn't it? You don't believe me? Well, look at fig. 1. This sky wire was run on a popular antenna analysis program. It is a 40 meter dipole, 67 feet long and 70 feet above ground. And there it is! See the lower left corner of the plot? It says the 0 dB curve on the plot represents 5.38 dB gain referenced to a dipole (dBd). And the plot meets the 0 dB reference curve at an elevation angle of about 28 degrees. What more proof do you want?

Okay, okay, I'm pulling your leg. But the point I want to emphasize is that when an antenna is placed over ground in most computer analysis programs, the computer takes into account ground reflection gain, which can be as high as 6 dB. The dipole itself has no gain, however. The ground environment produces the gain.

In this instance, the full 6 dB reflection gain is not realized because of skin effect and conductor loss in the dipole.

The instruction manual for this particular analysis program (MN 4.5 by K6STI) clearly explains ground reflection, saying, "expect up to 6 dB gain over free-space values at lobe maxima in the elevation plane."

It is very easy to not read the fine print and fall into this trap. The reliable way of determining true antenna gain is to examine the antenna in free space, where the effects of ground reflection do not enter into the computations. Once you have done this, you can add reference ground to the file and derive some very pretty elevation and azimuth plots. But the computer program knows! When ground is present, ground reflection is computed, with the resultant apparent boost in antenna gain.

The point is, if the dipole-over-earth exhibits 5.38 dB reflection gain, what gain figure will a 3-element Yagi exhibit when the antenna program takes ground reflection into account? If the Yagi has a free-space gain of 5 dB over a dipole, the total gain of the Yagi (placed 70 feet over ground as is this dipole) can be as high as an eye-popping 10.38 dB in the direction of the main lobe! Just don't be fooled into thinking this is simply the gain of the

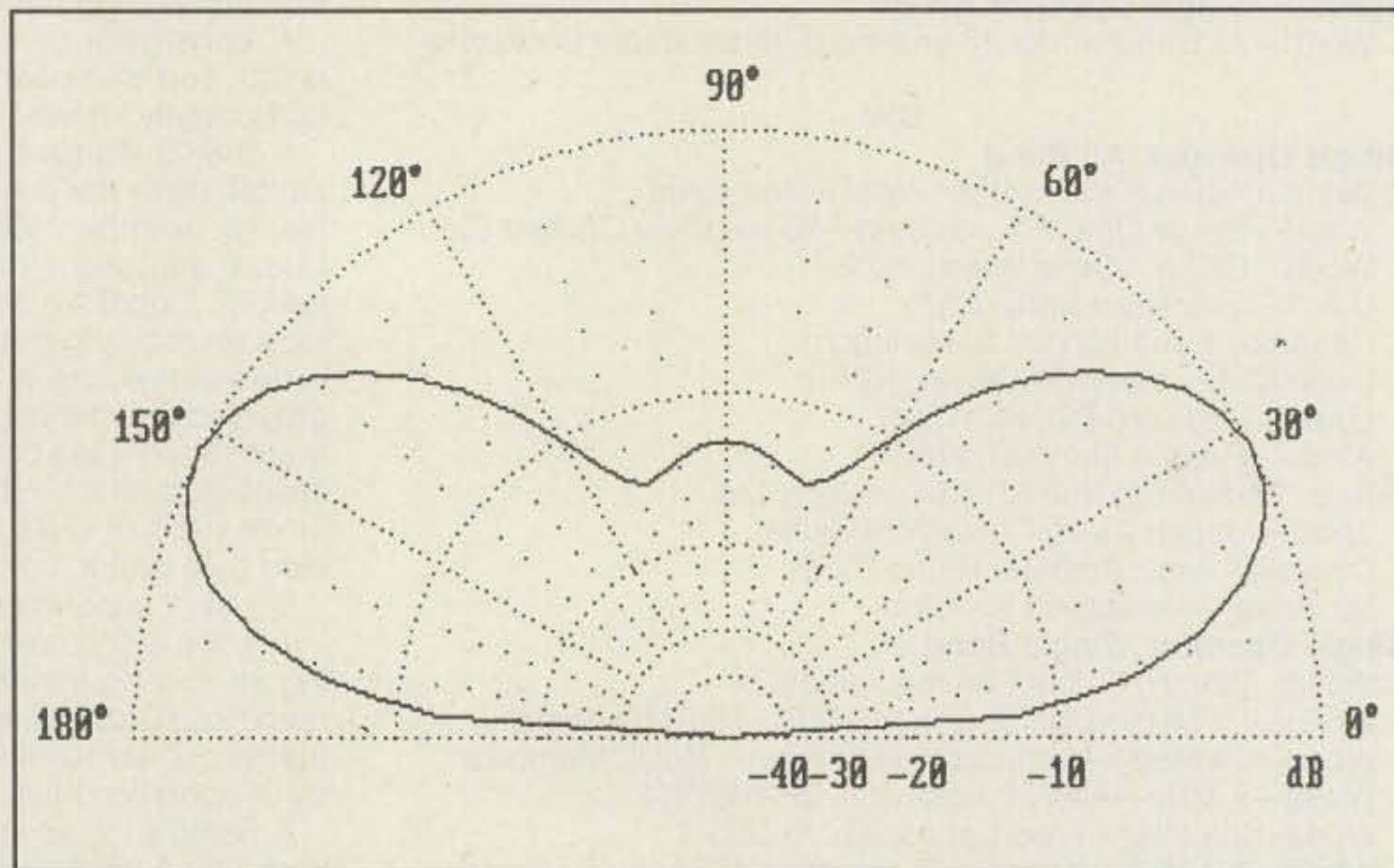


Fig. 1— Reflection gain figure (lower left) for dipole antenna. Main lobes are at an angle of about 28 degrees above horizon.

Yagi, as advertised by your friendly metal bender!

Where Does This "Free" Gain Come From?

When an antenna exists in free space, its radiation pattern is as though the antenna is at the center of a sphere of infinite dimension. Radiated power is distributed over the surface of this sphere, in accord with the pattern of the antenna. When the same antenna is placed over earth, it is as if the sphere is cut in half horizontally and a metallic plate representing the earth substituted for the missing half of the sphere. Since the same amount of power is radiated into half the volume of space, the measured field is doubled, or increased by 3 dB.

In addition, the ground plane reflects the radiated energy of the antenna. Thus, the field can be doubled at best, or cancelled under the worst circumstances. At the radiation angle of the main lobe of the antenna a possible 3 dB of gain is added to the field radiated in the half-volume of space about the antenna. It is therefore possible to have a power gain of up to 6 dB when comparing a dipole antenna above ground against a dipole in space.

The gain is applicable to a Yagi or a quad, or another horizontally polarized

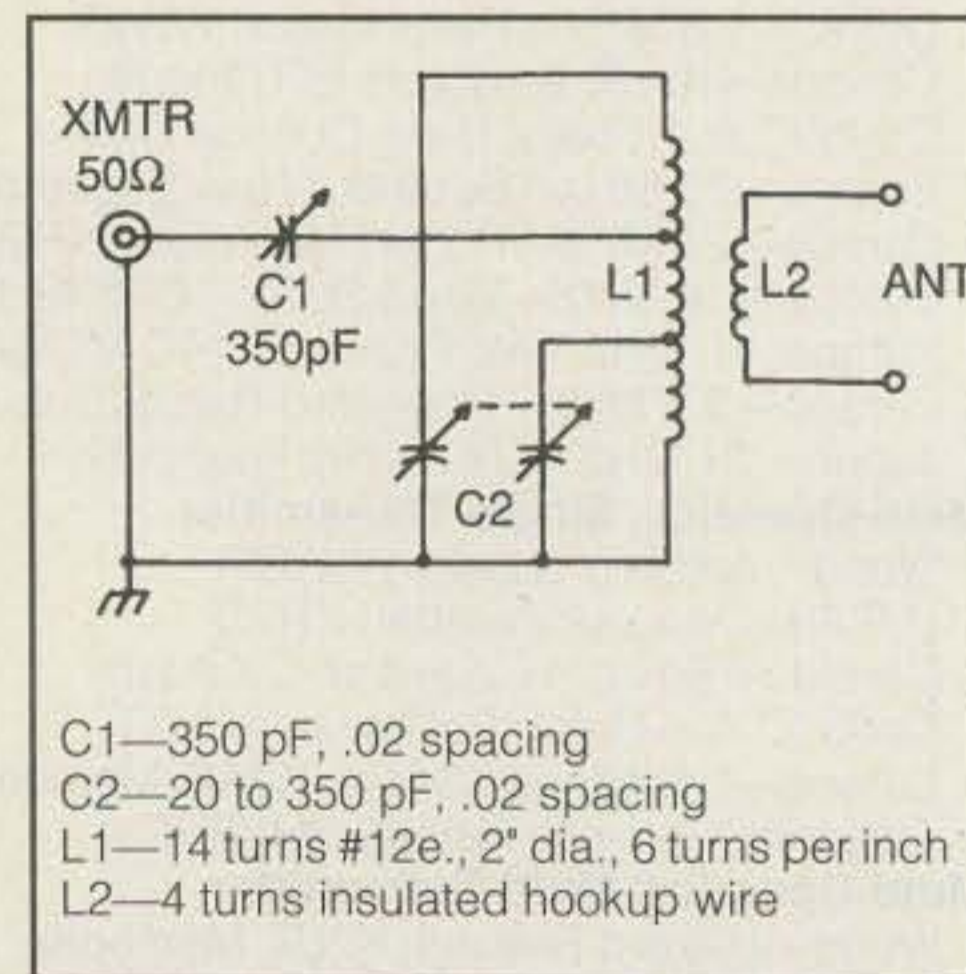


Fig. 2— Circuit of Z-match tuner.

C1—350 pF, .02 spacing
C2—20 to 350 pF, .02 spacing
L1—14 turns #12e., 2" dia., 6 turns per inch
L2—4 turns insulated hookup wire

antenna. Thus, a 3-element Yagi having a free-space gain figure of, say, 6 dB can have an apparent boost in gain of 3 dB when placed over a reflecting surface (ground) plus ground reflection of an additional 3 dB, making a grand total of 12 dB gain over a dipole in free space.

That's sort of like comparing apples and oranges, and many hams and casual antenna builders have fallen into this gain trap. Definition of just how the gain is measured, placement of the antenna with respect to earth, and what the com-

48 Campbell Lane, Menlo Park, CA 94025

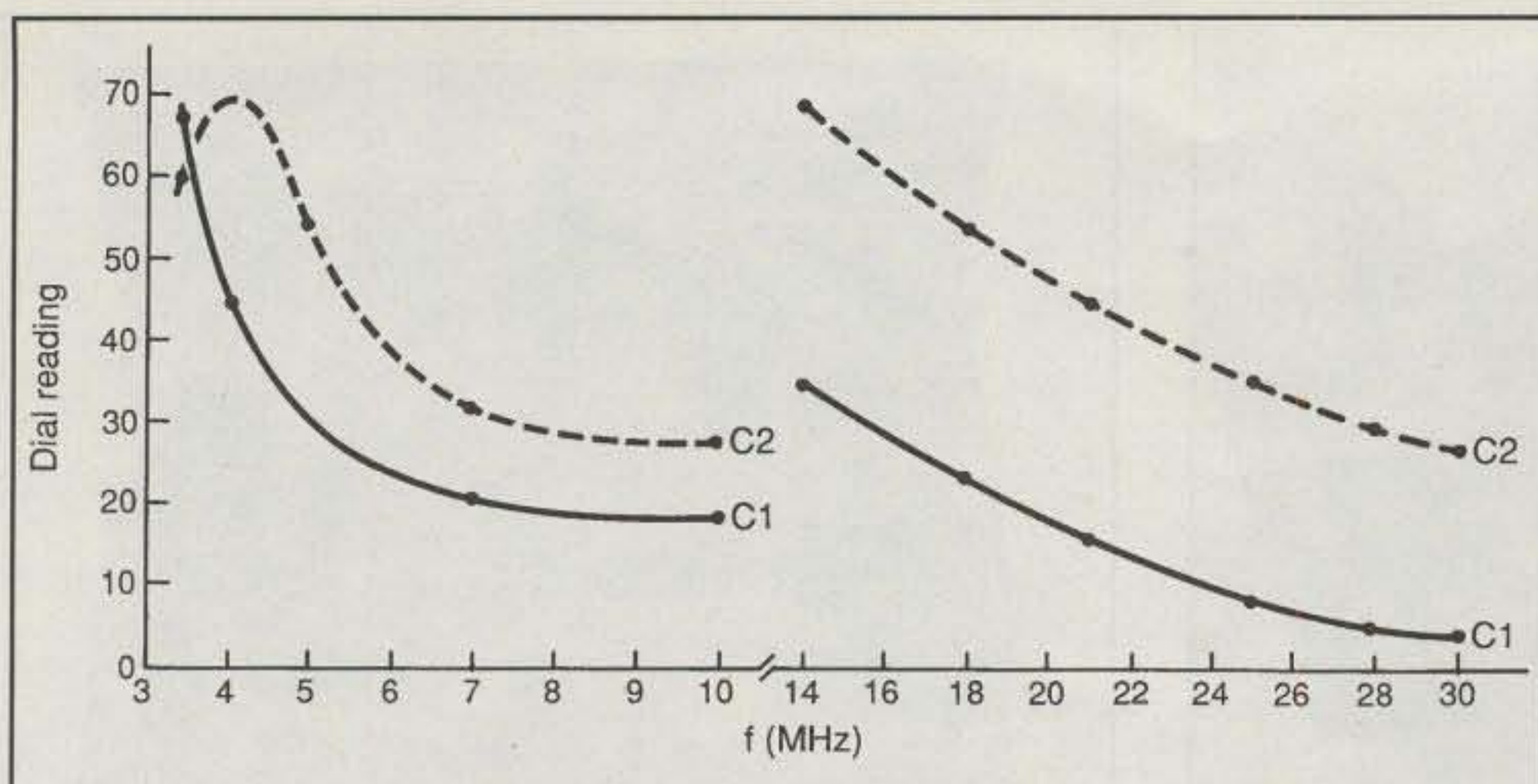


Fig. 3— Frequency range versus dial settings (approximate).

parison antenna is against which the gain is compared are important specifications that are often overlooked by many.

The Z-Match Revisited

In my last column I provided a brief description of a simple ATU (antenna tuning unit) that covered all amateur bands between 3.5 MHz and 29.7 MHz with only two tuning controls. No bandswitching is required with this unit (fig. 2).

In brief, the Z-match tunes two frequen-

cy ranges simultaneously. When the unit is properly designed, the ranges covered are approximately 3.5 to 11 MHz and 11 to 29.7 MHz.

Output is taken via a link-coupled coil which may be either unbalanced or balanced with respect to ground.

I have played with a homemade version of this circuit (photos A and B) and I like it! Construction is very simple. My unit is made up on a piece of plywood, 8" x 8". The panel is a piece of Masonite, 4 inches high and 1/8 inch thick. The dials

are vernier drives taken from a defunct surplus BC-375 tuning unit. Vernier drives are most helpful, as tuning is interlocking and quite sharp.

The following are construction and operation suggestions that will aid you in duplicating this device:

1. Components are mounted directly to the board. The two capacitors have small metal brackets that permit them to be screwed securely to the surface. The vernier drive for the "Load" control (C1) is insulated from the dial by a ceramic coupling. This decreases hand capacity effect. For appearance, the "Tune" dial for C2 is a similar unit. The dial mechanisms are bolted to the rear of the panel.

2. The fiberglass coil form is mounted in the clear, in a vertical position. The coil is "hot," so keep it clear of the capacitors. It is bolted to the baseboard with two small right-angle brackets.

3. The 4-turn pickup coil (L2) is a loose slip fit over the main coil. I used high voltage hookup wire wound by hand into a coil. Five plastic cable ties are used to hold the coil in shape. The pickup coil is positioned around the two bottom turns of the main coil. If coupling is too loose, the main tuning capacitor (C2) may spark over. In my case, the dual capacitor is a well-made broadcast type with .02 inch spacing. Since the plates are stamped out and the edges are not rounded or



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- CTCSS Encode AND decode subaudible tone built-in
- Even CTCSS scan
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- 7 types / 3 modes of scan
- Also available now: The C288A (220 MHz) has the above features, but with super extended receive: 115-249 MHz (Yes, a 220 HT that receives 2 meters!)

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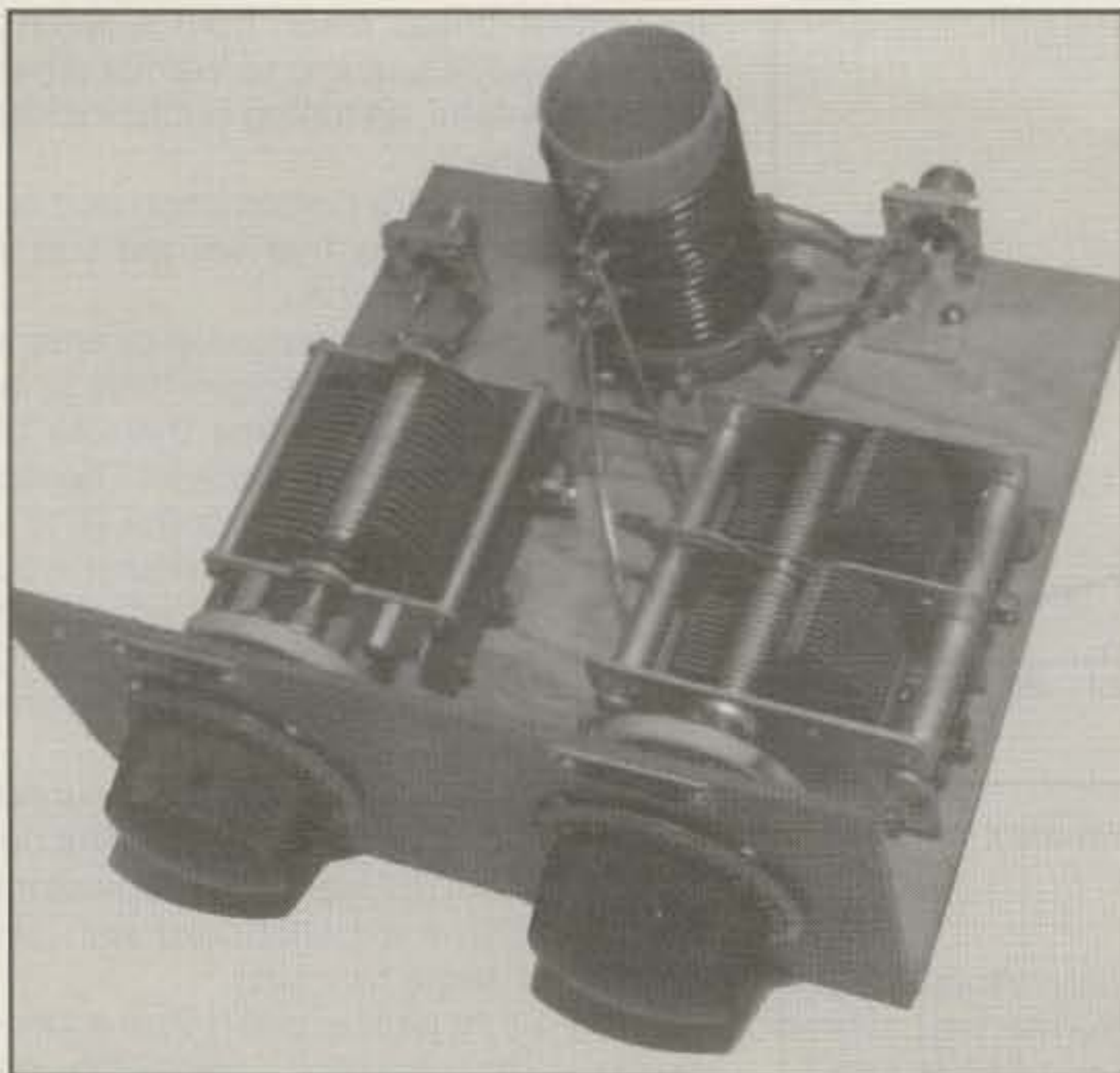


Photo A— The Z-match tuner. On the left is the loading capacitor with double section tuning capacitor at the right. Common ground lead connects input and output receptacles, bottom of main coil and rotor of "TUNE" capacitor, C2.

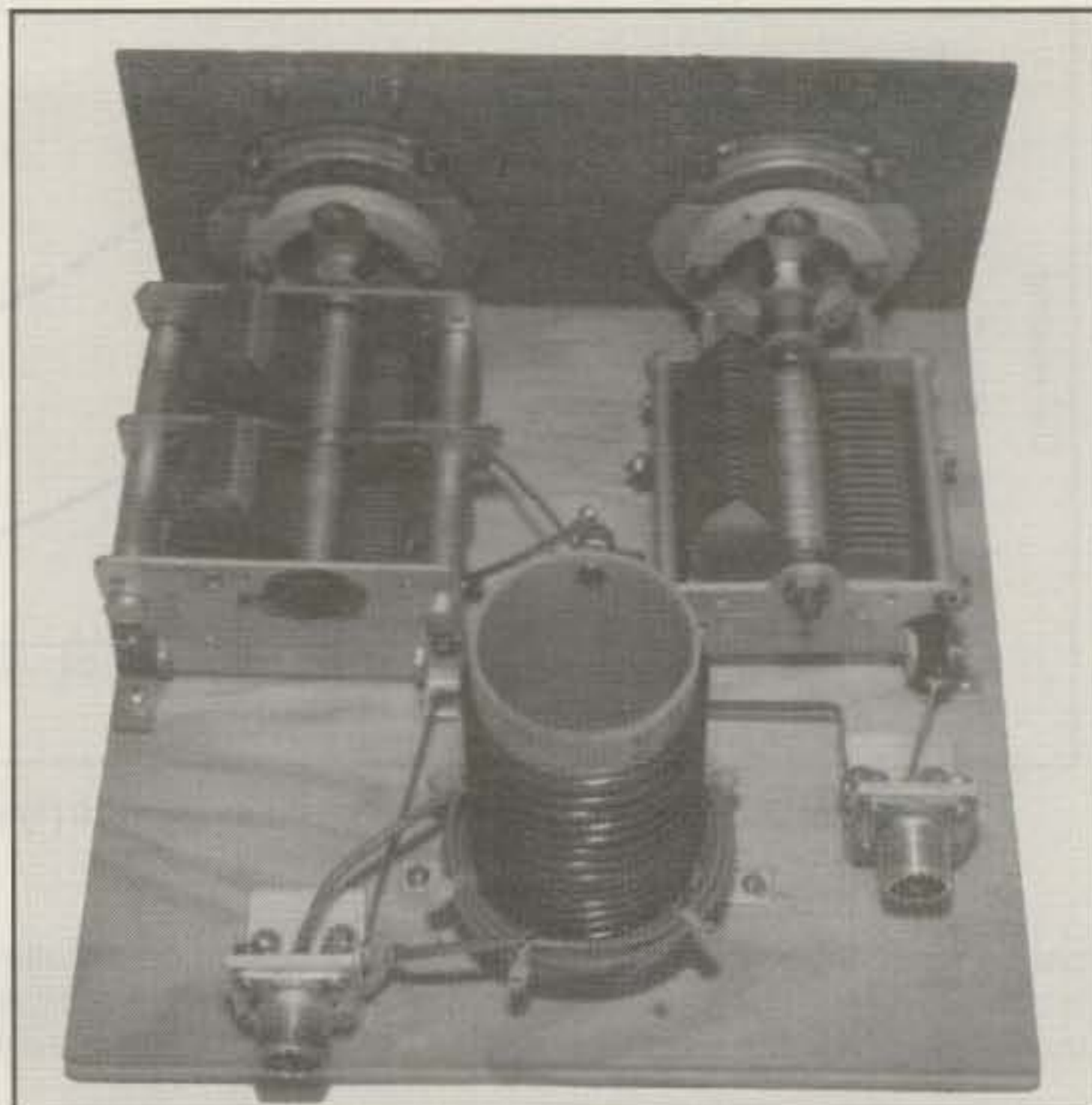


Photo B— Link coil L2 is slip-fit over the main coil and may be moved up and down about one-half inch to adjust coupling.

buffed, the RF breakdown voltage is only about 800 volts. When the link coupling is correct, the capacitor will not spark over at power levels up to 125 watts. (That was the maximum power my transceiver

would develop for the tests.) No sparking was ever noticed in the single section input capacitor, which also has .02 inch spacing.

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*Same size as FNB-26 case		
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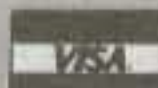
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5. To tune up from scratch, place the SWR meter between the Z-match and your transceiver. Set the loading capacitance to about half-range and tune the resonating capacitor (C2) until you notice a "kick" in the SWR meter forward reading. Vary the loading capacitor (C1) back and forth until the reading is enhanced. Now, retune C2 to peak the reading, followed by a second adjustment of capacitor C1. Continue tuning and loading until you "waltz" the controls to provide maximum power output with an SWR indication of less than 1.2-to-1. And that's it!

6. The "Tune" circuit is high-Q and plenty of circulating current flows in the coil and the leads to the capacitors. I first tried a commercial air-wound inductor of #16 tinned wire. It ran quite hot. Substituting a coil of #12 enamel-coated wire resulted in much less heat loss.

7. With the values given, the unit tunes from 3.5 to 11 MHz and 13 to 30 MHz. A tuning gap exists between 11 and 13 MHz. The frequency range versus dial readings are shown in fig. 3. Note that the setting of capacitor C2 apparently drops in value across the 80 meter band. You ask, why? I'll tell you: I don't know. I have checked this apparent contradiction many times and it really exists. It could be an idiosyncrasy of the particular antenna system under test. One of these days I may investigate further.

8. I used Formvar insulated wire for my coil, and it is a devil of a job to scrape the insulation off in order to make taps on the coil. I wound the coil on the form, marked the tap points with the sharp blade of a knife and then unwound the coil so I could attack the tap points, cleaning about 1/2 inch of insulation completely around the wire. These two spots were then tinned.

9. The coil turns are spaced a little more than the wire diameter. Even so, care must be taken when making the tap points. I took a long, thin soldering lug and wrapped the arm around the wire, leaving the main body of the lug free so I could bolt a connection to it. The arm soldered easily to the coil wire, and the lug provided a rigid, reliable mounting point for a connecting wire. I used 4-40 hardware to make the connection at this point. (A friend of mine said that this approach was the hard way. He suggested I merely hammer flat the end of the connecting wire and wrap the flat portion around the coil wire. A nifty idea! All that is needed is a hammer and a bench vise, and it is easy to flatten the soft copper wire.)

10. Finally, there is an intense RF field around the coil. Leave plenty of air about it. Don't cram it in a small metal box. You can see the detuning effect of a nearby

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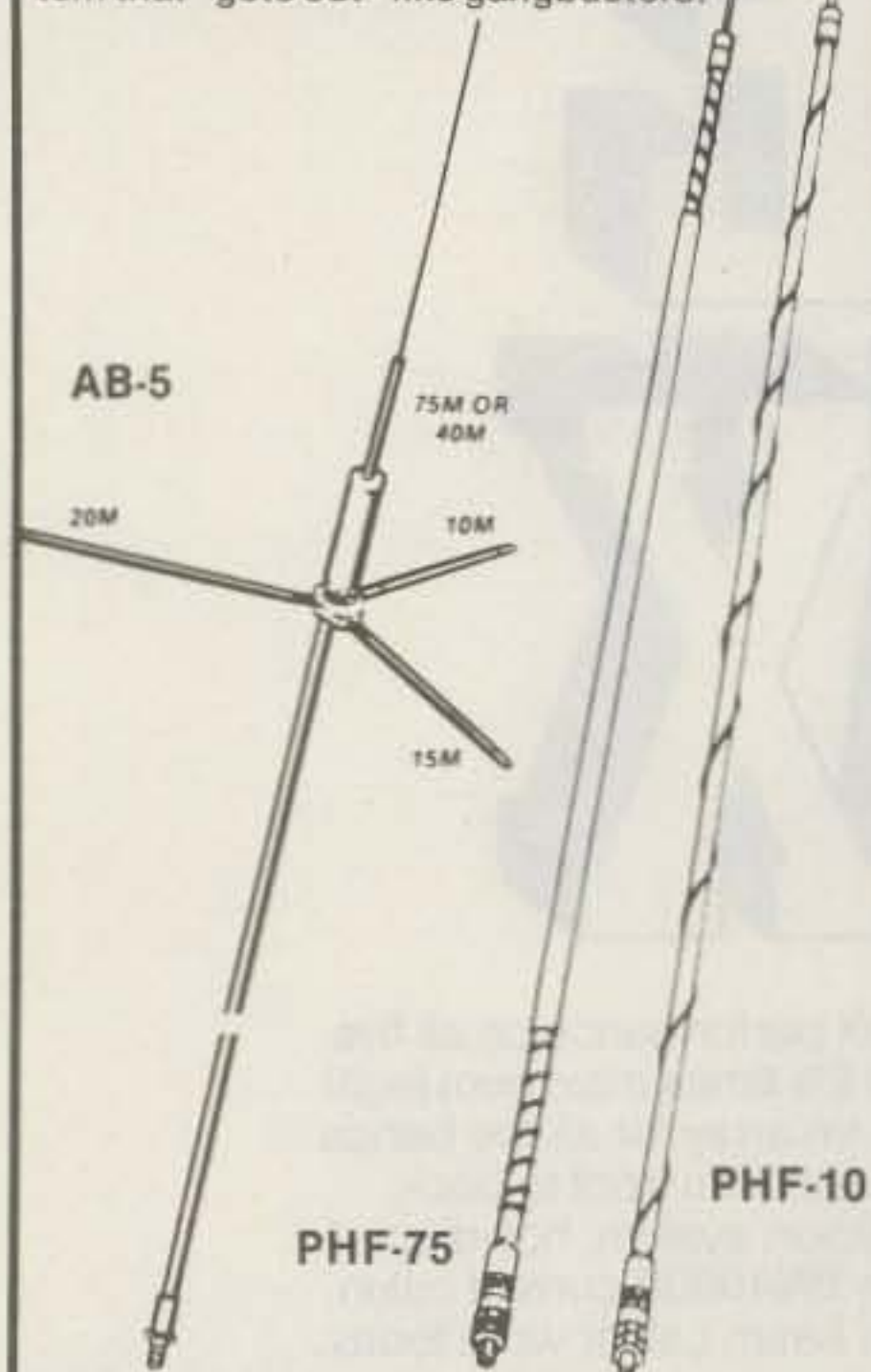
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Photo C- Gross CB-25 RF deck. Operation is possible on 160, 80, 40, and 20 meter bands with 40 watts input. Jacks provide meter monitoring points.

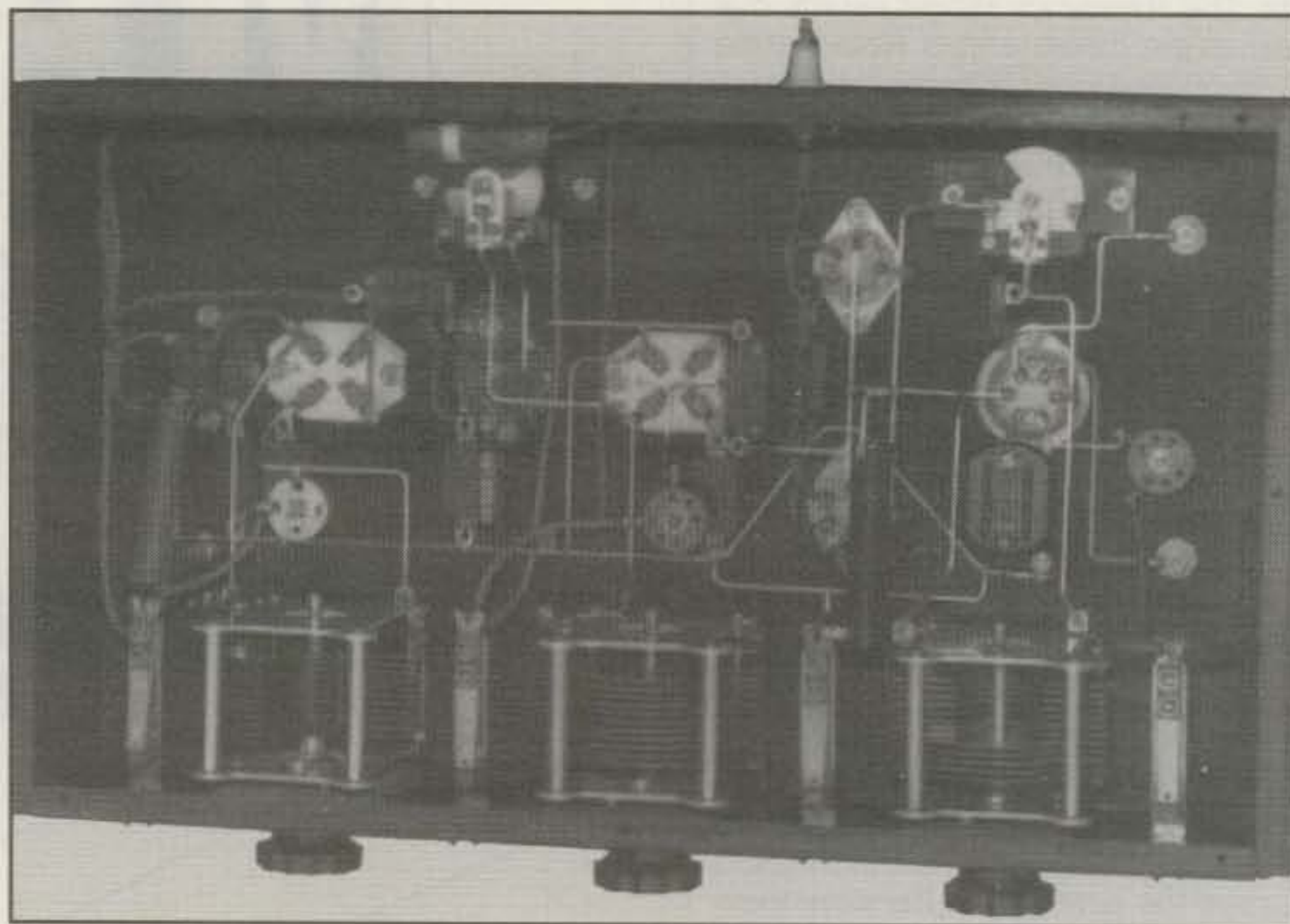


Photo D- Buss-bar wiring shows modern (1934) wiring technique.

object by bringing your hand close to the coil while you are passing power through the tuner. Don't touch the coil. I said "close to the coil." You get the idea.

11. You can substitute a two-terminal connector for ladder line in place of the coax plug. In normal use the coaxial connector frame is grounded to the ground wire of the tuner. For the balanced line, the connector need not be used, and the 4-turn coil "floats" with respect to ground.

That's about it for now. Have fun with this circuit and let me know how it works out!

The Gross CB-25 Transmitter

In 1934 if you could afford to spend \$90 on amateur radio, you might well have purchased the Gross CB-25 transmitter. This was a 40 watt, AM phone rig sold by Gross Radio Co. in New York City. There were plenty of the transmitters active on



Photo E— Power supply and modulator for CB-25 transmitter.

160 meters, but I could never afford one, being in junior high school on a 25-cent a week allowance!

I had forgotten the CB-25 until recently when I received a note and some photos from John Rollins, W1FPZ, who was just finishing the restoring of one of Jerry Gross's transmitters (photos C, D, and E). Photo C shows the RF deck using the popular 47-46- parallel 46's tube lineup.

A heavy steel chassis was used, and buss-bar wiring took care of the RF connections (photo D).

The modulator/power supply occupied a second steel chassis (photo E). A pair of 46's were class B modulators, driven by a single 46 and a 57 speech amplifier. Two mercury vapor 83 rectifiers powered the little transmitter.

When John's project is completed, the

whole shootin' works will be assembled in a small steel rack, complete with a meter panel—all ready to go on the air and amaze his friends. The Gross CB-25 is a fine example of 1934 state-of-the-art. Too bad you can't get them anymore!

The Dead Band Quiz

Last month I tried a "Jeopardy" type Quiz on you. The answer is "9, W." What is the question?

The question is, "Do you spell your name with a V, Mr. Wagner?"

Enough of that.

Now, for last month's quiz. The question: A room contains three exposed light bulbs. Three switches, each controlling one bulb, are outside the room. The room's door is closed. You are outside and cannot see into the room.

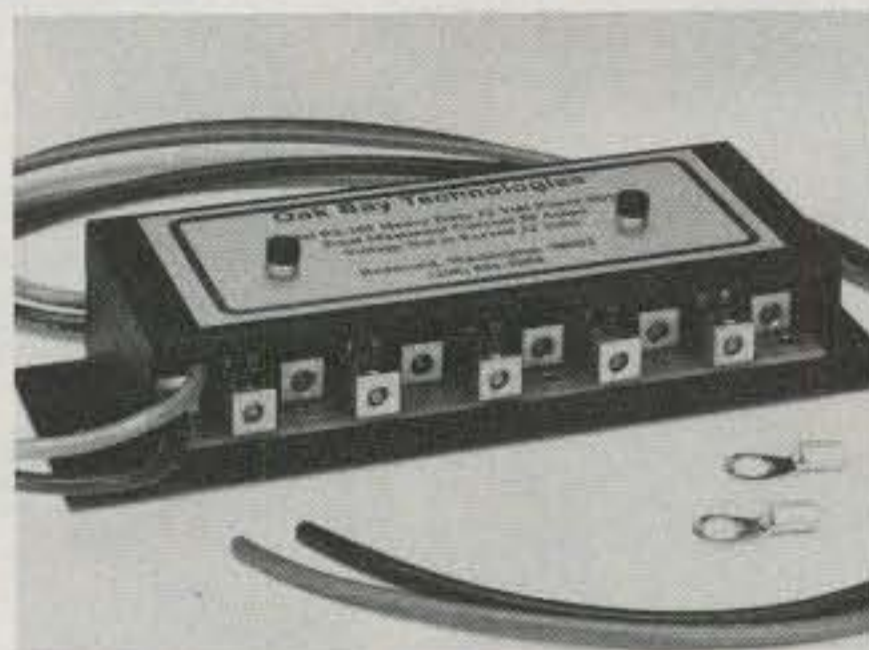
Your problem is to determine which switch controls which bulb. You are allowed to go into the room, but once you've opened the door, you may not touch the switches.

The answer: You turn on switches 1 and 2 and turn off number 3. Wait a few minutes, turn off number 2 as well, then go into the room and touch the two unlit bulbs. The warm one is controlled by switch 2, the other unlit one is controlled by switch 3, and the lit one is controlled by switch 1. Okay?

73, Bill, W6SAI

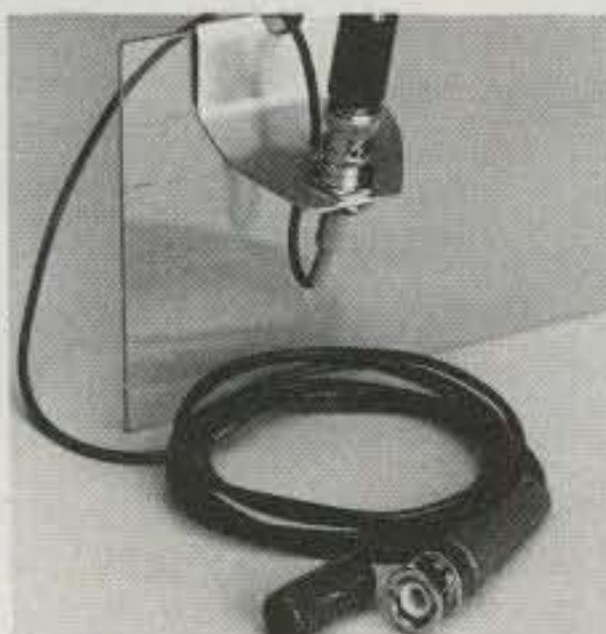
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ALL ABOUT THE WORLD ABOVE HF

Trips, Trips, and More Trips

Several VHF operators ventured into rare grid squares this summer. What follows are summaries of many of these trips.

Pat Rose, W5OZI, John Godwin, KG5IUA, Paul Stein, K5AWK, and Rafael Ortiz, XE2LQB: Because of his father's touchy health situation, Pat Rose, W5OZI, decided to stay close to home. Therefore, he, along with John Godwin, KB5IUA, went to Pat's ranch in DM90 over the 4th of July weekend. While there, they made 248 QSOs in 108 grids. QSL to Pat to his home address.

Pat was to go with Paul Stein, K5AWK (operating as XE2AWK), and Rafael Ortiz, XE2LQB, into the interior of Mexico. However, without Pat and John, Paul and Rafael went on by themselves for a very successful trip over that same weekend. Next month I will have a more complete report on their trip. However, if you need a card from either Paul or Rafael, then send yours, plus an SASE, to Paul.

Incidentally, Pat loaned Rafael his 551D, so look for Rafael on the air from DL98 from time to time.

The Bostedors Grid Expedition: In what was probably the most successful grid expedition of the summer, Dave Bostedor, Sr., K8WKZ, Pat Bostedor, N8PYO, Dave Bostedor, Jr., N8NQS, and Linda Bostedor (possibly the only sane one of the group) spent several days in Canada in grid squares FN17 and FN18. Because of Dave, Sr.'s health problems, the trip, originally scheduled for another group of grid squares, was rerouted to these two. Nevertheless, the group was very popular on the bands.

The total QSO count for the two grid squares was 670 for 6 meters and 66 from 2 meters. Dave, Jr., reports that they made VUCC from FN17 and missed VUCC from FN18 by only 5 grid squares.

Dave says that their biggest frustration was when operators would spend considerable time repeating their callsign before giving their own call. He cited one example where an operator spent 20 seconds repeating "K8WKZ" before fading out, never to be heard again. Dave stated that the most successful contacts were made when an operator would call once, then repeat his or her own call twice. He says that often complete QSOs could take place within 10 seconds!

Dave stated that his father was in charge of 6 meters and that he manned the 2 meter radio. He reported that because of interference between the two stations they had to synchronize their CQs. Whoever got a response could then complete the contact.

They were very appreciative of the efforts of their host, Randy Nordlund, VE2NRN. Dave says that Randy and all the other Canadians

VHF PLUS CALENDAR	
Sept. 1	α Aurigids meteor shower possible peak. (See text for details.)
Sept. 2	Canada UHF Sprints, 1900-2300 local time. (See text for details.)
Sept. 5	Moderate EME conditions.
Sept. 8	Canada 432 MHz Sprint, 1900-2300 local time. (See text for details.)
Sept. 9	Last quarter moon.
Sept. 11-13	ARRL VHF Contest. (See text for details.)
Sept. 12	Good EME conditions.
Sept. 14	Canada 220 MHz Sprint, 1900-2300 local time. (See text for details.)
Sept. 15	Perigee.
Sept. 16	New moon.
Sept. 18-19	ARRL 10 GHz Cumulative Contest. (See August column for details.)
Sept. 19	Good EME conditions.
Sept. 19-28	Mellish Reef DXpedition, 160 to 6 meters. (See text for details.)
Sept. 22	First quarter moon.
Sept. 24-25	Microwave Update conference, Atlanta, Georgia. See text for details.
Sept. 26	Good EME conditions.
Sept. 27	Canada 144 MHz Sprint, 1900-2300 local time. (See text for details.)
Sept. 28	Apogee.
Sept. 30	Full moon.

were exceedingly friendly and helpful. He says of Randy that he possesses an Indian's tracking ability to seek out fantastic VHF transmitting locations. Dave remarks that Randy must have put 200 miles on his car searching out spots for them to set up the antennas. Additional invaluable help was received from the

following other Canadians: Rudy, VE3BDR, Bob, VE3CTT, and Chad, VE2HOG.

As a spinoff of the trip, several Canadians commented that they had worked into areas of the states that they previously had not heard, let alone worked. It seems that with all the state-side antennas pointed north (for a change)



After placing first in the Foreign category in last year's ARRL June VHF QSO Party, Emilio Berny, XE3EB, was once again looking forward to a great contest. However, Murphy had other plans. In spite of having a team of excellent operators present at his QTH, a total of only 13 QSOs were made during the contest (one of them with Hal Perry, KC4YO, on 2 meters meteor scatter). Could the real culprit be the attraction of the beach only 80 yards away from the operating position? Or was it the swimming pool, or maybe the good food, or something else? Hum, I wonder. The beachcombers, from left to right, are: Pat Rose, W5OZI, Emilio Berny, XE3EB, Jack Henry, N6XQ, Ruben Sansores XE3WSB, Bill Tynan, W3XO, and Rolando Lorono, XE3XE. (Photo courtesy W5OZI)

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



"Chief op" Dave Bostedor, Sr., K8WKZ, with the feather in his cap, is pictured here shortly after making his only contact with Europe on 6 meters during his family grid expedition to FN17 and FN18. (Photo courtesy N8NQS)

everyone benefited. Dana Shtun, VE3DSS, remarked to your editor during our telephone conversation concerning the Canadian Sprints that there exist surprisingly large pockets of VHF+ weak-signal activity in areas of Canada not thought to show any amateur radio activity whatsoever. We in the states need to point our beams north much more often.

Dave, Jr., reports that one of his father's goals was to make a contact with Europe. However, he almost did not! One evening after the propagation had died down for awhile, the family broke out the video tape cameras and spent a couple of hours making tapes for their favorite amateur video television program. After tiring of that, Dave, Sr., turned on the radio and heard 9H1PA. They completed a contact during the last ninety seconds of a 1 1/2 hour long opening to Europe.

Dave, Jr., reports that he and Linda are already making plans for next year's trip to Canada. If you still need a QSL card for this trip, send yours to Dave, Sr. When you do, tell them how much you appreciated their efforts and wish Dave well as he continues his battle with cancer.

Gordon West, WB6NOA, and Carmine Fiorello, AB6KE, Bounce Through Four Grids: Do you remember that children's story about Cecil the seasick sea serpent? Well, over the weekend of the June VHF QSO Party Gordon West, WB6NOA, and Carmine Fiorello, AB6KE, probably thought of it. The goal of these two nautical novices was to operate as a Rover from CM93, CM92, DM02, and DM03, by traversing the intersection of these four grids with their 28 foot Bayliner yacht.

For 6 meters they used an M² SQLOOP. For 2 meters and 70 cm they used Cellular Security Group quad antennas and M² SQLOOPS. For 10 GHz they used a small horn antenna. For position accuracy they used two GPS receivers that showed their location to within 300 feet and maintained at least 600 feet of distance from the edge of the grid in order to assure themselves that they were within the announced grid square.

Well, it appears that Murphy is also acquainted with King Neptune. Gordon remarked that it took them over 6 hours to make the 123 statute mile trip to the intersection. He

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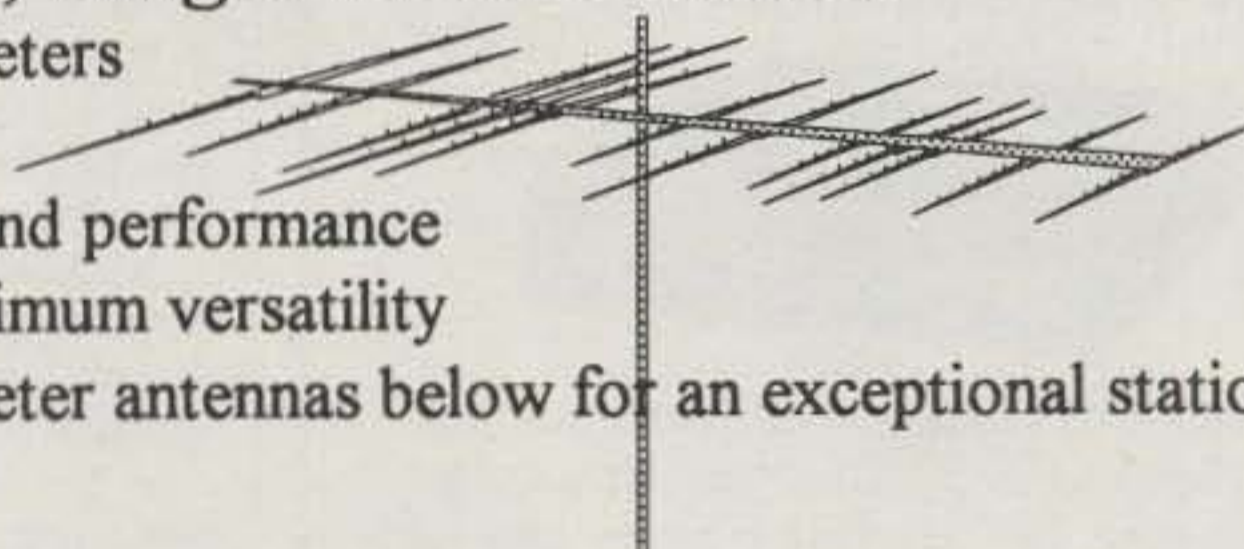
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reported that a low-pressure system off the northern California coast created 14 foot ground swells. He adds that when the wind came up, it was pure havoc.

Carmine stated that after they got into position within the first grid square, they had just started making contacts when he looked over his shoulder to see a huge ground swell beginning to break white water. He adds that when the wave hit, they all went flying! Luckily, no water came in and the equipment survived just fine.

Gordon stated that they had little trouble making contacts up to 300 miles via ground wave on 6 meters. However as they went higher in frequency, they found the ocean to be their benefactor one minute and their adversary the next. Particularly on 1.2 GHz and 10 GHz, they found that every time they rode to the top of a ground swell they would have excellent propagation. However, as they went into the valley between the swells, they would lose all signals and would just have to wait for the next crest.

Another problem they found was that it was impossible to keep the boat and the antennas oriented in the right direction while being tossed about. This predicament proved particularly annoying on 2 meters and 70 cm when they were using the quads. They finally switched to the SQLOOPS and sacrificed some signal strength for the convenience of not having to steer the boat around after every swell.

After only 1 1/2 hours into the contest the wind changed directions. When it did, it also picked up speed. Gordon reported that the gusts were so strong that the white water at each wave crest became a stinging horizontal sheet of fog-like spray. It was then they decided to call it a day.

They straggled back into port several hours later very exhausted but also very elated. In spite of their efforts, however, Gordon stated that you will not see their line score in December QST. Gordon remarked that because of the roughness of the ocean, they were not able to write down much of any intelligible information in the log. They do know whom they worked, however, and if you were one of the lucky ones, you can be assured that you will receive a QSL card in response to yours.

XE2/N6CL Activated During Memorial Day Weekend: Between 27 and 30 May your editor operated from Ojinaga, Mexico, in grid square DL79.

A group, all members of the Lawton-Ft. Sill ARC, regularly makes trips to Mexico. Among the members of the club is a dentist, Dr. Bob Morford, KA5YED. Bob covers a number of locations near the border and into the interior.

Upon learning about their activities from Claude Matchette, KD5RQ, I inquired into the possibility of going on one of these trips. Arrangements were made for me to go to Ojinaga on this most recent trip. As a good VHF+ operator I had to take at least 6 meters along.

While there, I had propagation every day. In total I made over 150 contacts on 6 meters and about the same number on HF during the CQ WW CW WPX Contest when 6 meters was dead.

I used the Yaesu FT-650 and an M² 5 element beam. For my beacon I used an AEA MorseMachine. The Yaesu worked great and I highly recommend it for grid and DXpeditions such as this. (I will be doing a review of this

radio in a future issue of CQ.) The M² beam is excellent for these kinds of trips because it can easily be broken down and stored or shipped. The MorseMachine was the band opener. Having a beacon running was an excellent way to announce my presence and to let me know that others were hearing me.

I really appreciate the help of Bruce Brown, KI5TE, Claude Matchette, KD5RQ, and Bob Sims, W5KCB, all of whom were on the trip and helped me set up this grid expedition. Look for me to operate from other rare Mexican grids on future trips with these great guys.

Jim Moss, WB9AJZ, and Company Rained Out of Grid Expedition: It was to be a fun Memorial Day weekend of operating from one of California's least land accessible grid squares. Jim Moss, WB9AJZ, Kevin, N5XSA, and Jim, N5TSP, set up camp from grid square CM79, only to be rained on and practically blown away from the very beginning of the expedition.

Jim stated that the location for operating from this grid square is a small strip of land located about 40 miles north of Fort Bragg (this Fort Bragg is in California, not North Carolina). Because of its almost inaccessible location, it has gained the nickname of "The Lost Coast." Journeying to it is via a 2 1/2 mile hiking trail that starts at the Kings Range National Conservation Area. The first 1/2 mile of the trail is up a 1000 foot incline!

The team arrived at the parking area and off-loaded their equipment from their vehicle. In order to transport everything they used a hand truck and created a stretcher from a sleeping bag, two 10 foot masts, and two 10 foot sections of the 6 meter beam. Additionally, several of the radios fit into backpacks.

After finally getting everything ready to transport, they were on their way. About three switchbacks later they finally got to the main trail. However, Murphy already was making his presence known. They noticed drizzle coming through the forest canopy. Nevertheless, they pressed on.

When they arrived at the location they were to use for their camp, Jim noticed some ominous clouds rapidly heading their way. Because they wanted to get a current weather report, they decided to set up the 2 meter station first. Once on the air, they tried to raise a local on 2 meters FM, but with no success. They switched to SSB and immediately had a pileup. When Jim finally worked a local operator, he asked him to check with the weather service for a current weather report. During the time it took for the other station to return, they worked several stations in northern California and Nevada.

When the weather report came back, it stated that none of the reporting stations were showing rain! Jim reflected that maybe they should have reported their rain. A little bit later Jim worked Len, WA6KLLK, who found out that rain was now being reported and predicted to continue to fall throughout the next 24 hours.

With that forecast in hand, coupled with the falling temperatures and the overall deteriorating conditions, the team decided to cancel the remainder of the trip. At 6 PM they advised Len that they were breaking camp and heading back to the car, and that if he did not hear from them by 9 PM he was to notify the authorities (good idea!).

The trip back, although with gear weighed down more from the water in the sleeping bag,

was mostly uneventful. Once back under the forest canopy, they were able to escape most of the downpour. What was an uphill trip on the way out was downhill (and much easier) on the way back.

They arrived at their car at about 8 PM. Once in the car, Jim turned on the 2 meter radio only to hear Len calling them. Jim immediately notified Len that everything was fine and that they had survived CM79.

Altogether they made 25 contacts in 10 grids. Jim thinks that they will go back again, so be watching for them for a future expedition from one of the most rare grid squares in California.

Jim Treybig, W6JKV, Operates as ZF2QR: For 10 days from 30 June through 9 July Jim Treybig, W6JKV, operated from the Cayman Islands as ZF2QR. Altogether he made 485 QSOs. Jim also reported three contacts via sporadic-E on 2 meters. He said that he had contacts with Costa, CU1EZ, at least three days during the trip. Jim stated that although he heard the YV4AB beacon, he made no South American contacts.

While there, he was visited by locals ZF1RC and ZF1DC, who are now planning bigger antennas after Jimmy demonstrated that they could regularly work Europe in the evenings.

Jim reported that there must be many new amateurs on the bands because when he returned, he discovered that he already had 70 QSLs, mostly from amateurs he had never previously worked.

He said that he was using the back four elements of his 50 foot 6 meter beam and his Yaesu FT-650, running 80 watts. He stated that he found that the noise blanker in the FT-650 was superior to other radios he has used in the past (*my experience as well with that radio—ed.*). And that it was a good thing, because his noise level was S-9 all the time, with bursts exceeding 30 dB over.

Jim also discovered that baby monitors that operate just below the band emitted signals in excess of 60 dB over S-9. What a comforting thought that is to the 6 meter operator!

If you need a card from Jim for this very successful operation, send one, with an SASE, to his home QTH.

June VHF QSO Party

It appears that although not as great as last year, this year still seems to have been a great contest. Among some of the scores I have been able to track down are the following: In the Multi-Multi category W2SZ seems to be the leader with around 1.2 million points. Close on their heels, however, is the Rochester VHF Group, with around 1.03 million points. In the running is the Packrats with 797k. Also showing with excellent scores are: AA9D, 712k; W0UC/9, 443k, and KB0CV, 291k.

In the single operator class the following scores have been reported: WB0CQO, 46k; KB0IKP, 40k; WA0NTT, 78k; K0FQA, 44k; NN9K/0, 128k; WA2HFI, 21k; W0PHD, 153, N9CIQ, 15k; W0YPT, 3k; WB0HHM, 4k; WB9OJR, 19k; WD9IAB, 273; and KA0RYT, 9k.

Rover scores include: WA4VCC, 176k, four grids; KE9QT, 109k, N0SUO, 8k; K9JK, 33k; and N6CL, 89k, five grids. Also operating as a Rover team were Ron, KC6WLC, and Joe, N6RPM, traveling through at least five grids in northern and central California.

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The senior Bostedors have lunch with their hosts shortly after their arrival. From left to right are: Pat Bostedor, N8PYO, Dave Bostedor, Sr., K8WKZ, Randy Nordlund, VE2NRN, Bob, VE3CTT, Rudy, VE3BDR, and Chad, VE2HOG. (Photo courtesy N8NQS)

Incidentally, on my trip through five grids I had the pleasure of having first-time VHF con- tester Jim Rudnicki, NZ7T, along for the ride. Jim, who was in town for an FAA school, called me the Thursday evening before the contest to tell me that he was a fan of mine (there I go, being vain again). On Saturday morning I called him to ask him if he wanted to go with me as I roved through several grids.

Jim jumped at the chance. Although he had never been on VHF before he proved to be a natural. His previous contesting experience bade him well. At one point Saturday we had a 90 QSO hour. Without Jim's help I would never had done as well as I did or had as much fun. Thanks, Jim!

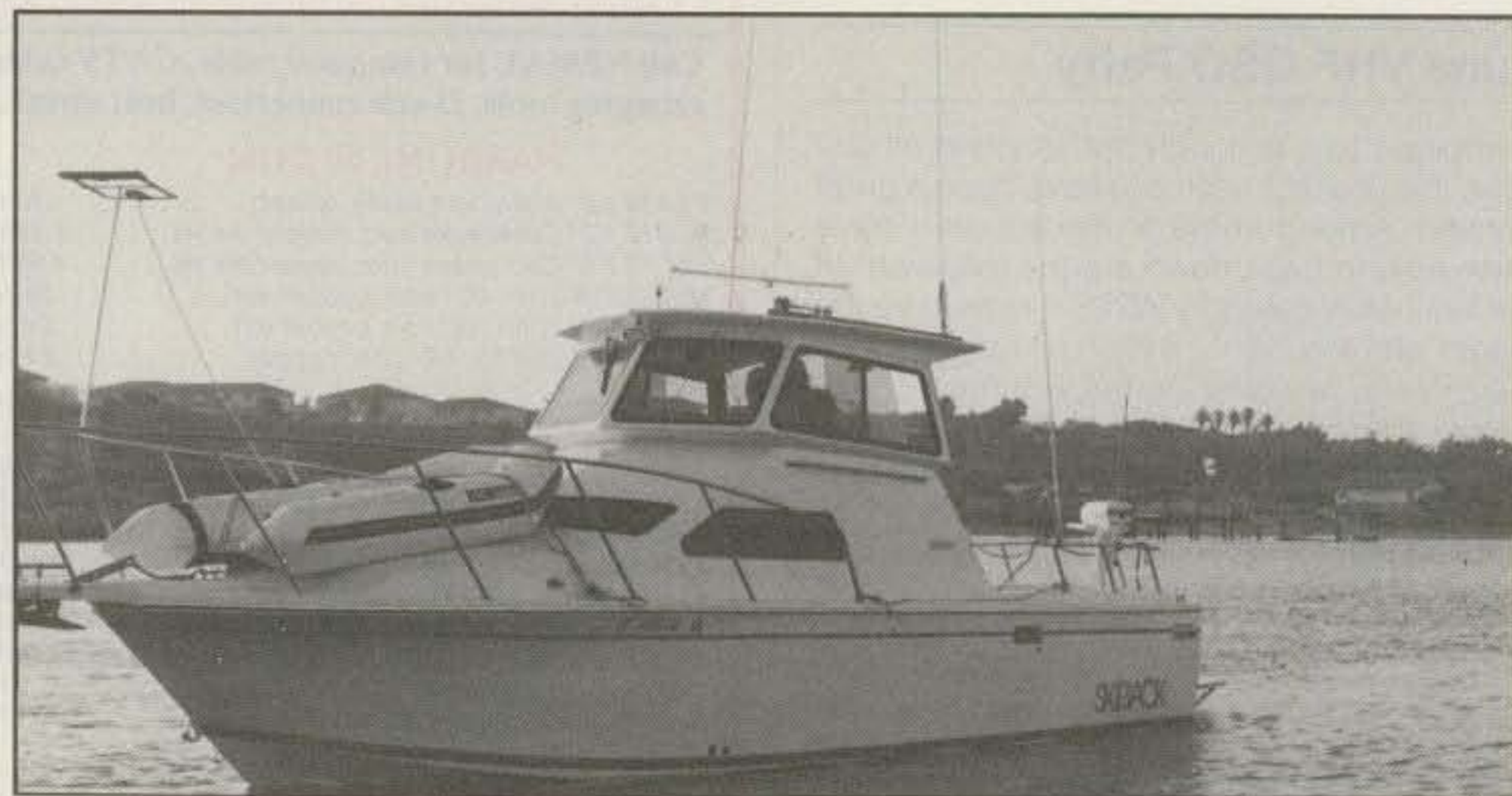
Tim Marek, NC7K, along with Dave Eubanks, NR6E, operating from Pond Peak, Nevada, was on 6 and 2 meters and 70 and 23 cm. After trudging through snow drifts and over a road that eats cars alive if they travel more than 5 miles per hour, they arrived Friday evening before the contest. The next day their efforts were rewarded with excellent conditions that

lasted through the weekend. Contacts included the following: 6 meters, 171 QSOS in 94 grids, 2 meters, 101 QSOs in 42 grids, 70 cm, 35 QSOs in 20 grids, and 23 cm, 6 QSOS in 5 grids, for a total of 58k points.

What a disappointing time it was for the team operating from Emilio's beach front QTH. After last year's success, a team that included Jack, N6XQ; Pat, W5OZI; Bill, W3XO; Rolando, XE3XE; Reuben, XE3WSB; and their host, Emilio, XE3EB assembled at the beach home. While enjoying excellent propagation the day before the contest, only a total of 13 QSOs were made during the contest.

Several stations, which included Duane, KA5WRG, and Larry, W5NZZS, in Oklahoma reported working Hawaii. Duane worked Shel, NI6E, Paul, KH6HME, and Al, KH6IAA, while Larry worked two of the three Hawaiian stations.

On the other end, Jon Jones, NOØY, operating from WBØDRL, reported that they were heard in Europe. (Jon also reported that they had 639 QSOs in 214 grids on 6 meters.) Not



Gordon West, WB6NOA, and Carmine Fiorello, AB6KE, bounced through four grid squares during the June VHF QSO Party. They used a 28 foot Bayliner yacht to make the trip to the intersection of grids CM93, CM92, DM02, and DM03. While there, they were reminded of Cecil the seasick sea serpent. This photo, taken in port, shows the 6 meter M² SLOOP mounted up forward to pick up the best height over the water. (Photo courtesy WB6NOA)

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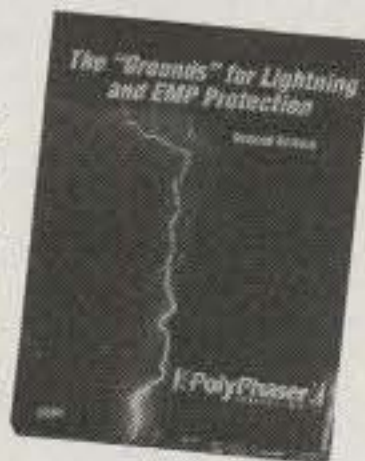
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surprisingly, other stations were heard and two, Hal Perry, KC4YO, and Mike, VE1MQ, reportedly worked into Europe during the contest. Another highlight for Hal was being one of the 13 stations worked by XE3EB and that by way of 2 meter meteor scatter!

On The Air

6 Meters: Late May through early July featured many sporadic E openings on 6 meters. On 7 June, shortly after getting his new EME array up, Mike Staal, K6MYC, worked five Alaskan stations, one right after another.

Carl Huether, KM1H, sent me a FAX of his log showing 75 contacts with western and central Europe beginning at 1638 UTC 11 June. The opening lasted until 1941 UTC and then opened up again briefly at 0057 UTC on 12 June. He reported that OK1MAC was country number 82 and that OX3LX was country number 83. When we were conversing on the phone at 0300 UTC, Carl reported hearing the VO1, OX, and GB3VHF beacons. By early July Carl had added five more countries to bring his count to 87!

On 12 June between 1510 and 1924 UTC Ray King, WB8YFE, worked the following DX stations: VP2ECW (for country number 80), KP4BZ, FY3EL, KP2A, 6Y5IC (for country number 81), HH2PK, C6AFP, 9Y4VU, COØFRC, XE2/K9VV, and heard YV4AB beacon.

On 16 June Phil, K6EID, and Bob, KA2DRH, worked OX3LX. Unfortunately for Bob, a number of stations were calling DX randomly on top of the OX station. Bob hopes that this type of HF operating practice is not going to be the norm on VHF. He says that is why he rarely



Tim Marek, NC7K, and Dave Eubanks, NR6E, operated from this site, Pond Peak, Nevada, during the June VHF QSO Party. With a view like that, no wonder they had excellent propagation. (Photo courtesy NC7K)

works any HF DX anymore. (I hope not, Bob.—ed.)

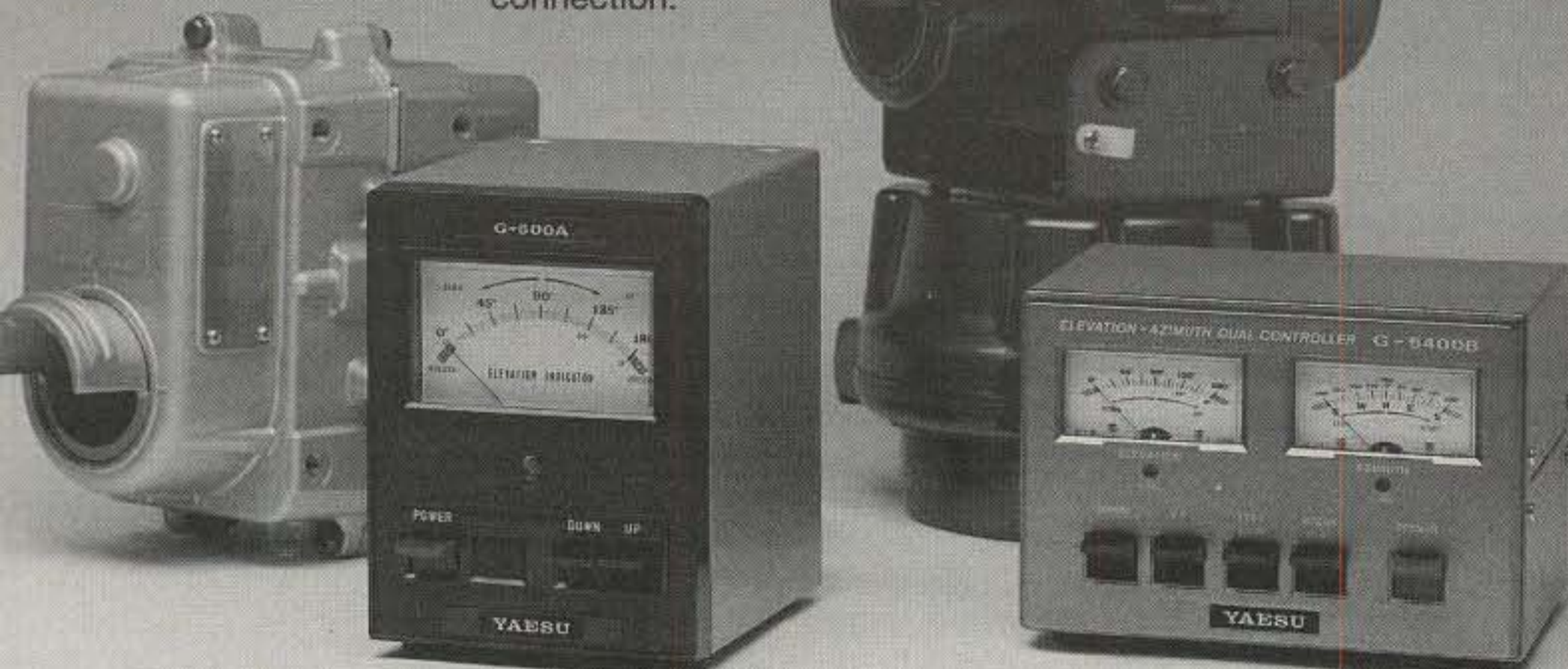
Terry Baxter, N6CW, operating as VP2ECW, reported that he made 350 contacts before and during the June VHF QSO party. Terry also reports that the VP2EA beacon is operational

on 50.012 MHz. And, thanks to Terry, who loaned his rig to VP2EHF and VP2EE, several hundred contacts with Anguilla have been made over the summer. Among them was Don Karvonen, K8MFO, who worked VP2EE for country number 99. Don went on to work Wenti,

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6Y5IC, for country number 100! It is rumored that at least one other operator completed DXCC by working someone in VP2E.

Bob Magnani, K6QXY, reports the following propagation: on 20 June he worked NL7OW, KL7Y, and KL7HFQ. On 23 June he reported working KL7IKV, AL7C, and NL7OW. On 24 June he and Mike Staal, K6MYC, worked Ken, VE8KM, in DP79. Bob reports that after 13 years he can finally apply for the Worked All Canadian Districts award.

On 29 June between 0500 and 0600 UTC Bill Clemow, KE7CX, and a number of other Oregon operators—including AA7EA, N7AVK, N7DB, K7RWT, and W7ZRS—worked Ken, VE8KM.

Roger Webb, WB4WTC, reports the following: On 15 May he worked HH2PK; on 23 May he worked CO2KK; on 2 June he worked VE1PZ; on 15 June he worked VY2DCS and CT3FT; on 16 June he worked VE1PZ and XE3EB and heard the OX3VHF beacon; on 17 June he worked VP2ECW; on 21 June he worked VE1PZ and CO2KK; on 2 July he worked XE1ABA, CO2KK, and XE3EB, and heard ZF1DC and ZF2QR.

Then on 3 July Roger reported that between 1330 UTC and 2400 UTC he worked ZF2QR, XE3AWK, VP2MO (for country number 96), and VP2EE. He also heard, but did not work, HI8DAF, KP4EIT, HH7PV, KP4BZ, HH2PK, VP2EHF, 6Y5IC, ZF1DC, KP4EOR, and XE3EB. Also heard (in the opposite direction) were W7s. Roger says that when he heard the VP2MO beacon for over 20 minutes he called the number he had for Bobby Martin. Upon discovering that it was connected to a FAX machine, Roger sent Bobby a FAX (Bobby's FAX number is 809-491-6368). About an hour later

Bobby showed up and made a multitude of contacts, including Roger's 96th country.

On 6 July at 2250 UTC, CT3FT, worked a number of stations in W4, W8, W9, WØ, and one contact west of the Mississippi, that being with Len Parsons, W5AL. This was Len's 67th country.

2 Meters: Between 1 and 10 June Dave Teague, KF5IU, reported tropo and sporadic-E, with the highlight being on the 10th. On that day the following stations were worked, WA7GSK, DN13; K7TM, DN13; W7ID, DN13; KB7PGM, DN13; WBØDOM, DM79; KDØDW, DN70; KB7FUV, DN44; KAØPAY/M, DM79; WBØDOM/M, DM79; NØIPL, DN70; W2CRS, DM78; WA7KYM, DN71; and NØUVU, DM78.

On 29 June Ed Maikranz, KG5UN, worked Rene, WB4MJE, possibly on sporadic-E.

On 7 July Len Parsons, W5AL, reported a 10-minute 2 meter sporadic-E opening into eastern Oregon, eastern Washington, and Idaho.

Mellish Reef DXpedition

Between 19–28 September a group, including VK4CRR, VK2BJL, VK2BEX, P29DX, V73C, WA4DAN, K5VT, and G3WGV, will operate from Mellish Reef, VK9M. Operations will be on all bands through 6 meters. A beacon will be maintained on 6 meters, with the frequency to be announced at a future date. This trip needs approximately \$30,000 of financial underwriting. If you wish to make a contribution, write to Murray Adams, WA4DAN, 403 East 14th St., Greenville, NC 27858. Include an SASE for a bulletin update to be sent out just prior to departure.

Current Conference

The Microwave Update conference is scheduled for 24–25 September at the Northwest Atlanta Hilton in Atlanta, Georgia. The list of speakers to date includes: Zack Lau, KH6CP, speaking on 10 GHz transverter construction; Dennis Sweeney, WA4LPR, speaking on waveguide filters; Al Ward, WB5LUA, speaking on 24 GHz equipment; Kent Britain, WA5VJB, speaking on microwave basics; Randall Rhea, N4HI, speaking on microwave computer-aided design; Charles Osborne, WD4MBK, speaking on radio astronomy; Irving Rosenberg, W2CQH, speaking on Evanescent mode waveguide filters; Jim Davey, WA8NLC, speaking on microwave engineering techniques; Rick Campbell, KK7B, speaking on single-board 1296 MHz transceivers; Dave Kunkee, KØDI, speaking on 90 GHz passive radiometry; and Tom Williams, WA1MBA, speaking on his historical (2 May 1993) 3.5 km 145 GHz contact with Jim Mead, WB2BYW (this talk alone should be worth the price of admission).

If you want conference registration information, contact Jim Davey, WA8NLC, Conference Chairman, 4664 Jefferson Township Place, Marietta, GA 30066. You may call him at work at 404-333-2136 or at home at 404-998-6971.

Current Contests

Canadian Sprints: Our friends to the north, Radio Amateurs of Canada, are sponsoring their annual Sprints beginning this month. Two important notes: First, the dates have been changed this year because of past weather

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conditions. Second, the new organization, the Radio Amateurs of Canada, formed from the combination of CRRL and CARF, has taken over sponsorship of the Sprints. There have been no rules changes; they are the same as last year. All Sprints, except the 50 MHz Sprint, run from 1900 to 2300 local time. The 50 MHz Sprint runs from 1000 to 2400 UTC.

The first one is the Microwave Sprint. It is set for 2 September and includes 902, 1296, and 2304 MHz. The second one is the 432 MHz Sprint and it is scheduled for 8 September. The third is the 220 MHz Sprint. It is scheduled for 14 September. Canadians will monitor 222.100 in an effort to work south into the States. The fourth one is the 144 MHz Sprint, which is scheduled for 27 September. The last one, the 50 MHz Sprint, is scheduled for 2 October. Exchange is your grid square, and contacts are worth one point per QSO in each contest. Scoring for each Sprint is the grid squares multiplied by the total QSOs. Please note: No FM contacts are allowed on 146.52 simplex or via any repeaters. Mail your logs to RAC Vice President and VHF column editor Dana Shtun, VE3DSS, 500 Willard Ave., Toronto, Ontario, M6S 3R6, Canada.

September ARRL VHF Contest: The September VHF contest is similar to the June VHF QSO Party. The contest starts Saturday, 11 September at 1800 UTC and ends Monday, 13 September at 0300 UTC. Full rules can be found in August QST. Remember, last year's contest was highlighted by record-breaking tropo conditions covering the east and extending into eastern Oklahoma. So be prepared. You never know.

ARRL 10 GHz Cumulative Contest: The second weekend of this contest is September 18-19, from 8 AM local to 8 PM local. A summary of the rules can be found in last month's column.

Next Month: The first weekend of the ARRL EME contest is set for 9-10 October. As I was finishing this column, I received a call from Mike Owen, W9IP, informing me that his group has permission to operate VE3ONT from the Algonquin Observatory during the EME contest, weather permitting (remember last year?). More information on their operation will be in next month's column.

Current Meteor Showers

On 1 September the α Aurigids meteor shower may have a possible peak. This is a minor shower that showed some life in 1986 (a one hour shower was observed in Hungary). Its radiant position is around 42°, in the constellation α Aurigae. It is also worth remembering that this time of year is favorable for early morning sporadic meteors.

News of Newsletters

50 MHz DX Bulletin: It appears that Shel Remington, N16E, and Victor Frank, K6FV, have come to an agreement on the immediate future of the "50 MHz DX Bulletin." The June issue contained editorial from both Shel and Victor. Additionally, Shel wrote a note that because of his lack of resources he was relinquishing the position of editor to Victor. In turn, Victor advised readers to not send money. He stated that he was attempting to fill the subscriptions of current subscribers and would not be soliciting new subscribers, at least not in the

near future. So for the moment, it appears that this newsletter is slowly being phased out.

220 Notes: The ownership of the "220 Notes" has been transferred to Burt Hicks, WA6MQV. The subscription price is \$5.75 per year (a bargain). Send your editorial input and your subscription order to Burt at 28221 Stanley Court, Canyon Country, California 91350. You may call him at 805-251-5558; you may also FAX him at 805-251-5572.

Upper Midwest VHF/UHF Newsletter: The "Upper Midwest VHF/UHF Newsletter" serves the upper midwest and central Canada. It is edited by Rich Westerberg, NØHJZ, 17500 Cherry Drive, Eden Prairie, MN 55346. Subscription rates are \$7.00 per year in the U. S. and \$10.00 per year in Canada. Rich has a number of contributors and lots of reporting on VHF activities in that area of the country.

The West Coast VHFer: Bob Cerasuolo, WA6IJZ, has added a correspondent to the staff of the "West Coast VHFer." Tim Marek, NC7K, will be reporting on activities in the northwest as well as continuing to supply up-to-the minute contest expedition information to the newsletter. This newsletter is perhaps the most successful currently available. Although it principally covers activity in the west, it is always full of good VHF+ news. (Where do you think I get a lot of my west coast VHF+ information?) The July issue was 18 pages long! If you are interested in a subscription send \$14 to Bob at P.O. Box 685, Holbrook, AZ 86025.

"Please QSL. Why QSL?" Feedback

A number of you wrote favorable comments to me commenting on the QSL topic in the July column. Several of you (WB5KYK and AA7OA) pointed out one mistake and one glaring omission. First, the mistake: An IRC, by international agreement, will buy you one unit of airmail postage from your country. However, in practice, that does not always work. Check with your local post office to be sure.

Next, the omission: Be sure to include your grid square information on your QSL card. It becomes quite a chore to track down a grid square trying to use an atlas and a magnifying glass (especially to this guy who uses the most powerful drug store glasses and a magnifying glass to read fine print).

Additionally, while none of you commented on it, I did not discuss bureaus, principally because most of our QSLing is domestic and not eligible for bureau use. However, if you work DX and want to take advantage of the bureaus, here is how.

Most countries maintain bureaus for use by their amateurs. The addresses for these bureaus can be found in the *Callbook*. Each country has its own regulations concerning eligibility criteria for use of its bureau. Therefore, when in doubt, QSL direct.

In the U. S. the ARRL maintains two separate bureaus—an incoming and an outgoing bureau. The incoming bureau is administered by volunteers within your own call-letter location. The outgoing bureau is administered at League headquarters.

The incoming bureau is administered by call letter. For example, even though I live in Oklahoma, because I have a 6-land callsign, I get my DX cards via the incoming bureau in California. Therefore, I maintain SASEs at that bur-

eau. When they get enough cards to fill an envelope they send it on to me. However, my friends here in Oklahoma who hold 5-land call signs have to maintain their SASEs at the bureau for 5-land licensees, located in Midland, Texas.

To use the outgoing bureau, you must send your cards (along with the appropriate fees) to League Headquarters. Also, unlike the incoming bureau, to use this service you must be a League member. You may send as few as one card or as many as you can take to the post office (the record is in excess of 50 pounds!).

For a list of addresses of incoming bureaus, and a complete list of rules for both bureaus, send an SASE to the ARRL.

Surprisingly, in spite of several stations no longer QSLing, the topic is still very popular. There is something special about getting anything (but a bill) in the mail. And it is especially enjoyable to receive mail from someone with whom you are now friends.

6 Meter EME Tests Scheduled For Every Month

Mike Staal, K6MYC, reports that every month he, Bob Magnani, K6QXY, and Jimmy Treybig, W6JKV, will be conducting EME tests to Europe. The center frequency is 50.030, with each station being plus or minus that frequency. If you are interested, contact Mike for more information. For up-to-date information, you can FAX Mike at 209-432-3059, or Bob at 707-538-1343.

VHF+ Resources

Carl Huether, KM1H, owner of Radiokit, P.O. Box 973, Pelham, NH 03076, reports that they can modify Heathkit SB 200 and SB 220 series amplifiers and the National NCL 2000 amplifier for dedicated 6 meter service. He says that they can also provide an amplifier ready for you to use. Carl also reports that he has obtained two of the three original 6 meter 16-element collinear arrays that were sold by Cushcraft in the 1960s. He has redesigned these models and is selling these redesigns. For more information on these or their other products or services, contact Carl at the above address. You may also phone him at 603-635-2235, or FAX him at 603-635-2943.

4U1UN QSL Route

Carmello, AA2FN, reports that he has all the logs for the last 1 1/2 years. So, if you are needing a card and have tried other routes without success, then drop Carmello a line at his *Callbook* address.

Wanted: 6 Meter Composition

About four years ago Harry Schools, KA3B, published a paper entitled "Six Meters, the Magic Band." He has misplaced the original and I am looking for a copy of it. If anyone has a copy and is willing to make a photo copy of it, I would be glad to pay for the expenses of the reproduction. Please contact me via the address at the beginning of this column.

And Finally . . .

I received two letters and a tape from Walter Ahern who reports that he is a "retired ham." He states that he first got involved with the hobby during the Depression. However, now he has moved into an apartment building that severely restricts his ability to install an antenna. Nevertheless, he does enjoy listening to the amateur bands. However, he has having a bit of trouble with his Radio Shack DX 100 lately.

I would like to invite anyone who has knowledge of the operation of this radio to get in touch with Walter. His address is 51 Leroy Place, Apt. 4-B-2, Newburg, New York 12550. He says that he misses listening to his old friends who still operate on the daily nets that he now cannot check in with.

Walter's letters and demonstration of friendship toward me has reminded me of how important it is to revere our senior members of our hobby. Upon joining QCWA, I have become acquainted with many who have been a part of the hobby for decades. Through writing this column for the past couple of years, I have come in contact with some of the pioneers of our niche of the hobby. People such as Paul Wilson, W4HHK, Ed Tilton, W1HDQ, Mrs. Vi Chambers, W6NTC (widow of John Chambers, W6NLZ), Bert Adams, K6BTO, and so many others have unpretentiously given so much to us through their work.

It is my strong urging to you that if you know

one of these pioneers you take some time to really get to know him or her. Sit at his or her feet and listen to him or her tell you of past accomplishments of what it was like "in those day." Learn from these pioneers before they graduate to being Silent Keys. They have so much to offer to us, to share with us. When you have learned, write to me and tell me what you have learned.

If you are a senior member of our fraternity, then please let me hear from you concerning your pioneering days. Write to me as Walter has and tell me about your accomplishments. I am looking forward to opening doors to so much knowledge that is out there waiting for an audience.

My thanks to all of you who have sent me material, transmitted FAXs (what did I ever do before I got the FAX machine?), and called me to tell me about what you are doing. Particularly, I appreciate receiving information supplied in the "Upper Midwest VHF/UHF Newsletter," the "West Coast VHFer," the "432 and Above EME Newsletter," the "220 Notes," the "50 MHz DX Bulletin," Bill LeBaron, W0MTK, Shep Shepard, W7HAH, and Hat, JA1VOK, individuals who led me to bits of news for use in the column. If you would like to be included in a future column, drop me a note, call me at 405-528-6625, or FAX me at 405-528-0746 by 1 September to be included in the November issue. Until next month . . .

73, Joe Lynch, N6CL

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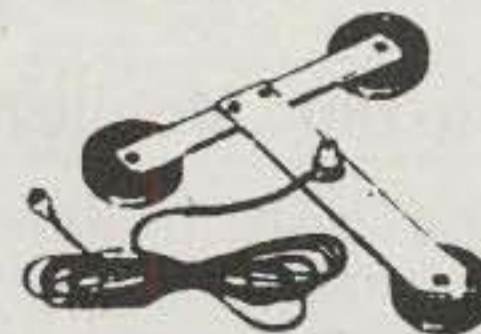
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A LOOK AT THE WORLD AROUND US

Mobiling Yesterday and Today

Exciting developments are happening so fast in many special-interest areas that it is difficult to limit this month's column to a single topic! QRP activity is booming as if sunspots are increasing rather than decreasing, new low-power rigs are flourishing, the CW bands are hotter than Texas chili, and more fancy keys are being announced every day. The good times just keep coming, and everyone should be experiencing an overload of amateur fun! All of those topics are slated for coverage in future columns. I am also in the process of wrapping up another book (number 18!), so please bear with me and my sporadic appearances during the next few months. Meanwhile, let's highlight some fascinating views in the world of HF mobiling—another area of continuously increasing popularity.

Are you enjoying your fair share of mobiling fun during this prime time of the year, or are you still leading a sheltered life of basement-only operations? We are once again near the Equinox, you know, and even barefoot transceivers connected to basic vertical antennas are working DX like gangbusters. What are you waiting for? A personal invitation? Okay, here is the pitch. There are no stipulations requiring you be "in motion" or traveling the open road to have fun mobiling. Even 15 minute operating stints from your driveway or the parking lot of an antenna-restricted apartment complex can give you a new lease on life. Why, your car might even be a decoy shack you can move every so often. In other words, few limitations keep a devoted amateur off the air. Go for the gusto. We're pulling for you!

The First Big-Time Mobile?

If you think setting up a full-blown HF mobile rig is challenging with today's streamlined and slick-buttoned cars, visualize what it was like during the early days of radio. There were no computer controlled gadgets to blink, screech, or poke you in the chest when subjected to RF, but rigs were large as a car's seat and filled with voltage-guzzling vacuum tubes. Simply powering all their filaments from a car's 6 volt battery required clever planning. And only a fraction of an ohm resistance result-

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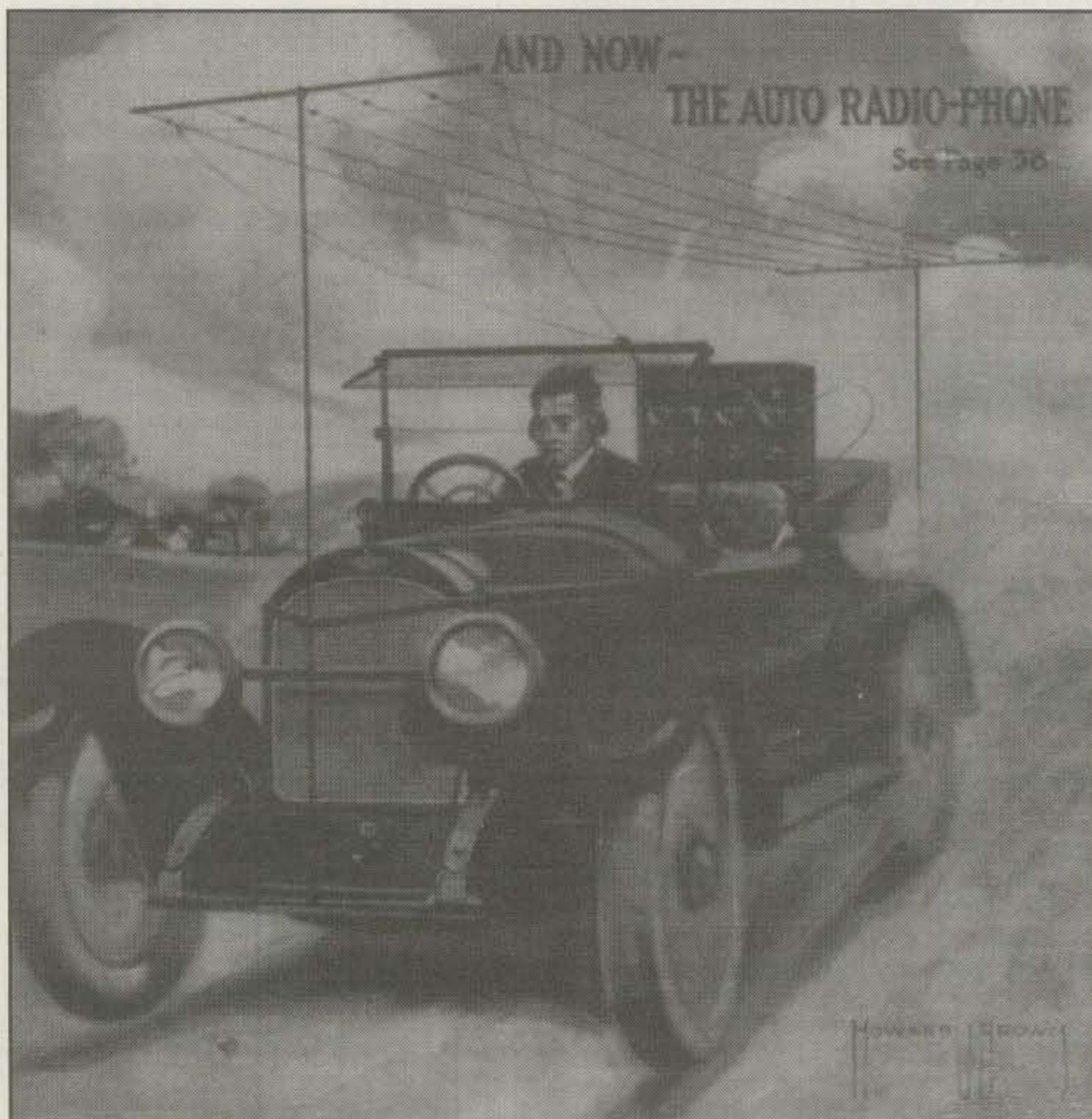
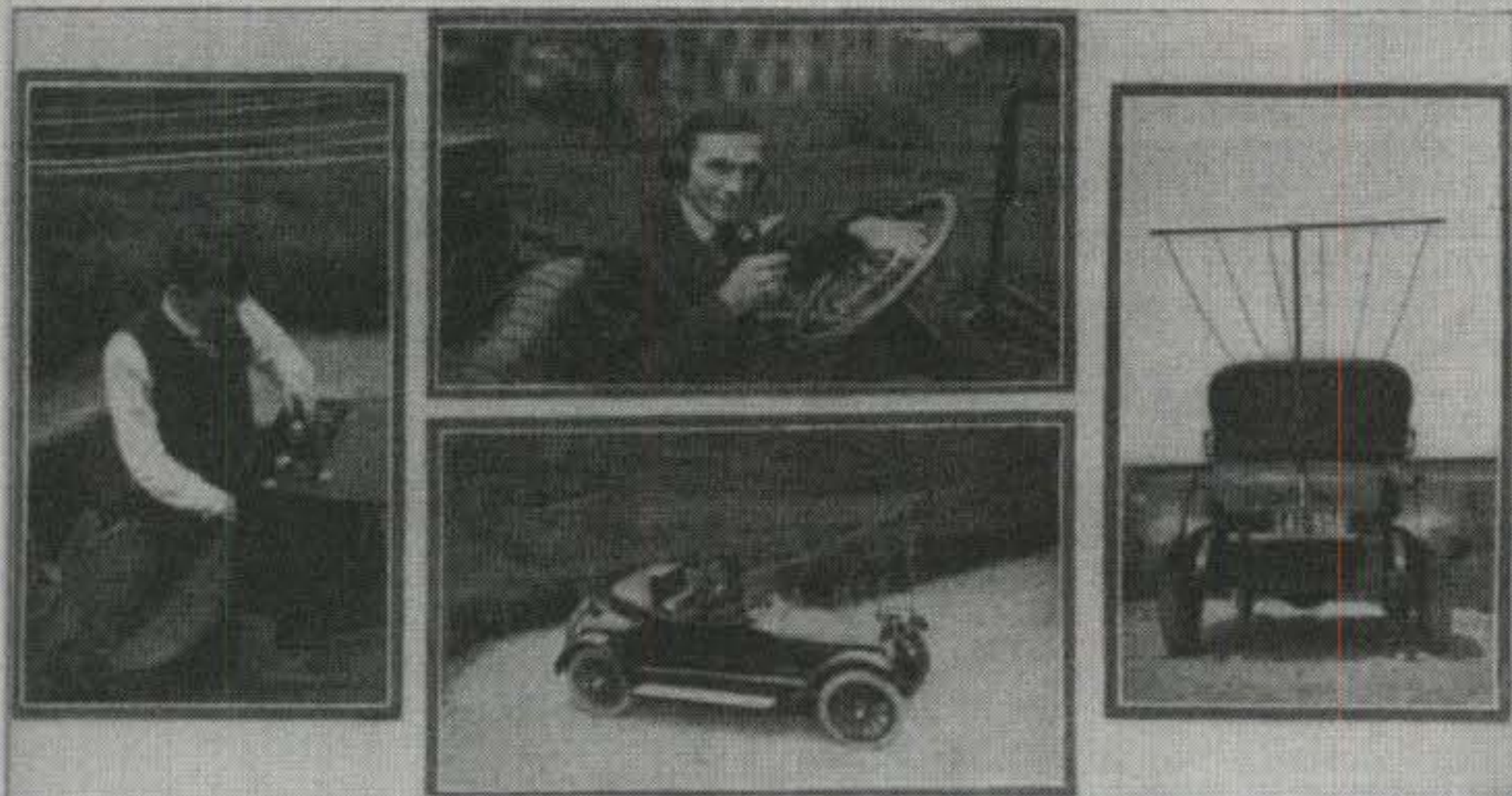


Photo 1— Authentic view of A. H. Grebe's 1919-style mobile tuned up and rolling across the flatlands. Look at the big behind-seat rig, that incredible antenna, the magnificent car! Our special thanks to Gerald Samkofsky, N4ZB, for these photos, which originally appeared in Radio Amateur News magazine.

ing from dirty connections meant losing several precious amperes of current. Ah, but A. H. Grebe overcame the obstacles in high style, and thanks to Gerry Samkofsky, N4ZB, of Clearwater, Florida, we have reproductions of actual magazine photographs to substantiate that fact. Check out photos 1 and 2; now that is big-time mobiling for sure!

N4ZB did not supply miniscule information with these amazing but true pictures, which originally appeared in the August 1919 edition of *Radio Amateur News* magazine. We will thus attempt to fill in several blank spots that have faded in the annals of time. Although we cannot confirm the A. H. Grebe shown here is the same chap noted for unique radio de-

signs during the '20s and '30s, that conclusion is quite logical. Notice Grebe's transmitter and receiver would not fit under the dash, but were conveniently accessible from the front seat. Clever, eh? And check out that unique forerunner to Bugcatcher and Outbacker mobile antennas. It is a genuine 6-wire aerial complete with front and rear masts bolted to the car's body (looks like grandmom's old clothesline, true, but it is a condensed version of the '20s famous "flat top" antenna). Pizzazz? You bet! Grebe could just reach up, hold a lamp to the antenna while transmitting, and light up the road! Finally, bear in mind loop modulation was in vogue during this era and it was a "bear" to adjust properly. Watch



Left—Mr. Grebe Tuning up His Auto Radio Phone Set. Top Center—Mr. Grebe Radiophoning En Route. Bottom Center—Complete View of Auto, Showing Antenna Construction. Right—Rear View of Auto Showing Method Employed to Support Mast

THE AUTO RADIOPHONE

By A. H. GREBE

Left: Radio Construction

Photo 2—An action view of Grebe operating and driving. Good show, old chap!

out for that pothole straight ahead, A. H. Whew!

Peak Preview: The New "Superspanner" Antenna

Moving into the present time, we recently received information on a new big-league antenna that should prove appealing to many serious HF mobileers. The critter is called a "Superspanner," and it is a modernized and highly improved version of the famous Webster Bandspanner (see photo 3). The Superspanner is being made by Roy Atkins, W7JZO, who worked with Webster making the original Bandspanner, and Allan Beer, Sr., K6GSO, a sharp RF engineer. The antenna stands between 7.5 and 11.0 feet tall, depending on selected base extension tube length, and covers 75 through 10 meters including WARC's with its integral 2.6 foot center loading coil. Band switching is accomplished by physically extending the antenna's top whip/stinger to lower the frequency (52 inches for 75 meters) or retracting the stinger to raise frequency (32 inches for 10 meters). Simultaneously, the stinger's "unexposed end" moves a contact spring inside the coil to select fewer turns with the shorter whip length (for 10 meters) or more turns with the longer whip length (for 75 meters). Neat!

Allan and Roy invested some serious time and effort developing this antenna. They compared various coil wires and diameters, turns per inch, mating stinger lengths, wind loading, etc., then concentrated on a good toroidal matching coil

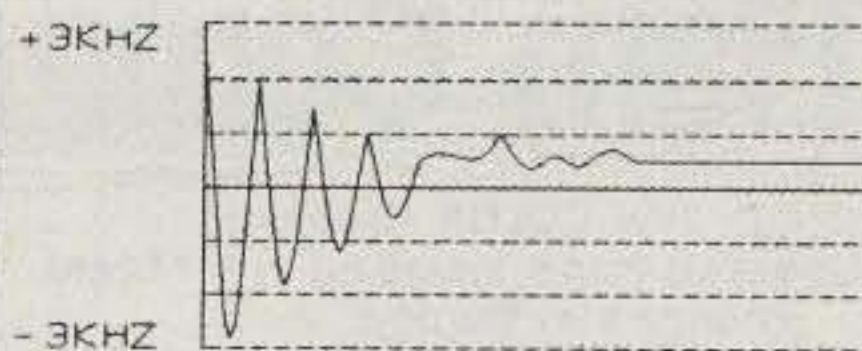
for the base. The results are a mobile antenna with very high efficiency, and it is rated at a full 600 watts of power. That point is substantiated by over 100 Superspanner users who say the antenna makes their mobile setup sound like a home rig. Hmm . . . who will be the first bicycle mobileer to gear up with this big signal multiband delight? Want more details? Drop Allan a note and SASE. His address is 647 Arata Lane, Windsor, CA 95492.

Mounting and/or supporting a large Superspanner or Bugcatcher-type antenna on today's cars is the most often reported obstacle to HF mobiling, so here are a few suggestions I have found beneficial. A lightweight (Class A) trailer hitch can be installed on almost any car in only a few minutes. Many U-Haul facilities are equipped to install these hitches while you wait. The hitches' ball can then be replaced with antenna mounting hardware, and you have one heavy-duty (and solidly grounded) mount. The antenna's weakest point will then be its $3/8$ -24 threaded base ferrule, so adding two light nylon ropes or fishing-line guys helps to avoid mechanical snaps or side-sway. Remember, a maximum overall ground-to-tip height of $13\frac{1}{2}$ feet is necessary to clear interstate overpasses, less height is necessary for in-city driving, and really low "overhangs" can usually be avoided with one or two block detours.

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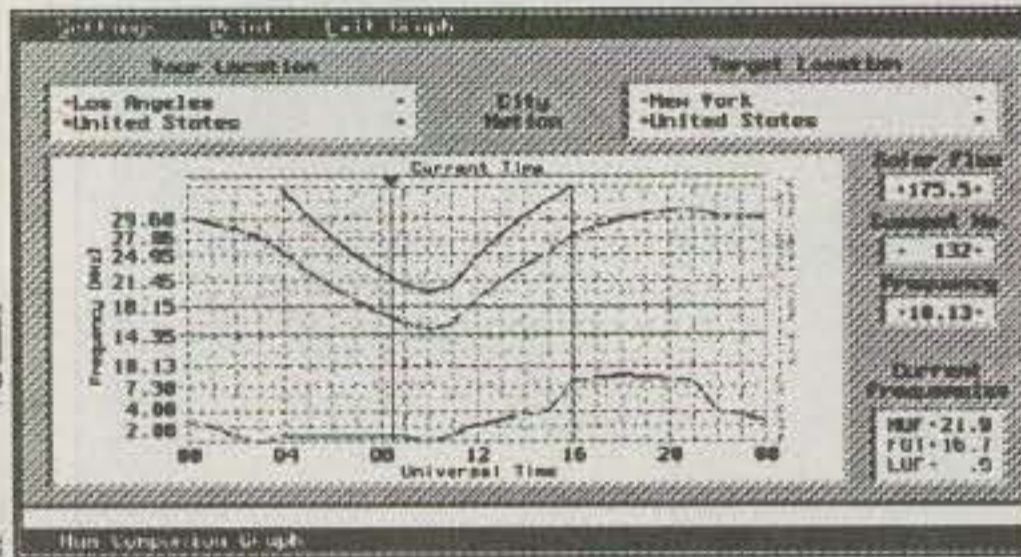
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Installation and dismantling of towers is dangerous and temporary guys of sufficient strength and size should be used at all times when individuals are climbing towers during all types of installations or dismantlings. Temporary guys should be used on the first 10' or tower during erection or dismantling. Dismantling can even be more dangerous since the condition of the tower, guys, anchors, and/or roof in many cases is unknown.

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

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

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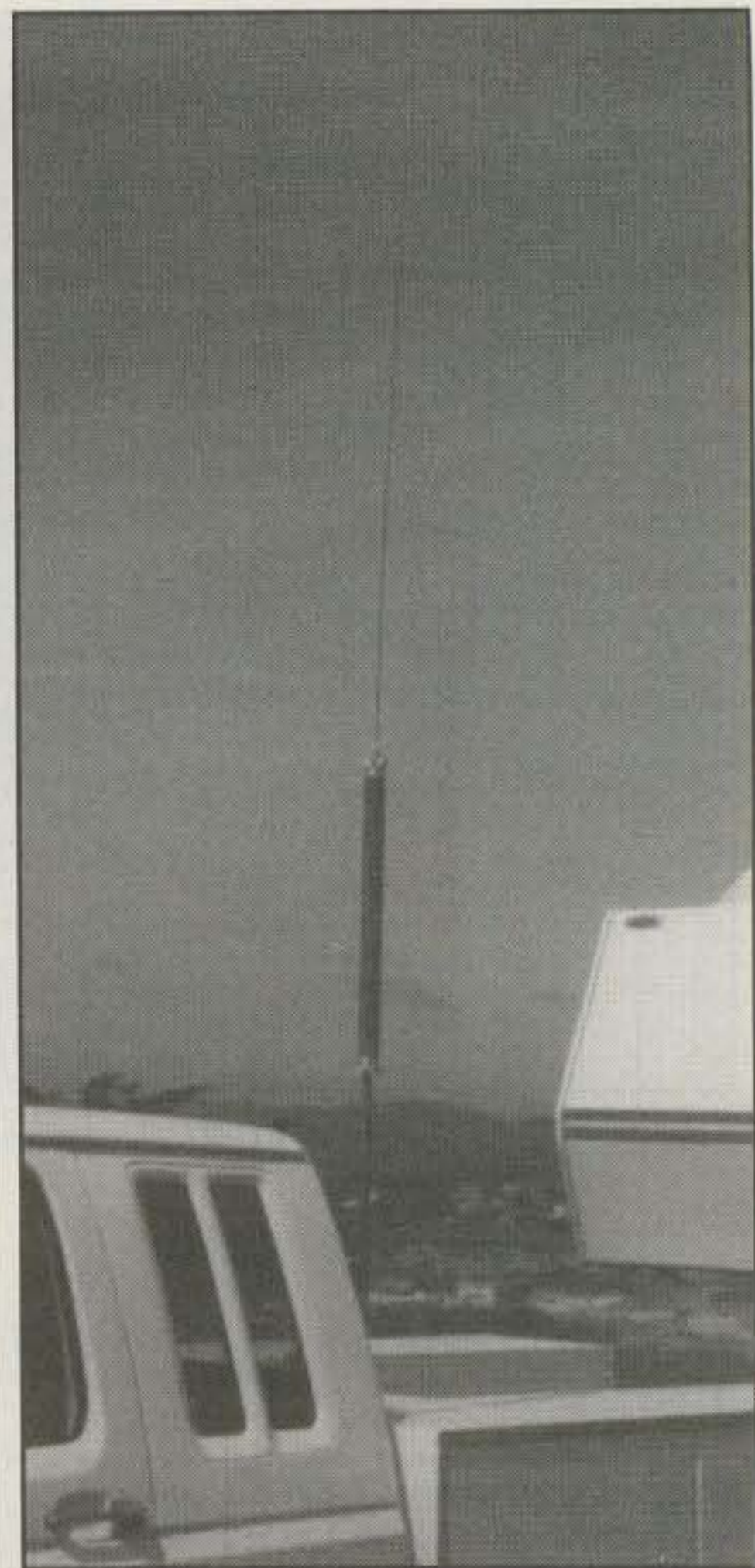


Photo 3— New Superspanner mobile antenna installed on K6GSO's pickup truck. This high-performance delight covers 75 through 10 meters, including the WARC bands and MARS frequencies, simply by adjusting its top stinger.

superstation? Check out Ameritron's new ALS-500M mobile linear amplifier shown in photo 4. This solid-state and no-tune tyke measures only 3.5"H x 9"W x 15"D (small as a mobile transceiver!), and pumps out an incredible 600 watt signal when driven with less than 100 watts. It also pulls a peak current of 80 amperes from your car's battery, so a heavy-duty alternator and high-current battery are most important.

The amplifier uses four hefty 2SC2879 power transistors in a dual push-pull arrangement. It covers 160 through 15 meters including the WARC's, and has a built-in cooling fan plus full heat and SWR protection. Setting up a blow-out high-power mobile requires good technical expertise, but the ALS-500M's manual is filled with helpful information, and Ameritron's technicians are also trained to guide you through obstacles via telephone. This is the way to go! Everyone needs to experience the thrill of Rfing street lights in succession during late-night travels at least once! That's right:



Photo 4— Ameritron's new ALS-500M solid-state mobile amplifier. This compact, no-tune gem pumps out a terrific 600 watt signal.

Many neons will light up one after the other as you motor down the road.

Bicycle Mobileers Keep On Rolling

As mentioned in our last "mobiling column" (September 1992), silent sport mobileers continue to generate notable excitement on the bands and on (less traveled) roads. They are also realizing the benefits of sharing ideas and experiences with other cyclists through a club-type arrangement, and are joining the Bicycle Mobile Hams of America as soon as their pedal-powered setups are operational.

Most BMHAers use 2 meter FM with a belt-clipped transceiver, helmet-mounted mike and speaker with VOX, and rear-mounted antenna, but more and more mobileers are expanding into HF activities. Some of them even work CW mobile with a miniature or homebrewed paddle clamped to the handlebars. Now that is rolling like a big wheel! Five watt/QRP rigs have been quite popular. However, 100 watt transceivers powered via a motorcycle battery are fast becoming new favorites.

BMHA has as its members both casual mobileers who mainly pedal around their neighborhoods on conventional or classic bicycles, and serious, devoted cyclists who travel hundreds of miles a year "nomad style" with custom or touring bicycles that make regular bikes look like a plain package of metal tubing! BMHA has almost 200 members in 33 states and several countries. This group's big meeting (and forum) is held every year at the Dayton Hamvention. Many of the guys even bicycle in. They are really on top of activities and developments. They were using specially ordered SSB/CW HF handheld transceivers before those little rigs were even known or available in the U.S.

Why bicycle mobile? Might we point out you need not be "in motion" to enjoy the many benefits of bicycle mobile. Indeed, an HF setup on a bicycle is an ideal "portable" station with rig, antenna, and pow-

er supply you just roll out and enjoy on-the-spot (perfect for apartment dwellers).

Want to learn more about "good health" bicycle mobiling—what works best, neat antenna ideas, and so on? Check into the BMHA net, which meets on 14.253 MHz (plus or minus QRM) beginning at 2230 GMT on the first and third Sunday of each month. Some BMHA members check in while biking, some from home, some with touring or trail news, and some with technical information. BMHA also publishes a very informative newsletter loaded with technical tips, articles on safe biking, and stories of amazing bicycle tours. For a free sample of the BMHA newsletter (plus full details on joining the club) send a self-

addressed business-size SASE to BMHA, Box 4009, Boulder, CO 80306.

Conclusion

That winds down this month's "mobiling special" column, gang, and here's wishing you great DXing on the open road. I look forward to talking with you (particularly you mobileers!) during the coming weeks. My schedule is rather tight at this time, but I still frequent 14.180 to 14.225 MHz Sundays between 2200 and 2230 GMT, plus squeeze in nighttime operations on 10.100 to 10.112 MHz between 0130 and 0145 GMT.

73, Dave, K4TWJ

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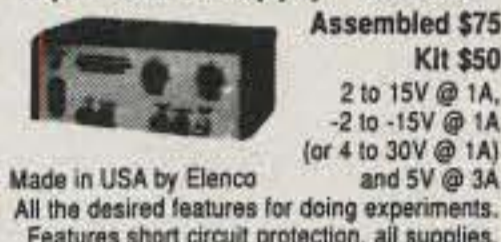
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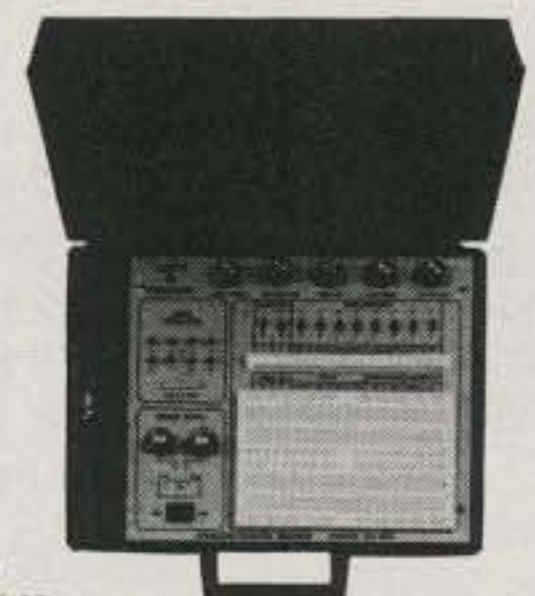
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CONSTRUCTION PROJECTS, TECHNIQUES, AND THEORY

Some Thoughts on Broadband Transformers

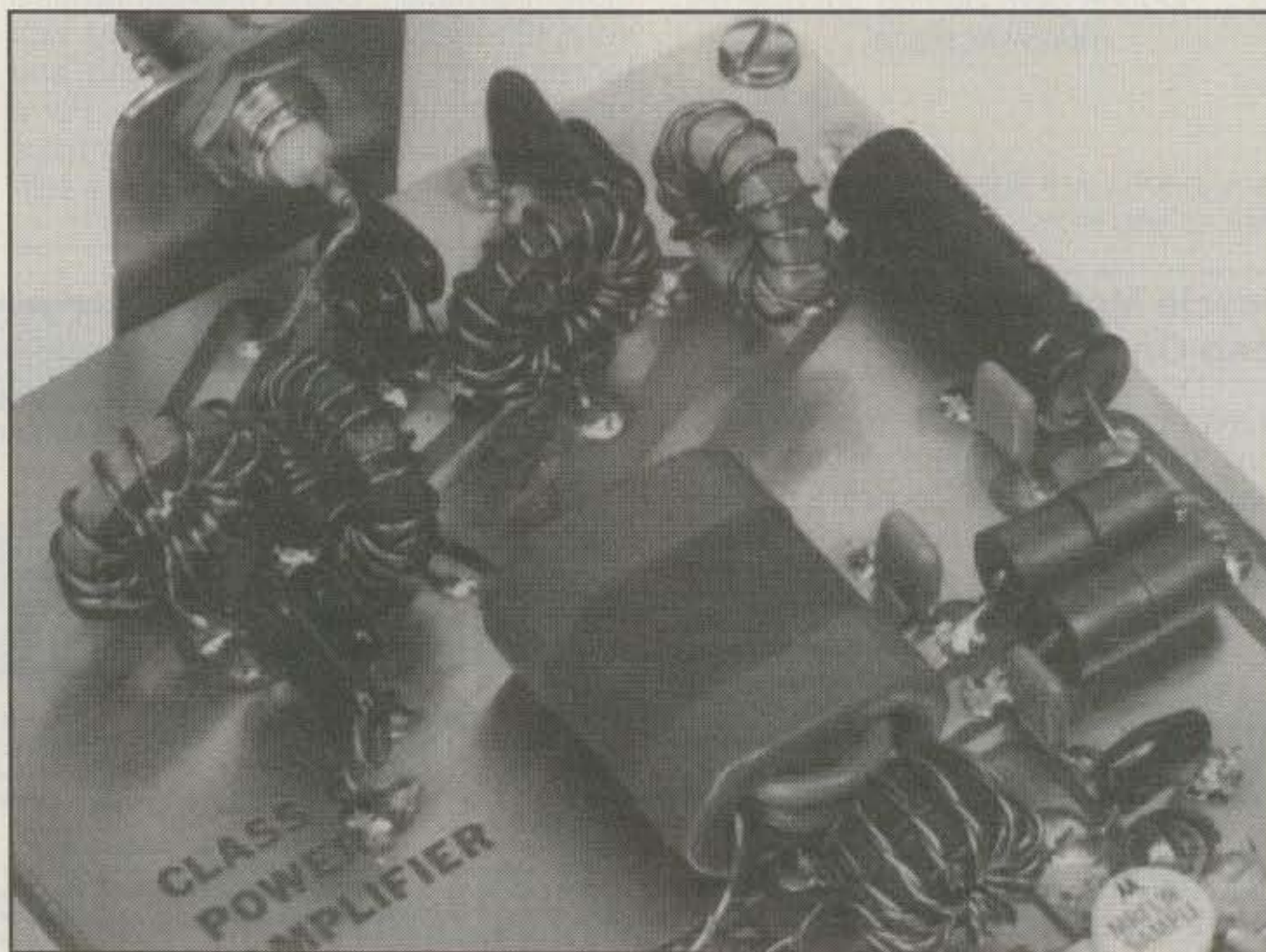
There are two kinds of RF transformers—narrowband and broadband. The applications and design procedures for each type of transformer differ considerably. Knowing the general steps required for making your own broadband RF transformers will help you to build amateur equipment that functions with minimum losses between transformer-coupled circuits. This article is aimed at the builder who is inexperienced in the area of transformer design and who is overwhelmed by column-wide equations. Although this approach may seem oversimplified to some readers, and lacks some of the subtle design steps that are followed by engineers, the information here can be applied by the beginner to obtain satisfactory transformer performance in all but the most critical of circuits.

Narrowband vs Broadband

Narrowband RF transformers are high-Q tuned circuits, such as those in the IF system of a receiver. They are found also in RF bandpass filters, oscillators, and similar frequency-selective circuits. These transformers often require retuning when the operating frequency is changed, in order to ensure resonance.

Broadband transformers, on the other hand, must provide a wide frequency response without being tuned at any frequency. You may regard them in a similar light to audio transformers that must provide uniform audio output power from, say, 100 Hz to 20 kHz. A typical well-designed broadband transformer for the HF part of the radio spectrum offers good impedance matching and power transfer from 1.5 to 30 MHz, for example. It should introduce minimum SWR to the circuit in which it is used. Broadband transformers are used to provide an impedance match between a source and a load, such as between the collector of one RF stage and the base of the one which follows (drain to gate for FETs). In a like manner we use broadband transformers to match the collector or drain circuit of an RF power amplifier to a 50 ohm low-pass filter at the output of a solid-state transmitter.

*P.O. Box 250, Luther, MI 49656



Here is an example of using broadband transformers in a power FET amp I built some years ago.

Two Kinds Of Broadband Transformers

We have what is referred to as the "conventional" transformer and the "transmission-line" transformer. Both are applicable in RF circuits. Excellent articles on the subject of transmission-line transformers have appeared in recent issues of *CQ* and *Communications Quarterly*. These papers were written by Jerry Sevick, W2FMI. It is generally believed by design engineers that transmission-line transformers are the most efficient of the two types of broadband transformer. However, my experience has indicated that the losses in conventional broadband transformers are not sufficiently greater than those in transmission-line transformers to be a significant consideration in most amateur work. Fig. 1 shows both types of transformers in schematic form. You should be aware that any impedance transformation ratio within the restrictions of broadband transformer design may be obtained with the conventional style of transformer. Conversely, transmission-line transformers

can be used only for specific impedance-transformation ratios—such as 1:1, 4:1, 9:1, and such—unless you adopt the techniques described by Sevick in the earlier references. In essence, the conventional transformer is easier to design and construct if you are new to the art.

Impedance Limits

Generally speaking, the practical upper impedance limit for a broadband transformer is on the order of 1000 ohms. It is for this reason that broadband transformers are not found in the grid and plate circuits of vacuum-tube equipment (audio transformers excepted). One of the problems associated with using broadband transformers in high-impedance circuits (especially power circuits) is that high levels of RF voltage are developed, and this figures into the list of factors that determines core saturation. In other words, the greater the RF voltage in the windings the larger the cross-sectional area of the core must be to avoid unwanted saturation. Saturation causes core heating, possible

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29.000 - 53.995 MHz. (NFM)	5.0 KHz
54.000 - 71.995 MHz. (WFM)	50.0 KHz
72.000 - 75.995 MHz. (NFM)	5.0 KHz
76.000 - 107.995 MHz. (WFM)	50.0 KHz
108.000 - 136.995 MHz. (AM)	12.5 KHz
137.000 - 173.995 MHz. (NFM)	5.0 KHz
174.000 - 215.995 MHz. (WFM)	50.0 KHz
216.000 - 224.995 MHz. (NFM)	5.0 KHz
225.000 - 399.995 MHz. (AM)	12.5 KHz
400.000 - 511.995 MHz. (NFM)	12.5 KHz
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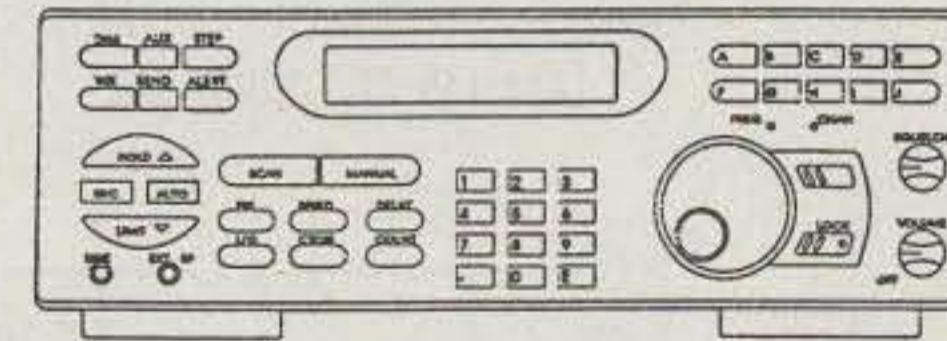
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29.000 - 54.0000 MHz. (NFM)	5.0/12.5/25.0 KHz
108.000 - 136.9950 MHz. (AM)	5.0/12.5/25.0 KHz
137.000 - 174.0000 MHz. (NFM)	5.0/12.5/25.0 KHz
216.000 - 224.9875 MHz. (NFM)	12.5/25.0 KHz
225.000 - 399.9875 MHz. (AM)	12.5/25.0 KHz
400.000 - 512.0000 MHz. (NFM)	12.5/25.0 KHz
806.000 - 823.9875 MHz. (NFM)	12.5/25.0 KHz
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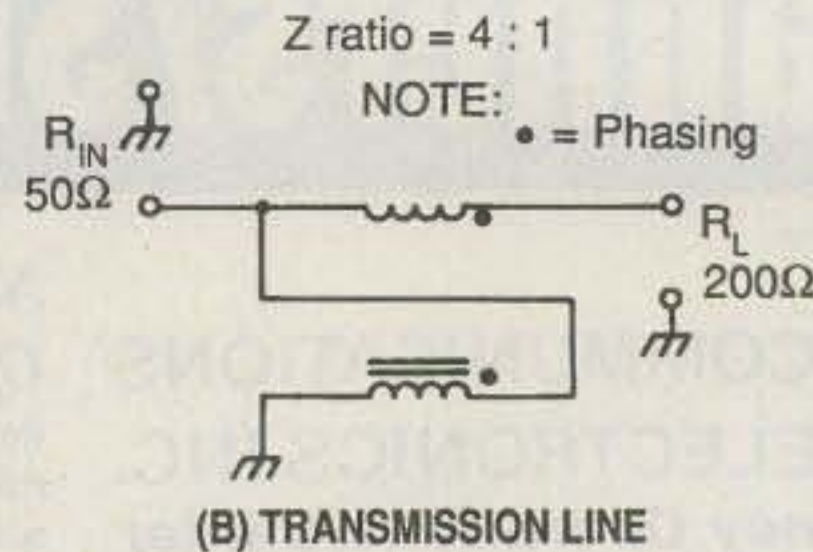
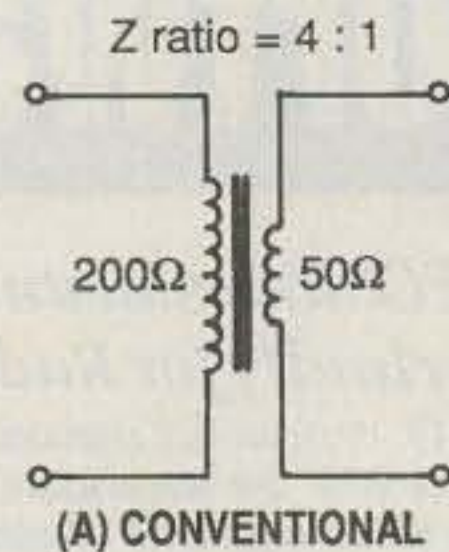


Fig. 1— Illustration (A) shows a conventional broadband transformer that has two windings (more may be used). It can be wound for any impedance-transformation ratio in the range from 10 to 1000 ohms. Drawing (B) shows a 4:1 unbalanced-to-unbalanced transmission-line transformer. It contains a bifilar winding (see text) and must be connected to the circuit in accordance with the winding polarity (black dots) to assure proper performance.

permanent damage, and the generation of harmonic currents.

Core Materials

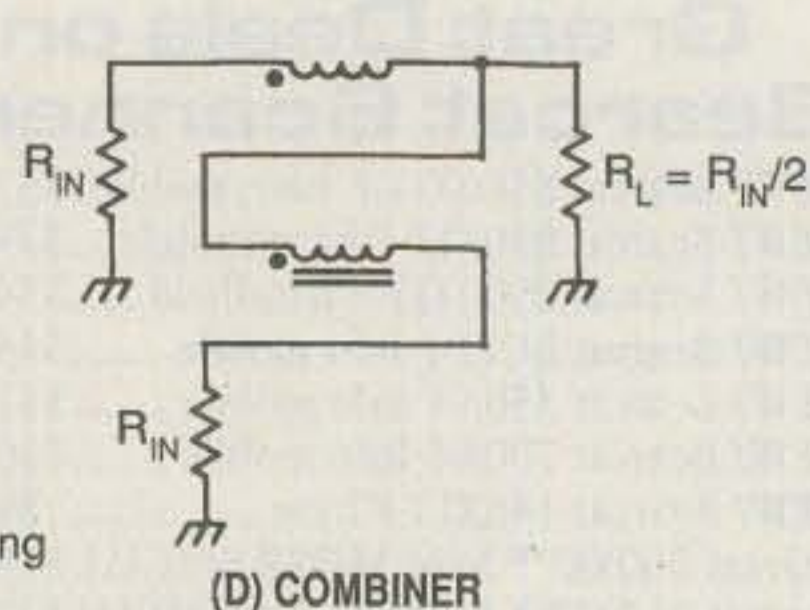
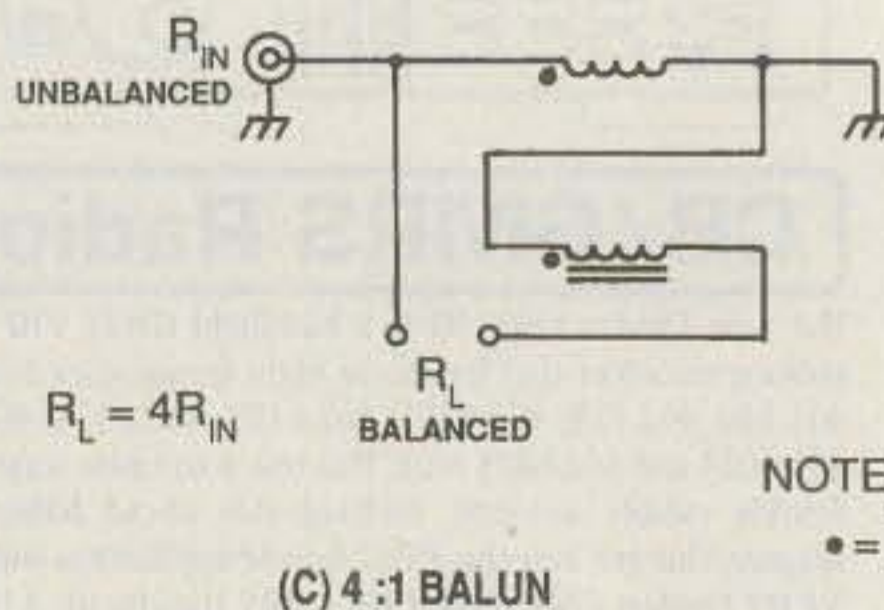
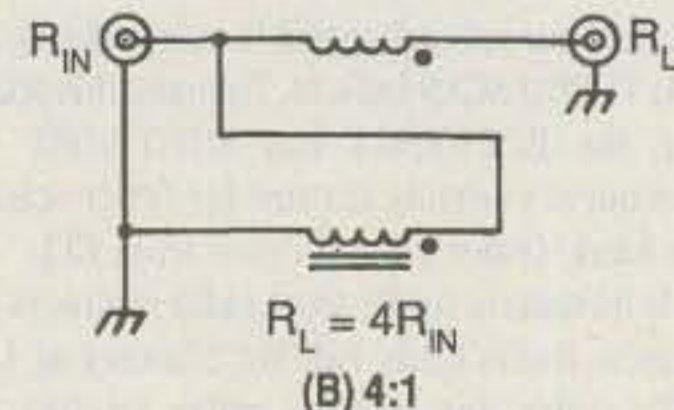
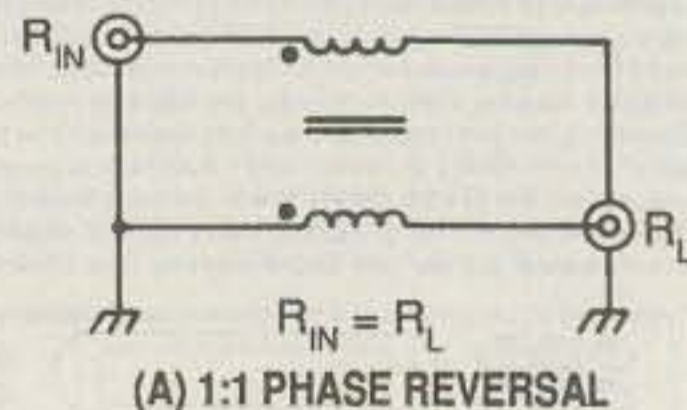
Broadband transformers may be wound on toroids, beads, sleeves, and rods. They are usually wound on high-permeability ferrite materials. For applications in the HF spectrum we generally employ this high permeability material (see "Doug's Desk: Working With Toroids," CQ, June 1993, p. 82). I like to use Q2 material or Amidon Associates No. 43 material, which has a permeability (μ_i) of 850. Cores with greater permeability (2000, for example) are used for applications from 1 kHz to 1 MHz, but they are effective as high as 50 MHz for RF suppression filters.

Amidon No. 77 material has a permeability of 2000.

Broadband VHF transformers can be constructed on No. 61 ferrite (125 permeability) for operation to 200 MHz. No. 67 material (permeability of 40) is suitable also for broadband transformers to 200 MHz.

The Nature Of Broadband Transformers

Transformers that are wound on so-called balun or "binocular" cores, toroid cores, and beads are inherently self-shielding. This minimizes stray coupling to other components and aids stability. The foregoing virtue is not true when we wind transformers on ferrite rods. Transformer



NOTE:
• = Phasing

Fig. 2— Circuit examples of some broadband transmission-line transformers. A 1:1 phase reversal transformer is seen at (A). An unbalanced 4:1 transformer is shown at (B). The more familiar 4:1 balanced-to-unbalanced (balun) transformer is illustrated at (C). A hybrid combiner is depicted at (D). These transformers differ in construction from conventional ones because the above designs use 25 ohm transmission lines (multifilar conductors) for the windings.

performance is otherwise the same.

High-permeability cores enable us to use fewer turns of wire in the windings than would be true of low-permeability cores or air-wound inductors. This minimizes the AC resistance of the circuit and makes the transformer easier to wind (fewer turns) by hand. The lower the operating frequency with high- μ (permeability) cores the greater the effective winding inductance (important). As the operating frequency is increased, the core tends to become more "invisible" to the circuit, and the effective winding inductance decreases. It is this characteristic that establishes the desired broadband performance.

Winding Inductance Rules

Particular attention must be paid to the broadband transformer winding inductance to ensure that the transformer does not introduce SWR or exhibit losses at the low end of its operating range. A suitable rule of thumb for amateurs is to have the winding for the lowest-impedance terminal (i.e., the low-Z winding of a 4:1 transformer) exhibit a reactance that is at least 4 times the terminal impedance of the circuit. Thus, if the low-Z transformer winding is connected to a 50 ohm termination, we will want the winding to have an XL of 200 ohms or greater. Therefore, if the lowest operating frequency for the transformer is 3.5 MHz, we will calculate the required inductance from $L(\mu\text{H}) = 200$ divided by $6.28 \times f(\text{MHz})$. This results in an inductance of 9 μH . The larger transformer winding (conventional transformer) automatically has sufficient inductance by virtue of it being the larger winding on the same core. The remaining winding of the 4:1 transformer will connect to a 200 ohm termination and should have an X_L of at least 800 ohms. Always design the winding for the lowest operating frequency of your circuit or antenna system.

The correct number of transformer turns can be determined by using the manufacturer's A_L factor for the particular core material, as discussed in my article on toroids mentioned previously. Remember that the impedance ratio of a transformer is the square of the turns or voltage ratio. In other words, the turns ratio of a 4:1 transformer is 2:1 and not 4:1.

Transmission-Line Transformers

Multifilar windings are used for broadband transmission-line transformers. These may be bifilar (two wires), trifilar (three wires), or quadrifilar (four wires) windings. The windings are pre-cut, twisted together (about 8 turns per inch), and wrapped on the core as a single winding.

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Some designers prefer to lay the windings on the core in parallel rather than twisting them. The characteristic impedance of this style of winding is 25 ohms, since in effect it is a short piece of transmission line. Special 25 ohm miniature-coax cable is used in place of parallel or twisted windings by some commercial designers. The coax is employed mainly for winding large cores in power circuits.

It is essential to keep track of the ends of the multifilar windings when connecting them to a circuit. The phasing (polarity) of the windings must be honored if the transformer is to function correctly. I recommend that you obtain magnet wire with assorted colors of enamel insulation (red, brown, tan, and green) for use when creating multifilar windings. This makes it easy to identify the windings. Alternatively, you may spray paint the ends of the wires in an assortment of colors before placing them on the core. An ohmmeter may be used to sort out the windings if a

single color of wire must be used. Fig. 2 shows a group of broadband transmission-line transformers.

Proper Transformer Termination

Broadband transformers must be terminated by a resistive load if they are to work properly. This is seldom possible in active circuits that use semiconductors. The input and output capacitances of transistors vary with frequency and device type. In a like manner, a broadband 1:1 or 4:1 balun used in an antenna system is in its proper environment when it looks into a resistive load of the desired ohmic value. This requires that the antenna present the desired feed resistance in the chosen part of the operating band. Large frequency excursions from that part of a given band cause the SWR to increase, and this places the balun in a hostile envi-

ronment. In high-power RF circuits the balun core can become hot, it may arc, or it may be destroyed. As mentioned earlier, core saturation causes harmonic currents to be generated, and this can create TVI and other interference.

Although a broadband transformer seldom has a perfect nonreactive load to look into when working with active circuits, acceptable results may be had in amateur work. Compensating networks can be added in troublesome circuits to cancel unwanted capacitive or inductive reactance.

Core Size

The following equation may be used for calculating the size of a broadband-transformer core. Some of the factors in the equation must be obtained from the manufacturer's data sheets or catalog.

$$B_{\max} (AC) = \frac{E_{\text{rms}} \times 10^8}{4.44fN_pA_e}$$

where A_e is the equivalent area of the magnetic path in cm^2 , E_{rms} is the applied voltage, N_p is the number of core turns, f is the frequency in Hz, and B_{\max} is the flux density in gauss. From this information we may select a suitable core, based on its gauss. It is wise to choose a core that can accommodate greater power than your circuit produces. This allows a margin of safety for saturation. As the core becomes saturated its permeability decreases, and this can spoil the performance of a broadband transformer. I use a rule of thumb when I don't want to calculate the core size from the foregoing equation. If the core becomes excessively warm to the touch in an operational circuit, I replace it with one that does not become more than slightly warm to the touch. In an ideal situation the transformer core would remain cool at all times, but this is seldom practical where component space is at a premium.

Some Final Thoughts

This has by no means been a thorough treatment of broadband transformer design and application. However, the tips I have offered should help the inexperienced transformer builder to understand the fundamentals of the art and to construct transformers that will work satisfactorily.

It's unfortunate that Prentice-Hall Publishing chose to discontinue my book *Ferromagnetic Core Design & Applications Handbook*, since it covers this subject in depth. However, the folks at Amidon Associates Inc. have asked my permission to reprint the book because of demand. I agreed to let them do that. Check with Amidon about the availability date.

73, Doug, W1FB

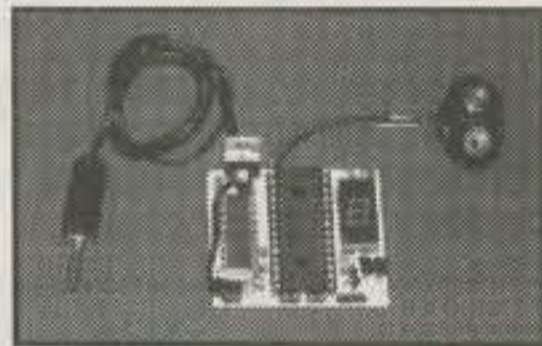
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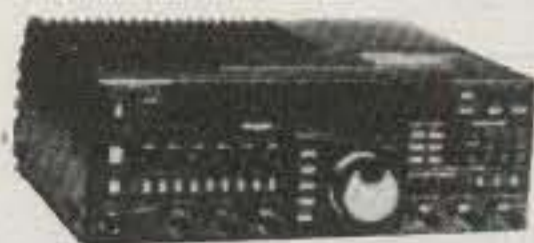
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1993 CQ Contest Survey

September's Contest Tip

Improve your contest score by being aware of when you send unnecessary information during contest exchanges. CW examples include: Sending a **leading "0 or T"** in front of your single-digit CQ/ITU zone, ending a CQ with a **"K,"** starting an exchange with **"UR" 59905.** SSB examples include: **"QSL...QRZ,"** K1AR, **"UR" 5905 "OVER,"** etc. If you think these illustrations are insignificant, try sending "UR" on CW 200 or more times and imagine working stations during that same time period.

This month marks my fourth annual contest survey. Each time the intent is to respond to current issues in a fashion that draws opinion from a broad base of the contest community, not just the big guns. For this reason, all of your input (and comments) is invaluable.

Over the years contesters have been characterized as and/or accused of many things. We have a love-hate relationship with the amateur community that we so ardently support ourselves. There are many amateurs who recognize the value of our operating skills, contributions to advancing the state-of-the-art, and pushing the envelope of station design. Others can't see past the curtain of QRM that covers 20 meter SSB during the CQ WW.

Please take a few moments to voice your opinion. Many of the questions are designed to be introspective. Others are simply there for fun. Don't forget that this year's results are to be mailed directly to CQ!

Len Chertok, W3GRF Silent Key

It seems with increasing regularity that I have the sad task of reporting the loss of another fellow contester. This month was especially difficult, as one of contesting's legends and my good friend, Leonard Chertok, W3GRF, passed away on June 24th.

Lenny's accomplishments were innumerable. He was the contester's contester, who was in on the ground floor of

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Sept.	5	Bulgarian DX Contest
Sept.	4-5	All Asian SSB DX Contest
Sept.	8-10	YLRL Howdy Days
Sept.	11-12	Worked All Europe SSB Contest
Sept.	12	North American CW Sprint
Sept.	18-19	Scandinavian Activity CW Contest
Sept.	19	North American SSB Sprint
Sept.	25-26	CQ WW RTTY Contest
Sept.	25-26	Scandinavian Activity SSB Contest
Sept.	25-26	Washington State Salmon Run
Oct.	2-3	VK-ZL Oceania SSB DX Contest
Oct.	9-10	VK-ZL Oceania CW DX Contest
Oct.	10-11	Illinois QSO Party
Oct.	13-15	YLRL CW Anniversary Party
Oct.	16-17	JARTS WW RTTY Contest
Oct.	27-29	YLRL SSB Anniversary Party
Oct.	30-31	CQ WW DX SSB Contest
Nov.	6-7	ARRL CW Sweepstakes
Nov.	20-21	ARRL SSB Sweepstakes
Nov.	27-28	CQ WW DX CW Contest

contesting as we know it today. Lenny motivated a whole generation of contesters to follow him into the delights of the radio sport. His other amateur radio credentials included antenna expertise equivalent to the incomparable Vic Clark, W4KFC, and others; builder of gigantic antenna farms; the sixth member to enter the CQ Contester's Hall of Fame; former member of the CQ WW Contest Committee and ARRL CAC; and seven-time winner of the USA single-operator all band category in the CQ WW. There are very few who even come close to Lenny's achievements.

Lenny was a magnanimous competitor. His early days in radio began in 1934 when Lenny first learned the Morse Code in the Boy Scouts and joined his high school radio club. In later years he did most of the antenna work for his perennial rival, W4KFC, frequently providing signal improvements which enabled Vic to edge ahead of Lenny in the next contest.

Through Lenny's mutual founding of the Potomac Valley Radio Club with Vic and several other amateurs, the idea of amateur radio contesting was successfully promoted as a principal means of improving operating skill and the camaraderie of amateurs around the world. He was a pioneer in the true sense of the word.

The contesting community will surely miss Lenny's distinctive fist. We'll miss his feisty competitive spirit. Most important,

we will miss his insight into the very beginnings of contesting and his unabashed desire for excellence, which resulted in memories for us to enjoy for years to come. Rest in peace, old friend.

Final Thoughts

I look forward to seeing the results of this year's contest survey. Feel free to add your own comments at the end of the survey. Believe it or not, I read each one of your submissions from start to finish, as they provide valuable input for future column topics.

Please remember that the deadline for the November issue is September 1st.

73, John, K1AR

Panama Anniversary Contest

0001Z to 2359Z Saturday, Sept. 4

The Panama Radio Club invites all radio amateurs of the world to participate in the XXII Anniversary Contest.

Classes: Single Operator, SSB-only.

Frequencies: 40, 20, 15, meters.

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

Scoring: HP club members are 3 points; HP non-club members 2 points; all other stations 1 point. The multiplier is the total number of DXCC countries worked on all bands.

Awards: Certificate of participation will be sent to all amateurs who work 10 or more HP stations. Please enclose 3 IRCs and a separate log of these contacts. A plaque will be awarded to the station with the high score from each continent.

Logs must be postmarked by November 30th and sent to: Radio Club Panama, Anniversary Contest, P.O. Box 10745, Panama 4, Panama.

Bulgarian DX Contest

0000Z to 2400Z Sunday, Sept. 5

The Bulgarian Federation of Radio Amateur holds this activity the first Sunday in September each year. It's on CW only, all five bands, 10-80 meters, using the IARU Region 1 band plan.

Classes: "A"—Single operator, all band; "B"—Single operator, single band; "C"—Multi-operator, all band, single transmitter; "D"—SWL.

1993 CQ Magazine Contest Survey

Your Callsign (optional): _____

Contesting Experience (years): _____

1. What are the primary reasons why you participate in contests? (Circle the top one or two choices that apply)

- A. Ego
- B. The sport and competition factor
- C. Camaraderie among participants
- D. Developing personal technical competence
- E. Enhancing operating ability
- F. Other _____

2. If possible from your experience, identify the single most common failure point in your contest station (e.g., amplifier, rotor, transceiver, computer, etc.):

3. Quantify the \$\$ investment you have made in your contest station over the following time periods:

Last 12 months _____

Total Investment _____

4. Do you feel the "small gun" deserves more recognition in contest reporting?

- YES NO

5. If you answered YES to Question #3, what enhancements would you recommend?

6. There has been much debate about contest score equalization. Do you feel there is a need to implement a scoring equalization system to account for station/geographic differences?

- YES NO

7. If you take an honest look at the impact of contesting on amateur radio, do you feel the following need to be addressed by the contest community?

- | | | |
|--|------------------------------|-----------------------------|
| Excessive Power | <input type="checkbox"/> YES | <input type="checkbox"/> NO |
| Disrespect for the operating privileges of the "non-contester" during contests | <input type="checkbox"/> YES | <input type="checkbox"/> NO |
| Improper equipment operation (e.g., speech processor levels) | <input type="checkbox"/> YES | <input type="checkbox"/> NO |
| Stretching the interpretation of governmental licensing laws | <input type="checkbox"/> YES | <input type="checkbox"/> NO |

8. Do you think that your contest log would be more closely scrutinized if it were to be submitted electronically on disk?

- YES NO

9. Do you feel there is abuse of power limits in the following operating categories?

- | | | |
|------------------------|------------------------------|-----------------------------|
| QRP: | <input type="checkbox"/> YES | <input type="checkbox"/> NO |
| 100 watts (low power): | <input type="checkbox"/> YES | <input type="checkbox"/> NO |
| KW (full power): | <input type="checkbox"/> YES | <input type="checkbox"/> NO |

10. Should contests continue to be excluded from the WARC bands?

- YES NO

11. Have antenna zoning restrictions modified your plans for contest participation?

- YES NO

12. Do you think there is room in radio contesting for an "off-the-air" computer-based contest that is exclusive of any current on-air activities?

- YES NO

13. Do you agree with the growing opinion that contesting is evolving into a sport of "10 super-stations and everyone else?"

- YES NO

Comments:

(use additional sheet if necessary)

Return your survey responses to:
John Dorr, K1AR
1993 Contest Survey
c/o CQ Communications, 76 N. Broadway, Hicksville, NY 11801

Deadline: November 30, 1993

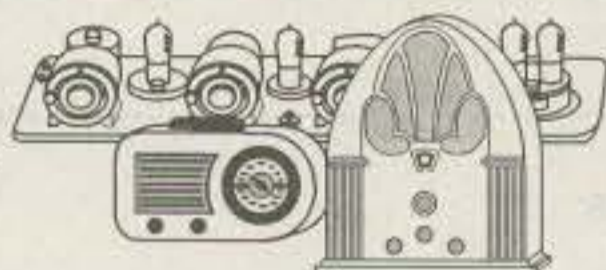
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CIRCLE 53 ON READER SERVICE CARD

118 • CQ • September 1993

Exchange: RST and ITU Zone.

Points: QSOs with LZ stations, 6 points. With other stations in the same continent, 1 point. In other continents, 3 points. SWLs must show calls of both stations heard. Score 3 points if both exchange numbers are copied; 1 point if only one is copied.

Multiplier: Total ITU Zones worked on each band.

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

Awards: Classes "A" and "C"—Cups and medals to the three top world scorers and medals to the three continental leaders in each continent. Class "B"—Medals to the top three scorers on each band in the world. Class "D"—Medals to top three.

Logs: Use a separate sheet for each band, a summary sheet showing the scoring, and the usual signed declaration.

Mailing deadline is 30 days after the end of the contest: Central Radio Club, P.O. Box 830, 1000 Sofia, Bulgaria. Logs may also include applications for the many BFRA awards: NRB, W-100-LZ, 5 Bands LZ, W-28-Z, Black Sea, and Sofia awards.

North American "Sprint"

CW: Sept. 12 SSB: Sept. 19
Sunday, 0000Z to 0359Z (Sat. night)

This is the fall edition of the "Sprint" run by the National Contest Journal. As the name implies, it's a shorty, only four hours long.

North Americans will be contacting other North American stations as well as stations in other countries, single operator only. North American boundaries are as defined by the rules used in the CQ WW DX Contest. Note the following rule changes: (1) Simultaneous transmission on more than one band is no longer permitted, (2) automatic reception methods may not be used, (3) you can no longer standby on a frequency and work the station who answers the CQ of the station you just worked (e.g., round-robin QSOs).

Exchange: Call, QSO no., name, and QTH (state, Canadian area, or country).

Scoring: Multiply total QSOs by the sum of States, Canadian areas, and other North American countries worked for your final score. (U.S. and VE are not countries; KH6 is not considered a state.) There are eight Canadian multipliers: VE1/VO1/VO2, VE2-VE7, VY1/VE8. Non-North America countries do not count as a multiplier.

Frequencies: Three bands only—80, 40, and 20 meters. CW—3540, 7040, 14040. SSB—3850, 7225, 14250. (Plus or minus QRM.)

Awards: A trophy to the highest scoring entrant. Certificates to the top scorer

in each U.S. call area, Canada, and other North American country. Also to the ten top scores, each member of the winning team, and the highest scoring entrant on each team.

Team competition is limited to a maximum of 10 operators as a single unit. Pre-contest registration is required for each team before the start of the contest with WN4KKN for CW and K7GM for SSB.

There are other detailed rules, a special QSY rule, disqualifying penalties, etc. I suggest you write to WN4KKN or K7GM if you do not have a copy of the NCJ.

Entries must be received no later than 30 days after the end of each "Sprint." CW logs go to: Larry Tyree, N6TR, 15125 S.E. Bartell Road, Boring, OR 97009. SSB goes to: Rick Niswander, K7GM, Box 3718, Greenville, NC 27386-1778.

YLRL Howdy Days Contest

1400Z Wed., Sept. 8 to 0200Z Fri., Sept. 10

This annual event is sponsored by the Young Ladies Radio League (YLRL) and is open to all licensed women operators around the world.

You may operate only 24 hours of the 36-hour contest period. Be sure to show time breaks in your log.

Operation: All amateur bands may be used. Any type of emission may be used (SSB, CW, etc.). A station may be worked only once on each band for contact points. No crossband, net, or repeater contacts allowed.

Exchange: YLRL member or non-YLRL member.

Frequencies: CW—80 meters 3.540-3.725 MHz; 40 meters 7.040-7.070 MHz; 20 meters 14.040-14.070 MHz; 15 meters 21.120-21.150 MHz; 10 meters 28.150-28.200 MHz. SSB: 80 meters 3.940-3.970 MHz; 40 meters 7.240-7.270 MHz; 20 meters 14.250-14.280 MHz; 15 meters 21.380-21.410 MHz; 10 meters 28.300-28.610 MHz.

Scoring: Score two points for each YLRL member contacted. Score one point for each non-YLRL member contacted. For each duplicate contact that is removed by the YLRL vice-president, a penalty of three additional and equal contacts will be exacted. There are no multipliers.

Awards: Top-scoring YLRL member will receive her choice of YLRL pin, charm, or stationery. In addition, the top-scoring non-YLRL member will receive a one-year YLRL membership certificate.

Send logs to: Carla Watson, WO6X, 473 Palo Verde Dr., Sunnyvale, CA 94086. Logs must be postmarked no later than October 10, 1993.

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1800Z Sat., to 0300Z Mon., Sept. 11-13

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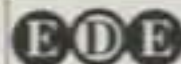
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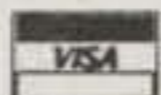


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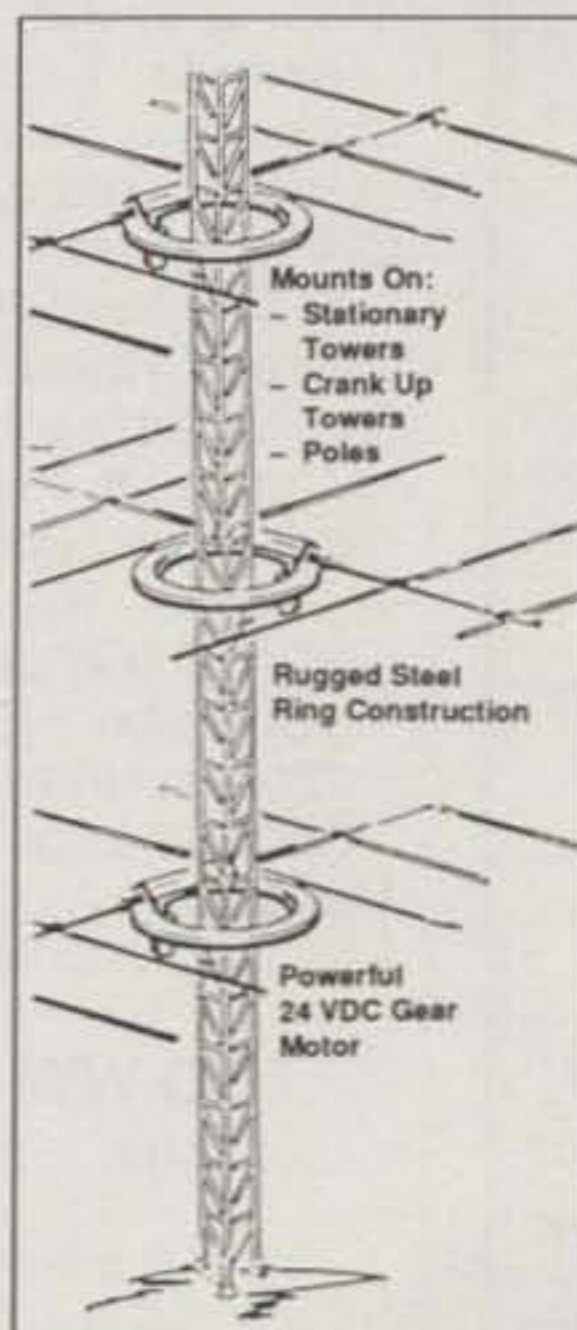
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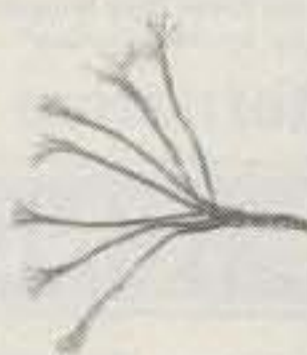
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CIRCLE 125 ON READER SERVICE CARD

120 • CQ • September 1993

for this one. The August issue of *QST* should have all the details. It is recommended that you send for official summary and log sheets. A large SASE will get you a supply. Address your request to the ARRL VHF Party, 225 Main St., Newington, CT 06111.

Scandinavian Activity Contest

CW: Sept. 18-19 Phone: Sept. 25-26
1500Z Saturday to 1800Z Sunday

It's the world working in this 34th Scandinavian Activity Contest (SAC). The same station may be worked on each band for QSO and multiplier credit.

The prefixes used in Scandinavia are: LA, LB, LG, LJ (Norway); JW (Svalbard & Bear Is); JX (Jan Mayen); OF, OG, OH, OI (Finland), OHØ (Åland Is.); OHØM (Market Reef); OX (Greenland); OY (Faroe Is.); OZ (Denmark); SJ, SK, SL, SM (Sweden); TF (Iceland).

Bands: 3.5, 7, 14, 21, 28 MHz according to IARU band plans; 3560-3600, 3650-3700, 14060-14125, and 14300-14350 kHz should be kept free of contest activity.

Classes: Single operator and multi-operator single transmitter, all band only. Multi-operator must remain on the same band for at least 10 minutes. Also QRP single operator (maximum of 10 watts output) and SWL (only SAC stations may be logged).

Exchange: RS(T) plus a QSO number starting with 001.

Points: European stations score 1 point for each SAC contact. Non-European score 1 point on 14, 21, and 28 MHz, and 3 points on 3.5 and 7 MHz.

Multiplier: Each call area in the above list of SAC countries worked on each band (call areas, not prefixes).

Final Score: The sum of QSO points from all bands times the sum of the multiplier from each band. Scoring for SWLs same as above.

Awards: Certificates to the winning station in each class, both CW and phone, in each country and each U.S.A. call area. QRP stations will be listed in one common list. The non-SAC SWL winner will be awarded. Plaques to the top-scoring station in each continent.

The usual disqualification criteria will be observed. Include a summary sheet and a dupe for logs with more than 200 QSOs, and a signed declaration. Logs may also be submitted on MS-DOS formatted diskettes. Mailing deadline is October 31st. Logs go to: NRRL HF Contest Manager, LA4YW, Liv Johansen, P.O. Box 142, N-7078, Saupstad, Norway.

CQ WW RTTY Contest

0000Z Sat. to 2400Z Sun., Sept. 25-26

This is the seventh running of the WW

RTTY contest organized by *CQ*, and from the response to last year's contest, it has become one of the major RTTY competitions.

Bands: All five bands, 10 through 80 meters.

Classes: Single operator, single and all band, and single-op assisted all band only. Multi-operator, single transmitter, all band only.

Keep in mind that single operators are limited to 30 hours out of 48-hour contest period. Off times may not be less than 3 hours in length. Multi-operator stations can operate the full 48 hours.

Exchange: RST, state or VE area, and *CQ* zone for stations within the 48 continental U.S. states and 13 Canadian areas. All others send RST and *CQ* zone.

Points: One for contacts within own country. Two for contacts outside own country but same continent. Three for contacts outside own continent.

Multiplier: One for each state (48) and VE area (13). One for each DX country (ARRL and WAE list). One for each *CQ* zone (40). All of the above on each band.

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

Awards: Plaques to the first-place winners in each operator classes. Certificates to the second and third place. And certificates to the first-place finisher in each DX country.

Complete and detailed rules were published in the July issue of *CQ* and should be reviewed for more detailed information.

The standard *CQ* log and summary sheets are recommended. Sample forms are available from *CQ*. Include a SASE (or IRC) with your request.

All entries must be postmarked no later than December 1st. An extension may be given upon a written request. Logs go to: *CQ* RTTY Contest, Roy Gould, KT1N, P.O. Box DX, Stow, MA 01775 USA. Requests for log forms go to: *CQ* Magazine, 76 N. Broadway, Hicksville, NY 11801.

Washington State Salmon Run

1600Z Sat., Sept. 25 to 2400Z Sun., Sept. 26

This state QSO party is sponsored by the Western Washington DX Club and is open to amateurs worldwide on SSB and CW.

Classes: Single or multi operator, single transmitter. Also, entrants may operate QRP, low power (200 watts or less), or in the open category on SSB, CW, or mixed modes.

Exchange: RS(T) and QTH (State/Province/DXCC Country or Washington State).

Say You Saw It In *CQ*

Scoring: Count 2 points for SSB and 3 points for CW. QSOs with CW Novice/Technicians are worth 6 points. The multipliers are Washington counties (maximum 39) or State/Provinces/DXCC Countries for Washington state stations. Credit multipliers only once per mode on multiple bands.

Scoring: Final score is total QSO points times multiplier. Low-power stations multiply score by 2 and QRP by 3.

Frequencies: CW—1805, 3560, 7045, 14060, 21060, and 28060. SSB—1815, 3925, 7260, 14280, 21380, and 28380. Novices—3700, 7125, 21150, 28160.

Awards: The highest scores in each DX country and US call area will receive a package of Pacific Northwest smoked salmon. Certificates will be available for other category winners. A participation certificate will be awarded to each log submitted (50 QSOs [US], 25 QSOs [DX], 100 QSOs [Washington State] minimum).

The mailing deadline for logs is October 31st. Logs can be sent to: Western Washington DX Club, W7FR, Box 224, Mercer Island, WA 98040.

Fall Classic Radio Exchange

2000Z Sun., Sept. 26 - 0400Z Mon., Sept. 27

The 1993 Classic Exchange, "CX" is a celebration of the older commercial and homebrew equipment that was the pride of our ham shacks just a few short decades ago. The object is to restore, operate, and enjoy older equipment with like-minded amateurs. A classic radio is anything that is older than 10 years (although not a requirement for participation).

Exchange: Name, RST, QTH, receiver/transmitter type. Each station may be worked with different equipment combinations on each band and mode.

Scoring: Multiply total QSOs by the following: Total number of different receivers and transmitters worked on each band and mode plus the total number of states/provinces/countries worked on each band and mode. Multiply that total by your personal Classic Multiplier (the total age of all receivers and transmitters used in your station). Homebrew units count as 25 years unless they are older.

Frequencies: CW—60 kHz from the low band edge; SSB—3880, 7290, 14280, 21380. Novice/Technician use 20 kHz up from low band edge. Note that 7060 and 3560 tend to be the most popular operating frequencies.

Send logs, photos, comments, and anecdotes to Jim Hanlon, W8KGI, Box 581, Sandia Park, NM 87047; or Marty Reynolds, AA4RM, Box 13354, Atlanta, GA 30324. Include an SASE for the next CX newsletter.

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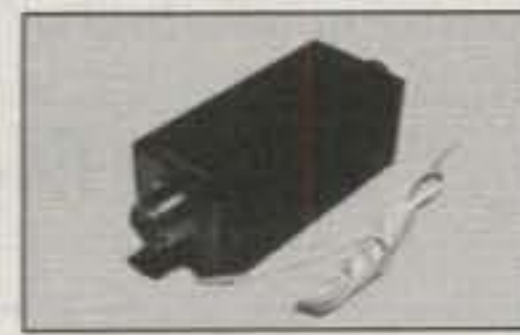


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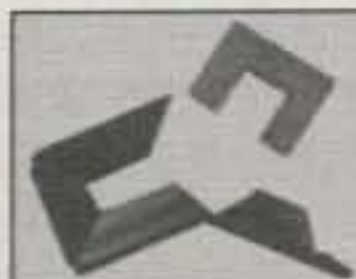
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NEWS OF COMMUNICATION AROUND THE WORLD

Mellish Reef and Sunspots

Eight DXpeditioners from several countries will stage a major operation from Mellish Reef VK9M late this month. Mellish is a small collection of coral reefs some 600 miles east of Cairns, Australia, at 17.5 degrees south and 156 degrees east. The collection of reefs is about 6 miles long, but is at or below sea level at most tides. A small islet near the center of the reef, Herald's Beacon Islet, is the only consistently dry land. The size of this islet varies with shifting sands, but is only a few hundred yards long at best.

In keeping with recent practice, the operators will not announce the actual callsign they will use from Mellish until their arrival to reduce the number of pirate contacts. However, under the recently updated callsign assignment system for Australia's off-shore islands, full-privilege amateur stations from Mellish will use the VK9M prefix.

There were two DXpeditions to Mellish in the 1980s. In May 1982 Harry Mead, VK2BJL; Franz Langer, DJ9ZB; and Fernando Martin, EA8AK, operated using the call **VK9ZR** for about a week. The team made some 16,000 contacts. In January 1989 a multi-national team including VE3CPU, NM2L, KD2HE, and ZF2KN operated as **VK9ZM** and made nearly 30,000 contacts. Both of these teams stopped by the Australian weather station on Willis Island VK9W on the sail back to Australia and operated as VK9ZR and VK9ZW, respectively.

The 1993 Mellish operation will not be following the previous pattern of including Willis on their itinerary. In 1993 Jim Smith, VK9NS, announced plans for, and solicited funds toward, a joint Mellish-Willis operation. A lukewarm response from the DX community forced Jim to cancel the Mellish leg, and instead limit his trip to less-rare Willis. This recent operation eliminated the need for a stop at Willis in 1993 and allowed the current crew to concentrate on rarer Mellish.

In *The DX Magazine's* 1992 Most Wanted Countries survey Mellish Reef was 26th, with 37% of reporters saying they needed a VK9M contact. Willis was 44th, with 29% needing a VK9W QSO. Willis supports a permanent weather base with a four-man crew; sometimes that crew includes an amateur radio operator. (Since that survey was conducted in the

P.O. Box 50, Fulton, CA 95439



Jack, W4LCL (ex-JY9LC), is now active from West Java in Indonesia as YB1ARW. QSL via his stateside address.

summer of 1992, at least five of the higher ranked countries have been on the air with major DXpeditions, so Mellish probably ranks about 20th on the Most Wanted list at this time.)

The 1993 Mellish Reef team expects to get on the air soon after their projected September 18th arrival at the reef. They plan nine days of operation, which should give all DXers a good shot at putting this one in their log. As this article went to press, the team continued to refine their choice of transmitting frequencies, and among the frequencies discussed were 1825, 3505, 7025, 10105, 14005, 18077, 21002, and 24897 kHz on CW, and 1825, 3799, 14195, 18145, 21295, 24945, and 28445 kHz on SSB. The 6 meter frequency will be 50120 kHz. RTTY will concentrate on 14080 and 21080 kHz. Remember, these are tentative choices; check with more current sources of information for the latest news.

This operation has been in the planning stages for more than a year. At the International DX Convention in New Orleans last August, IOTA DXpeditioner Murray Adams, WA4DAN, and Steve Telenius-Lowe, P29DX, discussed the possibility of combining their DXpedition talents in the Pacific. Kingman Reef and Mellish were among the destinations considered. With the announcement of the 1993 N9NS/KH5K trip, the pair narrowed their

sights onto Mellish. (Incidentally, this demonstrates one of the lesser-known values of major DX conventions: they provide unique opportunities for experienced DXpeditioners to sit down together in confidence, and to share their plans and ideas. DX conventions are not only fun to attend, they also lead to many DXpeditions!)

Murray and Steve teamed up with Bill Horner, VK4CRR, to begin the formidable task of assembling a suitable crew of operators, soliciting funding, and gathering equipment. Two-time Mellish DXpeditioner Harry Mead, VK2BJL, signed on, bringing his unique knowledge of the Reef to the team. Atsu Asahina, VK2BEX, a Japanese amateur living in Australia, also joined. He has considerable DXpedition experience in the South Pacific, including a recent Nauru C21 operation. Ken Wells, V73C (ex-V73CT), is another team member with South Pacific operating experience. And Vince Thompson, K5VT, adds to the group his many years of DXpeditioning skills from numerous rare locations. John Linford, G3WGV, will provide a European perspective to the operation. This is one of the most talented and experienced DXpedition crews ever assembled.

The crew will depart the eastern Australian city of Bundaburg on Hervey Bay on September 15 for the approximately four-day sail to the isolated reef. The cap-

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2385LU4FM 2388IK2QFR
2386ZP5XHM

CW

2784LU0/K3JXO 2785JM1VKW

MIXED

1598JH11ED 1599KM4FO

Mixed: 450 JA3WFQ, JH11ED. 500 JH11ED. 550 JH11ED. 600 JA1-20762/BV0, JH11ED. 650 WW0E, JA1-20762/BV0, JH11ED. 700 JH11ED. 750 JH11ED. 800 JH11ED. 850 JH11ED. AA7FL. 900 VO1SF, JH11ED. AA7FL. 950 VO1SF, AA7FL. 1000 VO1SF, IT9CC, AA7FL. 1050 HP2CWB. 1250 SM5BMB. 1300 SM5BMB. 1350 SM5BMB. 1400 SM5BMB, I2EAY. 1450 SM5BMB. 1500 SM5BMB, IS0MVE. 1550 SM5BMB, IS0MVE. 1600 SM5BMB, IS0MVE. 1650 SM5BMB, IS0MVE. 1700 SM5BMB. 2850 IT9TQH. 2900 IT9TQH. 2950 IT9TQH. IN3ANE. 3000 IT9TQH. 3050 IT9TQH. 3100 IT9TQH. 3150 IT9TQH. 3200 IT9TQH.

SSB: 350 KD4BK, WK3Z, LU4FM, ZP5XHM, JH11ED. 400 WK3Z, ZP5XHM, JH11ED, JP1RIW/BV0. 450 WK3Z, ZP5XHM, JH11ED, JP1RIW/BV0. 500 WK3Z, ZP5XHM, JH11ED. 550 WK3Z, ZP5XHM, JE6LDS, JH11ED. 600 WK3Z, ZP5XHM, JE6LDS, JH11ED. 650 WK3Z, ZP5XHM, JE6LDS, JH11ED. 700 WK3Z, ZP5XHM, JE6LDS, JH11ED. 750 WK3Z, ZP5XHM, JE6LDS, JH11ED. 800 WK3Z, ZP5XHM, JE6LDS, JH11ED. 850 ZP5XHM, JH11ED. 900 ZP5XHM, JH11ED. 950 ZP5XHM. 1000 ZP5XHM. 1050 ZP5XHM. 1100 ZP5XHM, SM5BMB, NE8Q. 1150 ZP5XHM, SM5BMB. 1200 ZP5XHM, SM5BMB. 1250 SM5BMB. 1300 SM5BMB. 1350 SM5BMB. 1400 SM5BMB. 1550 KF7RU. 2200 I8RFD. 2500 F2VX. 2550 F2VX. 2600 F2VX. 2750 IT9TQH. 2800 IT9TQH. 2850 IT9TQH. 2900 IT9TQH. 2950 IT9TQH. 3000 IT9TQH. 3050 IT9TQH. 3100 IT9TQH. 3150 IT9TQH. 3200 IT9TQH.

CW: 350 K3JXO/LU0. 400 K3JXO/LU0. 450 K3JXO/LU0. 500 K3JXO/LU0. 550 K3JXO/LU0. 600 K3JXO/LU0. 650 EA5YJ. 700 EA5YJ. 750 EA5YJ. 800 SM5BMB, EA5YJ. 850 SM5BMB, EA5YJ. 900 SM5BMB, EA5YJ. 950 SM5BMB. 1000 PY2YN, SM5BMB. 1050 PY2YN. 1200 I2EAY. 1300 IS0MVE. 1350 IS0MVE. 1400 IS0MVE. 1450 I8RFD. 2450 W4VQ. 2500 W4VQ. 2550 W4VQ. 2600 W4VQ. 2650 W4VQ. 2750 IT9TQH. 2800 IT9TQH. 2850 IT9TQH. 2900 IT9TQH. 2950 IT9TQH. 3000 IT9TQH. 3050 IT9TQH. 3100 IT9TQH. 3150 IT9TQH. 3200 IT9TQH.

10 Meters: SM5BMB, K8MDU, HA9PP, JH11ED
15 Meters: HA9PP
20 Meters: HA9PP

40 Meters: SM5BMB
80 Meters: HA9PP, KM4FO
160 Meters: HP2CWB, KM4FO

Asia: JA3WFQ, JE6LDS, JH11ED, JM1VKW
Africa: SM5BMB
No. Amer.: KD4BK, SM5BMB, HA9PP, JE6LDS, JH11ED
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tain of the 63 foot *Nina Q* two-masted schooner thinks that the prevailing winds will shorten the outbound trip, allowing more operating time on the reef. Once safely on the reef, they will erect a 30 foot tower, and several 20 foot masts, to support the Yagi antennas.

This Mellish operation has garnered support from many parts of the DX community. Dick Smith Electronics of Australia, in connection with Yaesu Australia, is providing five Yaesu FT-900 transceivers and two FL-7000 linear amplifiers for the expedition. Heil Sound is supplying five of their popular BM-10 headset combinations, and GAP Products is providing a Voyager DX-IV low-band vertical. Cushcraft has donated an A3WS Yagi for the new bands; US amateurs didn't have 17 meter privileges at the time of the last Mellish Reef operation, and it's likely to be a popular band this time (see below). In addition, all major DX foundations and many DX clubs and individuals have provided much-needed financial support.

The group plans to operate both CW and SSB on the same band simultaneously, due to the restricted number of open bands (see below). To accomplish this always-difficult task, they will set up two self-contained stations, separated as far as possible on the small islet. Dunestar Systems is providing five of their transceiver bandpass filters to assist.

The team selected the month of September because of the better propagation near the equinox, and to avoid the typhoon season of January and February. Unfortunately, this Mellish operation will not enjoy the superb band conditions of the two previous Mellish Reef DXpeditions. In 1982 solar flux hovered near 300 during the VK9ZR operation. This provided excellent 10 meter conditions and allowed the operators to spread out over all the higher bands. Likewise in 1989 solar flux was around 250 during the VK9ZM operation. The VK9ZM team made 17,500 of their 30,000 QSOs on 10 and 15 meters. Thanks to the precipitous drop in solar activity in 1993, the current Mellish team won't enjoy those long, loud high-band openings.

The predicted solar flux this month is about 100. What will this mean for the Mellish operators? How will their operating techniques differ from those successful at sunspot peaks? What effects do small changes in solar activity have on a DXer's chances of working Mellish? Thanks to the predictive value of W6EL's MiniProp Plus propagation analysis program, we can explore these questions in depth, and perhaps learn something about the relationship between the sunspot cycle and DXing success.

The east coast of the US will have substantially more difficulty working Mellish Reef than the west coast. (Mellish ranked

Mellish Reef to W3 Maximum Useable Frequencies

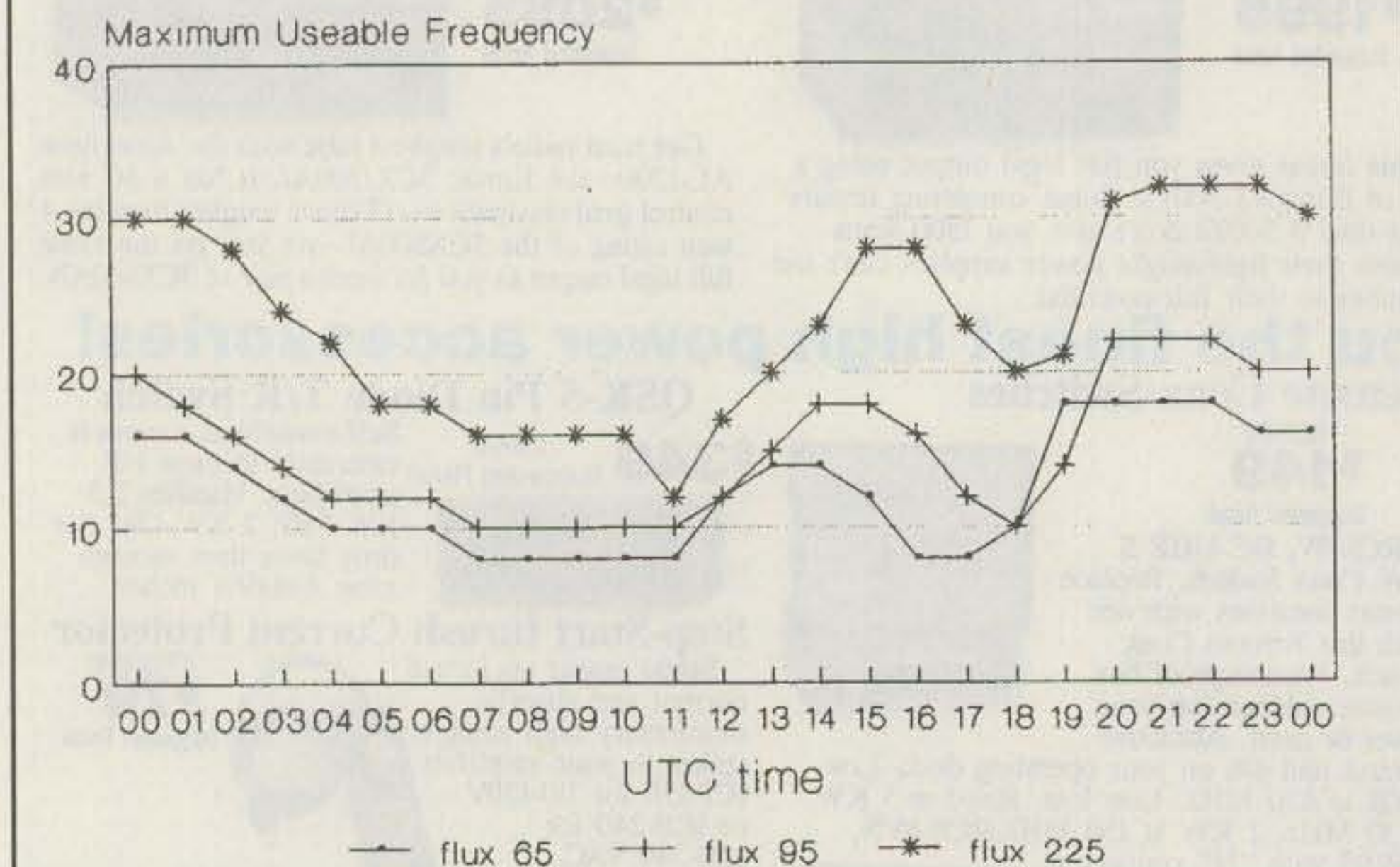


Fig. 1— Difference between the MUFs on the path from the east coast of the US to Mellish Reef during the last two Mellish Reef DXpeditions (1982 and 1989) and the current one.

Mellish Reef to W3 Maximum Useable Frequencies

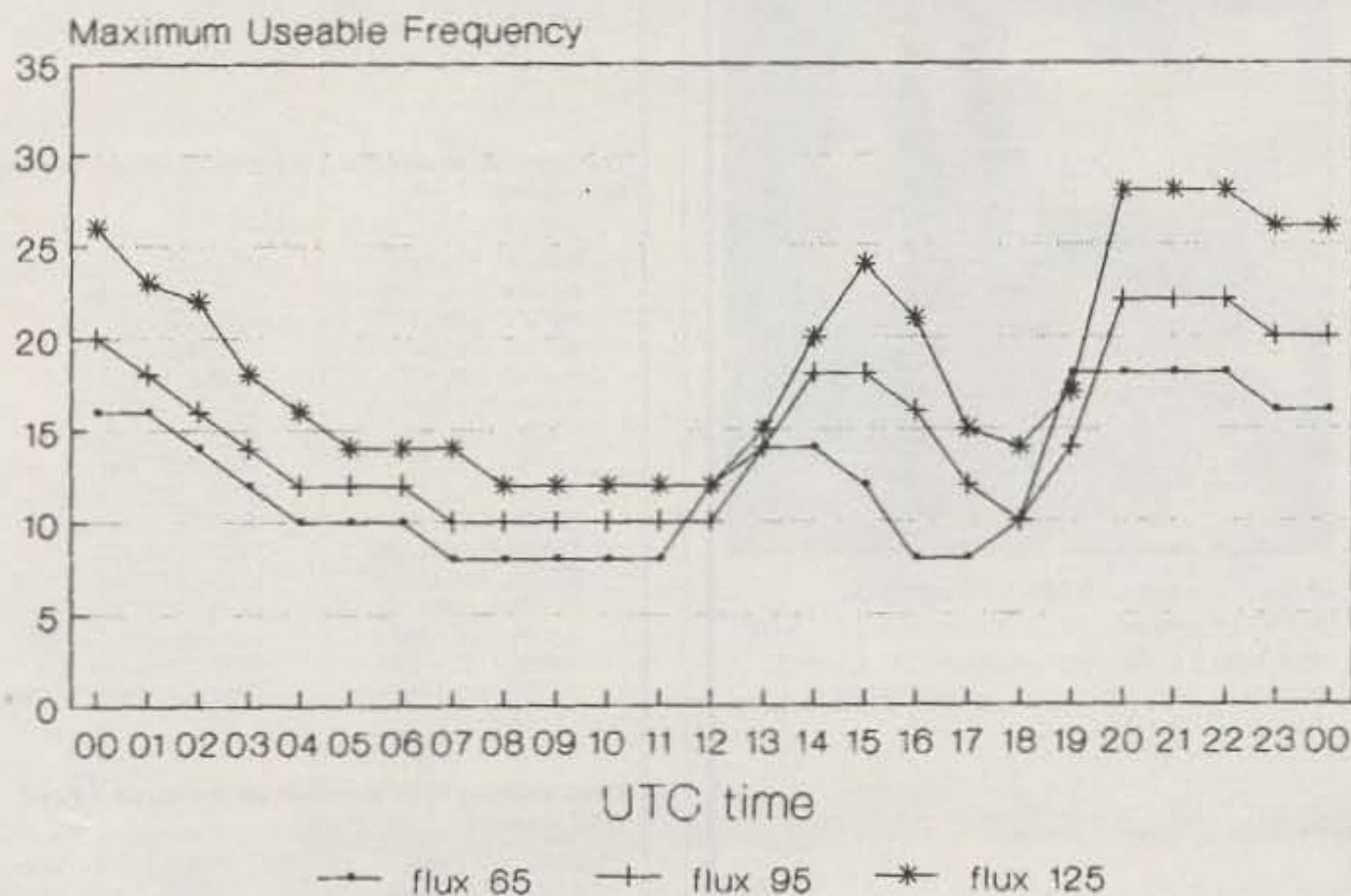


Fig. 2—The effect of minor changes in solar activity on the path from Mellish Reef to the east coast of the US. (See text for details.)

18th on the Most Wanted list for east coast DXers, but well below 50th for DXers in the west.) The path between Mellish and Philadelphia, for example, is a long one—just over 9000 miles. This requires five or six “hops,” or bounces, between the ionosphere and the surface of the earth. This in turn requires the ionosphere to refract the signal back to earth all the way along the path between the two points.

Fig. 1 shows the difference between the maximum usable frequencies (MUFs) on this path during the last two Mellish Reef DXpeditions and the current one. A flux of 225 was the minimum reading during the 1982 and 1989 operations. Projected solar flux in September 1993 is about 100. Minimum flux is about 65. Hence the choice of 225, 95, and 65 for the three curves in the chart.

Note that all three curves have the same general shape; only the height of the peaks is different. This reflects the daily variations on such a long path. MUFs begin to build between Philadelphia and Mellish at sunrise in Philly—1100Z. Then MUFs fall off as night continues to advance at Mellish, where the sun set at 0730Z. When the sun rises at Mellish at 1930Z, the MUFs rise rapidly, reaching their peaks when the entire path between the two points is in sunlight. After sunset in Pennsylvania at 2300Z, MUFs gradually decline, reaching their lowest levels when the path between the two points is in total darkness (0730–1100Z).

On the last two Mellish DXpeditions this

path was open on 10 meters from 2000Z to about 0200Z, with another, shorter opening around 1500 to 1600Z. The MUF stayed above 14 MHz (20 meters) throughout the night. However, the 1993 group will not have the benefit of such good propagation. At the projected solar flux level of 95, 15 meters will be the highest band open on this path between 2000Z and 2200Z. Twenty meters should provide some contacts in the 1300–1600Z time, and on either side of the 15 meter opening. At night, the MUF will probably drop below 14 MHz, limiting contacts to 30 and 40 meters. Since atmospheric absorption is highest on lower frequencies, signals on these lower bands are generally weaker than those on the higher bands. East coast amateurs will have their work cut out for them to make contacts with Mellish this month.

What will happen if the sun doesn't cooperate and solar activity drops to near minimum? Look at the lowest curve in fig. 1, with a minimum-value flux of 65. Again, the general shape of the MUF curve is the same as at higher solar-activity levels. However, the all-daylight path peaks at an MUF below 21 MHz. The 1900–2200 daylight “window” will be limited to 17 meters (18 MHz). Twenty meters will be open on this path for a time on either side of the 17 meter opening, and again briefly near 1300Z. At night the MUF will drop below 10 MHz, eliminating 30 meter possibilities.

Fig. 2 examines this phenomenon in

The WAZ Program

Single Band WAZ

10 Meter SSB

459.....WB2WBU

15 Meter SSB

445.....WB6JMS 446.....WB2WBU

17 Meter SSB

7.....N4MM

20 Meter SSB

923.....WBKZM 925.....KO4XM
924.....WB2WBU

10 Meter CW

136.....WB2WBU 137.....OH4OJ

15 Meter CW

244.....FE1JNA 246.....JF2WXS
245.....WB2WBU

20 Meter CW

432.....WB9CIF 433.....WB2WBU

40 Meter CW

166.....WB2WBU

80 Meter

37.....ON7PQ 38.....K9EL

All CW

30.....N1IR 31.....N4OT

All Band WAZ

SSB

4071.....NBACH	4079.....DL3NAT
4072.....W5GVP	4080.....KD1HN
4073.....WD4AFY	4081.....N6DUR
4074.....WD8LTM	4082.....CT3FF
4075.....KD6ZM	4083.....AC4NJ
4076.....N4XMX	4084.....FE1JSK
4077.....WB2WBU	4085.....SP5AUB
4078.....KA9WON	4086.....WA4DRU

CW/Phone

7341.....WA9YSD	7347.....N5HH
7342.....ON8DX	7348.....W4WKO
7343 (CW).....WB2WBU	7349.....IT9POD
7344.....K1BX	7350.....F6CBH
7345.....VE3CE	7351.....AA7AN
7346 (CW).....JK5NTK	

RTTY

80.....KB5GL

50th Anniversary WAZ

126.....WB2WBU 127.....I1POR

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (75 cents) size 4 1/4 x 9 1/2 to the WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Rd., Sudbury, MA 01776. Applicants forwarding QSL cards either direct to the WAZ manager or to a check point should include sufficient postage for safe return of their QSL cards. The processing fee for all CQ awards is \$4.00 for checkers and \$10 for non-subscribers. Please make all checks payable to the Awards Manager. In order to qualify for the subscriber rate, please enclose your latest CQ mailing label with your application. Send any questions to K1MEM by mail and include an SASE (please do not telephone).

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5 Band WAZ

As of May 31, 1993, 364 stations have attained the 200 Zone level.

New recipients of 5 Band WAZ Award with all 200 Zones confirmed:

OE6IMD
DK2OY
ON7PQ
K9EL
ON4ACG

The top contenders for 5 Band WAZ (zones needed, 80 meters):

N4WW, 199 (26)	VE7AHA, 199 (34)
K6YRA, 199 (34)	W1FZ, 199 (26)
PY7ZZ, 199 (34)	IK2GNW, 199 (1)
KØCS, 199 (34, 40m)	W9CH, 199 (26)
AA4KT, 199 (26)	ACØM, 199 (34)
K7UR, 199 (34)	G3MXJ, 199 (12)
NAØY, 199 (26)	IK8BQE, 199 (31)
VE7DX, 199 (34)	SM6AHS, 198 (12, 31)
WØPGI, 199 (26)	K1ST, 198 (19, 26)
W2YY, 199 (26)	4X6DK, 198 (4, 6)
W9WAQ, 199 (26)	ABØP, 198 (23, 34)
K6EID, 199 (34)	UA3AGW, 198 (1, 12)
IK8CNT, 199 (12)	KL7Y, 198 (34, 36)
W1JR, 199 (23)	VO1FB, 198 (19, 27)
W8SEY, 199 (26)	W6TC, 198 (34, 37)
N7RT, 199 (34)	EA5BCX, 198 (27, 39)

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

K6FG, 173 Zones	ON7PQ, 200 Zones
LZ1XZ, 150 Zones	W2UE, 193 Zones
I1POR, 196 Zones	N5HH, 166 Zones
G3MXJ, 199 Zones	

Endorsements:

GM3YOR, 196 Zones	KS1G, 190 Zones
N4DW, 191 Zones	K9EL, 200 Zones
OE6IMD, 200 Zones	ON4ACG, 200 Zones
IK8BQE, 199 Zones	NN7X, 193 Zones
EA5BCX, 198 Zones	W6ZKM, 184 Zones
F6HMJ, 150 Zones	OH4OJ, 195 Zones
DK2OY, 200 Zones	AA4DO, 196 Zones

834 Stations have attained the 150 Zone level as of May 31, 1993.

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.

more detail, showing the effect of minor changes in solar activity on propagation on this path. The three curves show MUF predictions at solar flux levels of 65 (equal to a sunspot count of zero), 95, and 125. Note that increases in solar activity have two effects on band openings. First, the MUFs increase with increased solar flux. The 1930-2300Z daytime peak is high enough to open 12 meters, and maybe even 10 meters, at a flux of 125, but peaks below the 15 meter band at minimum flux.

However, increases in flux have another benefit to DXers: the duration of the openings. Compare the minor peak after sunrise in Philadelphia, but before sunrise in Mellish—1100-1900Z. At minimum flux the MUF rises to a peak near 14 MHz and stays there for about an hour—1300-1400Z. At a flux of 125 the 20 meter opening begins a little later, about 1200Z,



Pat Parmentier, ON7PQ, recently earned DX's most difficult award, CQ's 5 Band Worked All Zones award.

but remains open all the way into the all-daylight opening commencing at sunrise in Mellish. Instead of an opening of about a hour, DXers have seven hours to try for possible higher-band contacts on this path.

The same effect can be seen for the evening opening. At minimum flux the 20 meter opening on this path will close only a couple of hours after sunset in Pennsylvania. However, at a flux of 125 the MUF will remain above 14 MHz until 0400Z, giving DXers another three hours of possibilities.

These charts demonstrate clearly why DXers love sunspots so very much. Even minor increases in solar activity will not only boost MUFs to open higher bands, but they will also lengthen band openings, permitting many more contacts. While not shown in the graphs, higher solar flux levels translate into higher signal-to-noise ratios as well, permitting less well-equipped stations to make contacts.

What does this mean for the DXer? Should he or she simply give up on DXing until the next sunspot cycle peak in 1999? Of course not! Merely because the band



Yet another reason to attend a DX convention: Elvin, JA3CZY, receives a hand-delivered QSL card from Jack Columbus, VE1XT, at the Visalia convention in April.

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CW

K2TQC 328	W7ULC 324	K9QVB 322	W0HZ 320	AA5NK 316	NC9T 311	KA7T 303	WD9IIX 295	HB9AFI 278
K1MEM 328	KZ4V 324	K2ENT 322	DL8CM 320	WA8DXA 316	K2JF 310	NY5L 302	G3KMQ 295	HA5NK 278
W9DWQ 328	EA2IA 324	W2FXA 322	WB4RUA 320	F3TH 315	K4CX 310	K9DDO 302	N1HN 294	KF5PE 277
K6JG 328	N7MC 324	W0IZ 322	WA4JTI 320	W3BBL 315	KU0S 310	WA4DAN 302	YV5ANT 294	WB6OKK 277
N4MM 328	K9IW 324	K9AB 322	IT9ZGY 320	W5OG 315	K4AH 309	KA2DIV 301	KB3X 289	KA3R 277
K2FL 328	K8LJG 324	IT9QDS 322	N6AV 319	K8NA 314	WB5MTV 309	K4JLD 301	VE1RJ 288	OZ5UR 276
DL1PM 328	ON4QX 323	W4BQY 321	SM3EVR 319	I5XIM 314	K4IQJ 309	VE7DX 301	WG5G/GRP 288	W3HQU 276
K3UA 328	K6LEB 323	K4XO 321	KB8DB 319	W1NG 314	K2JLA 309	IK2ILH 301	W1WLV 288	WF9K 276
W2UE 327	K9MM 323	OK1MP 321	AA6AA 319	PA0XPQ 314	W6DN 308	WA8YTM 300	W7IIT 287	DF3FJ 275
WA4IUM 326	N4JF 323	N2KW 321	N5FW 318	KQ9W 314	W9RY 307	W6YQ 300	WA9RCQ 286	4N7ZZ 275
K9BWQ 326	N6AR 323	G4BWP 321	N6CW 318	I8WY 314	K1VHS 306	AA2X 300	CT1YH 284	
YU1HA 326	K4CEB 323	VE3HO 321	W8XD 318	WD9IIC 313	W8URM 305	YU2TW 300	N4OT 284	
IT9TGO 326	N4KG 323	IT9TQH 321	N7RO 318	I2QMU 313	SM6CTQ 305	G2FFO 300	KP4P 283	
W0SR 325	SM6CST 323	W0JLC 321	KD8V 317	WA2HZR 312	N8MC 303	NN4Q 299	AG9S 282	
K2OWE 325	AA4KT 323	W7CNL 321	K9TI 317	W4OEL 312	K1HDO 303	OH3NM 297	N3DQD 280	
I4EAT 324	W6PT 322	W9WAQ 320	W1WAI 317	DJ2PJ 311	KB9XG 303	KA5TQF 295	W2LZX 279	

SSB

K4MZU 328	VE3MR 325	OK1MP 323	K8CSG 321	I4ZSQ 318	VE2GHZ 314	YV2EJU 308	I2ZGC 299	WK3N 282
K2TQC 328	VE3MRS 325	W4UNP 323	VE4AT 321	G4CHP 318	W5GVP 314	N3ARK 308	N1CWA 299	YB3CEV 282
K2FL 328	IK0IOL 325	YV5CWO 323	KE4VU 321	K1HDO 318	K4LR 313	W4BQY 308	NW5K 299	YC3OSE 282
W9DWQ 328	SV1ADG 325	W0SFU 323	IK8CNT 321	ZL1BIL 318	K1VHS 313	W8URM 308	WB6GFJ 299	YV1JV 282
W9SS 328	IT9TQH 325	YV5AIP 323	KC8EU 321	WA6DTG 318	I2EOW 313	N6AV 307	KB2FC 293	TG9EP 281
WA4IUM 328	A18M 324	T12HP 323	ON5KL 321	NC9T 318	WB4PUD 313	W2FKF 307	SV8CS 298	VE2NUP 281
KZ2P 328	VE2PJ 324	OZ5EV 323	IK8BQE 321	KB2MY 318	W1NG 313	WD5P 307	WA0TKJ 298	KA1LMR 281
K6YRA 328	KA3HXO 324	VE7WJ 323	K9HQM 321	N4CRU 317	W1LQQ 313	T12TEB 307	KX5V 298	KD5ZD 281
DJ9ZB 328	XE1CI 324	VE3GMT 323	WA4DAN 321	XE1XM 317	W4SSU 313	VE3DLR 307	KF5DX 297	WA0QII 281
K6JG 328	W2CC 324	I8XTX 323	AA6AA 321	KB3OQ 317	I8INW 313	WA2MID 306	NP4CC 297	VU2DVP 281
WA6OET 328	WA4JTI 324	YV1AJ 323	K7LAY 321	SM6CST 317	W5XQ 313	XE1MDX 306	VE3CKP 297	W8/DL2SCA 281
VE1YX 328	W2FGY 324	I8YRK 323	KB3X 321	KU9I 317	LU7HJM 313	VK3JF 306	XE1OW 296	LU6FAZ 281
WB1DOC 328	W5LLU 324	KB4HU 323	KE4HX 321	YV1CLM 317	K8CMO 312	EA2AOM 306	EA5RJ 296	NX0I 280
N4MM 328	WZ4I 324	N5FW 323	WD8PUG 321	IK1GPG 317	T12KD 312	N4KE 305	KA4RAW 296	YU1TR 280
DL9OH 328	IT9ZGY 324	T12CC 323	K13L 321	I8LEL 316	K8NWD 312	K3LUE 305	HP1JC 296	K2EEK 280
XE1AE 328	W2SUA 323	VE7DX 323	WA4ECA 321	W6SN 316	KC4MJ 312	WA6DTG 305	VE3XO 294	WN5K 279
CX1TE 328	K9MM 323	K4PQV 323	KR9O 321	AG9S 316	ZS6BBY 312	WF9K 305	EA3KW 294	WB8TLI 279
K5OVC 328	W2FXA 323	I4LCK 323	VE3HO 321	K8ZZU 316	N6CGB 312	N15D 305	W0IYR 294	K5AOL 279
EA2IA 328	OZ3SK 323	VK4LC 323	K9QVB 320	DU9RG 316	WA9IVU 312	G4NXG/M 305	WD9IIC 293	VU2CVP 278
AA6BB 328	KM2P 323	N2KW 323	W6DN 320	KV2S 316	KA5TQF 312	EA1QF 304	IT9VDQ 293	K4BYK 277
KA6V 328	VE3XN 323	K2JF 323	KB5FU 320	N4WF 316	K3NEE 312	ZL1BOQ 304	W8AXI 293	WA9BDX 277
VE2WY 328	K6WR 323	I2QMU 323	W3GG 320	YT7DX 316	WD0BNC 312	WA1DHM 304	OA4QV 293	WB0UFL 277
K5TVC 328	N4JF 323	AA5NK 323	AA4AH 320	WA9RCQ 316	N5ORT 312	EA3EQT 304	T12LTA 292	WN5MBS 277
YS1GMV 328	YU1AB 323	OE2EGL 323	NJ2C 320	WE2L 316	IN3ANE 312	AC0A 303	K9EC 292	KG9N 277
I8ACB 328	N6AR 323	WA4WTG 323	G4GED 320	KB9OC 316	4N7ZZ 312	KB9LN 303	K7UL 292	I8WYD 277
W6EUF 327	YV1KZ 323	I8KCI 322	NJ0C 320	K4JLD 316	I2MQP 311	KB0SY 303	SV1JG 291	WP4AFA 277
W4NKI 327	I0ZV 323	ZS6LW 322	K7EHI 320	N4KEL/M 316	NN4Q 311	AB4PY 303	WA5SUE 291	KA9I 277
N6AHU 327	W4JUV 323	I0AMU 322	NY5L 320	KB80 316	IK2GNW 311	I4CSP 303	CP5NU 290	CT1AHU 277
CX4HS 327	WA4JTI 323	K4CXY 322	EA1QF 320	WB2JZK 316	K0HQW 311	N6RJY 303	I4UFH 289	KG6LF 277
W0YDB 327	EA4DO 323	I8AA 322	W6NLG 320	KB2HK 315	N1ALR 311	RA3YA 302	W9TA 288	WB4UHN 276
ZL1AGO 327	WB4UBD 323	K9AB 322	IK8GCS 320	W0LSD 315	XE1ZLW 311	W2LZX 302	YB2OK 288	KJ6HO 276
K3UA 327	W9OKL 323	K8NA 322	W5LLU 320	IK7DBB 315	KD5ZM 311	XE1KS 302	T15RLI 287	VE7HAM 276
F9RM 327	OA4OS 323	KS2I 322	N5FG 320	KC2FC 315	KE5PO 311	N5HSF 302	OK1AWZ 287	NX4Y 275
YU1HA 326	W3AZD 323	KD8V 322	W6MFC 320	W0ULU 315	KF8VW 311	4X4JO 302	EA8TE 287	WA4PGM 275
W4UW 326	ZL3NS 323	G4ADD 322	CX1TE 319	WA5HWB 315	KA5RNH 310	WB4TGB 301	N8BJQ 285	HP6AYV 275
KF7SH 326	K4XO 323	W6BCQ 322	W9JT 319	WB4DBB 315	T12JJP 310	VE6PW 301	FD1OZF 285	T12SD 275
K2JLA 326	ZL1AGO 323	PY4OY 322	K9TI 319	YV5DFI 314	I8IYW 310	NO4J 301	KB7IVU 285	KJ6GC 275
KZ4V 326	N4KG 323	LA7JO 322	K1UO 319	W9RY 314	ZL1BOQ 310	W3SOH 301	W6SHY 285	KA5YCM 275
K9BWQ 326	DL6KG 323	OA4ED 322	WB6OKK 319	KU9Z 314	N6AHV 309	YU2TW 300	IK8BMW 284	KI4FW 275
W7OM 326	K2ENT 323	W7FP 322	KF5AR 319	HR1KAS 314	I5EFO 309	N4CRU 300	NZ7D 284	WA4OPW 275
N7RO 326	AA4KT 323	I4WZK 322	KD5ZM 319	A92BE 314	I1POR 309	WT4T 300	KB5RF 284	AB4NS 275
KS0Z 325	OE3WVB 323	K8YVI 322	KA9ABC 318	K4SBH 314	KP4P 309	VE3FJE 300	KD9CN 284	DK5WQ 275
W4EEE 325	WA3HUP 323	W7FP 322	KQ9W 318	XE1OX 314	XE1MD 309	WB4NDX 300	NU4Y 283	
WB3DNA 325	WD8MGQ 323	K2ARO 322	WB6PSY 318	OH5KL 314	WA8YTM 309	OE7SEL 300	KB9AIT 283	
I4EAT 325	K9HDZ 323	I8SAT 322	WB3CQN 318	WD0DMN 314	CE7ZK 309	N6PTI 300	VE3IMO 283	
K9IW 325	K0GT 323	CT1FL 321	9H4G 318	ZS6AOO 314	PY2DBU 309	AB4UF 300	XE1IL 283	
W0SR 325	K4MQG 323	WS9V 321	KB1JU 318	KB7VD 314	KP4EQF 309	I8IGS 299	E16FR 283	
KB8DB 325	4Z4DX 323	A18S 321	PA0XPQ 318	F6BFI 314	WD9IIX 308	K5DUT 299	WA9BXB 282	

openings will be fewer, shorter, and weaker doesn't mean they won't exist. In fact, the bottom curve of the two charts reflects the lowest possible level of solar activity, with a sunspot count of zero. MUFs won't get any lower than that. Thus, even with no sunspots, patient, knowledgeable DXers will be able to make long-haul DX contacts. DXing won't be as easy as it has been during the glory days of the past few years, but neither will it simply go away.

These charts also demonstrate the importance of flexibility. With fewer, shorter band openings, the DXers will need to have capabilities on all bands, including the low bands, and especially the new ones. Seventeen meters may be the best

place for east coast DXers to catch Mellish Reef this year. DXers should make sure that they have a suitable rig and antenna for both 17 and 30 meters; these will be important DX bands over the next few years.

These new bands have additional benefits over the traditional DX bands. There are no foreign broadcast stations on 30 meters, as there are on 40. Both 30 and 17 meters are available in their entirety to General Class and higher US amateurs, unlike 15 and 20 meters, with their exclusive subbands in the prime DXing segments. And there are few entrenched special-interest activities on 17 meters, such as the nets, phone patches, and slow-scan TV groups that limit freelance

DXing on 20 meters. In short, 17 and 30 meters are the places for DXers to be during the coming sunspot minimum.

A few words of caution about the above analysis. First, the MiniProp Plus program must be fine-tuned for each individual station. That is, not every DXer will experience the identical band openings. Factors such as antenna height and gain can have a dramatic effect on band openings. The above analysis assumes a minimum radiation angle of only seven degrees. A low dipole may not be effective on this path.

Also, the MiniProp Plus program does not reflect changes in the earth's geomagnetic field due to solar flares and coronal holes. In general, disturbances in



Here is the all-YL team that operated from Montserrat VP2M in July: Ellen Tessitore, N6XJM, Gayle Olson, KM6WF, Janet Munday, AB6MP, Nancee Graff, N6ZRB.

the geomagnetic field lower MUFs and signal strengths. However, solar flares can actually enhance propagation briefly, between the flare itself and the onset of the geomagnetic disturbance a day or two later.

Finally, this analysis ignores DXers in all the other corners of the world who are also trying to work the Mellish Reef DXpedition. Simply because a band is open between Philadelphia and Mellish Reef is no guarantee that the Mellish team will be on that band, beaming the east coast of the US. They must be fair to all amateurs, and be on different bands at different times to give DXers in Europe, Japan, South America, the rest of the US, and elsewhere good chances to work them. They may be on 10 meters working JAs at 200 an hour at 2100Z, for example, rather than trying to pull W3s out of the mud on 20. The Mellish operators have made their own propagation analyses on the more difficult paths, including the US east coast and Europe, and they will make a special effort to work these areas. However, they must work DXers in other parts of the world as well.

Finally, those DXers who are successful in making a Mellish Reef contact this month should send their QSL request to Bill Horner, VK4CRR, 26 Iron Street, Gympie, Queensland 4570, Australia. A donation to help with the US\$30,000 cost of the trip would certainly be appreciated and will encourage the DXpeditioners to venture out on another trip soon.

Other September DX Operations

The California Polytechnic State University ARC (CPARC), W6BHZ, announces

that CalPoly students and others will operate from Wake Island KH9 OC-053 Aug. 31 to Sept. 10 on all bands 160-6 meters, with special emphasis on the new bands. Amateur satellite activity, as well as CW, SSB, and RTTY operation. Usual DXpedition frequencies. Operators are Javier Campos, AH6MM; Christopher Lee, AB6EV; Kirk Fabrizio, AH6ML; Craig Gullickson, KC6CEX; Craig Boyer, AH9B; and Patrick Guerin, NH6UY. QSL route is via the Oklahoma DX Association, P.O. Box 88, Wellston, OK 74881. Donations would be greatly appreciated, made out to CPARC, University Union Box 53, San Luis Obispo, CA 93407. Callsigns will be announced at a later date.

Luc Glarey, I1YRL, will operate the International Telecommunications Union club station **4U1ITU** in Geneva, Switzerland this month, assisted by members of the INORC naval team. Luc will be the chief CW operator. QSL this 4U1ITU operation to Luc at Via San Martino 11, I-10091 Alpignano, Italy.

Helmut Enger, DL1ECU, and other Germans will operate from the town of Triesenberg in Liechtenstein HB0 Sept. 1-11, signing **HB0/DL1ECU**. QSL to Helmut's new address: Kottsiepen 78, D-42369 Wuppertal, Germany.

Fred Lucas, K1EFI, will operate **/VP9** from Bermuda Sept. 23 to Oct. 5, concentrating on CW. QSL via Fred's home address: 72 Long Meadow Hill Road, Brookfield, CT 06804. Fred handles QSLs for several Bermuda amateurs: VP9ID, VP9KG, VP9KR, and VP9KK.

ON6USA will again celebrate the liberation of the southwest and eastern portions of Belgium by US 1st Army troops in 1945, with an operation September 4-12. Try 40-45 kHz up on CW, and 14300-325, 21375-400, and 28475-500 kHz on SSB.

CQ DX Awards Program

SSB

2022.....N5WYR	2025.....VU2DIG
2023.....K9CC/M	2026.....OH2BFK
2024.....K0LLO	2027.....W5GVP

CW

881.....K0LLO

SSB Endorsements

320.....WB1DQC/328	320.....K13L/321
320.....EA2IA/328	320.....W6MFC/320
320.....AA6BB/328	320.....XE1ZLW/320
320.....KA6V/328	310.....KD5ZM/319
320.....VE2WY/328	310.....KB1JU/318
320.....K5TVC/328	310.....WA5HWB/315
320.....YS1GMV/328	310.....VE2GHZ/314
320.....I8ACB/328	310.....F6BFI/314
320.....ZL1AGO/327	310.....W5GVP/314
320.....K3UA/327	310.....IN3ANE/312
320.....F9RM/327	310.....4N7ZZ/312
320.....W7OM/326	275.....KX5V/298
320.....SV1ADG/325	275.....OA4QV/293
320.....IT9TQH/325	200.....HP2CWB/225
320.....N7RO/324	200.....K0LLO/200
320.....IT9ZGY/324	150.....OH2BFK/157
320.....VE4AT/323	

CW Endorsements

320.....DL1PM/328	320.....N7MC/324
320.....K2FL/328	320.....IT9TQH/321
320.....K3UA/328	320.....W0JLC/321
320.....W2UE/327	320.....IT9ZGY/320
320.....IT9TQH/326	310.....N7RO/319
320.....K2OWE/325	1.8 MHz.....IT9TQH
320.....EA2IA/324	

Total number of active countries is 328. 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.

QSL to ON6CL via the Belgium bureau, or direct to P.O. Box 11, B-4800 Veriers 1, Belgium. Two other Belgium special-event stations will be active Sept. 11-12: **ON7USA** by the Tilleur Radio-Amateur group (QSL to ON4RAT or direct as above) and **ON4USA** by the Verviers Radio-Amateur Group (QSL to ON5PL, or direct as above).

QSL Notes

Carl OH6XY, QSL manager for PJ9Y, reports that he is experiencing a significant amount of lost mail. Please resubmit if you haven't gotten a timely answer. (Carl was kind enough to return the US\$1 on a second request.)

QSL **T77C** to Tony in San Marino, and *not* via Tim Totten, KJ4VH. Tim did operate from T77C, but QSLed his contacts 100% via the bureau. He has since been receiving cards for his and other T77C operations, all of which must be remailed to T77C.

QSL the CQWW WPX SSB operation of **IB0C** via operator Gian Federico Mad-

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4K4D to G4WLZ
4K4N to G4WFZ
4L5A to UF6FFF
4L5A to IK3HHX
4L8A to OZ1HPS
4L8T to UF6DZ
4N5GBC to YU5GBC
4N5GX to YU5GBC
4N5JA to YU5XTC
4N5KO to YU5FSO
4N5M to YU5GBC
4N5MM to YU5MM
4N5PK to YU5XVD
4N5VV to YU5XCS
4N5W to YU5GBC
4N7DW to YU7BJ
4O4AE to YU1FW
4O4GNO to YU1XA
4O7AV to YU7AV
4U1UN to W8CZN
5H3XX to JH3RRA
5R0R to JR1PFO
5R8DG to F6FNU
5T5SN to FD1RUQ
5Z4BI to W4FRU
5Z4JD to F6AJA
7Q7ZZ to JA1UMN
7Z2AB to AA0BC
8P9FD to K8RWL
9A2TN to YU2TN
9D5CW to PY2CWW
9H3XX to DL6RAI
9K2KS to ON7LX
9K2ZZ to W8CNL
9M0S to W4FRU
A71BH to OE6EEG
AP5A to KC7V
BT2000BJ to BY1QH
BV4OB to KA6SPQ
C91J to W8GIO
C02VG to I0WDX
CQ1A to WA1ECA
CQ5E to CT1EEN
CQ5N to CT4NH
CQ6AHU to CT1AHU
CR6EEN to CT1EEN
CR7EDX to CT1EDX
CR7EEN to CT1EEN
CR8EDX to CT1EDX
CT5P to CT1DIZ
DL1VJ/T5 to DL1VJ
E35X to LA6ZH
EG1RJ to EA1MC
EM3W to UZ3AYR
ER40WQ to SP7LZD
EU0A to DL1GWS
EV7AA to UC2AHZ
EV7AA to UC2AHZ
EV8A to F6AML
EV9A to F6AML
FG5FC to F6DZU
FH/DK5WN to DL9OH
FP4EK to K1RH
GB2TI to GM3ITN
H44JS to H44SI
HC8J to WV7Y
HR1LW to JA1LW
HS0ZAA to KM1R

HV4NAC to IK0FVC
IB1AB to G0ITX
IB9T to IT9TQH
IP1TI to I1ANP
J288M to K1XE
J5AUA to G4ODV
J5UAI to NW8F
J68AC to WA2USA
J68AD to W8PR
J68AG to WD8IXE
J68AI to N8BJQ
J68AK to W8QID
J68AM to W8ILC
J68AN to W8FN
J68AP to K0IYF
J68AR to K9BQL
J68AS to N9AG
J68AY to GM4ENP
JT0AJ to UA3AQ
JT5DX to JA7FWR
JT75DX to JA7FWR
JW0F to SP2GOW
JW0F to SP2GOW
JW6MY to LA6MY
K4IQJ/BV to K4IQJ
KC6/DL1VU to DK5EX
KH5/DL1VU to DJ9BC
LY/UC2ABO to LY1BA
N8AFW/KH5 to WA2FUJ
OD5/SP7LSE to SP7EJS
OD5JY to JY5EC
OH0AAQ to OH2NRV
OK8EAR/P to DL6RDE
OM3LO to OK3LO
OX3GX to WA3KSN
OX3XR to OZ3PZ
OY/DK9FE to DK9FE
P29AI to VE7ELA
P29JA to JH7MSB
P40J to WX4G
P40NA to DL6NA
PJ0JT to W1AX
RC2CR to NF2K
RH1E/UA9XMC to UZ9XWH
RH5E/UA9XMC to DL1EE
RH5E/UA9XMC to DL1EE
RH8BKA to WA2NHA
RU1A to KC1WY
S21A to W4FRU
S21ZH to SP5IUL
S54ZZ to OE8SKQ
S79FIB to SM0FIB
T32VU to DJ3TF
T33VU to DL4YAH
T5THW to DL8KAW
T91A to DJ0QJ
T91AAM to 9A2OT
T91ENS to EA2URD
T92A to S57MX
T93M to DL8OBC
T94CR to SM5AQD
T94ON to DL8OBC
T94US to YU2NR
T95VO to 9A3KK
T95X to 9A2AA
T97M to DL8OBC
T99A to I4QGU
TN1AT to F6FNU
TR8LC to FD1PYJ
TU2QW to F6EXQ
TU4XA to OH7XM
TZ6FIC to FF6KEQ
TZ6VV to AA0GL
UA8TAB to I8KUT
UD6DKW to DL6KVA
UI8QU to K9FD
UI8ZAA to K9FD
UI8ZAA to UW6HS

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US0U to K8YSE
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V73/WV1V to WV1V
VK9LM to DJ5CQ
VP2ECW to N6CW
VP2EHF to KA3DBN
VP8COI to G8KOM
VP8PW to VE8RZ
VP9HE to KD8IW
VQ9AC to WN8O
VQ9KC to AA7AN
VS6CT to KA6V
VY8EA to VY2EA
WB4VKW/6Y5 to WB4VKW
XF3/XE1L to WA3HUP
XQ0X to CE3ESS
XR3A to CE3DNP
XU3ZP to LA2ZP
XU6TQ to PA3BTQ
XU6WV to VS6WV
XU7VK to HA0HW
XU9M to JH1KRC
XX9AS to KU9C
YB0ARM to N4AA
YU/F6PGP to FD1PYI
YJ0ATL to HB9TL
YR0ATW to YO4ATW
YS1DRF to W2PD
YS1XS to WD4LVP
YT5R to YU5GBC
ZA/OH6XY to OH3GZ
ZA1AB to OH3GZ
ZA1J to I1MQP
ZA1Z to HB9BGN
ZA2A to OH3GZ
ZD8DEZ to G8DEZ
ZD9CQ to ZS6SA
ZF2NE to W5ASP
ZF2SM to KQ2I
ZK1AQY to FE1DBT
ZK1UO to DL7UJO
4N5GB to P.O. Box 38, 92001 Stip, Macedonia
5R8DJ to Frank Turek, DL7FT, 1000 Berlin 19, Germany
5X1C to Mario, P.O. Box 9276, Kampala, Uganda
ET3SID to P.O. Box 10229, Addis Ababa, Ethiopia
ET3YU to P.O. Box 60349, Addis Ababa, Ethiopia
HS0/G4UAV to P.O. Box 2008, Bangkok, Thailand
LY75BQJ to Rolandas Mikalauskas, P.O. Box 787, 3041 Kaunas, Lithuania
LY75DR to Saulius Zalnerauskas, P.O. Box 787, 3041 Kaunas, Lithuania
TR8NSY to P.O. Box 8000, Liberville, Gabon
VU2TTC to P.O. Box 29, Madras 600045, India
XX9MD to P.O. Box 1339, Macau, via Portugal
Y11AB to P.O. Box 6100 Baghdad, Iraq
Y11DZ to Diya, P.O. Box 7361, Baghdad, Iraq
Y11MH to Magid, P.O. Box 5864, Baghdad, Iraq
YZ5AA to P.O. Box 171, Gevelija 91480 Macedonia
ZD7GWM to P.O. Box 66, Jamestown, St. Helena, South Atlantic
ZS7ANT to P.O. Box 17118, Congella 4013, Republic of South Africa

ruzza, IK0AZG, Via San Vetturino 9, 06126 Perugia, Italy.

QSL UJ8JMM, RJ8JM, UJ8JCM, UJ8XDE, and UJ9XWB direct only via Michael Kaiser, DL8WN, P.O. Box 1802, D-6550 Bad Kreuzach, Germany.

QSL ER0/N7LSZ via Nancy, NK4U, c/o ARRL QSL Bureau, Box 599, Sterling, VA 20167.

QSL GU0SWA via operator Will Dennis, W1WA, P.O. Box 463, Sanbornville, NH 03872.

QSL OH0MAM via Jukka Kulha,

OH1XM/OH2MAM, P.O. Box 73, SF-00521 Helsinki, Finland.

QSL Slaven Galic, T95X, via P.O. Box 22, Siroki Brijeg, Bosnia-Herzegovina, via Croatia.

Wayne Mills, N7NG, assisted with the mailing of 4J1FS QSL cards for stateside DXers, but he is not the manager; he has neither logs nor cards. Send follow-up requests and corrections to the manager: OH2BU.

QSL 4J4JJ and 4J4GK via GW3CDP. QSL S50A and S56MM via Tine Brajnik,

S52AA (ex-YT3AA), Maroltova 13, 61113 Ljubljana, Slovenia.

QSL **S50L** via Franc Bogataj, S59AA (ex-YU3BC), Cesta na Brdo 141, 61111 Ljubljana, Slovenia.

QSL Ramiz Biscic, **T94US**, via Emir Mahutovic, 9A2NR, P.O. Box 508, 41001 Zagreb, Croatia.

QSL Jim Wilson, **VQ9AC**, via his state-side address: WN8O, 5915 East Silver Lake Road, Pretty Prairie, KS 67570.

QSL **BZ4DHI** and Glarey Luc's operations of **4U1ITU** and **4U8ITU** via Glarey's home address: Via San Martino 11, 10091 Alpignano (To) Italy.

Art Phillips, NN7A, reports that all direct QSL requests for his operations as **V31JZ** and **HR6/NN7A** have been answered. QSL **V31RL** via NG7S.

John Ross Brummell, VE3EL, ex-VE3JDO, reports that all bureau cards for **V63BC**, **KC6CM**, **KC6CQ**, and **V63BD** (Oct. 11 to Nov. 3, 1990) have been answered. He can confirm these contacts, as well as **YN1QG** and **YN1FI** from 1984. John's address is 11 Beechfern Dr., Stittsville ON K2S 1E3, Canada.

Pras Rajagopal, **VU2PTT**, has a new address. It is P.O. Box 23, Mangalore 575001, India. Pras is also QSL route for **VU2OXX** and **VU2MTT**. Direct only, please, with SAE and return postage in the form of US\$1 or IRCs.

And in the bizarre category, F6HIZ,

QSL manager for **ET2A**, added a note to a returned QSL via the bureau that reads, "OM, you have sent a QSL direct! I have answered your QSL direct! Why sending a dup via buro? Do you realize that you are wasting my time? And the time of many other people?" Obviously, use care when QSLing via Pierre.

QSL Help Wanted

WDØHSP/KL7 seeks the QSL routes for PZ9AI, 3D2AO, T30TH, and OX2ZZ from the 1992 ARRL 10-meter test.

NSØB hasn't had any luck getting a QSL card from **9M2AX**. Any suggestions?

VE4MF seeks QSL routes for **5V1IJ**, a CW QSO from March 1991, and **ZJØAA**, CW on July 14, 1990.

KD6QV says he has had no success confirming **XW8KPL** via Box 3770, Vientiane, Laos. Any suggestions?

W7YS needs to confirm a QSO with **SU1EF** for his last zone on 20 meters. SU1EF said QSL via I2LES, but Bill can't locate a direct address. Ideas?

KA2NRR tried to confirm a 1989 QSO with **8Q7AC** via Box 702, Narfaru Island, but this is no longer a good address. Any other information?

WBØVNE seeks QSL routes for **3G1L**, **FØXX**, **HG4XT**, **LY3BS**, and **ZL3GQ**.

In the old contact category, K1VSI seeks QSL routes for **CR7DS** in 1968,

ET3GC from 1964, **ZE1AC** from 1966, and **CR6LV** from the late 1960s.

K4MPE seeks direct address for FD1ONC, QSL manager for **J28YC/FH**, and FD1OYK, manager for **ET3JR**.

3A2LZ needs help confirming **5T5HH** and **ZS8MI**; cards direct to Mauritania and ZS6AEN have not been answered.

W8UVZ hasn't received replies from **SV9BAI** (Box 92, GR-73100 Chania, Crete), nor from SP5AAS, for **XU3UN** (Dec. 1992).

And NY1I hasn't had any success QSLing **ZS8MI** from October 1990 via Gerald Everett, Box 13077, Jacobs 4026 RSA. Any suggestions?

QSL Help Provided

For K1VWL: QSL Polsky Josef **4X4MW** at P.O. Box 88, Oranit 44813, Israel. Thanks, GM4PVC.

QSL Manager Volunteers

W. P. Howard, WA5TUD, Route 1, Box 59-E, Water Valley, MS 38965, offers to manage and help pay for the QSLs.

Luc Glarey, I1YRL, offers QSL managing services to a CW operator from Asia, Africa, or the Pacific, direct only. Luc's address is above.

73, Chod, VP2ML

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Radio Rulemaking Update

It has been a busy year as far as new radio regulations go, and it's not over yet! Here is the status of important FCC upcoming proceedings involving amateur radio.

Blending of Novice And Technician

The year started off with three petitions affecting the amateur 222 MHz band being combined into one FCC proposal—PR Docket 92-289. The American Radio Relay League wanted a protected 150 kHz "weak signal" subband at the low end of the band and FCC permission for Novices to access the entire 222 MHz band rather than just what historically constituted the general operation, repeater, and simplex subbands.

The original goal of the 222 MHz Novice segment was to allow beginners to gain experience operating 1¼ meter repeaters, while discouraging them from transmitting on the traditional repeater output frequencies above 223.91 and the "fancy stuff" running around below 222.1 MHz. Weak signal, EME (moon bounce), packet, control link, experimental, and beacons frolic in the first 100 kHz of the band.

Theoretically, Novices are young, not knowledgeable, and need guidance. It is on that basis that they are prohibited from establishing a repeater. And the low-power (25 watt) restriction supposedly limits newcomers to safe RF levels. The fact of the matter, however, is that most youngsters by far enter amateur radio at the Codeless Technician level where the licensee may operate a repeater. And 222 MHz repeaters may (and do) operate anywhere in the band. The traditional 1¼ meter repeater segment is now muddled due to "local options."

Recognizing this, another petitioner (Dr. Michael C. Trahos, KB4PGC, of Falls Church, Virginia) suggested that the FCC allow Novices to operate repeater stations on VHF/UHF spectrum. The Commission agreed and proposed that Novices not only operate in the entire 222–225 MHz band, but they could establish repeaters as well. The FCC also went along

with the League's request for a small (150 kHz) protected segment at the low end of the 222 MHz band.

But in our view, the real news on this proceeding was nestled in the NPRM fine print. Few people seem to have noticed footnote 6. The FCC ominously noted that they "... amended the amateur service rules in PR Docket 90-55 (the Codeless Technician class proceeding) based on, among other things, the amateur community's view that the Novice Class operator license is needed as an entry-level for person's who cannot pass the more difficult written examination for the Technician class license. Comments are also requested, therefore, on the effect that the proposed changes would have on the current amateur operator license structure."

The effect of narrowing the differences between the Novice and Technician license, of course, is that both classes may not be needed. The "amateur community's view" has proved to be wrong, since most beginners (youngsters included) are clearly choosing the Technician path into amateur radio. The ultimate result might be a further FCC proceeding which seeks information on a more efficient and realistic amateur radio licensing structure.

Frankly, we thought the FCC would have made a final ruling on PR Docket 92-289 by now. But the amateur community is still waiting for the concluding Order. Our understanding is that the only thing standing in the way of adoption of the NPRM is the final concurrence by the Commissioners. This could come at any time.

Visiting Foreign Amateurs

The Commission is also expected to rule momentarily on their proposal to authorize VEs to examine foreign visiting amateurs so that they might operate amateur radio while on short visits to the United States. Such persons would include tourists and meeting attendees who wish to operate their amateur stations while in this country.

The FCC's NPRM (PR Docket 92-167) suggested an immediate 60-day operating period to foreign amateurs who could pass a short multiple-choice written examination on U.S. amateur operating

rules. Under the Instant Temporary Licensing procedure, a foreign amateur would be given credit for 8 of the 9 examination topics, all except FCC regulations.

The system would have volunteer examiners reviewing foreign amateur service licenses, administering a 20-question "rules" test (pass rate 18), issuing a "qualification document" (such as a CSCE—Certificate of Successful Completion), and recording the data so the foreign amateur could be contacted if necessary. The document would be the foreign amateur's instant operating authorization for 60 days.

At present, there are only two ways a foreign amateur may operate amateur radio in the United States. First, an alien may pass the necessary examinations to receive a regular ten-year term license. And second, citizens of 76 countries whose governments have signed reciprocal operating agreements with the U.S. may, on the basis of the amateur service licenses issued by their own countries, be issued one-year permits to operate amateur stations while in this country. Both ways require substantial advance planning on the part of the visitor and significant FCC involvement.

Besides "instant operating authority," this third temporary visitor arrangement would even include countries with which the United States does not have a reciprocal operating agreement.

Because of the different operating privileges afforded amateur operators by various countries, the FCC would allow the same operating terms and conditions afforded by the foreign amateur's own license, not to exceed those granted to U.S. amateur Extra Class licensees. This is the same arrangement afforded foreign amateurs operating under reciprocal operating agreements (see Part §97.107(b) of the Rules).

Our first impression was that this proposal might not have a good chance of being adopted, since the American Radio Relay League firmly opposed it in their formal comments. They want the Commission to consider United States participation in alternative international licensing schemes.

But FCC Personal Radio Branch Chief Johnny Johnston, speaking at the 1993 Annual Conference of VECs last June, brought up the proceeding again. The

National Volunteer Examiner Coordinator, P.O. Box 565101, Dallas, TX 75356-5101 (817-461-6443)

tone of his remarks was that the Commission was indeed planning on going forward with the visiting foreign amateur proposal.

Permissible and Prohibited Communications

At present, amateur service rules prohibit all business-type communications on the amateur bands. The service is primarily structured to encourage personal and technical development and to assist in emergencies rather than to provide personal (or business) communications for its participants. While the rules don't say so, amateur radio is also a hobby or recreational radio service.

The stated goals of the U.S. Amateur Service do not include providing routine communications for the operator or others, especially those who might realize a financial benefit or have radio frequencies of their own assigned to them.

Today extremely few amateurs build complete stations and practically none construct transceivers at the VHF and higher frequency range. Amateur radio in the United States, especially at the entry level, has essentially evolved from a technical hobby to a pastime of operating techniques, providing unpaid communications for others and leisure-type personal transmissions.

In PR Docket 92-136 the Commission has proposed to relax some of the restrictions on permissible communications in the Amateur Service. To what degree this will happen, however, is anyone's guess. There is reason to believe, however, that the FCC shortly will permit the routine ordering of merchandise and services for the amateur operator's own personal benefit . . . and perhaps even for the welfare of others. When and if this happens, more and more of the general public will certainly be attracted towards obtaining an amateur service license.

The FCC has been overwhelmed in recent years with a deluge of requests from the amateur community to deviate from the permissible communications content. "The restrictions were designed to protect the non-commercial character of the amateur service and ensure its basis and purpose—that is, as a reservoir of volunteer communicators, technicians, and electronics experts dedicated to advancing the radio art, to provide public service communications particularly in times of emergencies, and to enhance international goodwill," they said.

Amateur radio was never intended to be a communications service to assist public safety and other government agencies, or for things such as logistical support for parades and other events, classroom instruction, ordering supplies

for remotely located organizations, supplying news to the media, selling amateur gear, rebroadcasting non-amateur communications, or for expediting the personal and club business of amateur operators. In fact, these communications are specifically outlawed from the amateur bands. Still, the FCC gets dozens of requests to allow these communications to be handled on the amateur air waves.

In trying to find a way to accommodate the steady stream of these requests, the FCC initially thought that perhaps a system of communications priorities might allow amateurs to more fully participate in traditionally non-amateur communications. Initially, three types or levels of amateur communications were suggested: Priority, Primary, and Secondary.

Those communications which involve emergencies and disasters where the safety of life and property are at stake would be "Priority." Primary communications would be the currently authorized amateur communications. The transporting of all other non-amateur information would be Secondary.

The challenge is how to write a simple, easy-to-understand rule that allows an expansion of amateur communications without throwing open amateur frequencies to those who would exploit them commercially.

This entire proceeding has now gone



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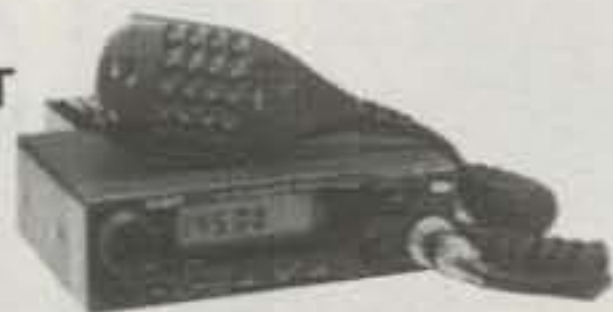
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through all of the required Administrative Procedures Act steps which define how our government must change rules. The FCC told us that all comments and reply comments have been considered on the matter, and that a Report and Order has now been forwarded to the Commissioners for action. This extremely important proceeding has the potential of changing the face of amateur radio as we now know it.

Commercial Radio Operator Testing

The FCC has announced that nine organizations will manage their newly privatized commercial radio operator license examination programs. The first to be chosen was The W5YI Group, Inc., Dallas, Texas.

More than 60 groups applied to become Commercial Operator License Examination Managers (COLEMs). The others selected are the National Association of Business and Educational Radio, International Society of Certified Electronic Technicians, Elkins Institute, Sylvan Learning Systems, Sea School, Drake Training and Technology, Electronic Technicians Association International and the National Association of Radio and Telecommunications Engineers. Each of these organizations has en-

tered into a Memorandum of Agreement with the government.

Examination managers are responsible for recruiting examiners, establishing testing centers, announcing test sessions, and preparing, administering, grading, and notifying applicants of passed examinations. A "Proof of Passing" document that is issued by the COLEM to examinees certifies their qualifications.

Common question pools are being developed by the Federal Communications Commission. Approximately 20 percent of the multiple-choice questions contained in a pool will be randomly selected to make up an examination.

The Element 1 (basic radio law and radiotelephone operating practice) and Element 3 (electronic fundamentals) question pools required for the General Radiotelephone Operator License will be the first available. The FCC plans to release these pools to the public in August. There will eventually be seven written examination question pools. It is anticipated that privatized commercial radio operator examinations will be available in September.

A completely rewritten Part 13 covering Commercial Radio Operators and the privatized Examination System rules has already been released by the Commission and is available at a cost of \$2.00 to

cover printing and handling from the W5YI Group, P.O. Box 565206, Dallas, TX 75356.

Commercial radiotelegraph applicants will be required to transcribe one minute coded (five-character groups) or text without an error. No other answer format will be permitted. For the first time, Amateur Extra Class operators will be given Morse Code exam credit towards the Second Class Radiotelegraph Operator license, but they must pass additional written examinations on radio law and operating practices.

The FCC did not establish an exam fee schedule. Instead, potential commercial examination managers were asked to submit their proposal for conducting privatized commercial radio testing. The W5YI Group said it would provide examinations utilizing both currently licensed Commercial and Amateur Extra Class radio operators as Registered Examiners.

The W5YI Group, Inc. has established a commercial operator testing division known as National Radio Examiners and is in the process of approving examiners and test sites. Priority for Commercial Radio License Chief Examiner status will be given to holders of the General Radiotelephone and Commercial Radiotelegraph Operator licenses, although Amateur Extra Class examiners may also be Chief Examiners.





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It will not be necessary for approved Amateur Extra Class level examiners to hold a commercial radio license to conduct commercial radio operator testing. Examination fees collected will be shared with Testing Centers. Amateur and Commercial Radio Operators interested in participating as Commercial Radio Operator examiners, establishing a Commercial Operator Testing Center, or taking a Commercial Radio exam are urged to contact: The W5YI Group, Inc., National Radio Examiners, P.O. Box 565206, Dallas, Texas 75356 (817-461-6443).

Amateur Radio Callsigns

The Amateur Radio Call Sign System adopted in 1978 provides for 7 prefix blocks, 93 prefixes (AA-AL, K, KA-KZ, N, NA-NZ, W, WA-WZ), and 5 format arrangements (1x2, 1x3, 2x1, 2x2, 2x3) in each of 10 regions. Although a total of 14,888,860 combinations are possible, only 4% of the available callsigns are assigned. Currently the FCC is processing about 125,000 applications annually at an annual cost of 2.5 work years.

At present the FCC does not have ability to assign specific callsigns, and the present Group A, B, C, D will remain. A new PC-based computer system coming on line shortly at the Commission's Gettysburg, PA licensing facility is being programmed, however, to provide personalized amateur callsigns which would require a fee. The FCC would like to retain that fee to help finance amateur radio administration, but this would require Congressional legislation.

The present Honeywell mainframe computer is badly out of date and will be retired in late 1994. Beginning in October 1993 two parallel systems will be used.

Among the new services to be offered by the FCC will be renewal notices and the issuance of Technician Plus licenses which will have to be submitted by the VECs. The new system will be capable of issuing "vanity" callsigns, reserved (for 10 years) and lifetime retired callsigns at a higher fee. In the future it might be possible for amateurs to obtain any unassigned callsign, "will" callsigns to heirs or friends, or retire a callsign permanently. An applicant could list up to five callsigns, and the first available call would be assigned.

The FCC said the new computer was being programmed to reserve two types of callsigns. First, upon notification, a current holder of a callsign could reserve his/her call for assignment only to a designated club station or to a designated person upon that person becoming eligible for a callsign in that group.

Second, anyone, amateur or non-amateur could reserve any available callsign. This reserved call would be available for

assignment only to a designated club station or to a designated person, including the person making the reservation upon that person becoming eligible for a callsign in that group.

And finally, the computer has the capability of retiring a callsign, which would allow anyone, but mainly the current holder, to withdraw a specific callsign so that it is never reassigned. Vanity, reserved, and retired calls will be made available to the amateur community upon approval from Congress to collect a fee for the administration of the personalized callsign system. A separate form will be used for this program. Reserve and retired calls could be held for ten years with the option to renew. Retired calls on a permanent basis would require a higher fee.

"The vanity, reserved and retired system would be in addition to the routine callsign assignment that we use today," the FCC said. "Although no decision has been made, we might allow a six month

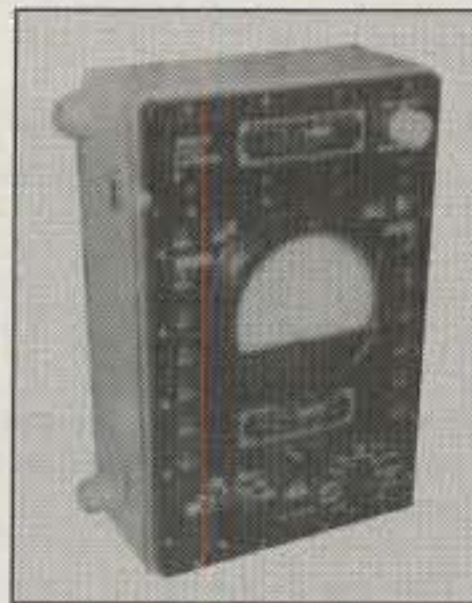
period for the applying for vanity, reserved, and retired calls. After that period, those old calls that are still not assigned could be made available to fill in those areas in the groups that have been exhausted."

The FCC also said it was currently considering a system that would allow new amateurs to become control operators immediately after passing the required license examinations. The instant operation approval would utilize a temporary self-assigned callsign from WZ-by-3 callsign block. A newcomer to amateur radio would simply use his initials and the appropriate identifier indicating that the examinee had upgraded to a specific license class. For example, WZ5FOM/AE could be used by Frederick O. Maia if his first license was amateur Extra Class until his permanent license was received from the Commission.

73, Fred, W5YI

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Name [G] [Sent] [Rog] [Insert] [Change] [Delete] [Clear]
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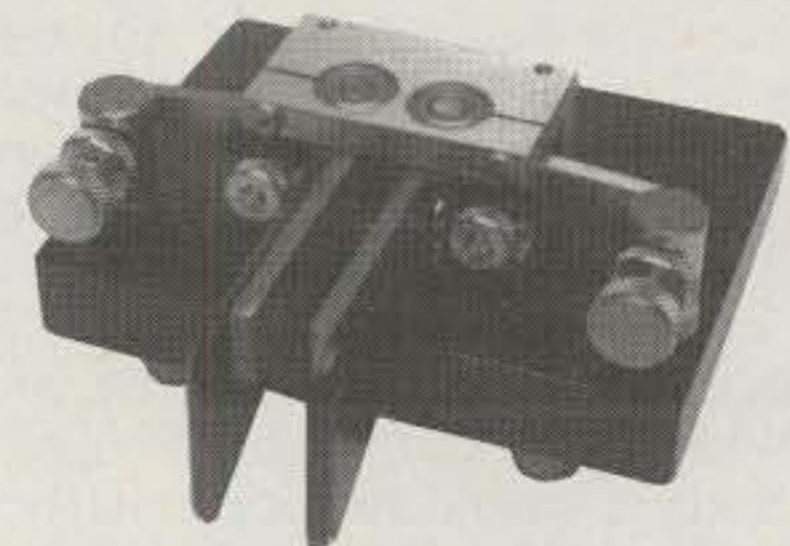
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THE SCIENCE OF PREDICTING RADIO CONDITIONS

Solar Cycle Progress

Sunspot Cycle 22 continues to decline slowly but steadily, much as expected.

The Royal Observatory of Belgium, the world's official keeper of sunspot records, reports a monthly mean sunspot number of 61 for May 1993. Daily values ranged from a high of 125 on May 11 to a low of 13 reported for May 19th. The mean value for May results in a 12-month running smoothed sunspot of 74 centered on November 1992. This is a decline of three points from October's level. The solar cycle is measured by the level of smoothed sunspot number, which is an average of the mean values for the previous 12 months. A smoothed sunspot number of approximately 55 is forecast for September 1993.

As expected, there was a corresponding decrease in 10.7 solar flux levels during May. According to daily observations made at Penticton, B.C. by the Dominion Radio Astrophysical Observatory, the mean monthly level of 10.7 cm solar flux was 112. This results in a smoothed level of 128 centered on November 1992.

A smoothed solar flux level of approximately 115 is forecast for this month.

Sunspot Numbers Vs Solar Flux

Recently I received several letters asking why both solar flux and sunspot numbers are used to describe solar activity.

Although an unbroken string of telescopic sunspot records is available for the past 235 years, a more precise measure of solar activity was devised about 45 years ago. This is the measurement with very accurately calibrated radio receivers of radio frequency radiation emitted from the sun. While the source of these radio waves, called *solar noise* or *solar flux*, and the physical process which produces them are not yet fully understood, they are very closely related over time with sunspot measurements. Fig. 1 shows the close linear relationship which exists between daily levels of solar flux (SF) and the daily sunspot count (R).

Solar flux measurements can be more accurately calibrated and standardized on a worldwide basis than can measurements made with solar telescopes. Measurements can be made daily and are

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LAST MINUTE FORECAST

Day-to-Day Conditions Expected for September 1993

Propagation Index.....	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 5-6, 9, 16, 29	A	A	B	C
High Normal: 3-4, 8, 15, 26, 30	A	B	C	C-D
Low Normal: 1-2, 7, 10-11, 14, 17-18, 21-22, 25, 27-28	A-B	B-C	D	D-E
Below Normal: 12, 23	B-C	C-D	D-E	E
Disturbed: 13, 19-20, 24	C-E	D-E	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 good-to-fair (B-C) on Sept. 1st and 2nd, good (B) on the 3rd and 4th, excellent (A) on the 5th and 6th, etc.

unaffected by cloud coverage or adverse weather.

Solar flux measurements are presently made on a worldwide basis on selective frequencies between 245 and 15,400 MHz (not kHz). The frequency most used, for which the longest string of records is available, is 2695 MHz, or 10.7 cm wavelength. These are usually referred to as 2800 MHz measurements.

The 2695 MHz solar flux level is measured simultaneously at several observatories throughout the world at precisely 1700 UTC daily. The values are coordinated internationally by Canada's Dominion Radio Astrophysical Observatory in Penticton, B.C.

Besides being a more objective measure of solar activity, daily solar flux level measurements are more rapidly available to users of the HF spectrum than are sunspot counts. They are broadcast at 18 minutes past each hour during the solar/geomagnetic transmissions of WWV.

They are also available from several computer bulletin boards, including NOAA/SESC (303-497-5042) and Solar Terrestrial Dispatch (403-756-3008), and by telephone from the NOAA/SESC on-duty forecaster at 303-497-3171.

September Propagation

During most of September and early October expect variable propagation conditions on the HF bands. On some days conditions should continue to be much the same as they were earlier in the summer, but on other days the first signs of wintertime conditions should be noticeable. For this reason, this month's column contains DX Propagation Charts for the one-month period September 15 to October 15, rather than the usual two-month span. This month's column also contains Short-Skip Propagation Charts for September and October.

During September and early October expect a seasonal increase in 10 and 12 meter DX openings during the daylight hours. Expect some fairly good openings to the Caribbean and South America, and to the South Pacific area and the southern and central portions of Africa, particularly during the afternoon hours. When conditions are High Normal or better, openings should be possible to most other areas of the world as well.

A considerable improvement is expected for DX propagation on the 15 and 17 meter bands. Both bands should open for DX shortly after sunrise and remain open until after sundown. Openings should be possible to all areas of the world, with conditions best towards Europe and the northeast before noon, and to the rest of the world during the afternoon hours. Openings towards the South Pacific, Australia, New Zealand, and the Far East should be possible well into the early evening, particularly when propagation conditions are High Normal or better.

It may be a toss-up between 15 and 20 meters for the best DX band during the hours of daylight in September and early October, but the edge probably will go to 20 meters. Look for the band to open for DX at sunrise and remain open in all directions for a few hours. It should be possible to work into many areas of the world throughout the daylight hours, but look for a peak in DX propagation conditions during the afternoon hours. Twenty meters

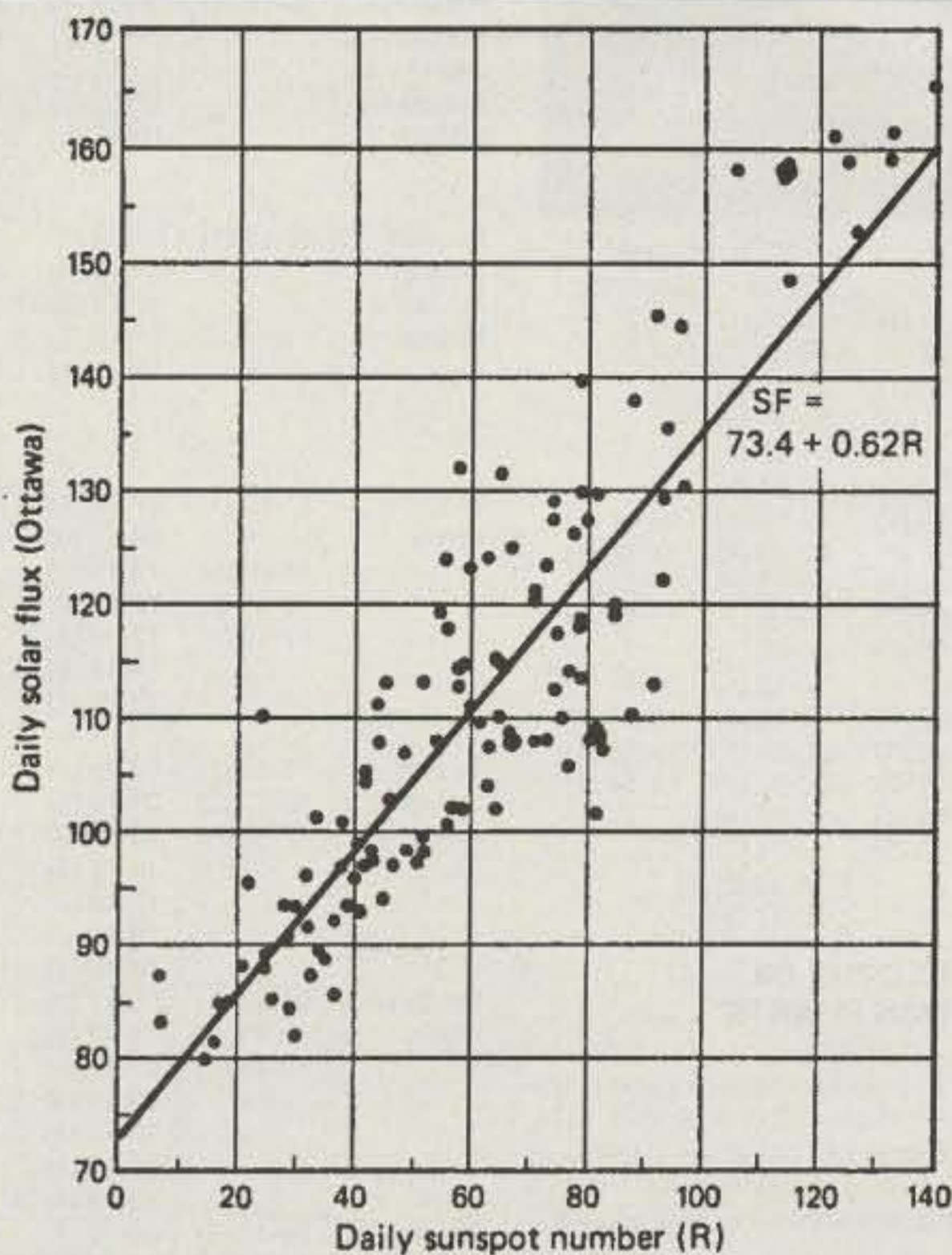


Fig. 1— Example of the linear relationship that exists between daily solar flux levels (SF) and daily sunspot numbers (R).

should remain open for DX during some of the hours of darkness as well. Nighttime conditions will favor openings towards the south and to tropical areas, but some openings will also be possible to other areas of the world, particularly when conditions are High Normal or better.

Expect an improvement in nighttime DX conditions on 30, 40, 80, and 160 meters during September and early October. This results from the increasing hours of darkness and a seasonal decline in the static level. Thirty and 40 meters should be best for worldwide DX from the sunset through the sunrise period. Check 80 and 160 meters during the hours of darkness, particularly for an hour or so before local sunrise.

For short-skip propagation during September and early October, use 80 meters during the day for openings shorter than 250 miles, and either 80 or 160 meters at night. For distances between 250 and 750 miles try 30 and 40 meters during the day and 80 meters at night. For openings between 750 and 1300 miles the best bet should be 20 meters during the day, 30 and 40 meters from sundown to midnight, and 80 meters from midnight to sunrise. For openings beyond 1300 miles try 15, 17, or 20 meters during the day and 30 and 40 meters during the hours of darkness. Check 10 and 12 meters for some fairly good openings beyond 1300 miles in the afternoon hours, particularly when conditions are High Normal or better.

Equinoctial Propagation

It's that time of year again when the sun is almost directly overhead at the equator. This happens twice a year, in the spring and fall, and is called an equinox.

The fall, or *autumnal*, equinox will occur on September 22. This is the day on which the sun will cross the plane of the earth's equator as it appears to travel from northern to southern skies. On this day the hours of daylight and darkness are equal in length throughout the world. Sunrise should take place at approximately 6 AM local time and sunset at about 6 PM local time, no matter where you are in the world.

This results in an ionosphere of almost similar characteristics over large areas of the world, and is usually the best time of year for long DX openings between the temperate regions of the northern and southern hemispheres, on all HF bands. Expect considerably more frequent openings from mid-September through mid-October between the USA and South America, the South Pacific, South Asia, and southern Africa, particularly on 15, 17, and 20 meters for a few hours after sunrise and during the sunset period.

Long-path openings also improve considerably during the equinoctial period. In western states look for long-path openings to Europe and Africa on 15, 17, and 20 meters shortly after sunrise and again during the early evening. Stations in eastern states can expect some long-path

openings to the South Pacific during the late afternoon and early evening, and to parts of eastern Africa and Asia just after sunrise. Long-path openings should also be possible on 30 and 40 meters, and at times on 80 meters, for an hour or so *before* sunrise and just *before* sunset.

VHF Ionospheric Openings

Conditions for trans-equatorial (TE) scatter propagation are expected to peak during the equinoctial period. Six meter openings, and some 2 meter openings as well, should be possible by this propagation mode between the southern tier states and deep South America. The optimum time for TE openings is between 8 and 11 PM local time. Openings can last from a few minutes to a few hours, and signals can vary between very weak and moderate, with flutter fading almost always present. While TE propagation favors the southern third of the country, during September some 6 meter open-

HOW TO USE THE SHORT-SKIP CHARTS

1. In the Short-Skip Chart, the predicted times of openings can be found under the appropriate distance column of a particular meter band (10 through 160 meters) as shown in the left-hand column of the chart. For the Alaska and Hawaii Charts the predicted times of openings are found under the appropriate meter band column (15 through 80 meters) for a particular geographical region of the continental USA as shown in the left-hand column of the charts. An * indicates the best time to listen for 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 HST 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 September & October 1993 Local Daylight Savings Time At Path Mid-Point (24-Hour Time)

Band (Meters)	Distance Between Stations (Miles)			
	50-250	250-750	750-1300	1300-2300
10	Nil	10-21(0-1)	08-10 (1) 10-13 (1-2) 13-15 (1-3) 15-16 (1-2) 16-21 (0-1)	08-10 (1) 10-13 (2) 13-15 (3) 15-16 (2-3) 16-17 (1-2) 17-19 (1) 19-21 (1-0)
15	Nil	08-10 (0-1) 10-15 (0-2) 15-21 (0-1)	08-09 (1) 09-10 (1-2) 10-15 (2-4) 15-17 (1-4) 17-18 (1-3) 18-20 (1-2) 20-21 (1) 21-08 (0-1)	08-09 (1) 09-10 (2-3) 10-11 (4-3) 11-17 (4) 17-18 (3) 18-19 (2-3) 19-20 (2) 21-08 (1-0)
20	12-14 (0-1) 14-16 (0-2) 16-22 (0-1)	08-09 (0-1) 09-10 (0-2) 10-11 (0-3) 11-12 (0-4) 12-14 (1-4) 14-16 (2-4) 16-18 (1-4) 18-19 (1-3) 19-22 (1-2) 22-08 (0-1)	06-08 (1-2) 08-09 (1-3) 09-10 (2-4) 10-11 (3-4) 11-18 (4) 18-19 (3-4) 19-22 (2-3) 22-00 (1-2) 23-00 (2) 00-06 (1)	06-08 (2) 08-09 (3) 09-14 (4-2) 14-16 (4-3) 16-19 (4) 19-21 (3-4) 21-22 (3) 22-23 (2-3) 23-00 (2) 00-06 (1)
40	08-10 (1-3) 10-12 (2-4) 12-18 (3-4) 18-19 (2-3) 19-21 (1-2) 21-06 (0-1) 06-08 (0-2)	08-10 (3-4) 10-12 (4-3) 12-16 (4-2) 16-18 (4-3) 18-19 (3-4) 19-21 (2-4) 21-23 (1-4) 23-03 (1-3) 03-06 (1-2) 06-08 (2-3)	08-10 (4-2) 10-12 (3-1) 12-16 (2-1) 16-18 (3-2) 18-19 (4-2) 19-20 (4-3) 20-21 (4-3) 21-03 (4) 23-03 (3-4) 03-05 (3-4) 03-06 (2-3) 05-06 (3) 06-08 (4-3)	08-10 (2-1) 10-16 (1-0) 16-18 (2-1) 18-19 (2) 19-20 (3) 20-21 (4-3) 21-03 (4) 23-03 (3-4) 03-05 (3-4) 05-06 (3) 06-08 (4-3)
80	07-09 (3-4) 09-12 (4) 12-19 (4-3) 19-23 (4) 23-05 (3-4) 05-07 (2-3)	07-09 (4-2) 09-12 (4-1) 12-17 (3-1) 17-19 (3-2) 19-21 (4-3) 21-05 (4) 05-06 (3-4) 06-07 (3)	07-09 (2-1) 09-17 (1-0) 17-19 (2-1) 19-21 (3-2) 21-22 (4-3) 22-04 (4) 04-06 (4-3) 06-07 (3-2)	07-09 (1) 09-17 (0) 17-19 (1) 19-21 (2) 21-22 (3-2) 22-04 (4-3) 04-06 (3-2) 06-07 (2-1)
160	17-19 (1-0) 19-21 (2-1) 21-06(4) 06-08 (3-2) 08-10 (2-1) 10-12 (1-0)	18-20 (1-0) 20-21 (1) 21-03 (4-3) 03-06 (3-2) 06-08 (2-1) 06-08 (1-0)	20-21 (1-0) 21-23 (3-1) 23-03 (3) 03-06 (2-1) 06-08 (1)	21-23 (1-0) 23-03 (3-2) 03-06 (1) 06-08 (1-0)

HAWAII September & October 1993 Openings Given in Hawaiian Standard Time

	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern States	08-10 (1) 10-13 (2) 13-14 (1)	07-11 (1) 11-12 (2) 12-14 (3) 14-15 (2) 15-16 (1)	11-13 (1) 13-14 (2) 14-18 (3) 18-20 (2) 20-04 (1) 04-07 (2) 07-08 (1)	18-20 (1) 20-22 (2) 22-00 (3) 00-02 (2) 02-03 (1) 10-21 (1)* 21-00 (2)* 00-01 (1)*
Central States	08-10 (1) 10-14 (2) 14-16 (1)	07-10 (1) 10-12 (2) 12-16 (3) 16-17 (2) 17-18 (1)	09-13 (1) 13-14 (2) 14-15 (3) 15-18 (4) 18-19 (3) 19-21 (2) 21-04 (1) 04-09 (2)	18-20 (1) 20-22 (2) 22-02 (3) 02-04 (2) 04-05 (1) 19-21 (1)* 21-00 (2)* 00-02 (1)*
Western States	0809-(1) 09-10 (2) 10-15 (3) 15-16 (2) 16-17 (1)	0709 (1) 09-10 (2) 10-13 (3) 13-15 (4) 15-16 (3) 16-17 (2) 17-19 (1)	10-12 (2) 12-14 (3) 14-18 (4) 18-20 (3) 20-00 (2) 00-05 (1) 05-06 (2) 06-10 (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)* 02-04 (2)* 04-05 (1)*

ALASKA September & October, 1993 Openings, Given GMT

	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern States	19-22 (1)	17-19 (1) 19-23 (2) 23-00 (1)	12-15 (1) 18-21 (1) 21-23 (2) 23-01 (3) 01-02 (2) 02-04 (1)	08-12 (1)
Central States	20-00 (1)	17-19 (1) 19-21 (2) 21-23 (3) 23-01 (2) 01-02 (1)	13-22 (1) 22-00 (2) 00-03 (3) 03-04 (2) 04-06 (1)	08-11 (1) 11-13 (2) 13-14 (1) 11-13 (1)*
Western States	20-22 (1) 22-01 (2) 01-02 (1)	18-21 (1) 21-22 (2) 22-00 (4) 00-01 (3) 01-02 (2) 02-03 (1)	16-18 (1) 18-20 (3) 20-00 (2) 00-02 (3) 02-03 (4) 03-04 (3) 04-05 (2) 05-07 (1)	08-11 (1) 11-14 (2) 14-16 (1) 11-14 (1)*

HOW TO USE THE DX PROPAGATION CHARTS

1. Use chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8, KP4, KG4, and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9, and 0 areas; the Western USA Chart in the 6 and 7 areas; and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 meters) for a particular DX region, as shown in the left-hand column of the charts. An * indicates the best time to listen for 160 meter openings.

3. The propagation index is the number that appears in () after the time of each predicted opening. The index indicates the number of days during the month on which the opening is expected to take place as follows:

- (4) Opening should occur on more than 22 days
- (3) Opening should occur between 14 and 22 days
- (2) Opening should occur between 7 and 13 days
- (1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

4. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. Appropriate daylight time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 7 hours in PDT Zone, 6 hours in MDT Zone, 5 hours in CDT Zone, and 4 hours in EDT Zone. For example, 14 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 03 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts CW, or 1 kw, PEP on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the propagation index will increase by one level; for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce, Boulder, Colorado 80302.

September-October 15, 1993 Time Zone: EDT (24-Hour Time) EASTERN USA TO:

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Central Europe & North Africa	09-11 (1) 11-12 (2) 12-14 (1)	08-09 (1) 09-11 (2) 11-14 (4) 14-15 (3) 15-16 (2) 16-17 (1)	03-04 (1) 04-06 (2) 06-10 (3) 10-12 (2) 12-15 (3) 15-17 (4) 17-19 (3) 19-20 (2) 20-21 (1)	18-19 (1) 19-21 (2) 21-23 (3) 23-02 (4) 02-03 (3) 03-04 (2) 04-05 (1) 20-22 (1)* 22-01 (2)* 01-04 (1)*

Northern Europe & CIS (former European USSR)	09-12 (1)	08-09 (1) 09-10 (2) 10-12 (3) 12-13 (2) 13-15 (1)	03-06 (1) 06-08 (2) 08-11 (3) 11-13 (2) 13-17 (3) 17-18 (2) 18-20 (1)	18-20 (1) 20-04 (2) 04-06 (1) 21-04 (1)*
Eastern Mediterranean & Middle East	10-13 (1)	08-09 (1) 09-12 (2) 12-14 (3) 14-16 (2) 16-17 (1)	07-09 (2) 09-15 (1) 15-17 (2) 17-20 (3) 20-21 (2) 21-23 (1) 23-01 (2) 01-07 (1)	19-21 (1) 21-00 (2) 00-01 (1) 22-23 (1)*
Western Africa	11-13 (1) 13-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	07-09 (1) 09-13 (2) 13-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	05-08 (2) 08-15 (1) 15-17 (2) 17-18 (3) 18-21 (4) 21-23 (3) 23-03 (2) 03-05 (1)	20-23 (1) 23-02 (2) 02-04 (1) 00-03 (1)*
Eastern & Central Africa	13-15 (1) 15-17 (2) 17-18 (1)	08-09 (1) 09-13 (2) 13-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	12-14 (1) 14-17 (2) 17-21 (3) 21-01 (2) 01-02 (1)	20-02 (1) 00-01 (1)*
Southern Africa	09-11 (1) 11-13 (2) 13-14 (1)	08-11 (1) 11-12 (2) 12-13 (3) 13-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	14-16 (1) 16-19 (2) 19-23 (3) 23-01 (2) 01-02 (1) 06-08 (1)	19-22 (1) 22-00 (2) 00-02 (1) 23-01 (1)*
Central & South Asia	09-11 (1) 19-21 (1)	09-10 (1) 10-12 (2) 12-13 (1) 20-22(1)	07-08 (1) 08-10 (2) 10-12 (1) 17-19 (1) 19-22 (2) 22-00 (1)	05-07 (1) 20-23 (1)
Southeast Asia	11-13 (1) 18-20 (1)	09-11 (1) 14-16 (1) 18-19 (1) 19-20 (2) 20-21 (1)	06-07 (1) 07-10 (2) 10-12 (1) 15-18 (1) 20-21 (1) 21-23 (2) 23-01 (1)	06-08 (1)
Far East	18-20 (1)	10-12 (1) 16-18 (1) 18-20 (2) 20-21 (1)	07-08 (1) 08-10 (2) 10-12 (1) 17-20 (1) 20-22 (2) 22-00 (1)	05-08 (1) 18-19 (1) 06-07 (1)*
South Pacific & New Zealand	09-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	09-14 (1) 14-18 (2) 18-20 (3) 20-21 (2) 21-22 (1)	08-10 (3) 10-12 (2) 12-20 (1) 20-23 (2) 23-03 (3) 03-07 (1)	01-02 (1) 02-03 (2) 03-06 (3) 06-08 (2) 08-09 (1) 03-05 (1)* 05-07 (2)* 07-08 (1)*
Australasia	10-12 (1) 16-17 (1) 17-19 (2) 19-20 (1)	09-11 (1) 14-17 (1) 17-18 (2) 18-20 (3) 20-21 (2) 21-22 (1)	07-09 (2) 09-11 (3) 11-13 (2) 13-16 (1) 16-18 (2) 18-21 (1) 21-23 (2) 23-01 (3) 01-03 (2) 03-07 (1)	02-04 (1) 04-06 (2) 06-07 (3) 07-08 (2) 08-09 (1) 04-05 (1)* 05-06 (2)* 06-07 (1)*
Caribbean, Central America & Northern Countries of South America	10-11 (1) 11-14 (2) 14-17 (4) 17-18 (2) 18-19 (1)	08-09 (1) 09-10 (2) 10-13 (3) 13-18 (4) 18-19 (3) 19-20 (s) 20-21 (1)	04-06 (1) 06-07 (2) 07-08 (3) 08-10 (4) 10-15 (2) 15-17 (3) 17-22 (4) 22-03 (3) 03-04 (2)	19-20 (1) 20-21 (2) 21-04 (4) 04-06 (3) 06-07 (2) 07-08 (1) 21-23 (1)* 23-04 (2)* 04-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina, & Uruguay	09-10 (1) 10-12 (2) 12-14 (1) 14-15 (2) 15-17 (4) 17-18 (3) 18-19 (1)	08-09 (1) 09-11 (2) 11-14 (1) 14-16 (2) 16-17 (3) 17-19 (4) 19-20 (3)	11-16 (1) 16-17 (2) 17-20 (3) 20-01 (4) 01-03 (3) 03-04 (2) 04-07 (1) 07-08 (2) 08-10 (3) 10-11 (2)	21-00 (1) 00-05 (2) 05-07 (1) 01-06 (1)*
McMurdo Sound Antarctica	16-18 (1)	12-15 (1) 15-18 (2) 18-19 (3) 19-20 (2) 20-21 (1)	16-18 (1) 18-21 (2) 21-23 (3) 23-01(2) 01-03 (1) 07-09 (1)	23-01 (1) 01-05 (2) 04-06 (1) 04-06 (1)*

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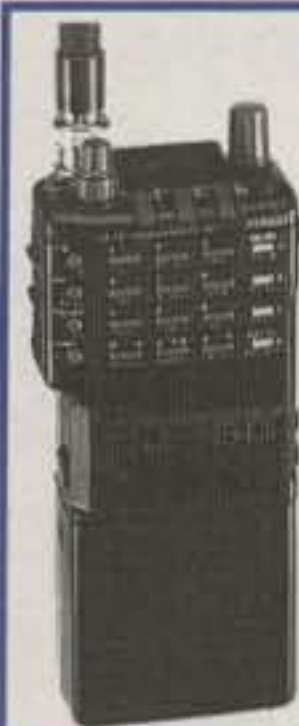


ALINCO DJ-180T 2m FM HT (left) • Superior receive audio and tough construction with simple intuitive operation. The command keys are laid out so you won't have to spend hours studying the manual. Covers 144-148MHz transmit and 130-174 MHz receive. Power: 2.0W, 5W with optional 12V battery. Illuminated LCD display, 16 digit DTMF pad, 10 memory channels. 5½" h x 2½" w x 1½" d **\$219⁹⁵**

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ALINCO DJ-F1T 2m Mini HT (right) • 130-174MHz rx, mod. for 118-136MHz rx and MARS/CAP tx. 8 scan modes, autodialer, back lit keypad, 40 memories, call channel. CTCSS, DTMF encode and DSQ paging. 2.5W; 5W opt. 4 ¾" h x 2½" w x 1½" d, 14 oz **\$289⁹⁵**
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Time Zones: CDT & MDT
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CENTRAL USA TO:

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Central Europe & North Africa	09-12 (1)	08-10 (1) 10-11 (2) 11-13 (3) 13-14 (2) 14-16 (1)	06-07 (1) 07-10 (2) 10-13 (1) 13-14 (2) 14-16 (4) 16-17 (3) 17-20 (2) 20-23 (1)	18-20 (1) 20-23 (2) 23-01 (3) 01-02 (2) 02-03 (1) 21-23 (1)* 23-01 (2)* 01-02 (1)*
Northern Europe & CIS (formerly European USSR)	09-11 (1)	08-10 (1) 10-12 (2) 12-14 (1)	06-07 (1) 07-10 (2) 10-12 (1) 12-13 (2) 13-15 (3) 15-16 (2) 16-18 (1) 22-01 (1)	20-23 (1) 23-01 (2) 01-02 (1) 22-01 (1)*
Eastern Mediterranean & Middle East	10-12 (1)	08-10 (1) 10-13 (2) 13-14 (1)	06-07 (1) 07-09 (2) 09-15 (1) 15-18 (2) 18-21 (1) 21-23 (2) 23-00 (1)	20-23 (1) 21-23 (1)*
Western Africa	11-13 (1) 13-15 (2) 15-17 (1)	07-10 (1) 10-13 (2) 13-15 (3) 15-17 (4) 17-18 (2) 18-19 (1)	05-06 (1) 06-08 (2) 08-15 (3) 15-17 (2) 17-18 (3) 18-19 (4) 19-22 (3) 22-00 (2) 00-01 (1)	20-23 (1) 23-01 (2) 01-02 (1) 23-01 (1)*
Eastern & Central Africa	12-15 (1)	09-11 (1) 11-15 (2) 15-16 (3) 16-17 (2) 17-18 (1)	13-15 (1) 15-17 (2) 17-19 (3) 19-21 (2) 21-22 (1)	21-00 (1)
Southern Africa	10-11 (1) 11-13 (2) 13-14 (1)	07-09 (1) 09-12 (2) 12-13 (3) 13-14 (4) 14-15 (3) 15-16 (2) 16-17 (1)	06-08 (2) 08-14 (1) 14-16 (2) 16-19 (3) 19-21 (2) 21-23 (1) 23-01 (2) 01-02 (1)	20-21 (1) 21-23 (2) 23-01 (1) 21-23 (1)*
Central South Asia	09-11 (1) 18-20 (1)	09-11 (1) 18-19 (1) 19-21 (2) 21-22 (1)	07-08 (1) 08-10 (2) 10-12 (1) 17-19 (1) 19-21 (2) 21-23 (1)	06-08 (1) 19-21 (1)
Southeast Asia	10-12 (1) 18-20 (1)	09-11 (1) 14-17 (1) 17-19 (2) 19-21 (1)	06-08 (1) 08-10 (2) 10-13 (1) 16-21 (1) 21-00 (2) 00-02 (1)	05-09 (1)
Far East	17-18 (1) 18-19 (2) 19-20 (1)	10-16 (1) 16-18 (2) 18-20 (3) 20-21 (2) 21-22 (1)	07-08 (1) 08-10 (3) 10-12 (2) 17-21 (1) 21-00 (2) 00-02 (1)	03-05 (1) 05-08 (2) 08-09 (1) 06-08 (1)*
South Pacific & New Zealand	13-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	09-13 (1) 13-17 (2) 17-19 (4) 19-20 (3) 20-21 (2) 21-23 (1)	07-08 (2) 08-11 (3) 11-13 (2) 13-18 (1) 18-20 (2) 20-22 (3) 22-00 (4) 00-01 (3) 00-03 (2) 03-07 (1)	00-01 (1) 01-06 (3) 06-08 (4) 08-09 (2) 09-10 (1) 02-04 (1)* 04-07 (2)* 07-08 (1)*
Australasia	14-16 (1) 16-18 (2) 18-19 (3) 19-20 (2) 20-21 (1)	09-11 (1) 13-17 (1) 17-19 (2) 19-20 (3) 20-21 (2) 21-22 (1)	16-18 (2) 18-21 (1) 21-23 (2) 23-03 (3) 03-04 (2) 04-07 (1) 07-09 (2) 09-11 (3) 11-13 (2) 13-16 (1)	02-03 (1) 03-05 (2) 05-07 (3) 07-08 (2) 08-09 (1) 05-06 (1)* 06-07 (2)* 07-08 (1)*
Caribbean, Central America & Northern Countries of South America	09-10 (1) 10-11 (2) 11-13 (3) 13-16 (4) 16-18 (2) 18-19 (1)	07-08 (1) 08-10 (2) 10-13 (3) 13-17 (4) 17-18 (3) 18-20 (2) 20-21 (1)	07-10 (4) 10-12 (3) 12-15 (2) 15-17 (3) 17-22 (4) 22-01 (3) 01-03 (2) 03-05 (1) 05-07 (2)	19-20 (1) 20-21 (2) 21-01 (3) 01-05 (4) 05-06 (3) 06-07 (2) 07-08 (1) 20-23 (1)* 23-05 (2)* 05-06 (1)

Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	09-10 (1) 10-13 (2) 13-15 (3) 15-17 (4) 17-18 (2) 18-19 (1)	07-08 (1) 08-11 (3) 11-15 (2) 15-16 (3) 16-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	04-08 (1) 08-10 (2) 10-16 (1) 16-18 (2) 18-20 (3) 20-23 (4) 23-02 (3) 02-04 (2)	21-00 (1) 00-04 (2) 04-06 (1) 01-05 (1)*
McMurdo Sound Antarctica	15-18 (1)	11-16 (1) 16-18 (2) 18-19 (3) 19-20 (2) 20-21 (1)	08-09 (1) 17-19 (1) 19-20 (2) 20-23 (3) 23-00 (2) 00-03 (2)	00-03 (1) 03-05 (2) 05-07 (1) 04-06 (1)*

Time Zone: PDT (24-Hour Time)
WESTERN USA TO:

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western Europe & North Africa	09-11 (1)	08-09 (1) 09-12 (2) 12-14 (1)	06-07 (1) 07-10 (2) 10-13 (1) 13-14 (2) 14-16 (3) 16-17 (2) 17-19 (1)	20-21 (1) 21-23 (2) 23-00 (1) 21-23 (1)*
Central & Northern Europe & CIS (formerly European USSR)	Nil	08-09 (1) 09-11 (2) 11-13 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-14 (2) 14-16 (2) 21-23 (1)	20-00 (1) 20-22 (1)*
Eastern Mediterranean & Middle East	Nil	08-09 (1) 09-11 (2) 11-12 (1) 20-22 (1)	06-07 (1) 07-10 (2) 10-13 (1) 13-15 (2) 15-16 (1) 19-20 (1) 20-22 (2) 22-23 (1)	20-23 (1)
Western & Central Africa	11-12 (1) 12-14 (2) 14-15 (1)	08-10 (1) 10-13 (2) 13-16 (3) 16-17 (2) 17-18 (1)	06-07 (1) 07-09 (2) 09-14 (1) 14-15 (2) 15-16 (3) 16-18 (4) 18-20 (3) 20-22 (2) 22-00 (1)	21-00 (1)
Eastern Africa	11-14 (1)	10-13 (1) 13-16 (2) 16-17 (1)	07-09 (1) 12-15 (1) 15-19 (2) 19-21 (1)	20-22 (1)
Southern Africa	10-13 (1)	07-09 (1) 09-11 (2) 11-13 (3) 13-15 (2) 15-16 (1)	05-07 (1) 07-09 (2) 09-10 (1) 12-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-22 (1) 22-00 (2) 00-01 (1)	19-22 (1)
Central & South Asia	17-19 (1)	08-11 (1) 16-17 (1) 17-19 (2) 19-21 (1)	07-08 (1) 08-11 (2) 11-13 (1) 17-19 (1) 19-21 (2) 21-23 (1)	06-08 (1) 19-21 (1)
Southeast Asia	16-19 (1)	10-11 (1) 11-13 (2) 13-16 (1) 16-18 (2) 18-21 (1)	05-07 (1) 07-09 (3) 09-11 (2) 11-12 (1) 21-23 (1)	01-03 (1) 03-06 (2) 06-08 (1) 03-06 (1)*
Far East	16-17 (1) 17-18 (2) 18-19 (1)	14-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	07-08 (1) 08-09 (2) 09-10 (4) 10-13 (3) 13-15 (2) 15-20 (1) 20-22 (2) 22-00 (3) 00-01 (2) 01-03 (1)	01-03 (1) 03-07 (2) 07-08 (3) 08-09 (1) 03-05 (1)* 05-07 (2)* 07-08 (1)*
South Pacific & New Zealand	11-13 (1) 13-15 (2) 15-17 (3) 17-19 (2) 19-20 (1)	09-11 (1) 11-13 (3) 13-17 (2) 17-19 (3) 19-21 (4) 19-21 (4)	13-19 (1) 19-21 (2) 21-23 (3) 23-01 (4) 01-03 (3) 03-05 (2)	21-22 (1) 22-23 (2) 23-00 (3) 00-05 (4) 05-07 (3) 07-08 (2)

		22-23 (2) 23-01 (1)	05-06 (1) 06-07 (2) 07-09 (3) 09-13 (2)	08-09 (1) 23-02 (1)* 02-06 (2)* 06-07 (1)*
Austral asia	14-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	08-10 (1) 13-17 (1) 17-19 (2) 19-21 (3) 21-22 (2) 22-23 (1)	19-21 (1) 21-23 (2) 23-01 (4) 01-03 (3) 03-04 (2) 04-07 (1) 07-08 (2) 08-10 (3) 10-12 (2) 12-13 (1)	01-02 (1) 02-03 (2) 03-06 (3) 06-08 (2) 08-09 (1) 02-04 (1)* 04-06 (2)* 06-07 (1)*
Caribbean, Central America & Northern Countries Of South America	09-10 (1) 10-11 (2) 11-13 (3) 13-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	07-08 (1) 08-10 (3) 10-12 (2) 12-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	06-08 (4) 08-10 (3) 10-15 (2) 15-17 (3) 17-23 (4) 23-01 (3) 01-03 (2) 03-05 (1) 05-06 (2)	19-21 (1) 21-02 (3) 02-04 (2) 04-07 (1) 20-22 (1)* 22-03 (2)* 03-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina, & Uruguay	09-10 (1) 10-12 (2) 12-14 (3) 14-16 (4) 16-17 (3) 17-18 (2)	07-08 (1) 08-09 (2) 09-13 (1) 13-15 (2) 15-16 (3) 16-19 (4) 19-20 (2) 20-21 (1)	06-15 (1) 15-17 (2) 17-19 (3) 19-23 (4) 23-01 (3) 01-06 (2)	21-23 (1) 23-02 (2) 02-04 (1) 00-03 (1)*
McMurdo Sound Antarctica	14-18 (1)	11-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	08-10 (1) 17-19 (1) 19-20 (2) 20-23 (3) 23-01 (2) 01-03 (1)	01-03 (1) 03-05 (2) 05-07 (1) 03-06 (1)*

#See explanation in "How To Use Short-Skip Charts" in box at the beginning of these charts.
 Note: Alaska and Hawaii Propagation Charts are intended for distances greater than 1300 miles. For shorter distances, use the preceding Short-Skip Propagation Chart.
 *Indicates best times to listen for 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2) or higher.
 **Indicates best times to listen for F-2 layer openings on 6 meters.
 For 12 meter openings interpolate between 10 and 15 meter openings.
 For 17 meter openings interpolate between 15 and 20 meter openings.
 For 30 meter openings interpolate between 40 and 20 meter openings.

ings should be possible from most other areas as well.
 Although summertime sporadic-E ionization should fall off considerably during September, an occasional 6 meter short-skip opening may still be possible over distances ranging between approximately 1000 and 1300 miles. The best time to check is before noon and again during the early evening.
 There is usually an increase in auroral activity during the equinoctial period, so expect some fairly frequent 6 and 2 meter auroral-type openings during September and early October. The best times for such openings should coincide with periods of radio storminess on the HF bands. Check the Last Minute Forecast at the beginning of this column for days during September that are expected to be Below Normal or Disturbed.
 No major meteor showers are expected during September, but some minor ones may permit meteor-scatter-type openings on the VHF bands from September 19 through the end of the month.

CQ DX Contest Special 1993

The 1993 contest weekends will mark the 43rd consecutive CQ WW DX Contest for which this column has contained special propagation forecasts. This year's contest weekends are:

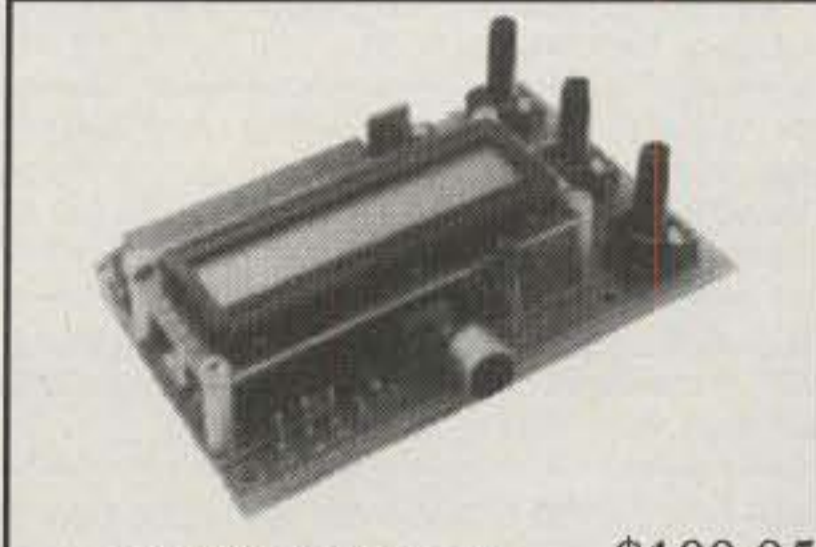
October 30-31—Phone Section
 November 27-28—CW Section

In the tradition of the past 42 years, there will appear in next month's Propagation column a special, comprehensive forecast which will focus on both sections of the contest. Besides the latest updated propagation predictions to all areas of the world, the column will also contain pointers for scoring as many points as possible.

73, George, W3ASK

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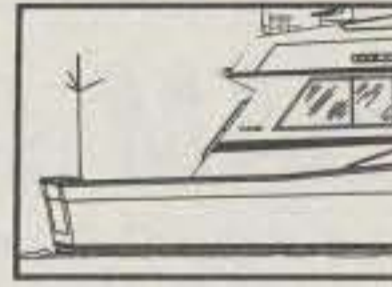
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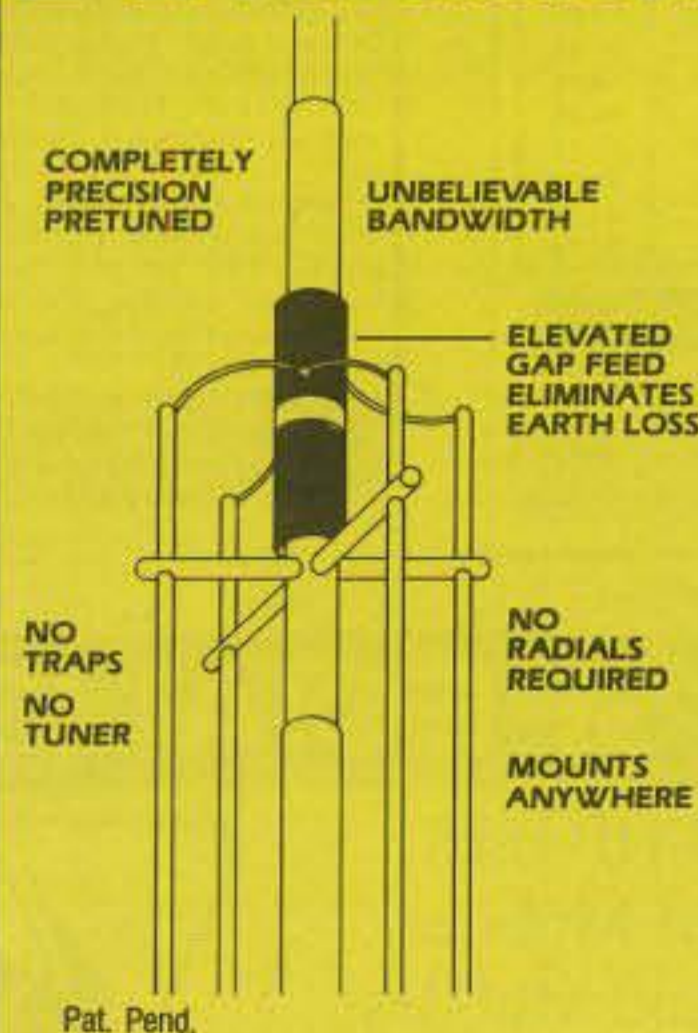


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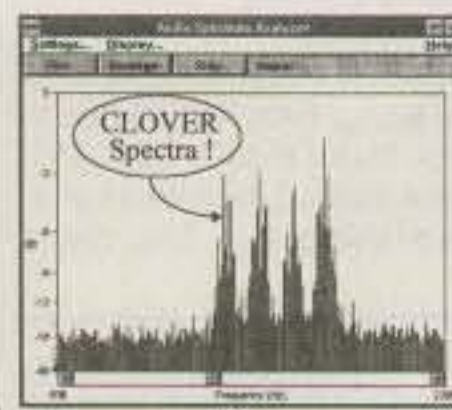
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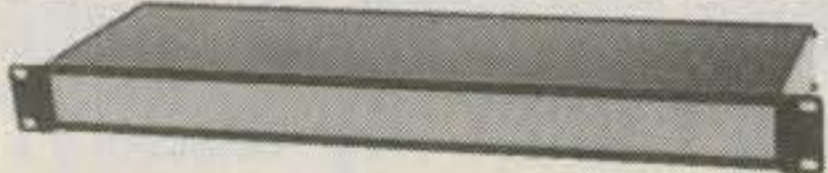
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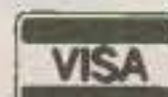
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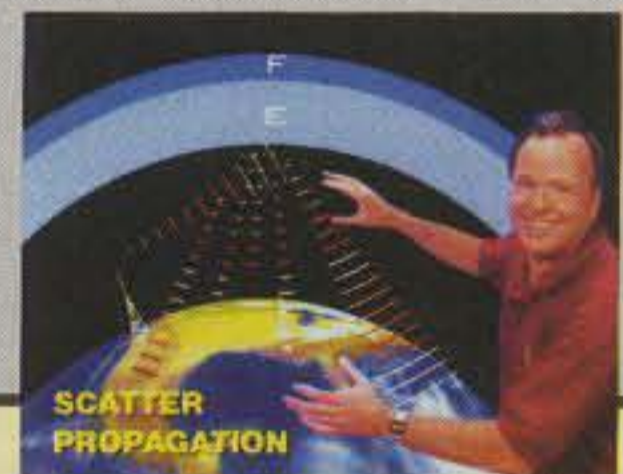
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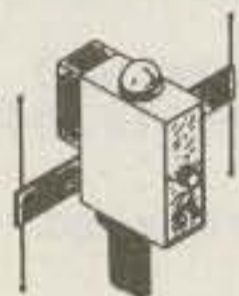
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FOR SALE: ICOM 551 6 meter all mode, \$550. ICOM 745 HF XCVR, \$899. Kenwood TS-130S ham bands w/WARC, \$475. Kenwood TH205AT HT, \$225. K3UKW, Tony Musero, 1609 S. Iseminger St., Philadelphia, PA 19148-1010 (215-271-8898. Please add UPS.

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KENWOOD TS950S Mint with original box and manuals, \$1900. KK6BY, Paul, 310-679-7641.

WANTED: Old AM Broadcast Receivers, in particular cathedrals, plastics, bakelites, and old transistor sets. Gerald Skloot, 2923 Mandalay Beach Road, Wantagh, NY 11793 (516-221-3535).

HELP! Have 30 students taking ham radio class. Need your 220 and 2 meter and HF rigs to get them on the air. Tax deductible equipment goes on school inventory. Robert Strange, K7VVU, Payson High School, 1050 South Main St., Payson, Utah 84651 (801-754-3535, FAX 489-2806).

HG52SS TOWER, Ham IV Rotator, A-4S Beam with 40 meters, 125 feet Beldon 8214 and 9405. Used six months in Florida, currently stored. \$1900 pick-up only. K3AQR, Lafayette, TN 615-666-7383.

WANTED: UX199 and UX120 tube. Thanks. Q.R. Galbraith, 4303 Kingsway Dr., Farmington, NM 87402.

SELL: CQ/HR/QST/73 Magazines. Send SASE for list. KA1VY, FOR SALE: Kenwood TS-520, \$350. Kenwood TS-700A, 2 meter all mode, \$275. Yaesu FT-208R, \$200. MFJ-945 tuner, \$95. MFJ Versa Tuner #948, \$125. ICOM IC2AT, std HT pkg, \$250. Ameco Preamp PT-2, \$65. Azden PCS 3000, \$229. Alinco DR-110 HT PKG, \$225. Tony Musero, K3UKW, 1609 S. Iseminger Street, Philadelphia, PA 19148-1010. Please add United Parcel Service Shipping. Telephone: 215-271-8898.

WANTED: NIR-10, FL-7000, 3K Tuner, CA2x4 Max-X510MA, 1278, RCS-4, QSK-5, Crank-up Tower Rotator. State price, condition. J. Vallone, 1050 E. 85 St., Brooklyn, NY 11236.

FOR SALE: ICOM 551 6 meter all mode, \$550. ICOM 745 HF XCVR, \$899. Kenwood TS-130S ham bands w/WARC, \$475. Kenwood TH205AT HT, \$225. K3UKW, Tony Musero, 1609 S. Iseminger St., Philadelphia, PA 19148-1010 (215-271-8898. Please add UPS.

DRAKE R4B \$225, T4XB/PS \$250, RV4 \$150, MS4 \$60. HEATH Mic \$40, HW-7 \$90, HA202A \$80, GD1A Grid Dip Meter \$50. Exc. list \$1/SASE. Joe Bedlovies, POB 139, Stratford, CT 06497.

WANTED: Must be inexpensive, Yaesu YO-100 and FTV-250. N5PHT, POB 305, Savoy, TX 75479.

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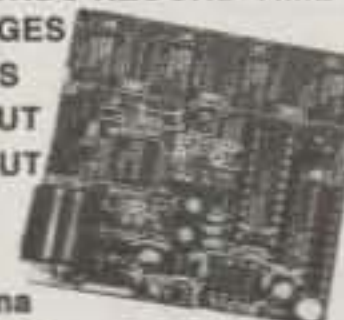
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KENWOOD TS950S Mint with original box and manuals, \$1900. KK6BY, Paul, 310-679-7641.

WANT: Screw-base flashbulbs #22 or larger, blue or clear. Graflex, Heiland bulb holders. T.N. Colbert, WA8MLV, Burton, OH 44021.

FOR SALE: ICOM 551 6 meter all mode, \$550. ICOM 745 HF XCVR, \$899. Kenwood TS-130S ham bands w/WARC, \$475. Kenwood TH205AT HT, \$225. K3UKW, Tony Musero, 1609 S. Iseminger St., Philadelphia, PA 19148-1010 (215-271-8898. Please add UPS.

DRAKE R4B \$225, T4XB/PS \$250, RV4 \$150, MS4 \$60. HEATH Mic \$40, HW-7 \$90, HA202A \$80, GD1A Grid Dip Meter \$50. Exc. list \$1/SASE. Joe Bedlovies, POB 139, Stratford, CT 06497.

5-1/4 inch 360K XT floppy drive, \$10.00. Walt Grosch, KZ9F, 1735 Stoneway Ct., Richfield, WI 53076.

FOR SALE: ICOM IC-781 transceiver with SP-20 speaker and SM-6 microphone. This unit is in mint condition and has been used very little. Serious inquiries please. OFFERS. Please respond to KD4AJ, 1968 Huntington Hall Court, Atlanta, GA 30338.

WANTED: Left-handed Vibroplex bug for left-handed OP. Sam, N2WR, 510-783-9251.

FOR SALE: Collins 51S-1 Receiver in excellent condition. You will not be able to tell this unit from a new one. Reducing my collection. Serious inquiries please. OFFERS. Please respond to KD4AJ, 1968 Huntington Hall Court, Atlanta, GA 30338.

WANT: 10 GHz amp. EIA in/out 12 or 24V, solid state. 1-10W out. Unconditionally stable. T.N. Colbert, General Delivery, Burton, OH 44021.

FOR SALE: TR4CW-RV4C AC4,34PNB Noise Blanker. Used very little, excellent shape, \$600. K7ABV, 406-727-7032.

WANTED: Crank-up or fold-over tower, H.D. rotator, beam antenna, antenna tuner. Specify model, price, condition. J. Vallone, 1050 E. 85 St., Brooklyn, NY 11236.

I'M AT YOUR SERVICE as QSL operation manager at reduced rates. You are absolutely welcome. My address is: Evgeny Tsargorodsky, P.O. Box 83, Atkarsk, 412400 Russia. UA4CD.

WANTED: AT930 the internal antenna tuner for Kenwood TS930; KAM; JPS NIR-10; only in good condition. Pse write to: IK1HLG, Frank, P.O. Box 155, 17025 Loano SV Italy.

HG52SS TOWER, Ham IV Rotator, A-4S Beam with 40 meters, 125 feet Beldon 8214 and 9405. Used six months in Florida, currently stored. \$1900 pick-up only. K3AQR, Lafayette, TN 615-666-7383.

FOR SALE: MFJ-202B RF noise bridge, mint, \$40. MFJ-206 Antenna Current Probe, mint, \$50. Please \$3 shipping. Commodore MPS 1000 serial printer, excellent, \$50 plus \$5 shipping. WBULU, Fred, 8534 Ingersoll Ave. So., Cottage Grove, MN 55016.

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WANTED: Clean ICOM IC-211/251 or IC-551 models. Details please to: John, WA7RZF, 818 NE 153 Rd., Portland, OR 97230 (503-254-3013).

KIEV ICAE RADIO CLUB is looking for sponsorship (used HF transceiver). Contact Jerry, UT4UZ, P.O. Box 785, Kiev-58 252058 Ukraine.

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WANTED: Old ham band receivers of any type. If you have one and would like to sell it, please write KD4AJ, 1968 Huntington Hall Court, Atlanta, GA 30338. All inquiries will be answered.

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WANTED: Local Crank-Up Tower, Dual-Band FM, NIR-10, PK-900/KAM Plus, FT-7000, PT-340. Send info, price. J. Vallone, 1050 E. 85 St., Brooklyn, NY 11236.

CRYSTALS: SASE for my list. K8LJQ, 2023 Lannen Rd., Howell, MI 48843.

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FOR SALE: Near new, mint TR-851A in original carton, \$550. (Have FT 736-R; don't need TR851A.) Dick Kemp, W6OV, P.O. Box 73, Cambridge, ID 83610.

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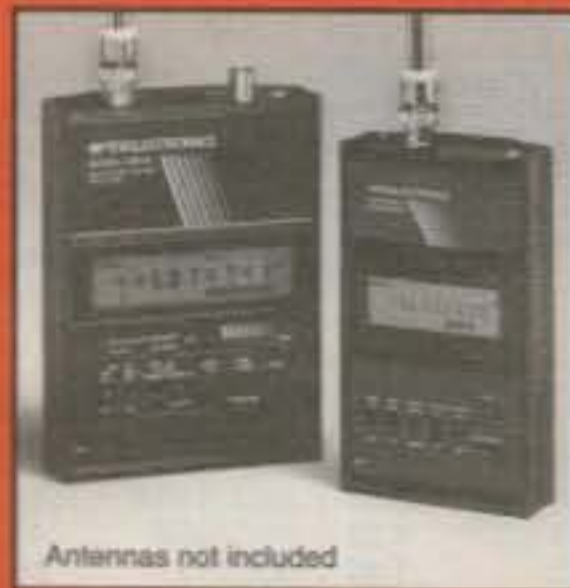
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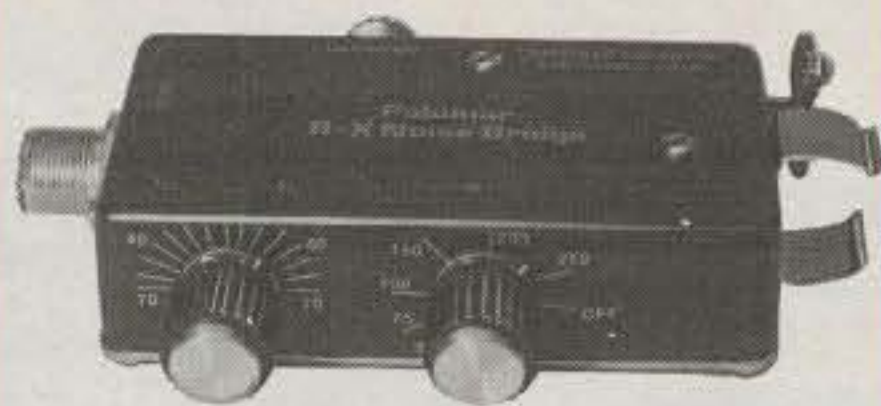
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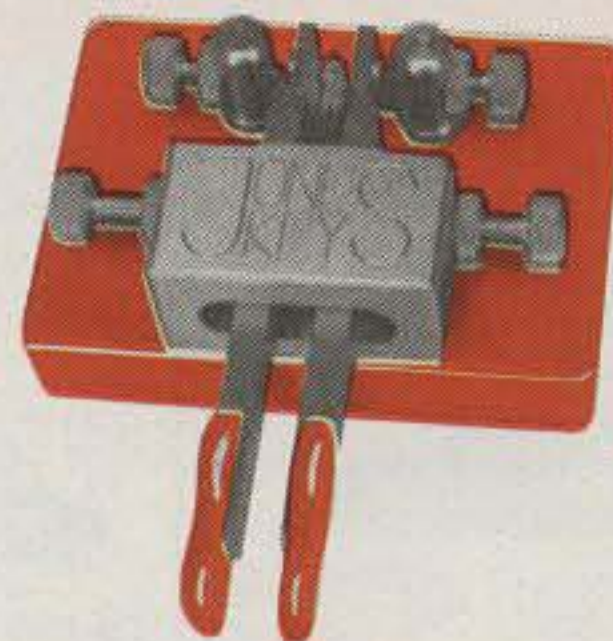
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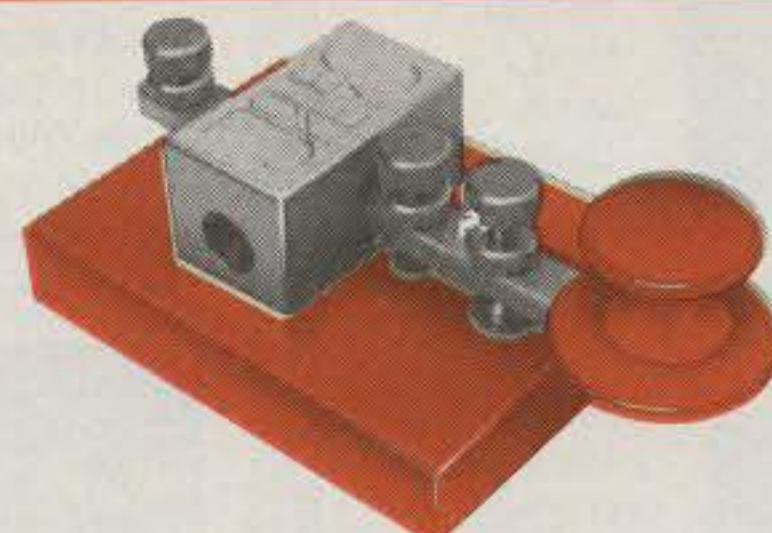
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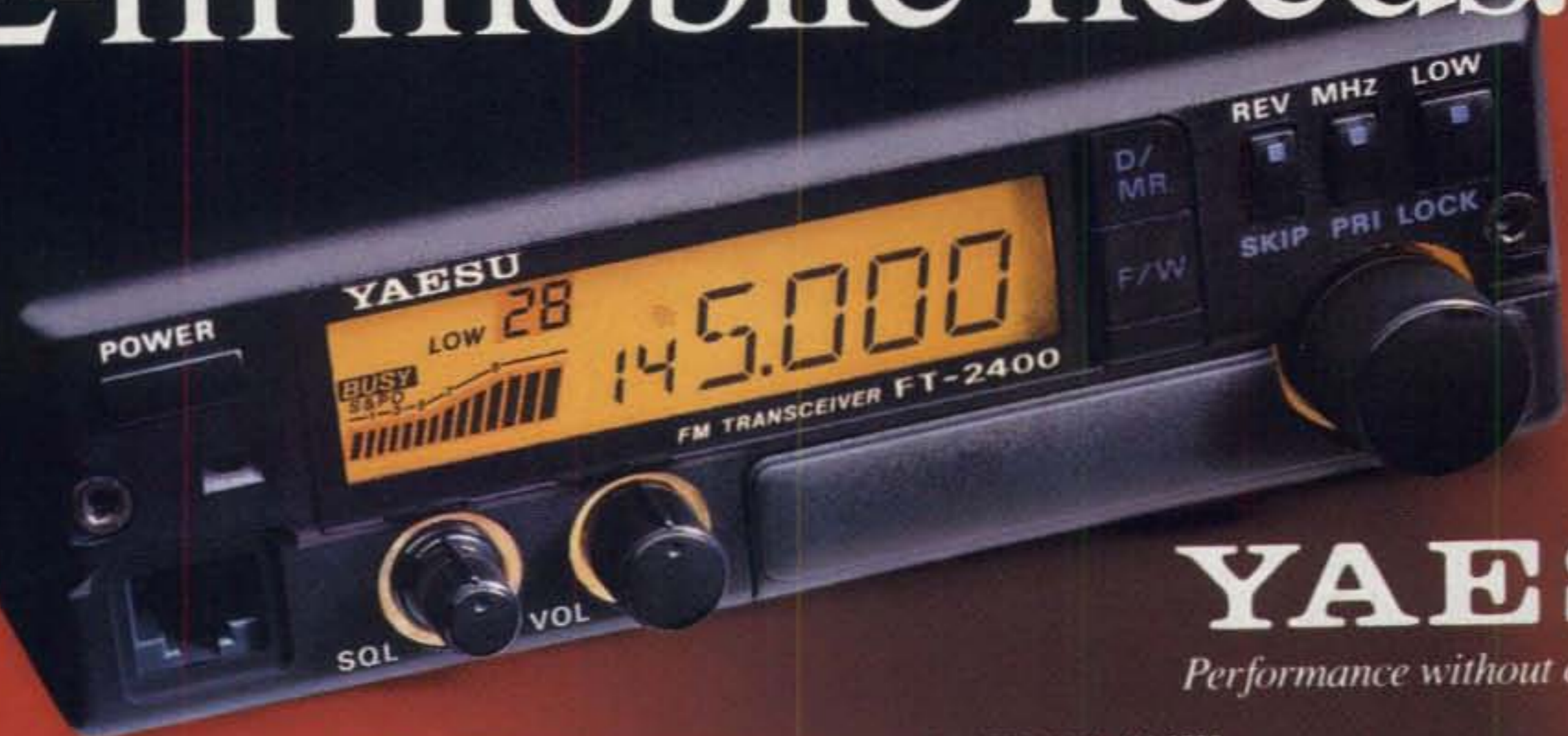
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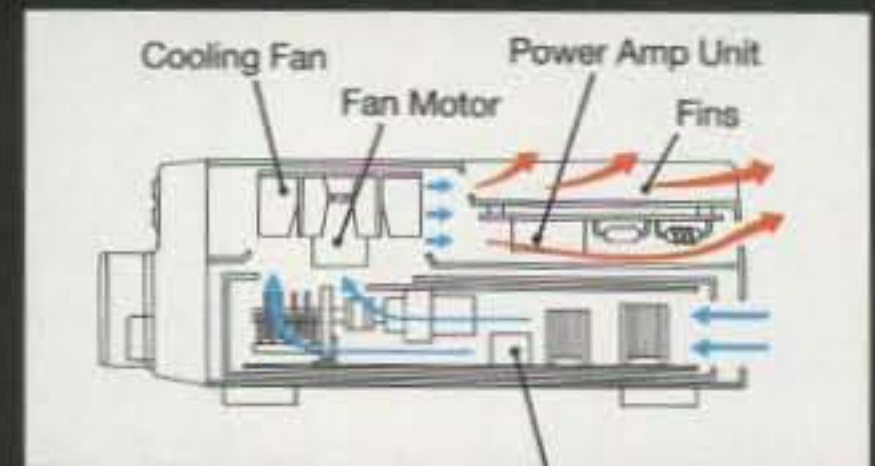
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Memory Channels	82	50	40	70
Slide-out Lithium Battery	YES	NO	NO	NO
Dual CTCSS Decoder	YES	NO	NO	YES
Battery Voltage Readout	YES	NO	NO	NO
Automatic CTCSS Tone Search	YES	NO	NO	NO
Transmit Battery Saver (Repeater & Simplex Operation)	YES	NO	NO	NO
Built-In 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-58 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

ICOM

IC-765 HF Transceiver

SPECIAL OFFER! LIMITED TIME ONLY!
 FREE with your purchase of an IC-765 you will receive
 a CR282 High Stability Crystal AND either a FL53A
 250 Hz CW Narrow Filter or a SM20 Desk Microphone



MAKE YOUR DREAMS A REALITY!

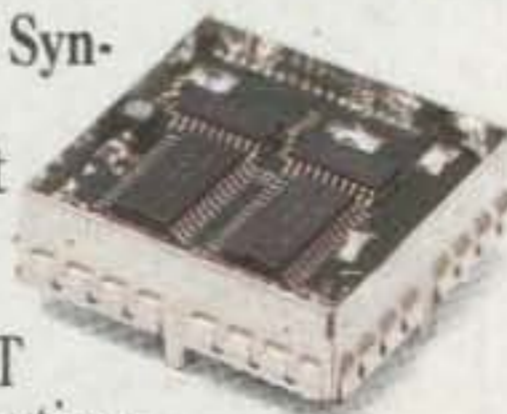
ICOM incorporated your most requested features with modern technology's best designs to produce the remarkable IC-765 dream rig. Its combination of excellent performance and superb reliability truly open a new dimension in HF operating enjoyment.

THE HF FOR TODAY'S ACTIVE AMATEUR.

Includes: ***Band Stacking Registers.** Each band's VFO's retain the last selected frequency, mode and filter choice when changing bands. Produces the equivalent of 20 VFO's; two per band. Great for multiband DX'ing! ***99 Fully Tunable Memories.** Store frequency, mode and filter selections. Each one can be returned and/or reprogrammed independent of VFO operations. Memories 90-99 also store split Tx/Rx frequencies. ***10Hz Readout.** Perfect on-the-dot frequency selection for nets, DX skeds and data communication modes. ***Full QSK Break-in.** For super CW operations!

*Direct Digital Synthesizer (DDS).

Assures ultra-fast PLL switching and lock-in for excellent PACKET and AMTOR operations.



***Maximum Operation Flexibility!** The three step attenuator cuts multi-station overloads. ***Built-in AC Supply.** The IC-765 is 100 percent duty cycle rated for cool operation and superb performance on all modes! ***Fully Automatic Antenna Tuner.** With built-in CPU and memory for extremely fast tuning and one-touch operation. Wide tuning range. ***CW Pitch Control.** Total operating comfort and convenience for successful contesting and DX'ing. An iambic keyer with adjustable speed and weight is also built into the IC-765! ICOM also included ***Narrow 500Hz CW**

Filters. The FL-32A and FL-52A deliver razor sharp selectivity. A serious DX'er's delight! 250Hz FL-53A and FL-101 optional.

The IC-765 General Coverage Receiver covers all bands, all modes and is backed by ICOM's full one-year warranty at any one of our North American Service Centers. The IC-765 turns your dreams into reality!

For information call the Literature Request Hotline 1-206-450-6088.

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