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**CQ**

## *In This Issue:*

- **CQ Reviews The Ten-Tec OMNI VI Transceiver**
- **Build The 40 Meter Fun Machine (in six easy installments)**
- **W6SAI on Computer Land-Line DXing**
- **W1FB on Simple HF Receivers**
- **'92 CQ WW RTTY Contest Results**



On the cover: Jim Rafferty, N6B L... CA

THE RADIO AMATEUR'S JOURNAL



# KENWOOD

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# In Force

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Experience excellence with Kenwood's TS-450S, a versatile HF transceiver offering compact, DX-pedition convenience plus the benefits of top-flight technology.

- 100 memory channels
- AIP (Advanced Intercept Point) system
- Internal or external automatic antenna tuner (option)
- Ultra-fine (1 Hz) tuning
- Optional DSP (digital signal processor)

• **100W power output**

RF output is 100W (40W in AM mode).

• **Wideband general coverage receiver**

The TS-450S covers all Amateur bands from 160 to 10 meters. The general coverage receiver covers from 500kHz to 30MHz.

• **100 memory channels with multi-scan functions**

Scanning of any or all of the 100 memory channels may be tailored with the programmable memory channel lock-out, group scan, and programmable band scan functions.

• **Split-frequency operations**

Split-frequency operations are easy with the TF-SET and  $\Delta F$  display (indicates RX/TX difference).

• **Kenwood's AIP system**

Clearer reception is assured by AIP (Advanced Intercept Point), an exclusive circuit design that improves intermodulation dynamic range to 108dB.

• **Automatic antenna tuner (built-in or option)**

The optional antenna tuner can automatically establish the optimum match between 20 and 150 ohms in the 80 to 10 meter band. An external automatic tuner (AT-300) is also available.

• **Ultra-fine tuning (SSB, CW and FSK modes)**

By engaging the FINE key, the operator can tune precisely in 1 Hz steps, thanks to the Direct Digital Synthesizer (DDS).

• **Optional digital signal processor**

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- **2.5W power with supplied battery pack**  
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# The Radio Amateur's Journal

**ON THE COVER:** Among the true gentlemen of the Amateur Radio world, few can compare with Jim Rafferty, N6RJ. Jim is more than just another great operator, whether in a contest, on a DXpedition, or in a pileup. He's one of those rare people who cares about the present and future of the hobby right through to his soul. Jim is shown here at his Yorba Linda, California antenna farm. (Photo by Larry Mulvehill, WB2ZPI)



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I must be an optimist (although some people who know me might disagree). I wake up early each morning, and after making coffee I turn on the rig, expecting to hear long-path signals on 10 meters. Now I know, and reality dictates, that this is not about to happen. However, I still do it. I've become adept at tuning with my left hand and using my right hand to write notes concerning work, errands to be run, or chores to be done. I'm a great note writer; it's part of being compulsive.

These days I hardly ever hear a signal—let alone DX—in the morning. Part of me thinks that they're all out there waiting for me to call "CQ" while I'm waiting for them. It's sort of like a covert military operation whereby no one wants to give away his position. Late afternoon is sort of a replay, when I check and read my mail as I tune. The hunter instinct abounds with hope at every blip. Maybe a new country or prefix today. Usually not.

About two weeks ago, on a Friday, the day started out pretty much the same way. I had coffee, made notes, and listened to a dead band. When it was time to leave for work, I took a new cassette tape of Cajun music with me to play in the car. On the way to work, when the auto-reverse was supposed to kick in, the player made a strange sound and began spewing tape out of the port. When I got to work, I called a repair facility and made an appointment to have the unit looked at early that afternoon. When I got there, I was told that they were suddenly backed up, and I had to come back several hours later or on Saturday. As it was close to where I live, I went home to wait. I was angry that this not only ruined a new tape, but was wasting the better part of a day.

When I got home, I took in the mail and as usual went to the shack to read it. I turned on the rig as usual and tuned. There was a lonely LU at the low end calling CQ with no takers, and lots of nothing as I tuned up towards 28.500. Suddenly, at 28.495 there was a loud signal, a good 5/8 to 5/9 signing with an EA (whom I obviously couldn't hear).

As I waited for him to give his call, I thought he might be a local. Then it hit. "This is 5X1DX listening on .497." I tuned up a bit to hear who was calling him and still heard nothing. For about a minute or so all I could hear was 5X1DX going back to Europeans and an occasional American. Nothing else. Just him. Nothing frantic, no apparent pile-ups, no fights, no questions. Adrenalin pumping, I gave my call. Nothing. He went back to someone else. On the second try he came back to me.

After I worked him, I sat back and just listened to him work a number of stations slowly and with a great deal of patience. Yes, he did give his name and QSL route a number of times, plus where he was located. I never heard the other half of his contacts; just him on this supposedly dead band. Serendipity and coincidence led to a new country for me and an incredible rush as I wrote it down in my log. It is a great hobby.

Maybe it's just partial reinforcement or something else, but I keep on listening and hoping for that new one to come. It doesn't seem to matter that they come less frequently now. The search can be satisfying in and of itself. We each have our own goals as to what we expect from the hobby, and most of us are caught up in what could be rather than what is. In case you're not completely tuned in, this is generally what is known as fun—the fun of anticipation, the fun of imagination, and the enjoyment of accomplishment.

---

### The Time Has Come

---

At Dayton this year Norm Koch, K6ZDL, our WPX Award Manager, asked me to remind you that as of May 1st he only has original WPX Award documentation for those who have applied or updated their files in the last five years. We wrote about it originally in December 1992 to remind you that you still had time to update your records. Well, time has run out. If you have not updated your files in the last five years, you will need to reapply with all new documentation.

---

### Next Month

---

Next month we have our second Antenna Special issue of the year, and it should prompt a bunch of us to start thinking about recycling some aluminum. The area in which I live has some pretty tight zoning regulations as to height, so I've been limited to one beam at a time, no higher than 27½ feet, or the height of a two-story building. For most of the past sunspot high I've had a six-element wide-spaced 10 meter beam, and with conditions being what they are, it's time to bid a fond adieu to the monobander until the next high.

At the last several hamfests we attended I gathered parts, hardware, and other goodies to move up to a multi-band Yagi. Hamfests are still a good place to get bargains and to see just what is available. Since I live in a one-story house, Woody, K2UU, has been after me for several years to put a Skyneedle through the house. He says we could start in the basement, come up through the living

room, and go out through the center of the roof. He envisions a sort of atrium effect through the house. I don't know, but some days it does sound interesting and like a great way to gain some height when you need it. When I mentioned the atrium idea to Bob Cox, K3EST, recently, he told me of a Japanese amateur who lived on a very small piece of property and who ran his tower through the house in a similar fashion. The idea may not be that crazy after all.

Through the kind auspices of the folks at Unadilla I received the replacement parts for my inverted Vee, which was destroyed in the Port Washington Chain Saw Massacre, which I described in a previous issue. This summer will definitely be antenna season at my house. And before you get a chance to read this, we will have been at the Rochester, New York Hamfest and down to Dallas for HAM-COM, so I should be able to pick up the last few things I'll need.

I know that real hams do their antenna work in the freezing days of winter, but lately we in the east haven't had too many days good enough for that kind of work. We've had a series of storms that have given a whole new meaning to the term "water-front property," whereby the water in front of you is now either over you or behind you (great take-off angle, though).

Depending on where you live, you might also want to get a jump on winter this year by refurbishing or updating your antenna system this summer. Pretty soon it will be time for the CQ World-Wide DX Contests and the ultimate test of both your station and your skill as an operator. You might want to start this process simply by asking yourself just how long ago you put up that antenna and how old the coax is. What have the weather and the environment done to the connections, and is the coax old enough to vote? Everything breaks down with age and exposure to the sun (not you, of course).

---

### Oops!

---

By now a number of you have written in to ask where my brain was when I prepared the "Buying An Antenna" article which appeared in the April issue. Everyone pointed out that one S-unit equals 6 dB instead of 3 dB as stated. No, the article was not an April Fool's article, and I probably was thinking ahead to Dayton, where if someone mentions 6 dB you bargain down to 3. Seriously, though, I apologize to our readers and to the author for this error. It's gratifying to know that so many of you do know the difference.

73, Alan, K2EEK



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# ANNOUNCEMENTS

•**1994 Twenty-fifth Anniversary Celebration of County Hunters Annual Convention** – K5KDG would like to hear from all old timers who may have left county hunting and/or have changed their call-signs (send postcard with old call and new, and present address). The reunion is scheduled for June 21–25, 1994 at the Bass Country Inn, Springfield, Missouri. Contact Steve Cope, K5KDG, Route 10 Box 766, Mountain Home, AR 72653.

•**The following Special Events are scheduled for July:**

**WA2UEC**, from Little Gull Island, off the coast of Long Island, New York; Radio Central ARC; July 16–19; all HF bands primarily on SSB with some CW. For QSL send SASE to WA2UEC, P.O. Box 680, Miller Place, NY 11764.

**N2JOA**, from 25th Annual French Festival, Cape Vincent, New York; Jefferson County RAC; 1200–

2400Z July 10; lower General CW and SSB portions on 80, 40, 20, 15 meters and lower Novice CW and SSB portions on 10 meters. For certificate send QSL and SASE to JCRAC, P.O. Box 523, Brownville, NY 13615.

**K2CT**, from 200th anniversary of Bethlehem Town Park, Delmar, New York; Albany ARA; 1400–2100Z July 4; SSB, 10 meter Novice and 25 kHz up from bottom of General portion of 15, 20, 40, and 75 meters (+/-QRM). For certificate send QSL and 9 x 12 SASE to K2CT, P.O. Box 460, Hagaman, NY 12086.

**KB2JZG**, from M1 Rifle Clinic, Endicott, New York; 1300–1900Z July 10; lower portions of General 40, 20, 10 meter phone subbands. For certificate send QSL and SASE to M1 Special Event, P.O. Box 572, Union Station, Endicott, NY 13760.

**KY2F**, from Central New York International Air

Show, Oswego County Airport, Fulton, New York; Oswego County ARES; 1200–2100Z July 10 and 11; middle of General 80, 40, 20, 15, 10 meter phone bands, Novice portion of 10 meters, 147.75/15 MHz, packet 144.91 MHz. For certificate send QSL and large SASE to Fred Swiatlowski, KY2F, P.O. Box 5227, Oswego, NY 13126.

**AA2CJ**, from Living History Day, Bath, New York 200th anniversary; Keuka Lake ARA; 1300–2400Z July 17; CW 3700, 7125, 28200; and SSB 3875, 7240, 14250, 28400. For certificate send QSL and 9 x 12 SASE to Reginald Gehret, N2MAH, 125 E. Washington, Bath, NY 14810.

**KA3OEG**, from 100th anniversary of Tatamy, Pennsylvania; 1400–2000Z July 11; on 3.965, 7.265, 14.265, 21.365, 28.365. For certificate send QSL and SASE to KA3OEG, Box 193, Tatamy, PA 18085.

**N4PZM/MPS**, from Manual-Powered Submarine Races, Ft. Lauderdale, Florida; Autec ARC, Andres, Bahamas; 1200–2400Z June 16–27 (If you hurry, you may be able to catch this one!—ed.); SSB 14.230, 21.300, 28.500, FM 146.300 simplex, CW 7.110. QSL to John D. Holverson, W7LZT, AARC, PSC 1012 Box 193, FPO AA 34058.

**4-land**, from Bicentennial Celebration of founding of Danville, Virginia; Danville ARS; July 17–18; CW and phone in lower portion of General and Novice 80, 40, 20, 15, 10 meter subbands. For QSL send QSL and contact number with SASE to L.G. Fehrenbaker, KC4YSD, 4 Country Club Dr., Danville, VA 24541–4720.

**WB5EMR**, from Old Settlers Reunion, Levelland, Texas; Hockley County ARC; 1300–2200Z July 10; General portion of 80, 40, 20, 15 meters and Novice 10 meters. For certificate send QSL and 9 x 12 SASE to HCARC, Box 338, Levelland, TX 79336.

**AA7QZ & KD6JUI**, from bicycle tour from Hood River, Oregon to Crater Lake National Park, Oregon; after 4:30 PM each evening July 11–17; 20 meter QRP on 14.06 MHz and 40 meter QRP on 7.04 MHz. QSL to Bill Paul, KD6JUI, 337 Estrella Way, San Mateo, CA 94403.

**AA7LP**, from 20th anniversary of Silverdale Whaling Days, Silverdale, Washington; Kitsap County ARES; 1700Z July 24 to 0300Z July 25; on 28.330 MHz USB and 147.510 MHz FM simplex. For QSL send QSL and SASE to Matt Amis, AA7LP, 2196 California Ave. E, Port Orchard, WA 98366.

**W8PIF**, from 100 mile Yacht Race Classic; Marinette-Menominee ARC; 1400–2000Z July 24; CW 7.045, 14.045, 21.045, 28.045; SSB 14.305, 21.305, 28.305. For certificate send QSL and SASE to Tom Hellem, KØSN, W6321 Two Mile Road, Porterfield, WI 54159.

**KD8FJ**, from "Heritage of Our Country," Heritage Hill Camp, Thompson, Ohio; beginning at 1400Z July 4; lower portion of 40 meter General phone band and 10 meters phone at 28.453 (conditions permitting). QSL with large SASE to KD8FJ, 386 Cedarbrook Dr., Painesville, OH 44077–2849.

**W8BLV**, from National Hot Air Balloon Championships, Middletown, Ohio; Dial ARC; evenings and weekends JULY 30 through August 8; SSB 3.965, 7.265, 14.265, 21.365, 28.365, 2 meters; CW 10 kHz from bottom of Novice bands. For QSL send QSL and SASE to Ernest Howard, AG8Y, 4003 Lewis St., Middletown, OH 45044.

**K8EPV**, from Port Huron to Macinac Island Yacht Race, Port Huron, Michigan; Eastern Michigan ARC; 1400Z July 24 to 0200Z July 25, and 1400–0200Z July 26; CW 3.710, 7.110, 21.110; SSB 3.910, 7.262, 14.262, 21.312, 28.393. For certificate send QSL and 9 x 12 SASE to K8EPV, 1640 Henry St., Port Huron, MI 48060.

**K9CAU**, from Streator, Illinois quasque centennial; Streator ARC; 1300–2100Z July 11; on 7235 and 14300. For certificate send QSL and SASE to Bernie McGurk, W9OLF, 204 N. Colorado Ave., Streator, IL 61364.

**KBØFUN**, from YLRL Convention, Wichita, Kansas; 1700Z July 8 through 1600Z July 11; all bands. QSL to KDØXW, Sharon Minor, 1226 W. 33 N, Wichita, KS 67204.

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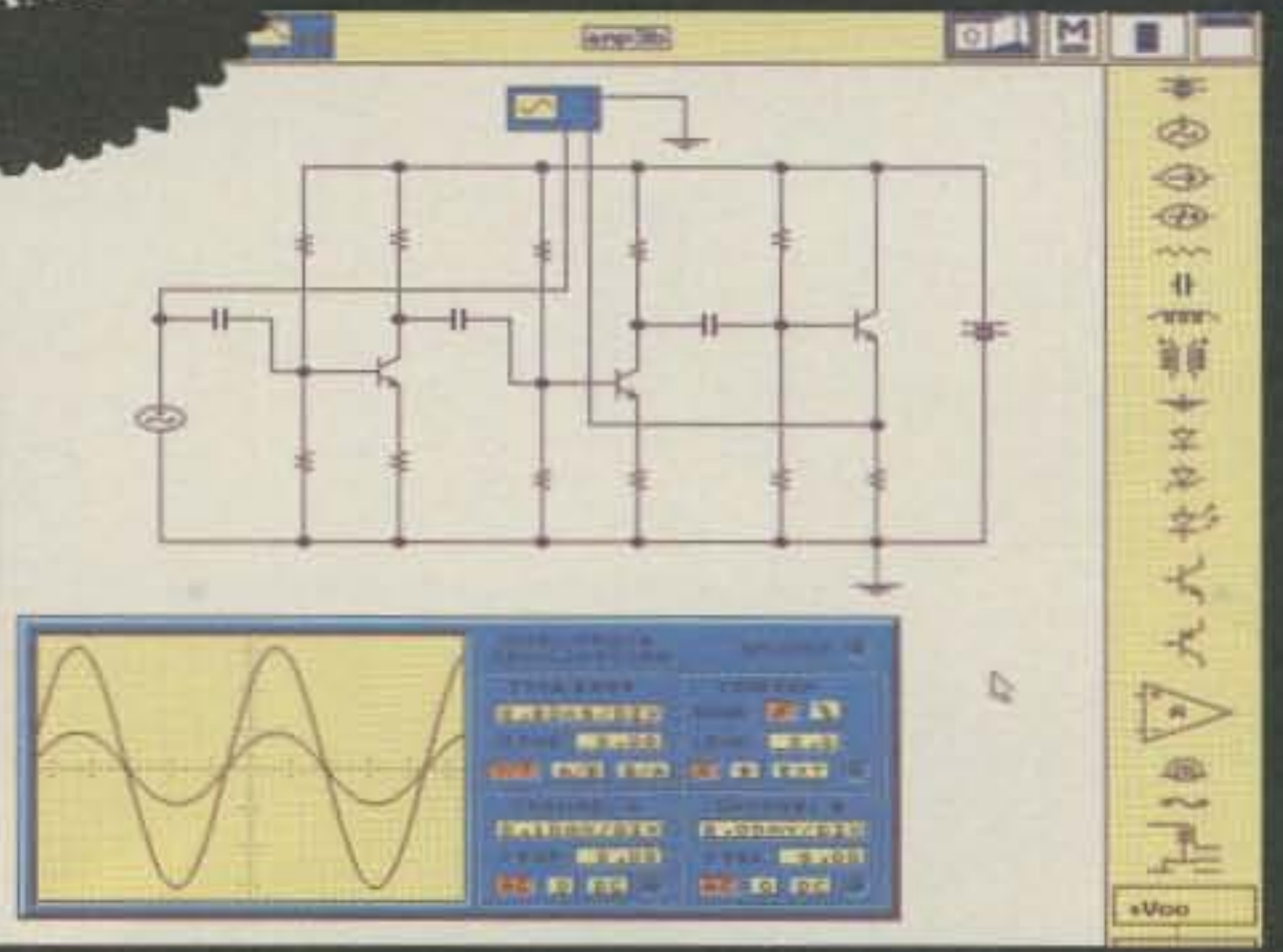
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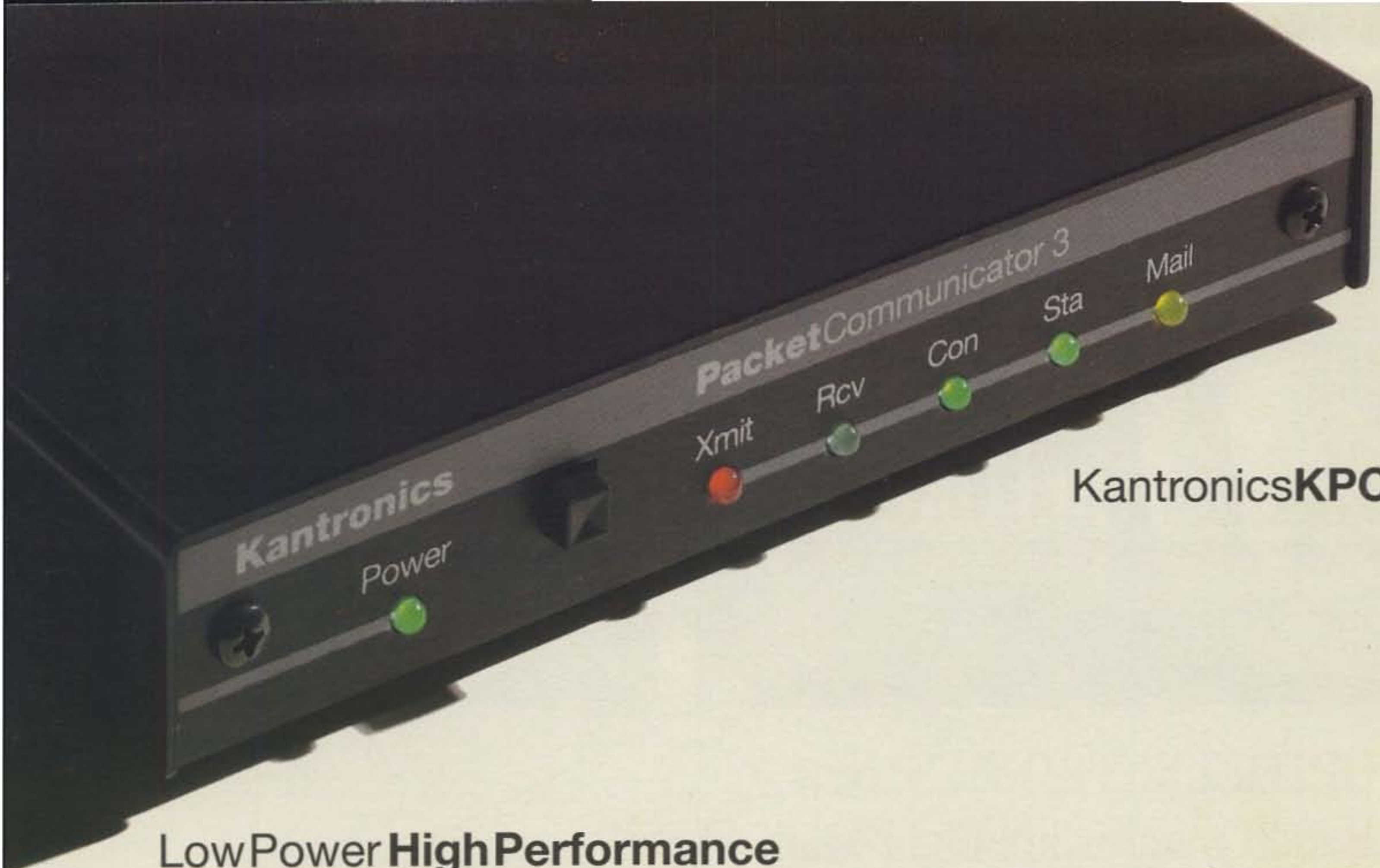


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**KØAAR**, from RAG-BRAI bicycle ride across Iowa; Sooland ARA; 10 AM to 6 PM CDT July 24; 15 and 20 meter phone bands and 10 meter Novice phone. For certificate send QSL and 9 x 12 SASE to Sooland ARA, ARA, 3407 Jennings St., Sioux City, IA 51104.

**Ø-land**, from 150th anniversary of Oregon Trail, Nebraska; designated stations from Nebraska will identify "Official Oregon Trail Stations"; July 15-18; general portion of all HF bands, and 10 kHz from bottom of Novice portions. For QSL/certificate send #10 SASE to NØBQW, Box 55, Scottsbluff, NE 69363.

**VE4IHF/Ø**, from International Peace Garden Hamfest, between North Dakota and Manitoba; July 9-11; 3.937, 7.255, 14.255, 21.355, and 28.355. QSL with SASE and IRC to KAØSLI, John Swanke, Box 304, Lakota, ND 58344.

**US/Canada**, from various sites in US and Canada; US and Canadian Nativist Societies; 10 AM to 3 PM, July 10-11; 40-2 meters. For certificate send QSL and 9 x 12 SASE to Nativist Society Amateur radio SIG, Box 74A Ash Road, Coatsville, PA 19320.

**DA1WA**, from Castle Frankenstein DXpedition, near Darmstadt, Germany; Wiesbaden ARC; 2000Z July 30 to 1200Z August 1; 80-10 meters SSB and CW and digital modes. For QSL, send QSL via the bureau or direct with 2 or 3 IRCs to DJØPU.

**PY6JJ**, from Itaparica Island (IOTA SA 23 and Award Brazilian Island DIB; Saturdays in July 2000-2100Z 14050 kHz CW; Sundays in July 2000-2100Z 14260 kHz USB. QSL PY6JJ via P.O. Box 367, 40.001-970 Salvador, Bahia, Brazil.

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

July 3, **Lehman, PA Hamfest**, Luzerne County Fairgrounds, Lehman, Pennsylvania. Contact KA3A, 717-824-5724 days, 717-825-3940 evenings. (Exams 10 AM, walk-ins preferred, Novice free.)

July 4, **Harrisburg PA RAC Hamfest**, Bressler Picnic Grounds, Harrisburg, Pennsylvania. Contact Steve Gobat, KA3PDD, 717-938-6943.

July 9-11, **North Dakota/Manitoba International Hamfest**, Peace Garden on USA/Canadian border. Contact Dave Snyder, 25 Queens Crescent, Brandon, Manitoba, Canada R7B 1G1.

July 10, **Straits Area ARC Swap & Shop**, Emmet County Fairgrounds, Petoskey, Michigan. Contact Harry Leiber, N8OIV, 616-347-6610. (Exams 10 AM.)

July 10, **Firecracker Hamfest**, Salisbury Civic Center, Salisbury, North Carolina. Contact Walter Bastow, N4KVF, 3045 High Rock Rd., Gold Hill, NC 28071. (Exams, preregistration required, form 610, copy of license, \$5.60, to Isabell Ledford, P.O. Box 826, Coolemees, NC 27014.)

July 10, **Charleston II Summer Hamfest & Computer Expo**, Charleston Exchange Club Fair-

grounds, Summerville (Charleston), South Carolina. (Handicapped accessible; exams, walk-in, 1200Z.)

July 11, **1993 Batavia Hamfest**, Firemen's Grounds, Batavia, New York. Contact Krute Carlson, N2DRX, 26 Burke Dr., Batavia, NY 14020 (716-343-5580).

July 11, **SCARC '93**, Sussex County Fairgrounds, Augusta, New Jersey. Contact Don Stickle, K2OX, 185 Weldon Rd., Lake Hopatcong, NJ 07849 (201-663-0677).

July 11, **North Hills ARC Hamfest**, Northland Public Library, Pittsburgh, Pennsylvania. Contact Don Jackson, N3LAZ, 8 Dale Ave., Bradford Woods, PA 15015 (412-935-3343). (Handicapped accessible.)

July 11, **Wood County ARC Hamfest**, Wood County Fairgrounds, Bowling Green, Ohio. Contact WCARC, P.O. Box 534, Bowling Green, OH 43402 (419-352-0856).

July 11, **PEARLFEST '93**, Brewster High School, Brewster, New York. Contact Shirley Dahlgren, N2SKP, 914-736-0717. (Exams.)

July 11, **DuPage ARC Hamfest**, American Legion Post 80, Downers Grove, Illinois. Contact Edwin Weinstein, WD9AYR, DARC Hamfest Chairman, 7511 Walnut Ave., Woodridge, IL 60517 (708-985-9256). (Exams, walk-ins welcome.)

July 16-17, **Electronics Fair '93**, Aldrich Arena, Maplewood, Minnesota. Contact Electronics Fair, P.O. Box 26331, St. Paul, MN 55126 (612-653-9999).

July 16-18, **Glacier-Waterton International Hamfest**, Three Forks Campground, west of East Glacier Park, Montana on Hwy 2. Contact George Smith, KC7OD, 1822 14th Ave. South, Great Falls, MT 59405 (406-452-5958). (Exams US and Canadian.)

July 16-18, **Yarmouth Clamfest Hamfest**, Yarmouth, Maine. Contact Jeff Weinstein, K1JW, Yarmouth RC, 207-846-0700.

July 17, **Cary Mid-Summer Swapfest**, Cary Community Center, Cary North Carolina. Contact Herb Lacey, 919-467-9608. (Exams, preregistration by July 6, call Vince Yakamovich, AA4MY, 919-847-8512.)

July 17, **Ausable Valley ARC Swap & Shop**, Comins Township Hall, Fairview, Michigan. Contact Ausable Valley ARC, P.O. Box 1, Mio, MI 48647 (517-826-5549, 848-5996).

July 17, **Skaneateles Hamfest & Computer Show**, Austin Street, Skaneateles, New York. Contact Skaneateles '93, Skaneateles Lions Club, P.O. Box 302, Skaneateles, NY 13152.

July 18, **MIT/Harvard Wireless Tailgate Electronics Fleamarket**, Albany & Main St., Cambridge, Massachusetts. Contact W1GSL, P.O. Box 82 MIT BR., Cambridge, MA 02139.

July 18, **Zero Beaters ARC Hamfest**, Bernie H. Hillerman Park, Washington, Missouri. Contact Ed Southall, WDØELL, P.O. Box 24, Dutzow, MO 63342 (314-459-6581, or 314-239-0060). (Exams, walk-in, 10 AM.)

July 18, **Van Wert, Ohio Hamfest**, Van Wert County Fairgrounds, Van Wert, Ohio. Contact Bob Barnes, WD8LPY, 419-238-1877 evenings, or Jack Snyder, WD8MLV, 419-495-2209 days. (Exams by preregistration only, call 419-795-5763.)

July 23-25, **ARCA Fort Tuthill Hamfest**, Coconino County Fairgrounds, Flagstaff, Arizona. Contact Tim Durkin, WB6UAN, 602-477-2748. (Exams Saturday July 24; three-day codeless Tech class.)

July 24, **Tri-County ARS Swap & Shop**, Gowanda Firemen's Grounds, Gowanda, New York. Contact Andy, 716-532-2250.

July 24-25, **ARRL New England Convention**, Center of New Hampshire Convention Center, Manchester, New Hampshire. Contact New Hampshire ARA, P.O. Box 573, Derry, NH 03038. (Exams.)

July 24, **Coos County Radio Club Hamfest**, Coos Bay, Oregon. Contact Zane Albertson, WA7OXM, CCRC, P.O. Box 3494, Coos Bay, OR 97420. (Exams.)

July 24-25, **Central Oklahoma Radio Amateurs Hamfest**, Oklahoma State Fair Park, Oklahoma City, Oklahoma. Contact CORA-Ham Holidays, P.O. Box 95942, Oklahoma City, OK 73143-5942 (405-677-5291). (Exams Saturday 1 PM.)

July 25, **Ashtabula County Hamfest & Computer Show**, Nappi's Party Center, Ashtabula, Ohio. Contact Ken Stenback, AI8S, 722 Lyndon Ave., Ashtabula, OH 44004 (216-964-7316 before 10 PM).

July 25, **BRATS Maryland Hamfest & Computerfest**, Timonium Fairgrounds, Timonium, Maryland. Call 410-467-4634. (Exams 10 AM.)

July 30-31, **"93" U.P. Hamfest**, Schoolcraft County Fair Building, Manistique, Michigan. Contact Debra K. Barton, WD8IBT, 906-341-5694 evenings.

July 30 - Aug. 1, **Regina (Sask. Canada) Hamfest**, Luther College, University of Regina Campus, Regina, Saskatchewan, Canada. Contact Lyle Hopwood, VE5HL, 4530 Third Ave., Regina, Saskatchewan, S4S 0E8 Canada (VE5AGA.SK. CAN. NOAM).

July 31, **Sugar River Amateur Radio Summer Festival**, Newport, New Hampshire. Contact Bob Boyd, N1CIR, 603-863-5383. (Exams, walk-in.)

July 31 - Aug. 1, **Greater Jacksonville Amateur Radio & Computer Show/ARRL Florida State Convention**, Osborn Convention Center, Jacksonville, Florida. Info: SASE to P.O. Box 10623, Jacksonville, FL 32207. (Exams 9 AM Sunday, walk-in.)

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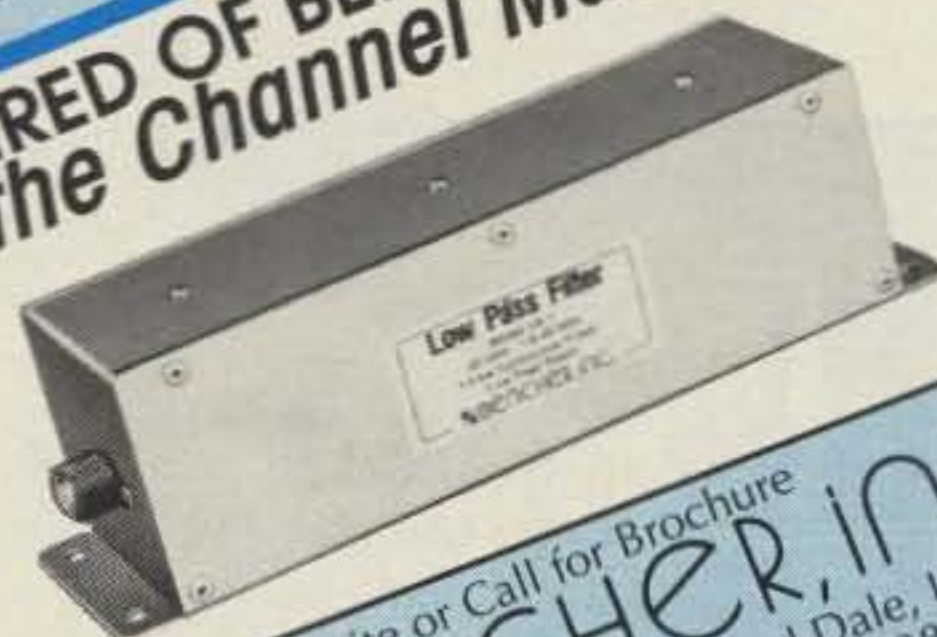
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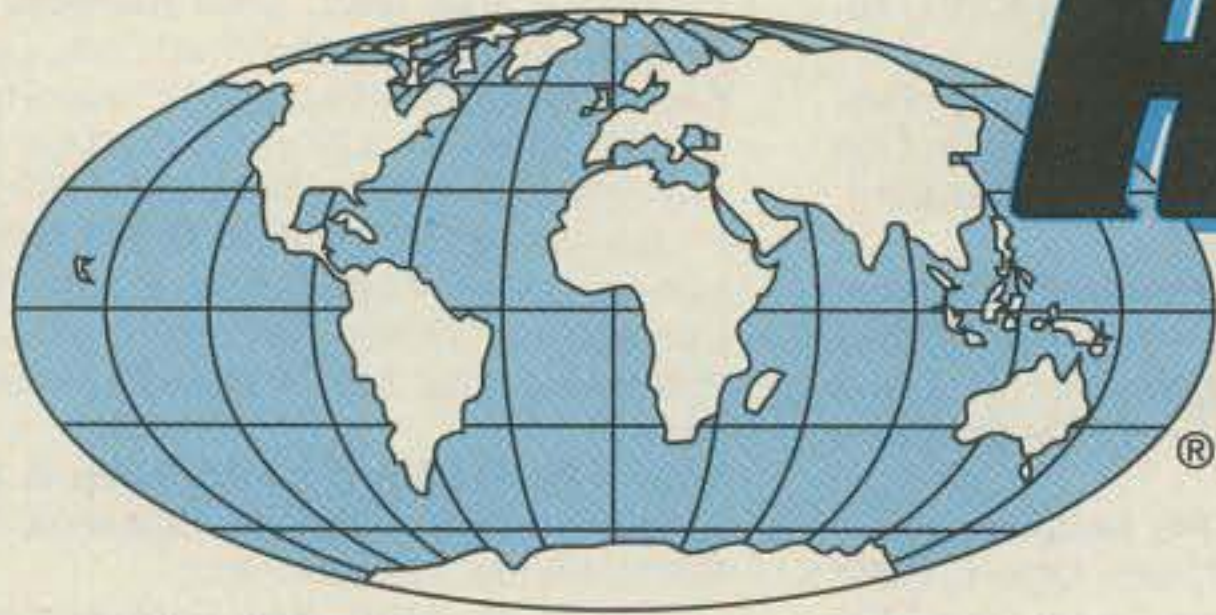
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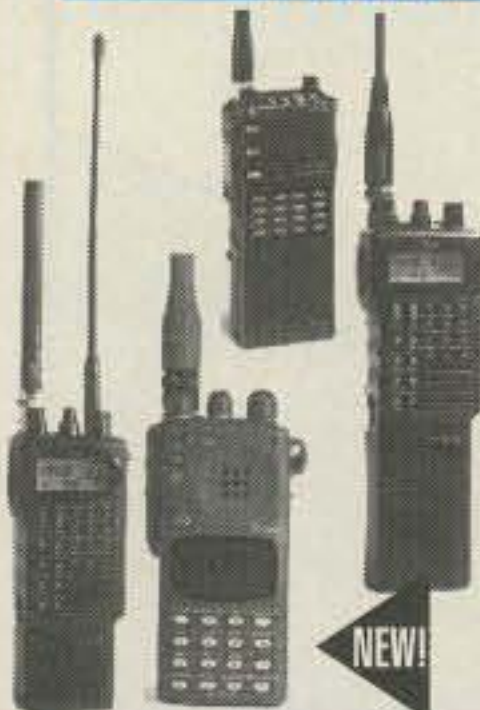


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# Results of The 1992 CQ WW RTTY DX Contest

BY ROY GOULD\*, KT1N

**C**onditions certainly were not the problem this year, as they were last year. Ten and fifteen were in great shape. There were big scores from around the world and records were broken. Over 400 logs were received this year. Please note the rules regarding separate logs for each band, the point structure, and multipliers. Many logs did not take the States and Canadian provinces as multipliers. Check a copy of the rules (see elsewhere in this issue) and the official log sheets (available from CQ with an SASE).

## Single Operator

Walter, DJ6QT, repeated as the World Single Operator, All Band winner as GU3HFN from Guernsey with 1081 contacts and a score of 1,223,849. VY2SS was second in the world, and first in North America with 1,034,351 points. South America and third in the world was won by CE6EZ with just under a million points (922,867). AM3NY took the European plaque, turning in 772 contacts with 692,900 points. Very close behind, to say the least (one point) was John, G4SKA, with 691,899 points. But after checking and rechecking, one point decided the plaque in Europe.

New Zealand took the Oceania plaque this year, with ZL3GQ having a score of 553,410, just a few points better than the V7RTTY effort from the Marshall Islands. Africa went to 5U7M from Niger with a nice effort and a new one for many with 582 QSOs and 424,804 points. In the USA, N4CC won the USA plaque and fifth place World with 733,562 points. There was no plaque sponsor for Canada, but VE3XO scored 812,876 points for fourth in the world. What about a sponsor for a Canadian plaque, gang?

In the Assisted category, DK3GI won the plaque with a score of 1,088,330 and 908 QSOs. Second went to Jeff, K1IU, with 911 contacts and a score of 971,412, the points per contact making the difference. AA6TT placed third in the world with 641,175 points. Entries were up this year in this class.



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*W2UP and assistants, first place on 7 MHz.*

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## TOP SCORES

### SINGLE OPERATOR WORLD

#### ALL BAND

GU3HFN	1,223,849	4M5RY	270,256
VY2SS	1,034,351	YU3HR	231,256
CE6EZ	922,867	NN2G	175,854
VE3XO	812,876	KE0KB	124,265
N4CC	733,562	WP4IIV	120,663
AM3NY	692,900		
G4SKA	691,899		
HC5K	690,378		
4V2PK	678,151		
AA5ZQ	648,340		

#### 14 MHz

ZP5JCY	433,532
ZS6EZ	382,630
PJ2MI	329,184
LZ1MC	247,950
LZ1BJ	193,536

#### 3.5 MHz

YU3BQ 11,781

#### 7.0 MHz

W2UP 64,329  
NJ0M 38,270  
VE7IN 34,456

#### 28 MHz

ZD8LII	355,426
SM0HTO	137,592
VS6BG	95,424
AB8K	74,259
SP3SUN	27,945

### ASSISTED

DK3GI	1,088,330	VE7SZ	624,012
K1IU	971,412	I2UIY	612,808
AA6TT	641,175		

### MULTI-OP SINGLE TRANSMITTER WORLD

P40RY	3,543,090	WA7EGA	979,195
UW2F	2,847,220	JJ3YBB	967,779
UZ9CWA	2,547,575	EG8CMR	963,116
FF0XX	1,518,940	WF1B	903,175
JL1ZCG	1,110,794	W4AQL	805,232

### MULTI-OP MULTI-TRANSMITTER WORLD

W3LPL	3,111,748	T32RA	1,770,131
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## Multi-Operator Class

This class is starting to get serious. There were 40 entries in the Multi-Operator Single Transmitter category, up five from last year, but there were some serious DXpeditions and some real organization going on. The big story, of course, was the P40RY effort from Aruba. Their score of 3,543,090 with 2222 contacts should stand for awhile, or will it? They even out-scored the Multi-Multi giant, W3LPL, who had eleven more contacts, but the three points from Africa for North America contacts made the difference.

It was a great effort from the gang at UW2F from Kaliningrad with 2,847,220 points, adding over a million points to their last year's score. The group from UZ9CWA came in third in the world with 2,547,575 points. FF0XX was next with 1,518,940 points, followed by JL1ZCG with 1,220,704 points. Hal, WA7EGA, was next from the USA with a score of 979,195. Big scores here, as last year's score ranged from 1,793,925 with 1205 contacts for first place down to 755,895 with 1014 QSOs for fifth in the world.

In the Multi-Transmitter category, Ed Bruns, W3EKT, and the effort he lead from W3LPL came in first with 3,111,748 points. It was a nice effort from East



Ed, W3EKT, who heads up the W3LPL multi-multi effort.

Kiribati, as T32RA with 1,777,031 points and 1744 contacts took second place. The other two entries for third and fourth place were AM1DVY from Spain and from OZ4HAM from Denmark.

## Single Band Category

There were about the same number of entries for 15 and 20 meters, with good scores on both bands, as well as on 10. On 15 meters ZP5JCY with a score of 433,532 and 871 contacts took back the honors this year from Chris, ZS6EZ. Luis's score was the highest for any single band entry. On 20 meters 4M5RY took the honors with 270,256 points, and on 10 meters ZD8LII had 355,426 points and 840 QSOs. Forty went to W2UP, who decided to try that band this year and scored with 64,329. YU3BQ scored 11,781 points on 80 meters.

## Summary

Thanks for the comments and suggestions and for your participation. I traveled to Dayton this year and picked up a few new sponsors for plaques, but we could always use more. Look for the rules announcement for this year's contest elsewhere in this issue, and note that we have added Low Power Single Operator and Multi-Operator Single Transmitter classes, 150 watts or less. There is also a new Novice/Tech class, plus a plaque for 28 MHz.

For this year's RTTY contest mark the calendar, always the last full weekend in September, September 25-26, 1993.

Unfortunately, this year's contest falls on Yom Kippur, and our apologies to our friends of the Jewish faith. We will look for your participation next year.

Thanks to my trusted assistants, Roland, N1FTD, George, KB2VO, and Dale, W6IWO, of the RTTY Journal, your co-sponsor.

73, Roy, KT1N

## Comments From NA

Great fun; my first time in this contest. RTTY by WF1B is amazing; just point and click . . . 4V2PK (HH2PK). It's more than a contest, it's a worldwide get together! . . . AA0GY. Worked out of a construction trailer while we were building a home here in Beaver Creek . . . AA0KA. Worked three all-time new ones on RTTY . . . AA4M/6. My first CQ contest. Really enjoyed it. Will not be my last . . . AA5ZQ.

My first entry in a contest. Lots of fun. I wish there wasn't a 30-hour rule . . . AB4MJ. Didn't have the time this year . . . AB8K. Had to do the first 24 hours without 20 meters; broken coax on the tower . . . AE6E. Condx good, WF1B SW great. Three-hour rule no good; make it 1 hour . . . A17B. Next year the linear is on line . . . AK9N.

Ten meters pretty much nonexistent this year from Alaska . . . AL7NK. My first time . . . J73WA. Got to get a better demod and WF1B software . . . K0BJ. While everyone was working Europe, I looked north and there was APWA2YWR calling CQ with no takers . . . K0BX. First time in contest, wish more Europeans would get on 80 . . . K1IU. After a night of QRZ agn pse, discovered I was inverted . . . K2PS.

My first RTTY contest, but not my last . . . K2UVG. Spoiled by CT; have to find some RTTY software somewhere . . . K8CV (It's out



there, Walt—ed.). Was my first attempt. Experienced ops were very patient . . . KA1CLV. No lids, no headaches, no ringing ears, no hoarse throat. Fun, Fun, Fun . . . KA2CDJ/4. My best contest so far . . . KA3JFI. I second last year's nomination for WF1B sainthood. He deserves sainthood, knighthood, or whatever else . . . KA5YSY. Twelve new countries . . . KABOUT.

Thanks to W4RWJ for the loan of his PK232 . . . KC4B. Biggest thrill was having A22BW come back to my CQ on 10 . . . KC6RKC. South America, where were you? . . . KC7UP. The most fun mode in ham radio . . . KD1GG. Still the best contest of them all . . . KD2YG. The CQ WW is the best . . . KD7H. Next year the chief op will be even more ready for WW RTTY 93 . . . KF0EF. Can't wait until next year . . . KF9CX. Don't care about the points, just like RTTY DX . . . KR1Z.

Biggest thrill was a UW2 calling me on 40 . . . KV5F. I am always pleased with the sportsmanship of the RTTY crowd . . . NO1J. Everyone seems to be getting on RTTY. The more the merrier . . . N2DL. WF1B's software make it so much easier . . . N2FF. Congrats to Team Aruba (P40RY) . . . N2HOQ. I only have been licensed since March. Really enjoyed it; 17 new countries . . . N2QCA. Biggest thrill was working 6V6A in a pileup with 100 . . . N6MSQ.

First RTTY contest. Will be back in 93 . . . N7KA. How about a Low Power category? . . . N8FEH (You got it.—ed.). Twenty new RTTY countries . . . NA2Q. First contest ever. Got started and couldn't stop . . . NI4H. This was my first real effort. Great fun . . . NR1J. Great to see the bands wide open . . . VE2JR. My first time on RTTY. Had a lot of fun . . . VE6JAV. My fourth year. Nice to see so many new calls . . . VE6KRR. Lost time when the big rig (50 KW brdcst station) went down Saturday at 8 AM. I gotta delegate . . . VE7BTO.

Nice to have an amp this year. Having WF1B software do all the work! . . . VE7IRA. Started to look like a wipe out. Lost 75 and 10 meter antennas. Glad 15 stayed open . . . VE7KD. My first real effort in a RTTY contest. Had a ball . . . VE7OR. WOW! . . . VY2SS. Would like to see a Single Op Low Power category . . . W2JGR (Okay, Jules—ed.). Apologies to those who called Friday night,

## PLAQUE WINNERS

**World Single Operator: Walter Skudlarek, GU3HFN (DJ6QT).** Advanced Electronic Applications, Inc. (AEA) Award.

**World Multi-Operator, Single Transmitter: P40RY (AA5AU, G0AZT, KP2N & N0FMR).** Advanced Electronic Application, Inc. (AEA) Award.

**World Multi-Op, Multi-Transmitter: W3LPL (W3LPL, W3EKT, WZ3Q, KF3P, N3UN, N3II & KH2F).** CQ Magazine Award.

**World Single Operator Assisted: Roland Mensch, DK3GI.** CQ Magazine Award.

**Continents, Single Operator All Band:**

**North America: Robby Robertson, VY2SS.** Hal Communications Corp. Award.

**South America: Ralf Hucke, CE6EZ.** Association of DX-EX Award.

**Europe: Edie Stark, AM3NY.** Hal Communications Corp. Award.

**Oceania: Peter Watson, ZL3GQ.** RTTY Journal Award.

**Asia: Kunihiko Fujii, JH1QDB.** N5JJ Memorial Award.

**Africa: Yoshiyuki Matsuda, 5U7M (JH4NMT).** Contest Committee Award.

**World Single Operator, 14 MHz: Pasquale Casale, 4M5RY.** Kunihiko Fujii, JH1QDB Award.

**World Single Operator, 21 MHz: Luis Kemper, ZP5JCY.** Denis, WD4KXB & Mike, KA4RRU Award.

**World Single Operator, 28 MHz: Steve Hodgson, ZD8LII (G0LII).** Contest Committee Award.

**United States, Single Operator All Band, High Score: Greg. J. Wilson, N4CC.** RTTY by WF1B Award.

but I had rain static 30 over 9 . . . W2UP. Great contest, no rudeness . . . W3AOH/4.

First time using RTTY by WF1B. Super program . . . W3FV. Worked some rare ones with big signals. Fifteen was fabulous! . . . W3LPL. Once I got on the right baud rate, the QSO rate picked up . . . WA6VZI. My first time in CQ RTTY. Had a great time with lots of help from WF1B. TNX CQ . . . WM2U. I have got to get better filters . . . WV1D. Good condx on 28 MHz . . . XE1/JA1QXY.

## Comments From DX

4M5KWS operated by YV5KWS. Too much QRM . . . 9M2AX. My very first contest of any kind. Next year I will have a linear . . . A45ZX. I have no doubt that this is the best contest I have ever worked . . . AM3GCV. Never had so few dupes in 30 years of contesting . . . CE6EZ. Some creative abbreviations of States . . . CE8ABF. I am surprised at my score running barefoot with only the Isooop—outstanding antenna . . . DA1SC. I have a great time every year in the WW RTTY Contest . . . DL1BFZ. Fun contest, lots of

countries . . . EC3CYB. First time as a Single Op. Great fun . . . F6IIE. Another great contest. Same again, please . . . G0ARF.

Excellent conditions. Ten meters was a like a pipeline Sunday . . . G4SKA. Much evidence of politeness and good operating condx . . . G4XDD. A 3-hour pile-up of US stations on 15 left me washed, but did wonders for the score . . . GM3UTQ. Need to get WF1B software. The other stations are so fast . . . GU3HFN (DJ6QT). Sri I missed KT1N . . . HB0/HB9NL. First time. Thanks to CQ magazine. I enjoyed it . . . HC3AP. Lost power for 12 hours at 0400 Saturday. Had to borrow a 15 KW generator from the motor pool . . . HL9AX.

This was my first RTTY contest. Will now try to be on for every one of them . . . I2UIY. Too many big guns, HI, HI . . . JA3VXH. Condx very good on 15. Many trx for nice contest . . . JE2UFF. My first CQ WW RTTY—Fun! . . . LA3YU. After a long silence on the bands, it was nice to hear the world RTTY again . . . LX1TO. Fantastic contest! . . . LZ1MC. First RTTY activity from our club . . . OR0OST. My favorite RTTY contest . . . SM0HTO. Make the contest Baudot only . . . SM5FUG.



Marlene Diaz, Rose Rivera, Ann Rodrigues and Angie Fernandez RTTY Contest ops at WB2JKJ, JHS 22, New York City.



Steven Reyes, age 16, the top RTTY op at WB2JKJ, the Radio Club of Junior High School 22, New York City.



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SV1SV operated by SV1BDO. The score is growing each year, but not as quickly as we want . . . UZ9CWA. I know everybody else in the test had a great time, because Murphy spent 40 meters, but it was fun . . . VK2BEX. Still waiting for Wyoming and South Dakota for RTTY WAS. Where are you? . . . VK3EBP. My first time in RTTY Contest. Sometimes did not know what to do. HI, HI . . . YC7BVY. Many interesting stations . . . YO6JN. Good condx first night on 80; second night only heard W3LPL. Big surprise was HZ1AB at the end of the contest . . . YU3BQ.

Nice contest. Good opening to States first day. See you next year . . . YU3HR. Excellent contest. Pity I had to finish early. Might have cracked 400K. See you next year as GØLII . . . ZD8LII. After finding CT accepts a zone plus a two letter abv, a log has finally been managed . . . ZL3GQ. Funny, but I did not work my own country . . . ZP5JCY. Enjoyed the new logging software by WF1B. Now if we can just get people to quit sending RYRYRYRY . . . ZS6EZ (Amen to that—ed.).

## Station Operators Multi-Op Single Transmitter

**9A1BHI** & **9A2FK**, **9A3ID**. **9A1CCY** & **9A3NM**, **9A3JZ**, **9A3ZV**, **9A3LG**. **EG8CMR** & **EA8RA**, **EA8AKQ**. **F6EKX** & **FD1NPE**, **FE4811**, M. Pontic. **FFØXX**: **F6FGZ**, **FD1NLY**, **FB1MUX**, **FC1OIH**, & **SWL** Stephane. **HL9AX** & **HLØOB**. **JJ3YBB**: **JA3CZY**, **JA3PJL**, **JA3FHL**, **JH3FQF**, **JH3UHG**, **JE3TXA** & **JI3ERV**. **KA3DSX** & **KA3HNM**. **LA1K**: **LA8UGA**, **LA5IIA**, **LA4OFA**, **LA7IHA**, **LA2RY** & **LA7HFA**. **N6TU** & **N6RZ**, **W6YJG**. **N9ITX** & **KS9W**. **OE3XCW/3**: **OE1GAS**, **OE3CHC**, **OE3MDC**, **OE3PUW**. **OH2AG**: **OH2GI**, **OH2HF**, **OH2JF**, **OH2KQ**, **OH2LTR**, **OH2LU**, **OH2SS** & **OH3DO**. **OK3RJB**: **OK3TCL**, **OK3CKW** & **OK3TVA**. **ORØOST**: ops.

**P4ØRY**: **AA5AU**, **GØAZT**, **KP2N** & **NØFMR**. **PI4COM**: **PA3ERC**, **PA3EWP** & **PA3DMH**. **PW2N**: **PY2NY**, **PU2VJJ** & **PY2-71156**. **SP3PLD**: **SP3IBM** & **SP3SBB**. **UB4KWV**: **UB5KDY** & **UB5KGA**. **UB4LWC**: **UB4LSB**, **UB4LRQ**, **UB4LQA**, **RB4LCL**. **UW2F**: **UL7PCZ**, **UA2FF**, **UA2FJ**, **UA2FM**, **RA2FA**, **UA2FX** & **UA2FZ**. **UZ9CWA**: **UA9CGA**, **RW9CF**, **UA9CR**, **UA9CFV** & **Igor Rjabkov**. **VE3FJB** & **VE3EKF**, **VE3OY**, **VE3ABG**, **VE3VSM**, **VE3THR** & **VE3PZX**. **VE3UR** & **VE3NIT**, **VE3EX** & **VE3IW**. **VE7ZZZ**: **VE7AV**, **VE7BUX**, **VE7DRS**, **VE7EME**, **VE7EQZ**, **VE7LKN**, **VE7PHA**, **VE7RBL**, **VE7SK** & **VE7WJA**. **VK2RTT**: & **Ben Beresford**.

**VK4WIE**: **VK4AH**, **VK4CRO**, **VK4EK** & **VK4NEF**. **WØNA**: & **NØBA**, **AA9DX**, **WØAR** & **WØYR**. **W8UMD**: **KAØJTW**, **N8NSA**, **N8ØBE**, **N8VCO** & **N9AG**. **WA4MCZ** & **WA4EHI**. **WA7EGA** & **K7DSR**, **KI7FX**, **W7YEM**, **WB7AVD**, **WS7I** & **WV7Y**. **WF1B** & **K1NG**, **WD1N**.

## Station Operators Multi-Op Multi-Transmitter

**AM1DVY**: **EA1DVY**, **EA1EYL**, **EA1AZC**, **EC1DJU** & **EA1BFZ**. **OZ4HAM**: **OZ2JZ**, **OZ1GBS** & **OZ1LUS**. **T32RA** & **T32SS**, **T32GV**, **T32RS**, **T32GG**, **T32WS** & **T32CW**. **W3LPL** & **W3EKT**, **WZ3Q**, **KF3P**, **N3UN**, **N3II** & **KH2F**.



Number groups after call letters denote the following: Classification (SOB = Single Op All Band, SOA = Single Op Assisted All Band, MOS = Multi-Op Single Transmitter, MOM = Multi-Op Multi-Transmitter), Final Score, Number of QSOs, Points, Zones, Countries, State and Canadian Provinces. Winners are in listed in boldface. (Note that the country names and groupings reflect the DXCC list at the time of the 1992 contest.)

### SINGLE OPERATOR NORTH AMERICA

CALL	CL	SCORE	QSOs	Pts	Zones	Ctries	US/VE
<b>ALASKA</b>							
AL7NK	SOB	235,662	540	1267	33	54	99
<b>ANGUILLA</b>							
VP2EE	SOB	247,572	562	1196	35	55	117
<b>CANADA</b>							
VY2SS	SOB	103,4351	1121	2659	69	76	144
VE3XO	SOB	812,876	765	1973	84	204	124
VE7SZ	SOA	624,012	800	1788	72	110	167
VE7KD	SOB	305,286	550	1241	48	90	108
VE4AIY	SOB	267,064	475	1064	51	96	104
VE6KRR	SOB	226,566	426	921	50	70	126
VE6ZX	SOB	180,180	391	858	38	57	115
VE2JR	SOB	164,450	201	506	38	85	202
VE7OR	SOA	160,576	344	772	45	62	101
VE2AXO	SOB	154,874	303	734	46	92	73
VE7IRA	SOB	150,976	305	674	52	68	104
VE7BTO	SOB	108,852	252	564	47	68	78
VE5SF	SOB	108,256	232	544	50	80	69
VE2BOB	SOB	41,322	120	291	37	57	48
VE7IN	7	34,456	240	472	11	13	49
VE6JAV	SOB	32,912	111	272	38	46	37
VE3RHJ	SOB	1,632	22	48	10	10	14
<b>DOMINICA</b>							
J73WA	SOB	190,284	420	942	42	71	89
<b>DOMINICAN REPUBLIC</b>							
HI8LEZ	SOB	33,264	145	336	23	34	42
<b>HAITI</b>							
4V2PK	SOB	678151	810	1889	65	144	150
<b>MEXICO</b>							
XE1/ JA1QXY	SOB	363,394	625	1387	51	71	140
XE1BEF	14	28,644	210	434	14	13	39
<b>PANAMA</b>							
HP1AC	SOB	135,226	324	743	38	56	88
HP1KZ	SOB	41,985	136	311	30	45	60
<b>PUERTO RICO</b>							
WP4IHW	14	120,663	431	981	20	56	47
KP4DDB	SOB	6,825	42	105	21	23	21
<b>UNITED STATES</b>							
K1IU	SOA	971,412	911	2028	96	222	161
N4CC	SOB	733,562	832	1702	93	196	142
AA5ZQ	SOB	648,340	876	1684	81	145	159
AA6TT	SOA	641,175	771	1545	87	178	150
W3FV	SOB	623,298	709	1586	77	191	125
NV1G	SOB	496,014	638	1374	72	176	113
NO2T	SOA	494,088	636	1384	66	161	130
N2LT	SOB	482,174	570	1414	79	173	89
NT0V	SOB	479,902	709	1387	65	141	140
AE6E	SOA	473,850	647	1170	91	157	157
W9KDX	SOB	457,378	609	1403	71	152	103
AI7B	SOB	430,905	649	1249	73	124	148
AB4MJ	SOB	421,480	608	1285	67	138	123
WB8YJF	SOB	411,320	508	1130	81	179	104
N2DL	SOB	379,404	512	1171	68	160	96
AA0KA	SOB	355,776	587	1088	68	120	139
WF5E	SOA	337,674	551	1002	72	125	140
WA7FAB	SOB	293,564	514	929	67	113	136
N2FF	SOA	274,995	416	873	71	147	97
K6WZ	SOB	269,376	487	976	50	120	106
WA8ZZA	SOB	248,920	376	889	67	139	74
W1BYH	SOB	228,304	428	751	66	110	128
N8FEH	SOB	224,190	364	795	64	127	91
KK4DK	SOB	214,008	364	723	63	124	109
KF9CX	SOB	197,380	347	710	65	118	95
KD1GG	SOA	191,052	376	732	53	108	100
KK6PD	SOB	182,368	414	656	60	93	125

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- GOLAY
- ACARS
- DTMF
- CTCSS (PL)
- DCS (DPL)

Forget the limitations you have come to expect from most "readers". The self-contained Universal M-400 is a sophisticated decoder and tone reader offering an exceptional range of capabilities. The SWL will be able to decode Baudot, SITOR A & B, FEC-A, ASCII and SWED-ARQ. Weather FAX can also be decoded to the printer port. The VHF-UHF listener will be able to copy the ACARS VHF aviation teletype mode plus GOLAY and POCSAG digital pager modes. Off-the-air decoding of DTMF, CTCSS (PL) and DCS is also supported. The M-400 can even be programmed to pass only the audio you want to hear based on CTCSS, DCS or DTMF codes of your choosing. The M-400 can run from 12 VDC or with the supplied wall adapter. The American-made Universal M-400 is the affordable accessory for every short-wave or scanner enthusiast. **Only \$399.95 (+\$6 UPS).**

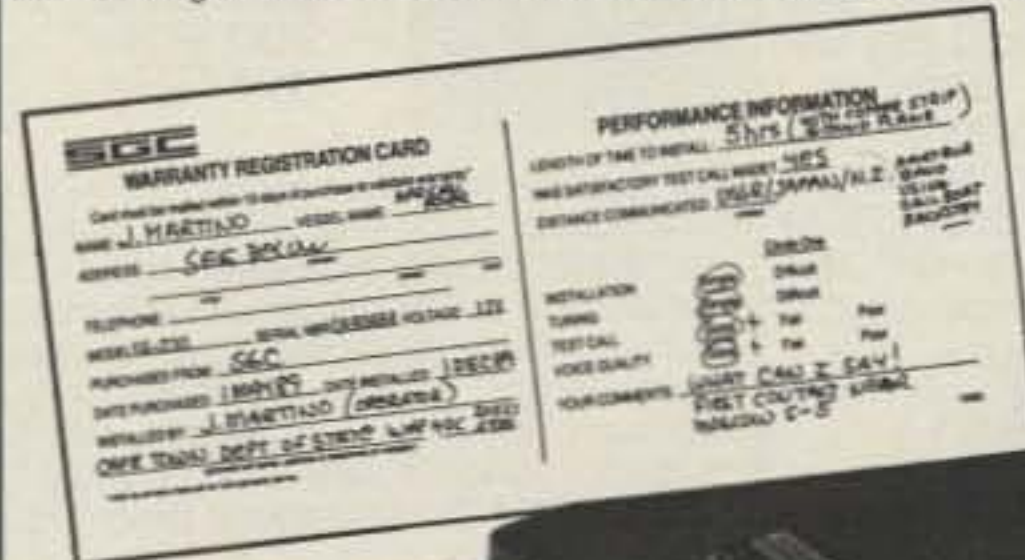
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HF ANTENNA COUPLER  
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FAST-INTELLIGENT-ACCURATE  
OPERATES WITH ANY HF TRANSCEIVER

The Smartuner high technology coupler intelligently tunes any length antenna (8 to 80 ft) in the HF band. The unit will operate with any HF transceiver within its' specifications. The Smartuner switches 64 input and 32 output capacitance combinations plus 256 inductance combinations in a "pi" network resulting in over a half-million different ways to ensure a perfect match for the transceiver. And, it remembers the frequency and the tuning values and will re-select these values in less than 10 ms next time you transmit on that frequency.



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HAM PRICE:**  
**\$595.00**

- MICROPROCESSOR CONTROLLED
- NON-VOLATILE MEMORY
- WATERPROOF
- B.I.T.E. INDICATOR
- 1.8 TO 30 MHZ RANGE
- 10 TO 150 WATTS INPUT POWER
- 10 MS RETUNING TIME
- 8 TO 80 FT. ANTENNA (All Types)

• FOR MARINE, AVIATION, HAM AND PARA-MILITARY APPLICATIONS

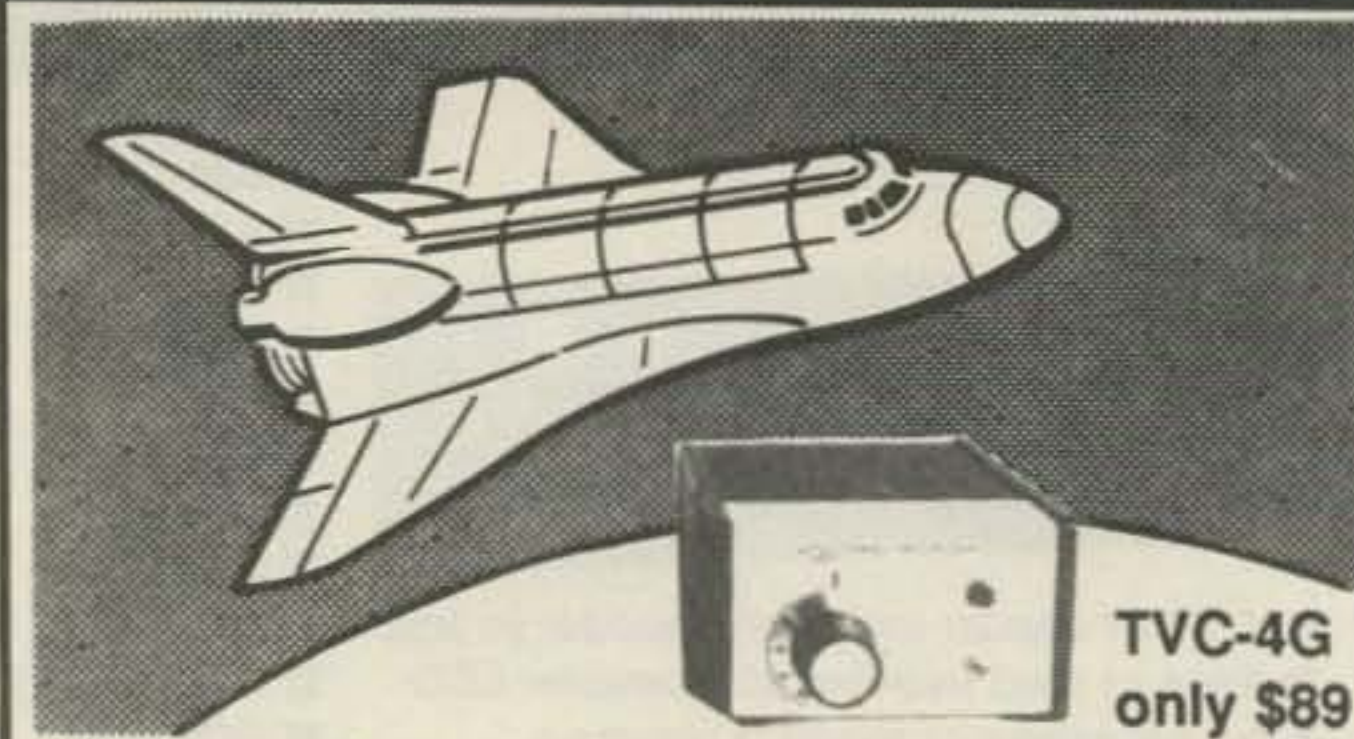
The SG-230 Smartuner is available from:  
 Eli's Amateur Radio, FL - 305-525-0103  
 Gordon West Radio, CA - 714-549-5000  
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 Henry Radio, CA - 213-820-1234  
 Surplus Sales, NE - 402-346-4750  
 Ham Radio Outlet, CA - 800-854-6046  
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CIRCLE 139 ON READER SERVICE CARD



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CIRCLE 134 ON READER SERVICE CARD

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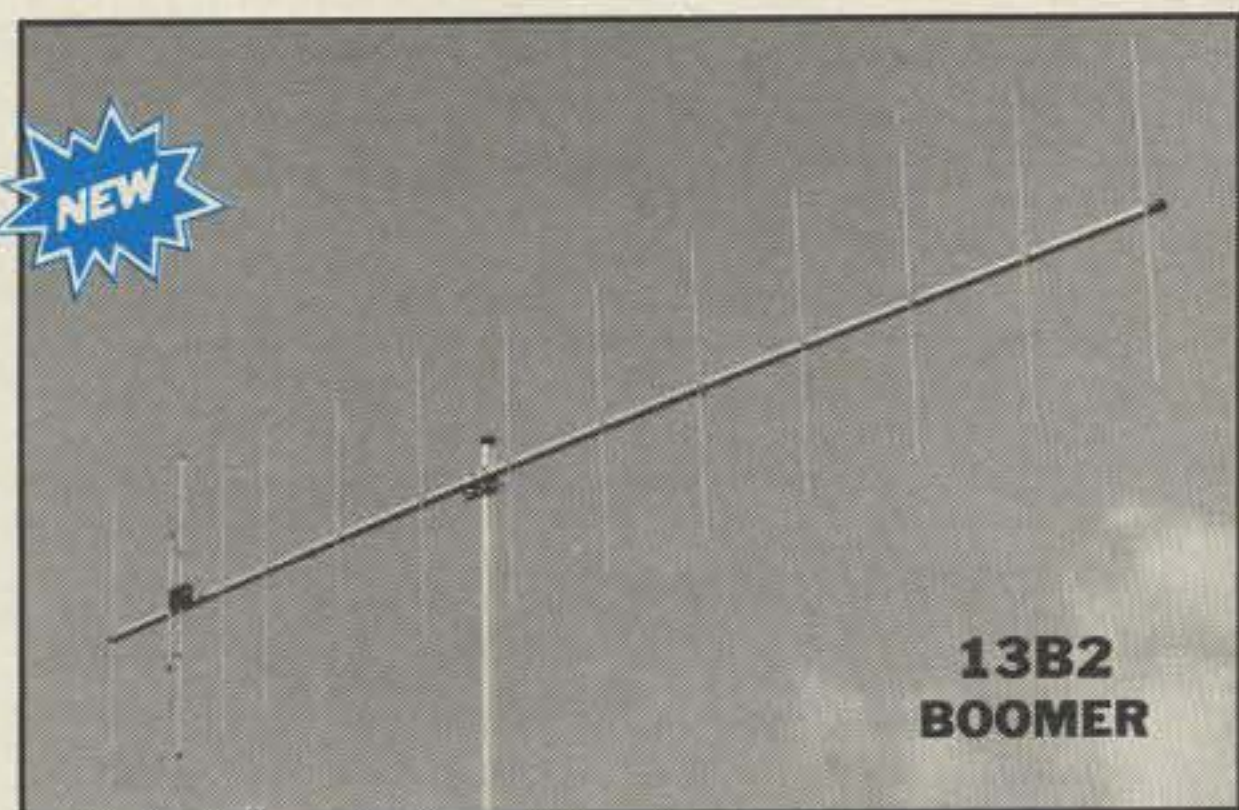
KD2YG	SOB	180,420	323	620	70	134	87
<b>NN2G</b>	<b>14</b>	<b>175,854</b>	<b>503</b>	<b>1113</b>	<b>27</b>	<b>83</b>	<b>48</b>
KD4MM	SOB	172,720	332	635	65	122	85
WB8MTT	SOB	161,798	366	637	55	82	117
NI4H	SOB	157,200	295	786	50	113	37
KØBJ	SOB	150,349	292	599	66	107	78
K5KLA	SOB	147,941	257	619	63	125	51
WB1AEL	SOB	139,302	284	654	52	95	66
K2PS	SOB	137,708	293	692	48	92	59
N4ROL	SOB	133,308	263	529	59	102	91
NA2M	SOB	128,002	265	574	56	108	59
W6DBV	SOB	127,986	289	514	62	75	112
NØBIW	SOB	125,100	272	556	61	100	64
KEØKB	14	124,265	462	857	27	68	50
<b>KA5YSY</b>	<b>21</b>	<b>116,621</b>	<b>417</b>	<b>839</b>	<b>29</b>	<b>68</b>	<b>42</b>
WA1MPB/4	SOB	111,606	225	534	56	108	45
WJ7S	21	111,219	382	849	27	61	43
KC6RKC	SOB	110,808	312	486	55	64	109
W2KHQ	SOB	108,968	230	514	48	93	71
WM2U	SOB	108,882	301	526	45	74	88
W2JGR/Ø	SOB	108,853	297	547	50	77	72
N7KA	SOA	107,632	225	496	57	96	64
W1VXV	SOB	105,716	225	494	53	99	62
KB3TS	SOB	105,408	215	488	57	104	55
WT3W	SOA	102,612	228	503	52	91	61
WA6VZI	SOB	101,010	230	518	47	74	74
AIØY	SOB	97,674	290	446	46	66	107
KØBX	SOA	93,729	215	471	53	95	51
NR1J	SOB	92,571	221	523	46	88	43
WA6UFY	SOB	92,432	259	424	52	65	101
N1FIO	SOB	91,956	207	474	46	95	53
W3KV	SOB	91,675	172	475	56	80	57
KA2CDJ/4	SOB	91,584	225	424	54	85	77
WA1IML	SOA	89,006	201	466	46	90	55
KC7UP	SOB	88,638	274	474	38	55	94
AA4M/6	21	85,412	350	652	24	60	47
KB2SE	SOB	84,420	184	420	53	97	51
W1BIH	SOB	83,250	167	450	52	112	21
K7PB	SOB	81,800	201	409	57	82	61
KD2YP	SOB	81,002	177	401	59	94	49
N9NMC	SOB	80,907	240	447	44	76	61
W4IF	SOB	80,698	186	514	45	98	14
KC9UU	SOB	78,260	198	430	45	83	54
KA3JFI	21	75,816	266	648	25	63	29
<b>AB8K</b>	<b>28</b>	<b>74,259</b>	<b>268</b>	<b>669</b>	<b>23</b>	<b>60</b>	<b>28</b>
N2QCA	SOB	68,058	207	342	43	65	91
WY2E	14	68,026	268	602	17	59	37
KF6HI	SOB	65,550	213	345	47	54	89
W2ZPO	14	64,750	264	518	24	59	42
<b>W2UP</b>	<b>7</b>	<b>64,329</b>	<b>301</b>	<b>523</b>	<b>20</b>	<b>56</b>	<b>47</b>
N6MSQ	SOB	60,310	171	370	53	58	52
WA5JWU	SOB	57,600	204	320	45	53	82
KC4B	21	57,404	197	508	24	67	22
AK9N	SOB	53,138	147	326	48	47	68
WD4KXB	SOB	48,672	136	312	44	75	37
AA5ZX	14	48,496	301	433	20	42	50
KV5F	SOB	46,760	166	334	38	63	39
N2HOQ	14	45,339	191	381	24	53	42
KE4BM	SOB	43,218	153	294	42	58	47
W7LHO	21	41,256	172	382	25	54	29
WN1E	SOB	40,150	152	275	36	48	62
W9KV	SOB	39,798	136	297	40	63	31
KA1CLV	SOB	38,961	115	333	37	78	2
W9MKR	SOB	38,458	114	287	43	69	22
NJØM	7	38,270	355	430	16	24	49
K4KIY	SOB	37,023	139	301	30	55	38
KD7H	SOB	35,670	136	246	47	43	55
KE9CU	SOB	34,965	134	259	40	52	43
NN5T	SOB	34,749	118	243	42	55	46
W3AOH/4	SOB	33,990	111	309	36	63	11
K8CV	SOB	33,354	121	306	31	55	23
WA8RXI	SOB	32,760	140	260	32	49	45
N6TYV	14	31,926	180	313	42	37	23
N7GVV	SOB	31,654	128	238	37	49	47
N6WFK	14	29,784	159	292	25	37	40
K4FPF	SOB	29,070	105	255	30	60	24
N5NMX	28	27,456	157	352	16	41	21
KA8OUT	SOB	26,676	96	234	35	57	22
AAØGY	SOB	26,445	130	205	36	37	56
KFØEF	SOB	23,320	147	212	25	23	62
WW3S	SOB	21,660	96	190	32	48	34
K2UVG	SOB	20,296	88	172	39	47	32
WR1H	SOB	19,920	78	166	23	33	64
W5TTE	SOB	19,838	115	182	27	29	53
NWØF	SOB	19,800	88	180	32	47	31
K17Y	SOB	18,360	99	180	27	30	45
KE2XF	SOB	17,069	88	169	31	40	30



# Cushcraft

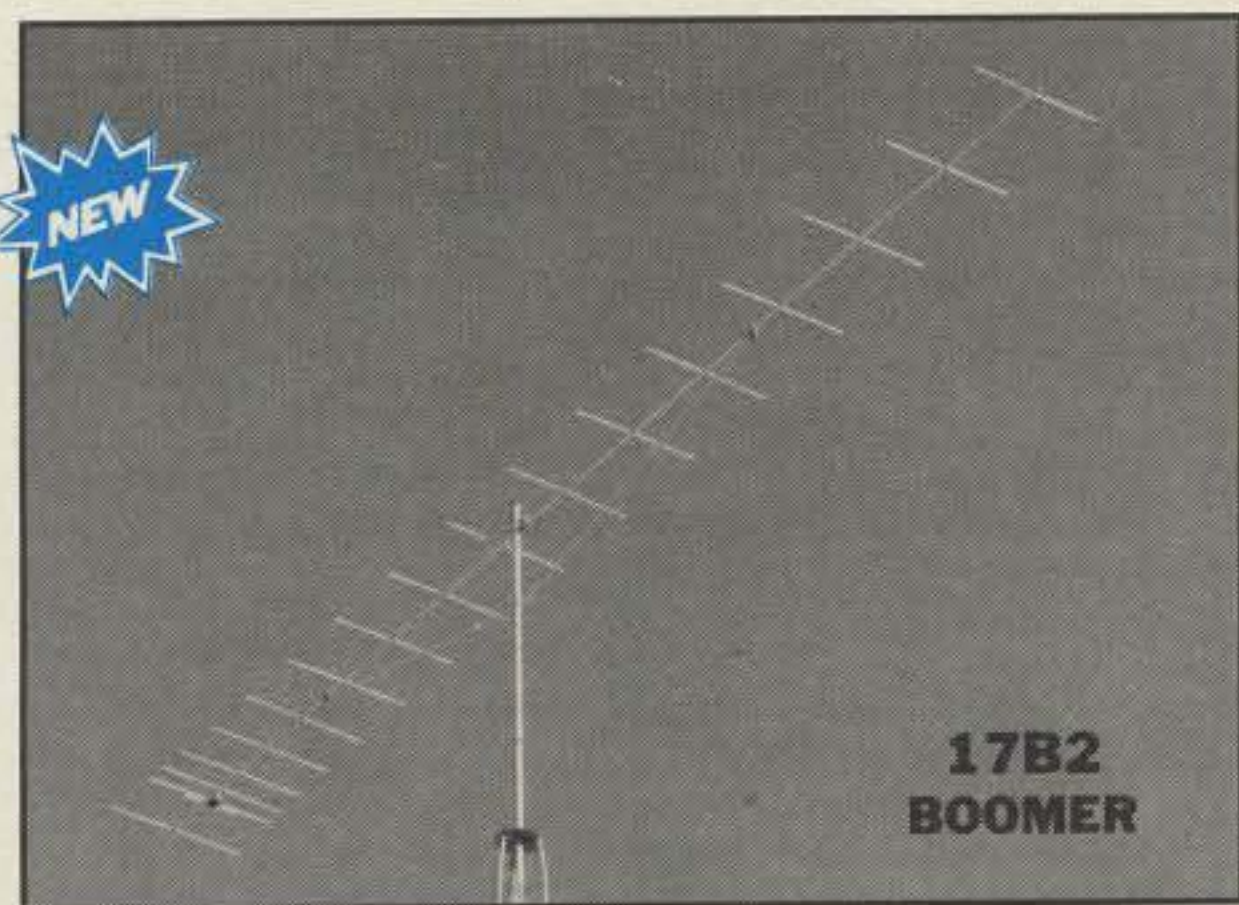
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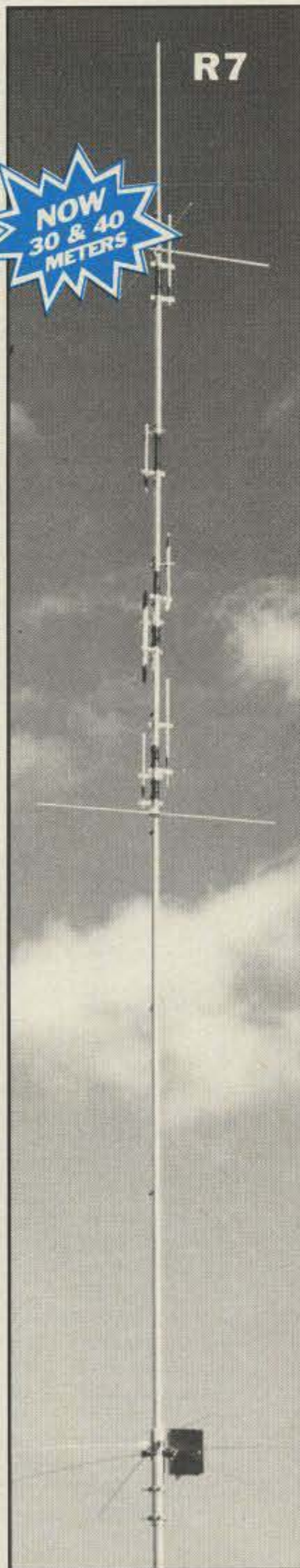


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**SKYWALKER MONOBANDERS.** 10, 15, 20 and 40 meter Yagis for more contacts, less waiting and a better signal. Preferred by contesters and DX-peditions worldwide.



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**R7**

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**LAC-4**



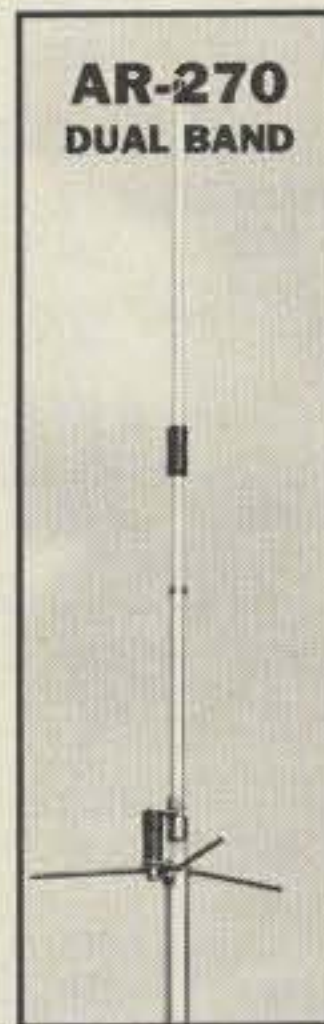
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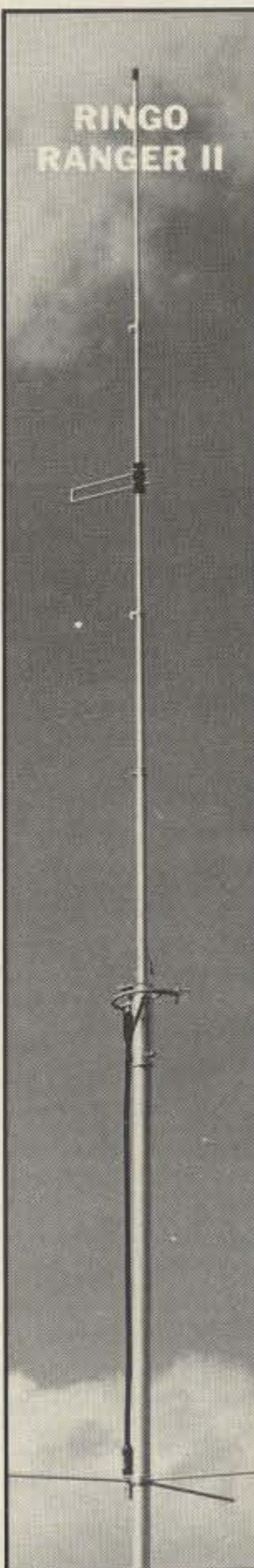
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**RINGO RANGER II.** Still the world's favorite 2 meter, 70 cm or 220 MHz omni antenna, with more gain. A must for your FM or packet station.

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**RINGO  
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WØLYM/4	7	16,320	139	204	14	29	37
KFØXV	SOB	12,104	71	136	25	30	34
WD5CBL	SOB	11,466	75	126	25	30	36
WB7OND/4	SOB	9,348	61	114	26	29	27
KD5VU	SOB	6,450	48	86	25	28	22
N3RC	SOB	5,655	38	87	22	29	14
W9ILY	SOB	5,568	41	96	25	33	0
KI7T	7	4,300	74	86	9	6	35
W1HFN	SOB	4,200	35	75	20	24	12
NØ1J	21	4,048	38	92	12	20	12
KR1Z	14	3,960	36	99	10	25	5
WA6FIT	21	3,268	29	76	15	22	6
AC4HF	SOB	2,100	29	50	13	13	16
KB7PDL	SOB	1,820	42	52	13	10	12
WV1D	14	1,488	27	48	9	10	12
N7IXI	14	780	21	39	7	5	8
N2CQ	14	680	13	34	6	9	5
KG6AO	SOB	676	15	26	10	7	9
W4JLS	7	644	20	28	5	4	14
NØMLB	28	228	7	19	5	7	0
NA2Q	3.5	132	9	11	3	2	7

**VIRGIN ISLANDS**

NP2R	SOB	349,792	560	1286	45	99	128
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**AFRICA**

**ASCENSION ISLANDS**

ZD8LII	28	355,426	840	2503	23	66	53
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**CANARY ISLANDS**

EA8ASI	SOB	158,976	374	1104	33	62	49
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**MELILLA**

AM9TL	SOB	18,894	94	282	19	42	6
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**NIGER**

5U7M	SOB	424,804	582	1741	48	91	105
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**SOUTH AFRICA**

ZS6EZ	21	382,630	772	2305	27	87	52
ZS6NW	14	97,632	303	904	24	48	36

**ASIA**

**ASIATIC RUSSIA**

UAØKZ	14	33,615	178	405	18	28	37
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**HONG KONG**

VS6WO	SOB	295,822	550	1402	54	109	48
VS6BG	28	95,424	492	1136	22	62	0

**ISRAEL**

4X6U	SOB	186,462	415	1151	44	118	0
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**JAPAN**

JH1QDB	SOB	397,444	524	1483	65	117	86
JA2IVY	SOB	362,255	476	1367	72	120	73
JH7QXJ	SOB	185,193	372	1083	40	75	56
JA2ESR	SOB	99,190	193	545	56	86	40
JE2UFF	21	84,588	259	742	25	55	34
JH1BIH	14	62,212	215	604	27	43	33
JH8JBX	14	31,302	120	333	24	48	22
JA7MAD	21	30,783	116	331	24	48	21
JA2NNF	14	24,338	104	283	25	45	16
JA7SUR	SOB	22,230	92	247	36	54	0
JF3LOP	SOB	20,493	75	207	35	49	15
JA1WYQ	SOB	17,520	78	219	26	42	12
JA3VXH	SOA	15,660	64	180	31	42	14
JA4RTX	SOB	12,218	53	149	32	45	5
JE2LPC	21	8,710	49	134	23	30	12
JA2DHG	28	7,904	53	152	17	16	19
JQ1NGT	SOB	6,149	50	143	11	13	19
JA3BSH	21	5,814	40	114	12	18	21
JR2CFD	3.5	153	10	17	4	3	2
JA7LMZ	3.5	6	3	3	1	1	0

**MALAYSIA**

9M2AX	SOB	41,877	224	517	29	45	7
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**OMAN**

A45ZX	SOB	233,382	470	1203	41	94	59
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**PAKISTAN**

AP/ WA2WY	SOB	61,226	192	506	35	78	8
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**EUROPE**

**AUSTRIA**

OE1MBB	SOB	123,088	240	628	46	91	59
OE2OWM	14	63,765	241	585	23	58	28
OE1TKW	SOB	17,400	67	174	39	49	12

**BALEARIC ISLANDS**

EA6PZ	SOB	321,642	419	1503	43	98	73
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**BELGIUM**

ON6CQ	14	968	21	44	6	15	1
ON4APU	7	48	4	8	2	4	0

**BULGARIA**

LZ2TU	SOB	465,412	587	1516	63	153	91
LZ1MC	21	247,950	623	1653	27	70	53
LZ1BJ	21	193,536	561	1536	23	55	48
LZ1IA	SOB	80,652	181	429	56	108	24

**CZECHOSLOVAKIA**

OK1DJO	21	48,503	189	533	20	35	36
OK3RBK	14	18,768	117	272	14	39	16
OK1MP	21	18,096	81	232	18	30	30

**DENMARK**

OZ5MJ	SOB	181,068	290	764	57	107	73
OZ4FF	SOB	157,645	289	769	48	90	67
OZ7XE	14	2,508	31	76	10	18	5

**ENGLAND**

G4SKA	SOB	691,899	739	2041	65	140	134
GØARF	SOB	433,273	556	1531	58	120	105
G3XVF	SOB	73,788	167	429	41	90	41
G4XDD	14	17,228	98	236	16	40	17

**EUROPEAN RUSSIA**

UA6LP	SOB	81,263	195	611	39	80	14
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**FINLAND**

OH2OM	SOB	46,860	142	355	34	70	28
OG2BP	28	23,895	107	295	21	36	24
OG6UP	SOB	14,960	69	176	26	41	18
OH5NHI	21	11,036	66	178	16	24	22
OH5MN/2	SOB	4,355	45	65	24	39	4

**FRANCE**

F6IIE	SOB	178,461	305	753	58	128	51
F1ØBK	SOB	152,736	303	688	52	103	67
F2AR	SOB	90,944	222	448	47	102	54
F6FGY	21	70,070	227	637	23	48	39
F11ALT	SOB	50,000	181	400	33	87	5
F6DZD	SOB	28,704	102	276	23	37	44
FD1PYI	21	1,276	24	44	10	19	0

**GERMANY**

DK3GI	SOA	1,088,330	908	2531	87	205	138
DJ6JC	SOB	570,878	610	1694	74	136	127
DL8UCC	SOB	124,440	221	610	55	94	55
DL1EAL	SOB	96,854	212	613	42	47	69
DL4JYT	SOB	92,920	195	505	50	85	49
DA1SC	21	72,100	244	700	20	43	40
DF3NA	SOB	66,518	156	421	40	66	52
DJ9MH	SOB	33,748	119	286	25	43	50
DL1BFZ	14	32,712	153	376	20	47	20
DL6SWR	SOB	31,752	108	294	34	49	25
DJ2YE	14	26,676	138	342	17	40	21
DL9YCS	SOB	26,000	89	250	34	45	25
DL3IT/P	SOB	25,344	102	264	22	39	35
DF5BX	SOB	25,305	88	241	34	40	31
DF1IK	7	22,119	128	303	13	43	17
DL9GGA	SOB	21,614	72	202	30	50	27
DL5SWB	SOB	19,440	80	216	25	37	28
DJ9XB	28	18,504	86	257	18	26	28
DJ6TK	SOB	17,935	79	211	26	33	26
DL5NA	SOB	17,100	64	180	36	40	19
DK5KJ	SOB	6,832	47	112	21	28	12

**GREECE**

SV1SV	SOA	353,346	515	1253	63	152	67
SV1NA	21	10,192	82	196	13	29	10

**GUERNSEY**

GU3HFN	SOB	1,223,849	1081	3007	80	191	136
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**HUNGARY**

HA8EK	SOB	245,080	428	1114	51	108	61
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ITALY							
I2UIY	SOA	612,808	617	1736	71	149	133
I2SVA	SOB	524,828	631	1466	81	164	113
IV3FSG	14	100,650	314	825	25	59	38
I2HWI	SOB	68,975	168	445	42	71	42
IV3KCB	21	53,000	186	500	22	47	37
I2KFW	14	48,598	205	517	15	46	33
IK1TWC	SOB	48,508	148	362	36	66	32
IV3QBL	SOB	43,344	109	301	0	0	0
IK4QJH	SOB	33,166	144	322	38	65	0
IK0CNA	21	20,670	111	318	10	35	20
I2DMI	SOB	15,576	82	236	16	16	34
IK1SLE	SOB	13,200	59	150	32	40	16
I0KHP	3.5	88	6	11	2	6	0

LATVIA							
YL2EO	14	2,430	36	81	6	17	7

LIECHTENSTEIN							
HB0/ HB9NL	SOB	145,867	253	733	34	91	74

LITHUANIA							
LY1BZB	3.5	2,976	45	93	6	24	2

LUXEMBOURG							
LX1TO	SOB	229,194	383	1071	46	89	79

MOLDAVIA							
UO5OIS	14	20,300	141	350	14	44	0

NORWAY							
LA7AJ	SOB	233,864	344	943	47	140	61
LA3YU	SOB	130,168	240	614	43	117	52

POLAND							
SP9BCH	14	77,467	303	767	18	50	33
SP4MPH	SOB	49,980	140	357	44	65	31
SP3SUN	28	27,945	118	345	18	29	34
SP2JPG	SOB	24,035	151	253	37	58	0
SP3BGD	21	16,030	80	229	20	21	29

PORTUGAL							
CT1CKP	SOB	16,376	85	184	24	60	5

ROMANIA							
YO6JN	SOB	210,405	332	845	61	136	52
YO5BAT	21	8,544	65	178	12	18	18
YO6ODN	28	4,002	30	87	14	23	9

SCOTLAND							
GM3UTQ	SOB	338,242	504	1291	53	131	78
GM0/WN1G	SOB	246,560	403	1072	55	104	71

SLOVENIA							
YU3EA	SOB	511,808	534	1454	75	215	62
YU3HR	14	231,088	592	1616	25	69	49
YU3BQ	3.5	11,781	111	231	8	35	8
YT3HM	21	1,404	21	54	10	14	2

SPAIN							
AM3NY	SOB	692,900	772	2132	69	139	117
AM3GCV	21	148,304	426	1196	22	52	50
EA1QK	14	119,660	360	965	23	59	42
EA7GXX	SOB	112,128	214	584	43	72	77
AM5EYJ	SOB	52,245	159	405	32	76	21
AM25DIHB	SOB	51,986	149	374	35	63	41
EA2CNG	SOB	50,800	153	400	31	53	43
AO1CTH	21	45,652	170	452	19	41	41
EA1FFH	SOB	13,432	111	184	32	41	0
AM1JO	SOB	6,760	40	104	24	31	10
EC3CYB	21	5,456	55	124	9	25	10
EA1EZA	28	4,958	48	134	10	12	15
AO3DCR	21	3,608	37	88	9	21	11
EA3FNI	28	2,414	30	71	14	17	3

SWEDEN							
SM5FUG	SOB	598,538	610	1658	77	172	112
SM4AAY	SOB	174,211	389	1007	38	74	61
SM4DHF	SOB	153,725	271	715	53	106	56
SM0HTO	28	137,592	364	936	30	87	30
SM0AJU	14	115,080	365	822	27	74	39
SM4GVR	SOB	95,784	240	614	38	78	40
SM4RGD	21	28,045	129	355	18	26	35

SWITZERLAND							
HB9DCQ	14	90,083	284	757	24	64	31

TURKEY							
TA2FT	14	33,810	172	483	16	41	13

UKRAINE							
UB4HQ	SOB	486,675	620	1575	70	162	77
UB4AR	14	8,404	89	191	11	13	0
RB5VT	SOB	7,616	59	119	19	28	17

WALES							
GW4KHQ	SOB	76,050	176	450	41	81	47

OCEANIA							
AUSTRALIA							
VK2BEX	SOB	96,520	260	760	41	53	33
VK3EBP	14	24,905	100	293	22	43	20
VK2BQQ	SOB	14,620	75	215	23	24	21
VK2EG	SOB	7,625	44	125	21	25	15

HAWAII							
AH6JF	SOB	406,808	649	1928	49	63	99

INDONESIA							
YC7BVY	21	5,535	41	123	12	26	7

MARSHALL ISLANDS							
V7RTTY	SOB	50,9330	647	1922	62	83	120

NEW ZEALAND							
ZL3GQ	SOB	553,410	653	1935	61	108	117

SOUTH AMERICA							
ARGENTINA							
LU3DSU	SOB	134,577	266	787	39	59	73

BRAZIL							
PY2PD	21	12,900	85	215	14	19	27

CHILE							
CE6EZ	SOB	922,867	972	2893	56	123	140
CE8ABF	14	107,835	348	1027	20	47	38

COLOMBIA							
HK1LAQ	14	41,230	199	589	17	49	4

ECUADOR							
HC5K	SOB	690,378	733	2171	66	128	124
HC3AP	7	1,800	25	75	7	5	12

NETHERLAND ANTILLES							
PJ2MI	21	329,184	766	2286	24	65	55

PARAGUAY							
ZP5JCY	21	433,532	871	2596	30	85	52

PERU							
OA4ZV	SOB	510,880	701	2060	46	119	83

VENEZUELA							
4M5RY	14	270,256	599	1778	23	73	56
4M5KWS	SOB	84,480	158	768	26	57	27

### MULTI-OPERATOR SINGLE TRANSMITTER

AFRICA							
CANARY ISLANDS							
EG8CMR	MOS	963,116	1048	3127	59	120	129

ASIA							
ASIATIC RUSSIA							
UZ9CWA	MOS	2,547,575	1580	4525	108	348	107

JAPAN							
JL1ZCG	MOS	1,110,704	1015	2954	83	166	127
JJ3YBB	MOS	967,779	903	2637	89	172	106

KOREA							
HL9AX	MOS	122,836	300	749	46	75	43

EUROPE							
AUSTRIA							
OE3XCW/3	MOS	275,550	376	1002	63	131	81



<b>BELGIUM</b>							
ORØST	MOS	2,550	35	75	9	23	2
<b>CROATIA</b>							
9A1CCY	MOS	368,906	470	1327	55	126	97
9A1BHI	MOS	128,590	297	770	29	57	81
<b>CZECHOSLOVAKIA</b>							
OK3RJB	MOS	30,900	122	309	28	49	23
<b>DENMARK</b>							
OZ4HAM	MOS	55,970	131	386	34	58	53
<b>FINLAND</b>							
OH2AG	MOS	556,100	652	1675	74	183	75
<b>FRANCE</b>							
FFØXX	MOS	1,518,940	1241	3460	76	201	162
F6EKX	MOS	581,343	701	1767	65	131	133
<b>GERMANY</b>							
DLØWW	MOS	4,416	65	184	11	13	0
<b>ITALY</b>							
IK1HXN	MOS	296,559	518	1191	76	173	0
IN3XUG	MOS	117,117	295	693	34	70	65
<b>KALININGRAD</b>							
UW2F	MOS	2,847,220	1767	4909	106	271	203
<b>NETHERLANDS</b>							
PI4COM	MOS	396,387	518	1431	63	122	92
<b>NORWAY</b>							
LA1K	MOS	264,578	471	1006	57	127	79
<b>POLAND</b>							
SP3PLD	MOS	220,416	338	896	57	114	75



Team Aruba, the P40RY motley crew.

<b>UKRAINE</b>							
UB4LWC	MOS	237,244	419	1036	46	127	56
UB4KWV	MOS	140,576	298	736	46	93	52

<b>NORTH AMERICA</b>							
<b>CANADA</b>							
VE7ZZZ	MOS	562,875	863	1975	57	104	124
VE3FJB	MOS	354,270	497	1205	61	135	98
VE3UR	MOS	98,747	221	517	45	60	86

<b>UNITED STATES</b>							
WA7EGA	MOS	979,195	1148	1939	98	211	196
WF1B	MOS	903,175	907	1985	89	214	152
W4AQL	MOS	805,232	924	1706	99	211	162
N9ITX	MOS	768,628	941	1981	79	184	125
N6TU	MOS	553,696	753	1331	91	150	175
WØNA	MOS	446,892	675	1338	73	145	116
WA4MCZ	MOS	325,710	461	987	73	147	110
W8UMD	MOS	142,240	283	635	52	105	67
KA3DSX	MOS	13,110	84	138	28	32	35
WB2JKJ	MOS	10,730	139	145	12	7	55

<b>OCEANIA</b>							
<b>AUSTRALIA</b>							
VK2RT	MOS	151,632	326	972	36	61	59
VK4WIE	MOS	71,540	178	511	42	71	27

<b>SOUTH AMERICA</b>							
<b>ARUBA</b>							
P40RY	MOS	3,543,090	2222	6635	91	220	223
<b>BRAZIL</b>							
PW2N	MOS	227,755	376	1111	44	69	92

**MULTI-OPERATOR MULTI-TRANSMITTER EUROPE**

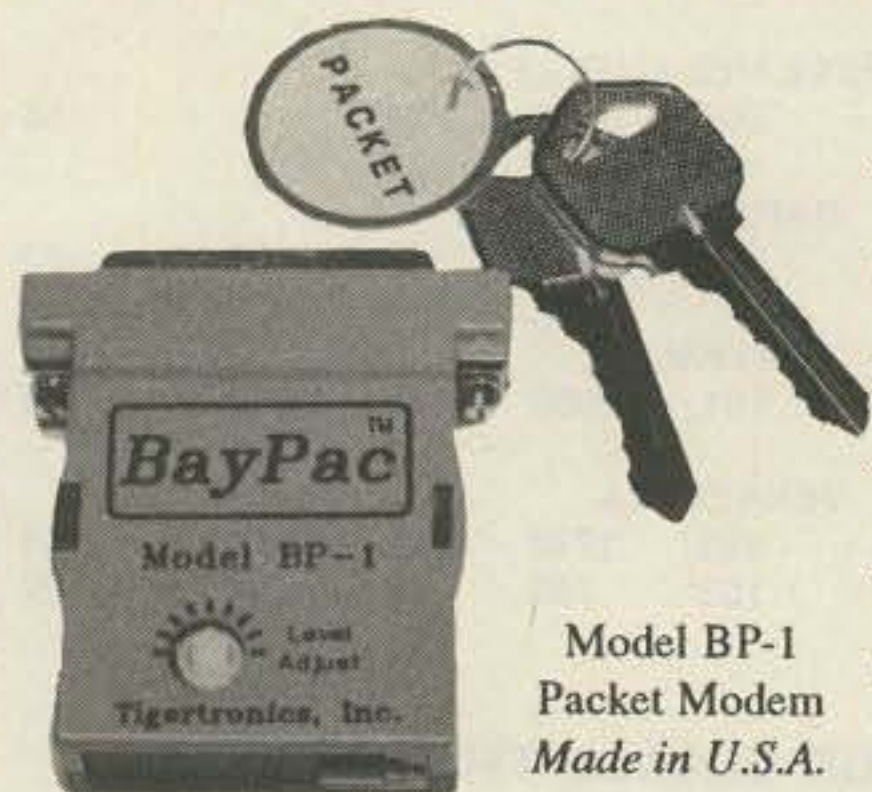
<b>DENMARK</b>							
OZ4HAM	MOM	55,970	131	386	34	58	53
<b>SPAIN</b>							
AM1DVY	MOM	94,844	209	524	42	81	58

<b>NORTH AMERICA</b>							
<b>UNITED STATES</b>							
W3LPL	MOM	3,111,748	2233	4556	116	326	241

<b>OCEANIA</b>							
<b>EAST KIRIBATI</b>							
T32RA	MOM	1,770,131	1744	5191	69	118	154

**CHECK LOGS:** F-10370, SM7CNA, SP2UUU, SM6BSK, SP2ERZ, HK3DDD, WAØSHF, VE1WH, W6JOX, W4MTE, F6DGH, UC2LEG, SM5EIT.

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# R.F. ODOR EATERS



## LOW PASS FILTERS

A must for every IIF transmitting station, lowpass filters stop spurious radiation of all frequencies above cutoff point that often interfere with other services. One of our most popular products and now sold worldwide, Model 420 LPFs offer steep cutoff points and attenuation exceeding 90db. Built in 1/8" thick aluminum chassis and available with S0239, N, or BNC connectors, these filters are a standard in Commercial and Industrial services. Packed with 4-page owner's manual and stainless steel mounting hardware.

Model 420	DC-30 Mhz.,	600WPEP/300DC	\$32.00
Model 421	DC-30 Mhz.,	6KWPEP/3KWDC	\$44.00
Model 422	DC-30 Mhz.,	12KWPEP/6KWDC	\$72.00
Model 425	DC-54 Mhz.,	600WPEP/300DC	\$32.00
Model 426	DC-54 Mhz.,	6KWPEP/3KWDC	\$44.00

## HIGH PASS FILTERS

Keep peace in the neighborhood with these seven-section comprehensive 75 ohm CATV/MATV filter assemblies. Providing over 60db of differential attenuation below 54 Mhz. and 20db of common mode (shield electrification) blocking, Model 430 Series filters are now constructed in lightweight black polycases with a 6" flexible connecting lead that attaches directly to TV set input connector. Model 430A now improved to incorporate both former wavetrap equivalents on 10 and 6 meters in a single unit. With mounting hardware and 4-page owner's manual.

Model 430A	Wide spectrum high pass filter assy.	\$21.00
Model 437A	Same as 430A but with 2M (144-148 Mhz.) wavetrap	\$22.00
Model 434A	Bandpass Style, Channel 3	\$19.00
Model 435A	Bandpass Style, Channel 4	\$19.00
Model 472	Dual unit - includes 430A and AC Line Filter	\$44.00

## AC LINE FILTERS

The ideal companion for transmitting or receiving applications, line filters provide high RF loss and decoupling of line operated equipment. Rated in a variety of voltage ranges and currents, these 4" square aluminum heavy chassis units block both differential and common mode RF interference while providing solid state overvoltage protection. Available in two or three wire arrangements (120V), each is separately fused and outfitted with 6 foot molded cord. Packed with mounting hardware, extra fuse, 4-page owner's manual.

Model 474-2 or -3,	20VAC, 15A capacity, 2 or 3 wire.	\$44.00 / \$48.00
Model 475-2 or -3,	120VAC, 25A capacity, 2 or 3 wire.	\$44.00 / \$48.00
Model 476	240VAC, 15A capacity, 3 wire.	\$48.00
Model 477	240VAC, 25A capacity, 3 wire.	\$52.00



**INDUSTRIAL COMMUNICATION  
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P.O. Box 18495 Indianapolis, Ind. U.S.A. 46218

At one time or another every station owner with a transmitter has had to deal with RF interference caused to other services. Whether it's with a neighbor, the family upstairs, or some of your own receiving equipment, there's one thing we can all agree on . . . IT STINKS!

Today Amateur operators and Commercial users enjoy the benefits of the best technologies ever produced to suppress harmonics, block wide-spectrum RF signals, decouple delicate consumer equipment, or maintain transmitted spectral purity. And there's no lineup in the world as broad or offering performance to the level of I.C.E.'s 1993 industrial quality passive filter selection. If you're looking to block it, ground it, restrict it, clean it, or regulate it we've got a deodorizer to fit every budget. See your local dealer or contact the factory for the whole story, and get your free Product Catalog anytime!

## BANDPASS FILTERS

Creating a world standard among contesters and high performance stations, Model 400 Series bandpass tranceiving filters pass only band signals, blocking spectrum above and below. Measured attenuations in excess of 60db (full chart in 1992 Catalog), rated at 200WDC transmitter power. Ideal for close-proximity multiple station setups such as Field Day, DX contests, or wherever peak single band low noise performance is sought. Available with S0239 connectors or N style, packed with 4-page owner's manual and mounting hardware. Price \$28.00 each (S0239s) or \$30.00 (N).

Model 403	160 Meters	Model 409	15 Meters
Model 404	80/75 Meters	Model 410	12 Meters
Model 405	40 Meters	Model 411	10 Meters
Model 406	30 Meters	Model 412	6 Meters
Model 407	20 Meters	Model 413	2 Meters
Model 408	17 Meters		

## TELEPHONE FILTERS

The only telephone RFI filters in the world designed for both common mode and differential mode induced interference, Models 465 (30db loss) and 467 (50db loss) are both 4-wire (1 or two 2 line) all modular units that conveniently plug into rear of modular telephones. High permeability toroidal design.

Model 468 is a 4-wire toroid-only assembly that attaches to wall-mounted phones. Model 469 is a toroidal core form available in many colors to attach to and insert about 20db RF loss into telephone handset cords.

Each is packed with 4-page owner's manual and helpful technical hints.

Model 465	Phone filter, 4-wire, 30db loss.	\$17.00
Model 467	Phone filter, 4-wire, 50db loss.	\$28.00
Model 468	Phone filter, 4-wire, 30db loss (wall).	\$ 9.00
Model 469	Handset filter, 20db loss (specify color).	\$ 6.00

(available black, white, yellow, red, gray, light blue, brown, beige, ivory.)

## MOBILE FILTER/REGULATORS

The final word is engine noise interference for most mobile radio applications, Model 443 provides both DC line noise filtration and overvoltage control by regulation to prevent damage to 12 Volt equipment during common periods of voltage regulator switching, startup transients, or recharge cycle fluctuations. All electronic circuit, excellent for 24 to 12 VDC conversion applications. Built in standard 1/8" thick I.C.E. heavy chassis, fuse protected, packed with stainless steel mounting hardware & 4-page owner's manual.

Model 443	25 Amp capacity for 100W or less transceivers.	\$44.00
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## CQ REVIEWS:

# The Ten-Tec Omni VI HF Transceiver

BY LEW McCOY\*, W1ICP

The Ten-Tec Model 563 HF transceiver, the Omni VI, has amateur band coverage from 160 through 10 meters. This coverage has twelve 500 kHz segments with a "shootover" range of 30 kHz at the upper and lower band edges. Basic frequency control is a local crystal-controlled oscillator that is mixed with a 4.97 to 5.53 MHz phase-locked loop. The display shows 7 digits with 10 kHz resolution. The LEDs are .56 inch high for frequency readout, and .3 inch for displays of clock, memory channel, and offset. Offset tuning is plus/minus 9.99 kHz receive and transmit. There are dual VFOs with split mode. There are 100 duplex memories available with one scratch-pad memory.

There is a PC (personal computer) interface via a serial port for operation of transmit or receive. This includes two-line RS-232 interface. It runs at 1200, 2400, 4800, 9600, or 19,200 baud.

Antenna input/output is 50 ohms unbalanced impedance. There are provisions included for remote bandswitching the Ten-Tec Hercules II amplifier and the Models 420 and 253 auto antenna tuners. The power required to run the transceiver is 2 amps receive and 12 to 14 amps transmit.

The transceiver is very rugged, using a rigid aluminum chassis with aluminum front panel. There are 20 type G10 epoxy glass circuit boards (which are mostly field replaceable—more on this later). Dimensions are 5.75"H x 14.75"W x 17"D, and the unit weighs in at 16 pounds.

### The Transmitter

The Omni VI is capable of 0 to 100 watts output, ALC stabilized with a maximum DC input of 250 watts, fed with 14 VDC. There is a 100 percent duty cycle for up to 20 minutes. The microphone input is 200 to 50K ohms and accepts microphones with 5 mV (-62 dB) output. There is also adjustable speech compression.

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



This is the front view of the Omni VI showing all the controls and layout. All switches and controls are very easy to handle. While not visible in this photo, the LED frequency readout consists of LEDs that are .56 inch high, a very large and easy-to-read display.

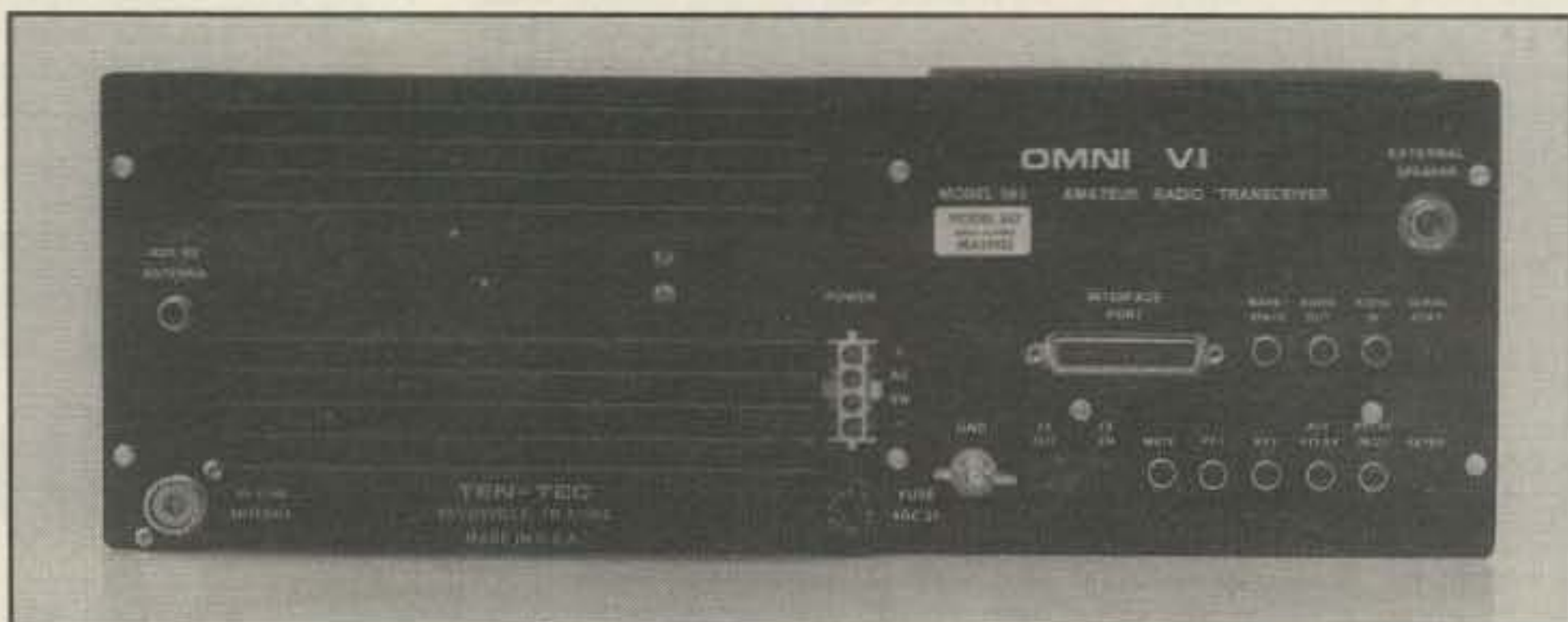
For SSB there is Push-To-Talk (PTT) or VOX, which is adjustable as to speed of operation. Ten-Tec has always been famous for the CW quality and operation of their equipment, and the Omni VI is certainly no exception. Extremely fast QSK operation is available, as is an adjustable Slow delay. The built-in iambic keyer can be set from 10 to 60 WPM, type A or B, weight adjustable from the keyboard. There is also a programmable 400-900 Hz DSP-generated CW offset. The sidetone automatically matches offset, and the volume is adjustable independent of the audio gain control.

For frequency shift keying the rate is

170 Hz. FM deviation is +/-5 kHz. Metering is switchable to show forward power, SWR, collector current, or audio processing level on SSB. The SSB is generated by a balanced modulator followed by a 9 MHz, 8-pole ladder filter. Unwanted sideband suppression is 60 dB down, and carrier attenuation is 60 dB typical. The third-order intermod is 30 dB below two-tone test at 100 watts PEP. And spurious signal output is 45 dB down below peak power output.

### The Receiver

Before getting into actual specs on the receiver, let me state that receiving is



This is the rear view of the transceiver.



# 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.

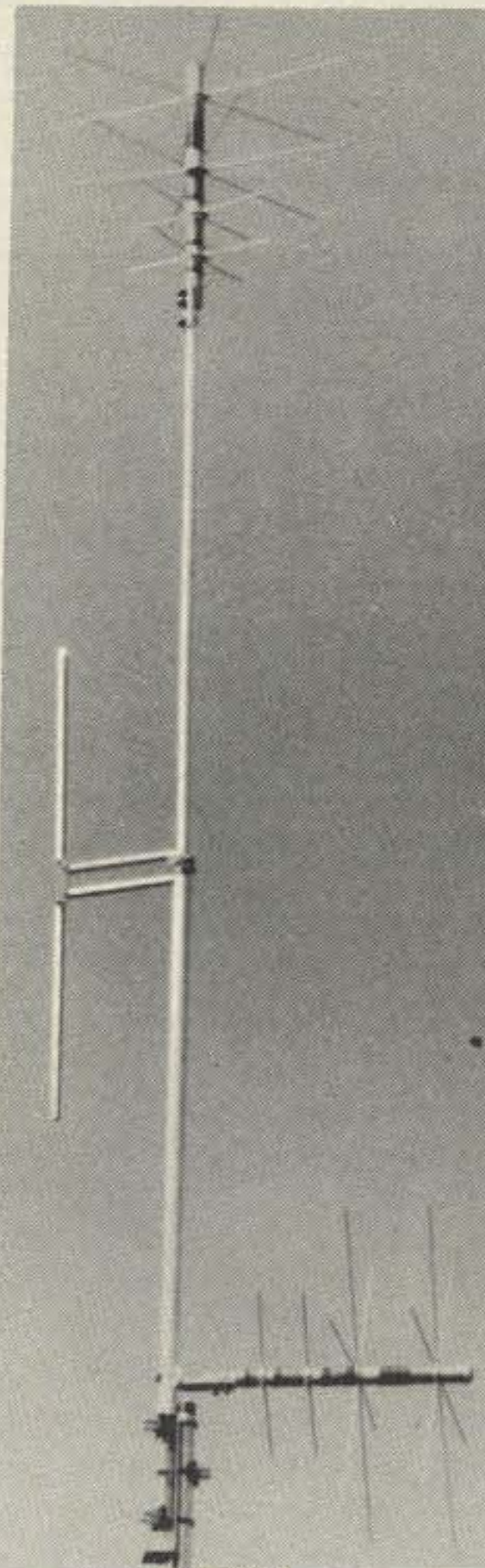
## No Radials or Ground ever Needed!

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

\$199<sup>95</sup>

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.

## Call Your Dealer for Your Best Price Today

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



Remember hunching over your regenerative receiver for hours with a pair of phones pressing uncomfortably against your ears?

You could hear just about anything that fancy superhets could hear. Sure, you had to play around with the regeneration control just right and have a steady hand to tune but you could hear 'em.

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. 7x6x2½ 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. 3½ x 1¼ x 4 inches.

Nearest Dealer/Orders: 800-647-1800  
Technical Help: 800-647-TECH(8324)  
• 1 year unconditional guarantee • 30 day money back guarantee (less s/h) on orders from MFJ • Free catalog

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MFJ-1022  
\$39<sup>95</sup>



one place where this transceiver really shines. In these modern design technique days it is not unusual to come up with a good transmitter. Apparently this isn't so with receivers. And what I am talking about is what one can actually hear with this rig as compared to other rigs. It is easy to give specs and measure them. But in this case, I had two other very first-class transceivers to test against. It was easy to switch between these three units while listening to the same signal and make some real comparisons—particularly on weak signals.

The Omni VI was very much quieter. Ten-Tec rates the noise floor in this unit at -133 dBm. In fact, on both CW and phone with very weak signals the Omni VI was the difference between actually hearing and working stations. This is a real plus. The rated specs for sensitivity on SSB, CW, and FSK is 0.15 uV with 10 dB S/N. On FM the rating is 0.30 uV for 12 dB SINAD. Additionally, the phase noise is rated at -122 dBc at 1 kHz and -138 dBc at 20 kHz. (dBc refers to a negative quantity in relation to phase noise and is read in dB below the carrier.)

Ah, and what selectivity this transceiver has! There are some optional filters available and I had them all installed. The standard filter is 2.4 kHz at -6 dB and -60 dB at 4.5 kHz with a shape factor of 1.87:1. Next, and this was one I really liked for SSB, was an optionable 1.8 kHz filter at -6 dB with -60 dB at 3.4 kHz and a shape factor of 1.89:1. All these filters are accessible using front-panel controls via illuminat-

RECEIVER		
Sensitivity		
FREQUENCY MODE	MHz	
SSB, CW, FSK	1.8-29.7	
	.15µV	10dB S/N
FM	.30µV	12dB SINAD

Sensitivity			
SELECTED FILTER	SELECTIVITY	-6 dB	-60 dB
STANDARD 2.4 KHz		2.4 KHz	4.50 KHz
OPTIONAL 1.8 KHz		1.8 KHz	3.40 KHz
OPTIONAL 500 Hz		500 Hz	1.40 KHz
OPTIONAL 250 Hz		250 Hz	850 Hz
STANDARD FM		15.0 KHz	30.0 KHz
			Shape factor
			1.87 : 1
			1.89 : 1
			2.80 : 1
			3.40 : 1
			2.00 : 1

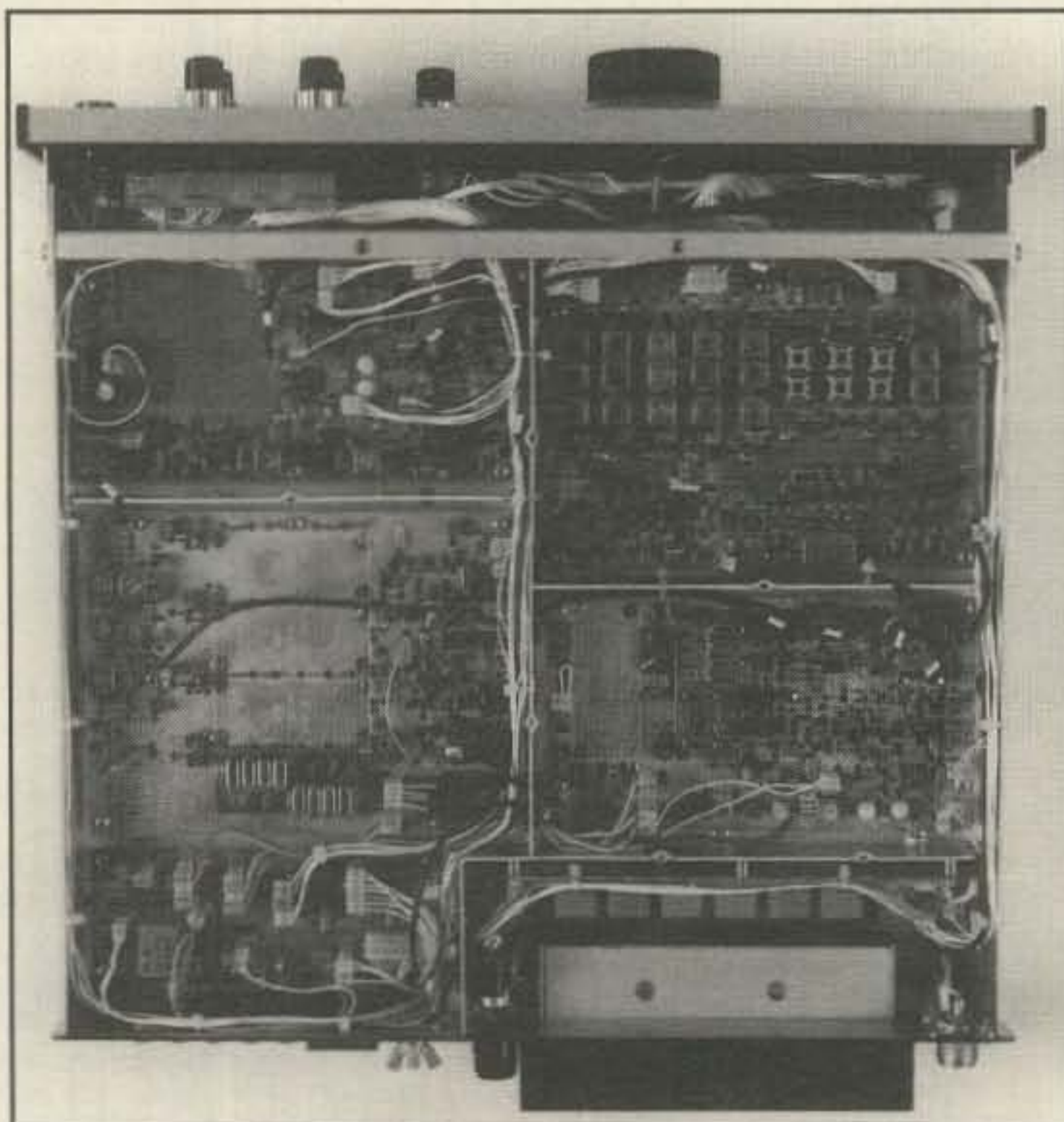
Table I— This chart, taken from the manual for the Omni VI, shows the various receiver selectivity setups.

ed pushbutton switches. On the crowded phone bands, it was really amazing to hear the difference and appreciate the achievable "copy-ability."

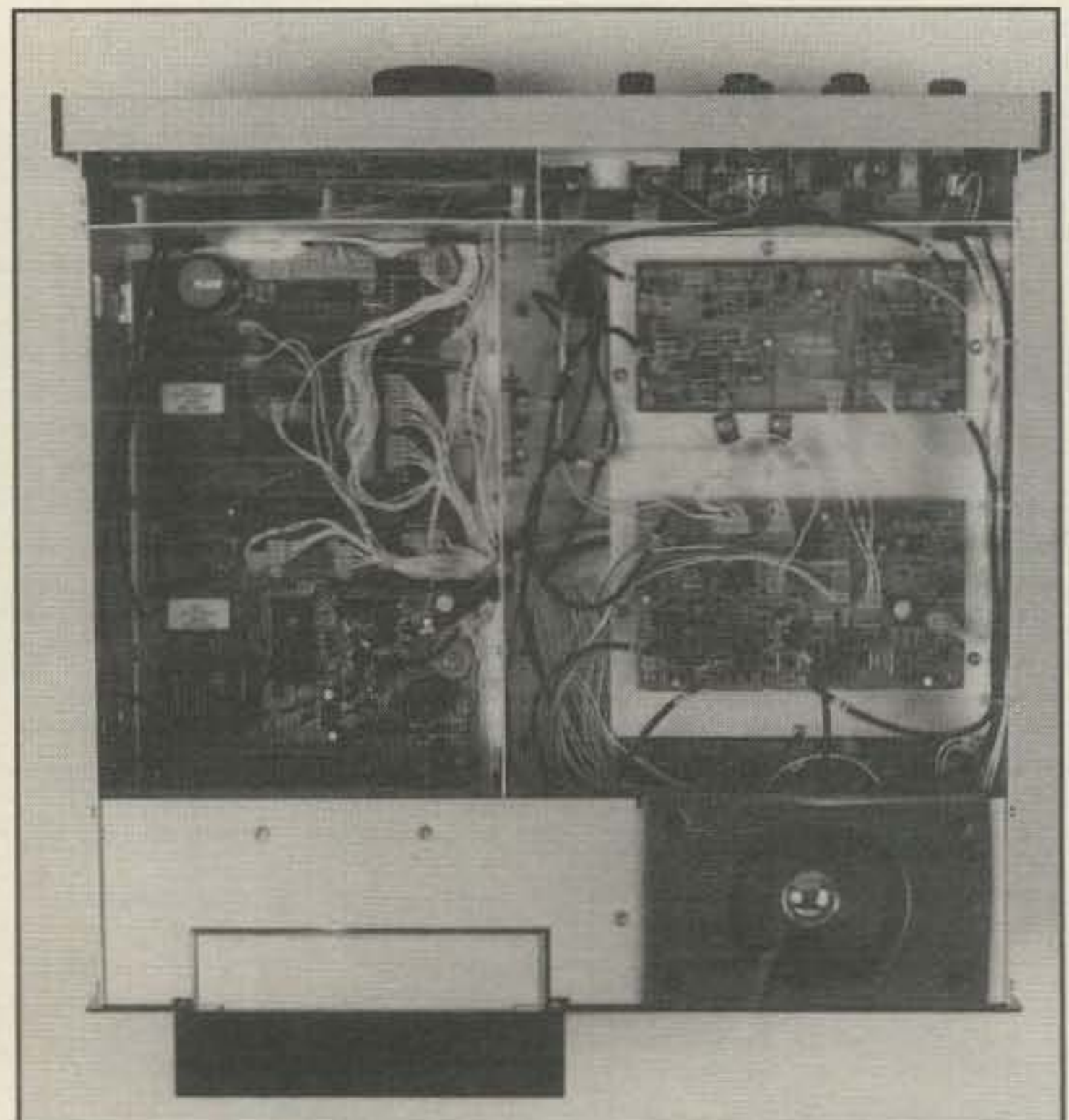
In addition, the Omni VI has a built-in notch filter which eliminates multiple heterodynes using a notch depth that is automatically selected. When used with the 1.8 kHz bandwidth setting, it is truly remarkable how this system eliminates adjacent interference. There is also an adjustable noise blanker, and if I had

any criticism it would be here. I found the blanker did a very good job on ignition noise, but fell short on power-line noise.

Also, there is a -20 dB attenuator to be used in case signals get too strong. Passband tuning is +/-1.2 kHz. The intermediate frequencies (IF) are: first IF at 9 MHz, second IF at 6.3 MHz (passband tuning), and second IF for FM at 455 kHz. In addition to the automatic notch filter there is a manual one that



Bottom view of the Omni VI. It is possible, believe it or not, to be guided through servicing with Ten-Tec's help.

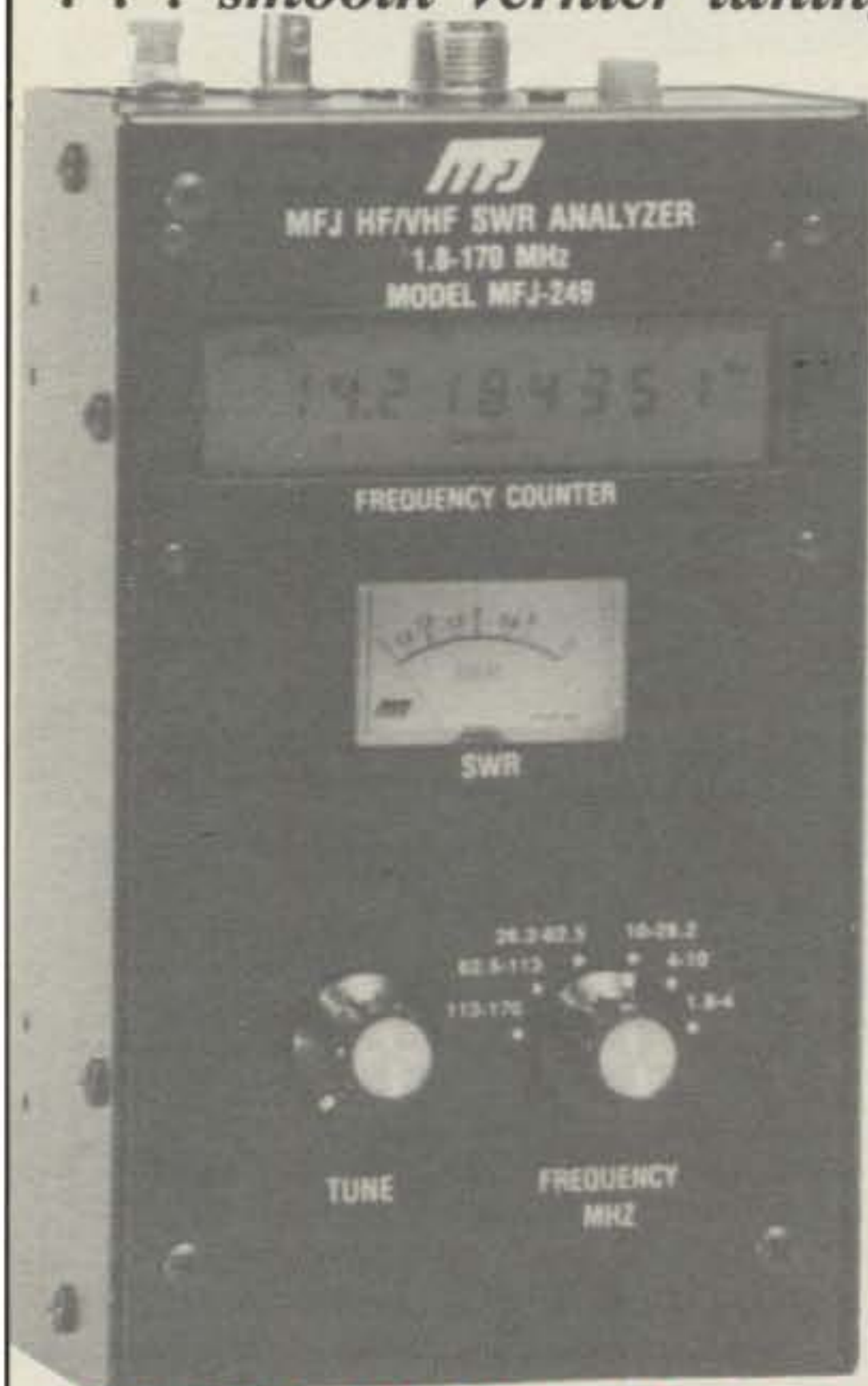


Top view with the cover removed. The speaker is at the lower right in this view.



# MFJ HF/VHF SWR Analyzer™

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



MFJ-249  
**\$199<sup>95</sup>**

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 ... a low distortion 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 6 AA cells or 110 VAC with MFJ-1312B, \$12.95 4x2½x6¾ inches.

## 1.8-170 MHz HF/VHF SWR Analyzer™



MFJ-209  
**\$109<sup>95</sup>**

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 6 AA cells or 110 VAC with MFJ-1312B, \$12.95. 4x2½x6¾ inches.

## 10-160 Meter HF SWR Analyzer™



MFJ-207  
**\$79<sup>95</sup>**

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. 7½x2½x2¼ inches.

## 2 Meter VHF SWR Analyzer™



MFJ-208  
**\$79<sup>95</sup>**

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-1312B, \$12.95. 7½x2½x2¼ 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  
**\$99<sup>95</sup>**

The MFJ-203 is a sensitive **Bandswitched Dip Meter™** that covers all ham 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. 7½x2½x2¼ inches.

## MFJ Antenna Resistance Analyzer™



MFJ-205  
**\$89<sup>95</sup>**

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 meter reading. 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.

Has jack for external frequency counter. Can be used as an RF signal generator. 7½x2½x2¼ inches. Use 9 volt battery or 110 VAC with MFJ-1312B, \$12.95.

## 600 MHz 10 Digit LCD Counter



MFJ-346  
**\$189<sup>95</sup>**

Add this handy MFJ-346 frequency counter to your frequency and get high accuracy 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. 4x1½x5¼ inches.

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# GORDON WEST RADIO SCHOOL

Prefix 0-823

**08731X No Code Tech. \$49.95**

Includes 1 textbook, 2 novice theory tapes, 2 technical theory tapes, the latest FCC rule book and VHF/UHF/HF band limits charts.

**087328 21-Day Novice \$39.95**

Includes 1 textbook, 2 code tapes, 2 theory tapes, sample 5 wpm Novice code test, and over \$50 in radio manufacturers' discount coupons.

**087301 Novice Code \$39.95**

Includes 6 tapes that make it easy to learn the code from scratch. Covers FCC Element 1A.

**087336 2-Week Tech. \$34.95**

Includes 2 theory tapes and 1 question-and-answer textbook. Covers FCC Element 3A.

**087360 Complete Gen. \$69.95**

Includes 6 code tapes (5 to 13 wpm), 2 theory tapes, and 2 textbooks. Ideal for upgrade from Technician to General.

**087352 General Code \$39.95**

Includes 6 tapes (5 to 13 wpm). Covers FCC Element 1B.

**087344 General Theory \$34.95**

Includes a fully illustrated textbook with 2 theory tapes to cover FCC element 3B.

**087379 Adv. Theory \$44.95**

Includes 4 theory tapes and 1 illustrated textbook. Covers FCC Element 4A.

**087409 Complete Extra \$69.95**

Includes 4 theory tapes, 1 textbook and 6 code tapes (13 to 22 wpm). Covers FCC Elements 1C and 4B.

**087387 Extra Theory \$44.95**

Includes 4 theory tapes and 1 illustrated textbook. Covers FCC Element 4B.

**087395 Extra Code \$44.95**

Includes 6 tapes (13 to 22 wpm) for the Extra code exam. Covers FCC Element 1C.

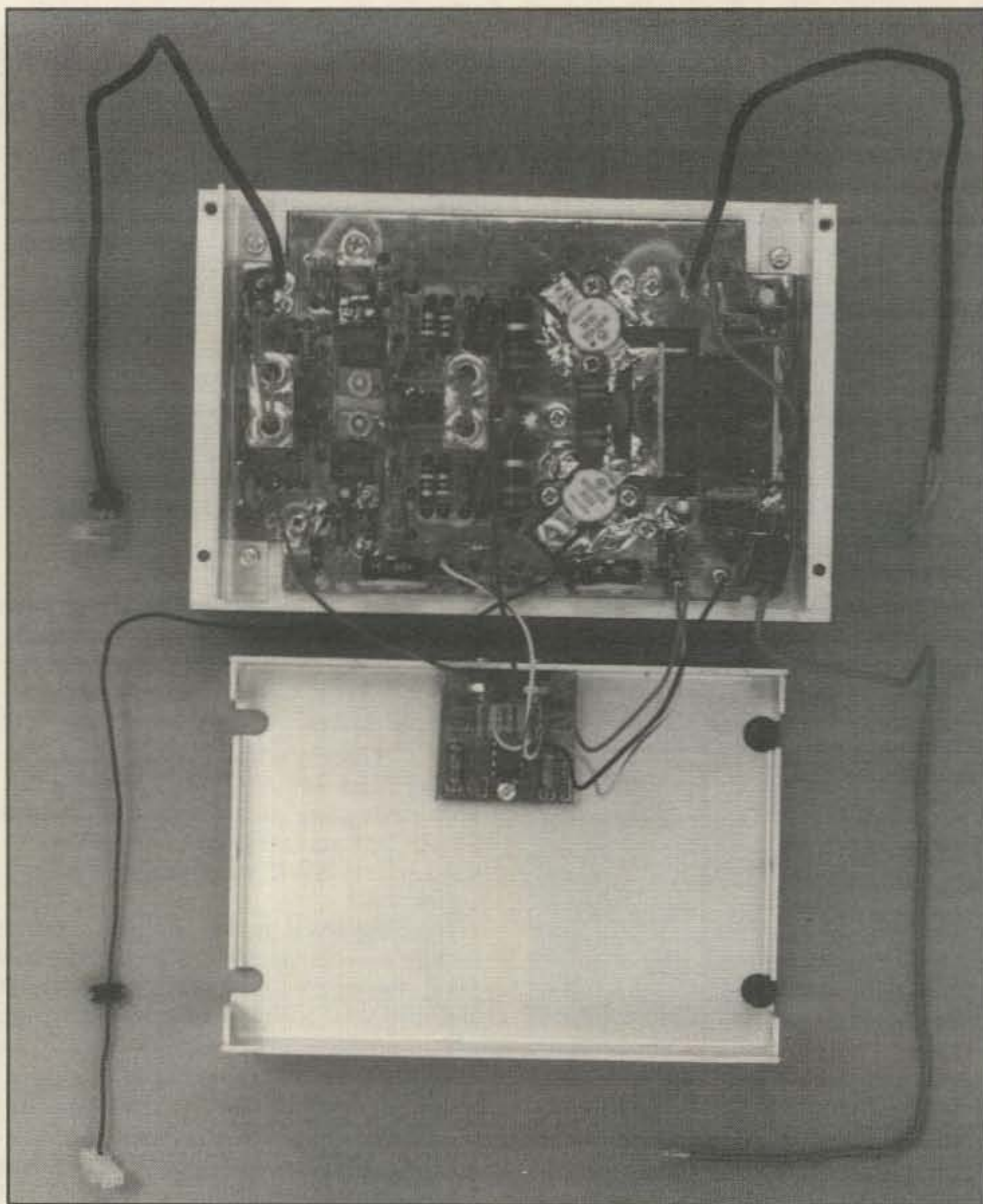
Please send me the items that I have indicated above. I have enclosed my check/money order for \$\_\_\_\_\_. (Please add sales tax in CA, DC, IL, MA, NJ, NY, OH, PA, TN, VA & Canada, and \$3.00 for postage and handling for U.S. shipments and \$7.00 for all shipments outside the U.S.)

Or call and charge on your credit card. American Express, MasterCard and Visa accepted. Please be sure to include shipping instructions. Prepayment required and must be in U.S. funds.

DRZZ 6693

**RADIO AMATEUR callbook**

P.O. Box 2013 Lakewood, NJ 08701  
1-908-905-2961 (Phone) 1-908-363-0338 (Fax)



The final amplifier stage, which incorporates a pair of MRF-458/8533 transistors.

goes from 250 kHz to 2.2 kHz with interfering signals attenuated greater than 50 dB.

Receive recovery time is less than 20 ms, including split mode. Image and IF rejection are greater than 90 dB. Audio output is rated at 1.5 watts at 4 ohms—built-in speaker plus a separate fixed output at 1 mW at 600 ohms. There is also a separate antenna input, front-panel selectable.

Getting back to selectivity, one of the real black-magic areas of receiver design these days is DSP (digital signal processing). The Omni VI has a built-in CW DSP filter that is a low-pass audio filter selectable in five steps of 1400, 1200, 1000, 800, and 600 Hz. This can be switched in or disengaged.

Those are the general specs, but there is a lot more to talk about. First, a matching power supply, the Model 961, is recommended, although I tested the transceiver with two different commercial supplies I had. There is a whole

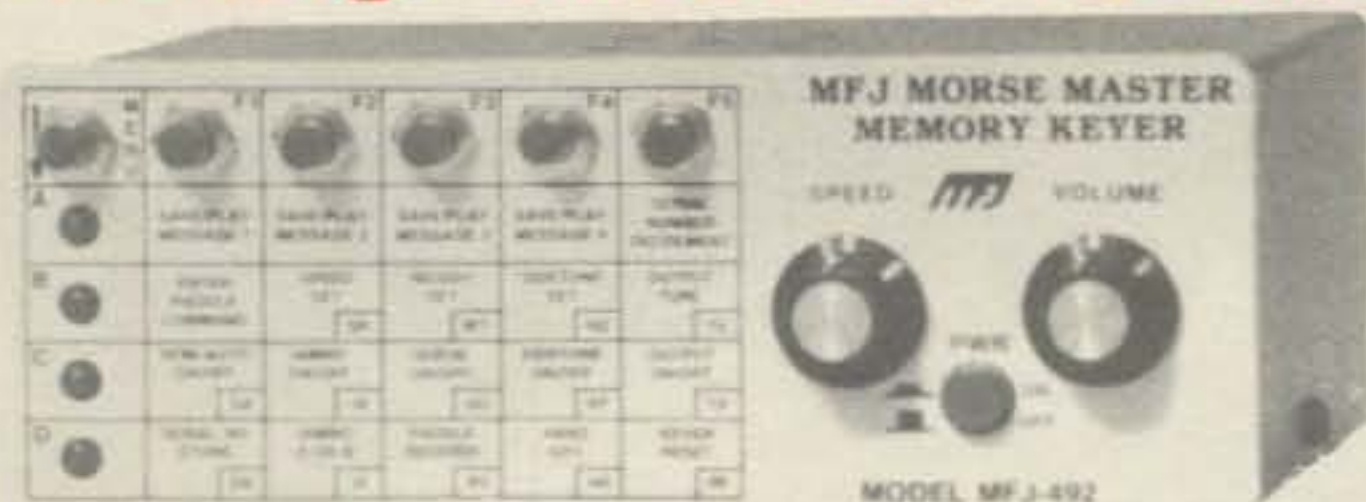
group of extra accessories available, including either 6- or 8-pole filters of 500 Hz, 1.8 kHz (8-pole), 2.4 kHz (8-pole), 250 Hz, and some others. Price of the filters is \$69.95 each.

The front panel has the usual controls: Audio and RF gain for receiving, Microphone and Power for transmit. A built-in keyer is used, and it has a front-panel Keyer Speed control. Also, a Processor control is panel mounted. The meter switch controls FWD (power), SWR, IC (current), and PROC. There is a Fast and Slow AGC switch, plus AGC On and Off. These are the customary switches and controls one sees, but there are many others which are more specialized. Let's deal with memories first.

There is a switch control pad on the front panel with each switch listing the band and a number, going from 1 to 9. There are three types of memories, a scratch pad, a band register for each band, and 100 general-purpose memories. Each will store mode, filter selec-



# MFJ Menu Driven Memory Keyer™



## Powerful Morse Code Trainer

A powerful Morse code trainer lets you practice or teach code in Farnsworth or normal mode.

You can select letters, numbers, punctuation marks or prosigns or any combination for practice. You can use standard 5

character groups, more realistic random 1 to 8 character groups or select specific six character sets to work on.

You can instant-replay a random session to check your copy.

You can store custom code practice sessions in memory for later replay.

### Here's what you can do with Message Memories . . .

**Message Repeat™** lets you repeat messages continuously. You can also insert pauses within a message. This lets you call

You can insert commands within a stored message. As you play it back, these commands will execute. For example, you can insert automatically incrementing serial numbers, replay messages continuously, call and play other messages, insert pauses or combine all these in one message!

When you play your messages back, automatic word and character spacing make your CW sound like perfect code. Or you can adjust the spacing for a more distinctive individual sound that DX stations will notice.

### Plus more . . .

You get contest serial numbering (0-9999) with auto-increment. You can send an N for 9 and a T for 0 to save time.

MFJ's **Analog Set™** lets you adjust speed, weight and sidetone just as smoothly as a knob - dot/dash paddles are used as an up/down control.

You get built-in sidetone, speaker, front panel volume control knob and adjustable 300-3000 Hz tone.

You can use automatic, semi-automatic bug or handkey modes, reverse dot/dash paddles, select iambic A or B or non-iambic modes.

You can adjust weight from 5 to 95% and compensate for transmitter distortion with a special transmitter compensation feature.

A tune feature lets you key your transmitter for tuning.

You can turn off the keying output so you can practice without keying your transmitter or unplugging your keyer.

You get direct and grid block keying. Keys solid state and tube rigs.

Special MARS characters are recognized and can be used in messages.

Uses 9 volt battery, 12 VDC or 110 VAC with MFJ-1312B, \$12.95. 6½x2½x6¾ in.

**MFJ-80**, \$14.95, Memory Expansion Kit. Expands your MFJ-492 to 8000 characters and adds four additional message.

**MFJ-492X**, \$114.95. MFJ-492 with MFJ-80 Memory Expansion Kit installed.

**MFJ-78**, \$19.95. Full function Remote Control puts message memories and menu control at your finger tips for real convenience.

## MFJ-492 MFJ's new Menu Driven

**\$99<sup>95</sup>** Memory Keyer™ lets you immediately enjoy your MFJ-492 without reading an

instruction manual - there's no keypad, no complex sequences, nothing to remember.

You simply select a menu by pressing a button. An LED lights to show you which menu is active. You select a feature by pressing a feature button. It's as easy as using a computer touch screen! Each menu is clearly printed on the front panel - there's no confusion.

From the menu you can save and play messages . . . decrement serial numbers . . . set speed, weight, sidetone . . . enter iambic, semi-auto, handkey, message queue, paddle command modes . . . turn on/off sidetone, transmitter tune, keying output on/off . . . select iambic A or B, reverse paddle, Morse trainer and store starting serial number.

You can bypass the menu by keying in simple two letter commands.

When you select a feature the keyer tells you its status in CW.

## Memory expandable to over 8000 characters

You can expand the MFJ-492 standard 192 characters in four soft sectored message memories to over 8000 characters in eight message memories by simply plugging in the MFJ-80, \$14.95, Memory Expansion Kit. Memories backed-up by lithium battery.

### Smooth Speed Control

Matching your CW speed to a QSO is best done by ear. The MFJ-492 lets you match speed by turning a knob or by using MFJ's Analog Set™. In this mode, pressing the dot or dash paddle smoothly increases or decreases speed from 5 to 100 WPM. You can also customize the range of the speed knob for precise control.

## MFJ Super Menu Driven Memory Keyer™/Keyboard



**MFJ-493** You get all the features of the MFJ-492 plus these . . .

**\$139<sup>95</sup>** ★ You get 32,000 characters of memory.

★ Plug-in a standard IBM compatible 01 AT type keyboard and you have an extremely powerful full featured standalone keyboard keyer. All commands, functions and memories can be done through the keyboard. Plus you get additional message memories and features.

★ Built-in serial port lets you combine the power of your computer with the MFJ-493. Use your computer to compose, build and store a complete library of often used messages, generate custom code practice sessions and exams and download to MFJ-493, control your keyer, automatically set up keyer for different operators during contest, display, edit and save message memories and keyer settings.

CQ, listen for an answer and then resume calling CQ by pressing a single button. Each pause can be up to an hour - it makes a perfect Automatic Beacon.

**Message Call™** calls other messages and **Message Queue** plays messages in sequence. You can store QTH, rig, weather and other information in separate message memories and play these in any sequence you want!

**Message Edit™** lets you correct mistakes while recording a message - you don't have to start all over if you make a mistake.

While you're playing a memory message you can break-in at any time and insert comments from your paddle and then resume playing your message.

As you key in CW, ASCII is also being sent to the serial port. You can use your computer to record an entire transmission.

★ In addition to the powerful Morse Code Trainer, in the MFJ-492 you get . . .

. . . an **FCC Exam Simulator** that sends random QSOs exactly like the FCC exams.

When you can copy these random QSOs, you're ready to pass your exam and upgrade!

. . . MFJ's **QSO Simulator** makes learning Morse code really fun. It's like making real on-the-air contacts. You can answer a CQ or call a station and enjoy a nice a QSO. You'll get operating experience while boosting your code speed.

. . . a new **Word Recognition Mode** gives you hundreds of commonly used words in amateur radio for you to practice recognizing entire words instead of individual letters. With practice you can learn to copy words in your head without writing it down and carry on an entire CW conversation without paper - just like the pros.

Compact 7½x2½x6¾ inches. Use 12 VDC or 110 VAC with MFJ-1312B, \$12.95.

**MFJ-79**, \$19.95, full function Remote Control.

## Menu Driven Memory Keyer/Bencher Paddle Combo

**MFJ-490** The best of all CW worlds - nearly all the features of the MFJ-492 Menu Driven Memory Keyer in a compact configuration that fits right on the Bencher iambic paddle! You can buy the combination or just the keyer for your Bencher.

**\$164<sup>95</sup>** You get message memories, Morse trainer, sidetone, automatic serial numbering - plus more. 5x3x5½ in. Uses 9 volt battery, 12 VDC or 110 VAC with MFJ-1312B, \$12.95. **MFJ-490**, \$164.95, Keyer/Bencher Combo. **MFJ-490X**, \$109.95, Keyer only. Memory expansion kit not available.



## Dedicated CW Keyboard



**MFJ-451** Dedicated CW Keyboard has 200 character type ahead buffer and two 100 character message memories with buffer and memory full indicators. Select features with **\$89<sup>95</sup>** **One Touch™** function keys. Use **Analog Set™** or type-in Speed (5-100 WPM), Weight (5-95%) and Sidetone (300-3300 Hz). Has speaker. 3½x1¼x3½ inches. Use 12 VDC or 110 VAC with MFJ-1312B, \$12.95. Keyboard supplied may vary from the one shown here.

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tion, split information, RIT, and XIT. Memories may be used in one of four ways: MS (memory scroll), MT (memory tune), automatic memory tune, and automatic band scan.

The band memory registers are a very special feature. This is a real treat for DX and contest work, or even just for general operating. Let's say that you switch to 40 meters and are listening to a QSO on 7155, and for some reason you would like to hold this frequency and come back to it. You simply hit the 40 meter band-switch button again and then tune to another frequency—say, 7238. You would like to go back and check the previous QSO on 7155, so you simply hit the 40 meter band-switch button again and presto, you are back at 7155, but you haven't lost 7238. Simply press the band button again and you are back.

Actually, it is more difficult to describe than to use. But for chasing split DX operation and so on, it is a wonder. The memory works from and between bands also. In other words, suppose you are on 21050 and want to check net activity on 14330. The same procedure outlined above works between bands!

The Memory Tune setup simply means pressing the MT switch for a second and then stepping or tuning through

the memories with the main tuning knob. In the Automatic Memory Tune mode the transceiver will scan through memory channels automatically. The scan rate can be adjusted via the Up/Down buttons.

There is a User Option Menu available for the owner who wishes to tailor the Omni VI to match personal preferences. The menu includes an ID 10 minute timer, bd, baud rate for PC interface, CDe to enable/disable Matrix mode, C-id for address ID for PC, FEP frequency priority, ANC audio annunciators, CCD continuous clock display, LCO linear control relay, I code for iambic keyer type A or B, and Odp for offset display preference.

Some other items that bear detailed discussion are the Pass-Band Tuning and the Notch system. The Pass-Band Tuning allows the user to move the pass-band back and forth across the desired signal. It can be used to "drop" QRM out of one side or the other of the pass band. It is a very effective method of improving selectivity.

The Notch system in the Omni VI is very unique. The system uses DSP, and it eliminates "carrier" or heterodyne interference. It operates in both Manual and Automatic modes. They can be

used separately or simultaneously. In the Automatic mode (on voice only) the manual notch control knob has no effect. When Auto is selected, any carrier or multiple carriers are automatically notched out. It was interesting to me, working on the big QCWA net, to hear other stations complaining about heterodynes. I just didn't hear any!

Going back to the transmitter, the nominal output/input impedance of the Omni VI is 50 ohms. There is a protective shut-down circuit built in to protect the final amplifier if the SWR exceeds 2 to 1. If the antenna system in use exceeds an SWR of 2 to 1, the power output will drop. For this reason, a Transmatch is recommended if higher than 2 to 1 SWR is encountered.

I could easily have included circuit diagrams of the transceiver, but they are very extensive—and numerous. By the time they were reduced to fit in the magazine, they probably would be unreadable. This brings me to a couple of other comments.

In this day and age of sophisticated design, there is such complexity to communications devices that they are for all intents and purposes far beyond the servicing ability of most amateurs. In fact, it would be safe to say they are beyond 99 percent of us. Ten-Tec historically is well prepared for this. If you talk to any amateur who has had service dealings with Ten-Tec, I can almost guarantee that you will be talking to a Ten-Tec fan. Most of this transceiver has removable circuit boards, and Ten-Tec has been known to actually "talk" and "walk" a customer through removing and replacing boards. Or, if the unit needs to be returned, the turn-around time is very realistic. Whenever I call any of the transceiver manufacturers, they usually assure me that "five" working days are normal for service. However, in all honesty, I have known of cases that have gone on for weeks or months. This is just not so with Ten-Tec.

Ten-Tec guarantees the Omni VI for one year, and if trouble should develop, they recommend you contact them directly. They have a customer service number. I might add that their warranty states that they "encourage" self help. For example, taking the covers off does not void any warranties. As they state, in many cases their customer service technicians, with your help, can identify a faulty circuit board, and they can quickly send replacement boards.

Getting back to the Omni VI, the manual that comes with the unit is extremely detailed as to use and actual circuit information. The Omni VI transceiver lists for \$2285.00. It is manufactured by Ten-Tec Corp., Highway 411 East, Sevierville, TN 37862. ■

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# The Kenwood Triple Challenge

You could win a trip to the Bahamas, A Kenwood TS-50S, or other prizes via three great Summertime Contests!



## Contest #1:

*The TS-50S Quiz.*

*If you get all answers right  
and we select your name, you win!*

**Grand Prize: Kenwood TS-50S**

**1st Prize: Kenwood MS-5 Compact Home Stereo System**

**2nd Prize: Kenwood Telephone/Answering Machine (Model IS-M51)**

**3rd Prize: Kenwood Wristwatch**

- Ask your dealer for a Kenwood TS-50S brochure and the TS-50S Quiz.
- Answer all the questions on the quiz, then mail to our address below.
- Quizzes with all correct answers will be entered into the random drawing!

**Contest #2:** *Creative Installations of a Kenwood TM-742A or TS-50S.*

*Show us your imagination and win!*

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**1st Prize: A Kenwood Home Audio Mini-System (UD-300)**

- Install your TM-742A or TS-50S in a unique way that demonstrates imagination, professionalism and safety considerations.
- Take two color photos showing two views of your radio installed, along with a brief description describing your set-up and the challenges involved. Send both to the address below.
- Winners will be selected by a panel of Kenwood judges, whose decision is final. Trip to Bahamas includes airfare and hotel.

**Contest #3:** *The Ultimate Kenwood Family. If you're our biggest fans, show us and win!*

**Grand Prize: Official Kenwood Jackets, plus your Family Photo in QST**

- Pull together your Kenwood ham radio family for a gathering—sons, daughters, brothers, in-laws, etc.—and take **one** picture. Be sure to include at least **one** Kenwood radio (and as many as you can) in the shot.
- Compile a list of names, legal relationships, ages, call signs, year first licensed (and jacket sizes!) of all family members shown. Feel free to add any unique stories or family anecdotes. Be sure to list the model numbers of Kenwood radios owned and shown in the photo!
- Send the photo and lists to the address below. Kenwood is looking for the largest number of licensed ham operators in a single family. Winners will be selected by a panel of judges, whose decision is final.

Contest period for all three contests is  
July 1, 1993-September 15, 1993.  
All entries must be postmarked no later than  
September 30, 1993. No facsimile entries will be accepted.

Send all contest entries to:  
Kenwood Communications Corporation  
Triple Challenge Contests  
P.O. Box 22745  
Long Beach, CA 90801-5745

All three contests open to residents of the United States only. Contest entry forms are available from all participating authorized dealers or from Kenwood Communications Corporation. One entry per person per contest. Winners for all three contests will be notified by mail. A list of contest winners may be requested after the contest period. Please enclose a self-addressed stamped envelope. Void where prohibited by law. Prizes cannot be substituted.

## KENWOOD

Kenwood Communications Corporation  
Amateur Radio Products Group  
P.O. Box 22745, 2201 E. Dominguez Street  
Long Beach, California 90801-5745

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***This is the first of a six-part series on how to build your own 40 meter CW QRP transceiver. Each part is independent, and you can build and use as much as you want. This would also make a great club project.***

# The 40 Meter Fun Machine

## Part I—Getting Started

BY PAUL CARR\*, N4PC

It has been said that a journey of a thousand miles begins with a single step, and the same can be said of a construction project. Let me pose this question. How would you like to have a 2 watt, 40 meter CW transceiver and be able to say "I built it myself"? Interested? Read on.

### Philosophy and Circuit Description

This series will consist of six parts. Following is a brief description of each part (see fig. 1).

**Part I.** This phase consists of an audio phase shift oscillator and an audio out-



*If you complete all six parts, this is what your rig will look like. You can dress it up with decals to suit your station.*

\*97 West Point Rd., Jacksonville, AL 36265

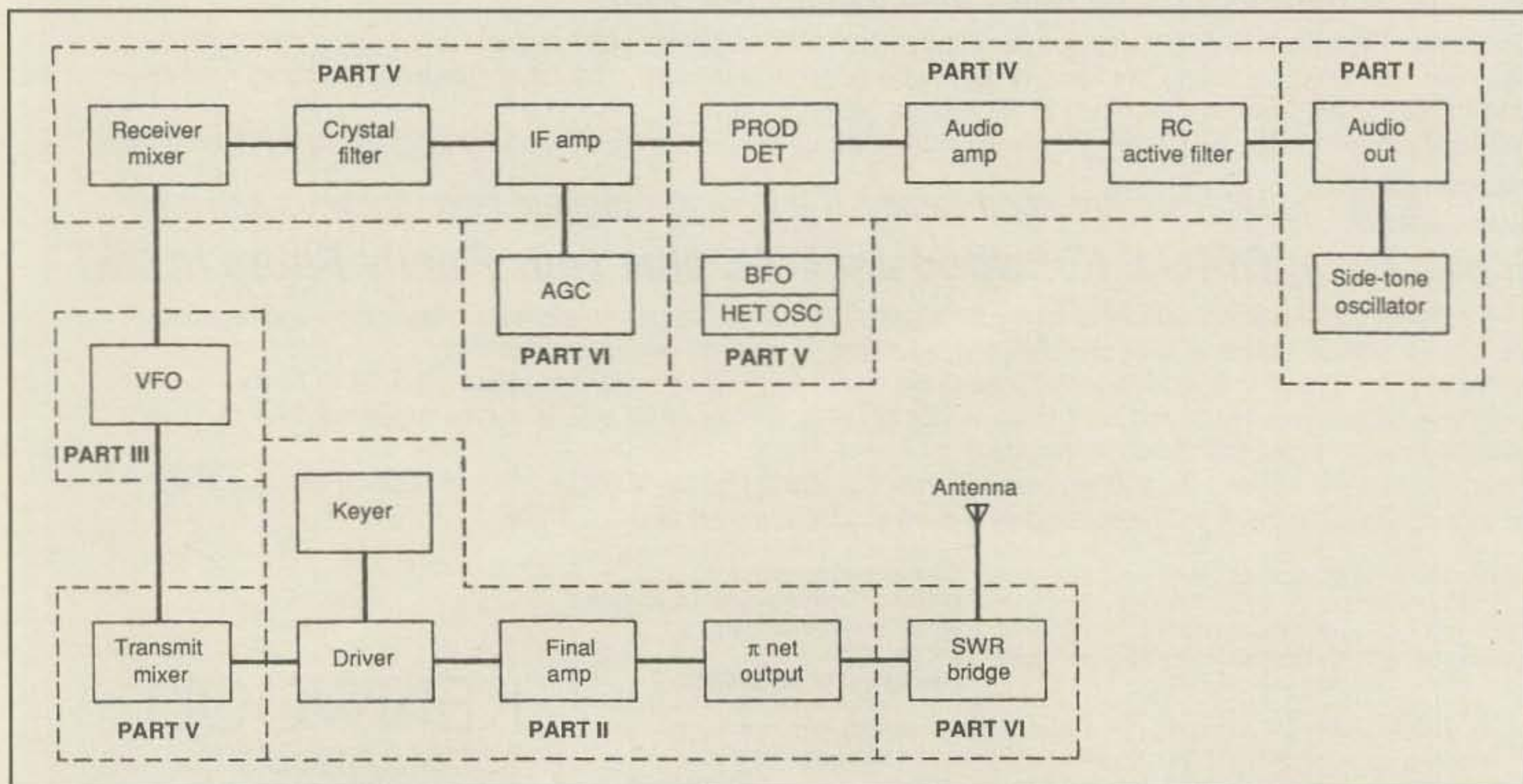


Fig. 1—Block diagram of the completed project. What will be covered in each of the six installments is indicated.



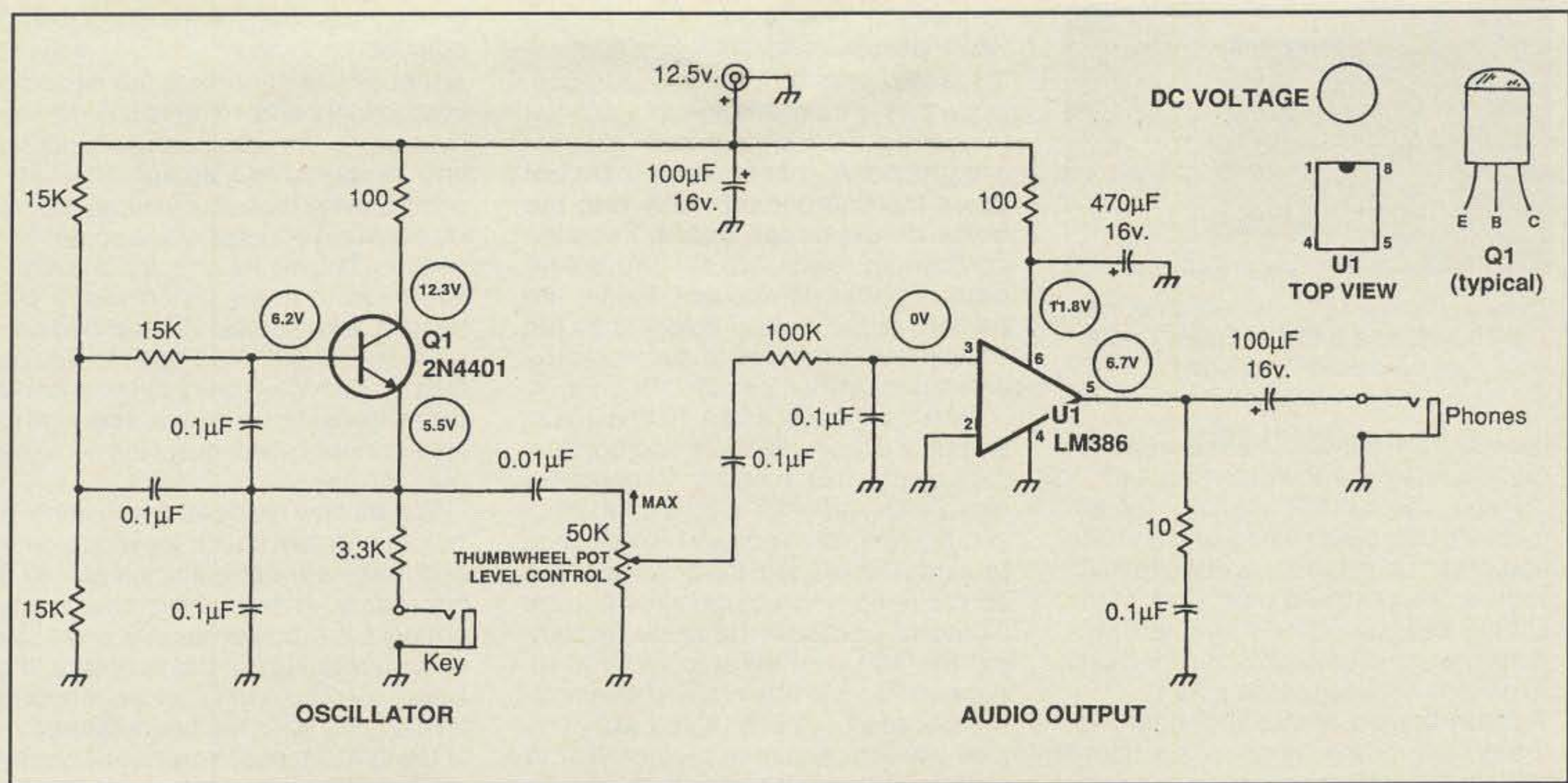


Fig. 2—Circuit diagram of the oscillator and audio output.

put stage. If you decide to stop at this point (and please don't), you will have a code practice oscillator. During this phase I will also emphasize proper construction techniques to ensure successful completion of the entire project.

**Part II.** Part I is followed by a standard building block for the home construction of a QRP crystal-controlled transmitter. Quite often this is the first construction project attempted by a newcomer. I have taken basic circuits and devised construction techniques that will ensure success. The circuit produces about 1½ to 2 watts RF output, and the keying characteristics are very clean and pleasant to hear.

**Part III.** A crystal-controlled transmitter is fun, but I'm sure you'll soon want more flexibility to traverse the band. Part III provides this flexibility in the form of a VFO. To ensure proper isolation and good frequency stability, I chose a base frequency of 3.5 MHz and a push-push doubler.

**Part IV.** In this part we expand everything we have done into a stand-alone transceiver. Here we build a product detector and associated audio circuits. If you want to stop here (again, please don't), you will have a perfectly functional 40 meter transceiver that will produce many QSOs and a great deal of satisfaction.

**Part V.** Here is where we take what we have built and make it into a super-heterodyne transceiver. In this session you will build a mixer, a crystal filter, (yes you can; it's easy), and an IF amplifier. We will need to modify the VFO slightly

and construct a transmit mixer.

**Part VI.** In this part we add some refinements. An AGC stage may seem to be optional in a simple CW transceiver, but I recommend you build the circuit and make your own evaluations. In this phase we will also add an SWR circuit and metering facilities.

I have tried to present the material in a logical, step-by-step format, thereby creating a project through which you will gain knowledge and confidence as you progress. Hopefully, you will never feel overwhelmed.

### Specifics—Part I

The LM386 is becoming the standard audio output stage for QRP projects. It has good gain characteristics and low current requirements, and is easy to use. The phase shift oscillator is also easy to construct and produces a pleasing tone, and these are my circuit choices for this project.

Proceed in the following manner. Take a 3" x 6" piece of unetched printed circuit board to use as a base (ground plane) for all of the circuits. You may use a board slightly larger if you desire, but do not use anything smaller, since other circuits will be built on this board. Next take one half of a Radio Shack Dual General Purpose IC PC Board (Cat. No. 276-159A) to use as connect points for the circuits. Clean both copper boards with fine steel wool to enhance soldering. (Clean copper is easier to solder.)

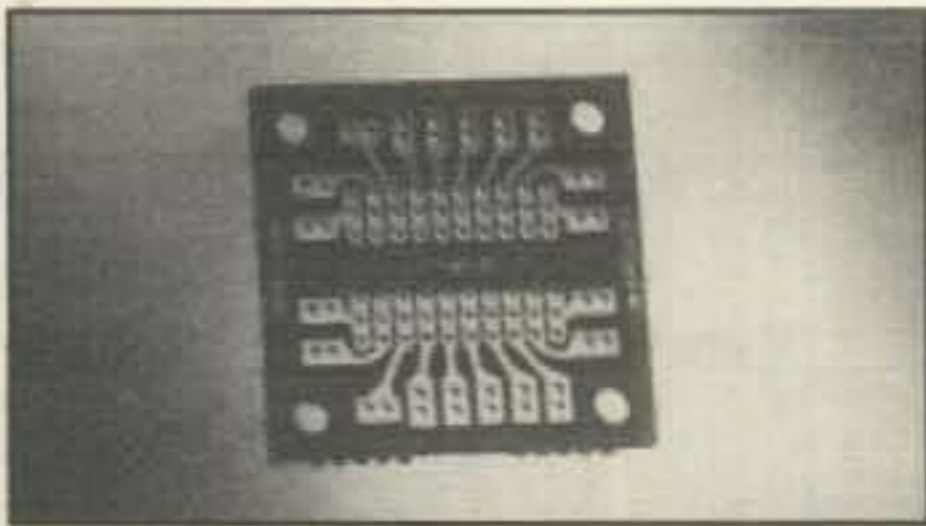
Next, with the copper pads of the

PARTS LIST	
<b>Resistors</b> (¼ W or greater)	
Three	15 K ohm
One	3.3 K ohm
Two	100 ohm
One	10 ohm
One	50 K ohm variable (thumbwheel)
<b>Capacitors</b> (16 V or greater)	
Five	0.1 uF disc
One	0.01 uF disc
Two	470 uF electrolytic
Two	100 uF electrolytic
<b>Miscellaneous</b>	
One	2N4401 transistor (2N3904, 2N2222, and other types usable)
One	LM386 audio out integrated circuit
One	8-pin socket (mini dip)
Two	open circuit jacks
One	experimenter's circuit board (Radio Shack Cat. No. 276-159A)
One	3" x 6" blank copper-clad board (base and ground plane)

experimenter's board facing down, place electrical tape over the holes in the circuit board. Use two layers of tape. This will ensure that no solder from the opposite side of the board reaches the ground plane.

Now turn over the experimenter's board (copper pads up). Prepare an 8-pin mini-DIP IC socket by carefully bending the socket pins outward until they are perpendicular to the body of the socket. This can be accomplished easily by placing the socket on a smooth, flat surface and applying pressure to the top of the socket. Be sure the pins are





Here's where we get started: a copper-clad board and a Radio Shack general-purpose IC PC board.

bent slightly outward before applying pressure from the top of the socket.

Place the socket on the experimenter's board with pins 1 and 8 at one end of the board. (This is done to have easy access to these pins. Gain of the LM386 can be altered by placing a capacitor, or a capacitor in series with a resistor, between these pins.)

Place the experimenter's board on the ground plane. Position the board such that there will be equal spacing at the ends and between two other boards that will occupy the same ground plane. There will be a total of three experimenter's boards on this ground plane if the entire project is built.

The experimenter's board will be held in place by the ground leads. Start by

connecting pins 2 and 4 to ground. Short pieces of resistor or capacitor leads are excellent for this purpose, since they are already tinned. Continue by placing a 0.1 uF capacitor from pin 3 to ground. A word of warning: **Do not place the component leads into the holes on the circuit board.** Keep the component leads flat on the solder pads. If the component leads are placed in the holes, solder can run through and penetrate the electrical tape and create a short circuit.

Next cut the leads of a 10 ohm resistor and a 0.1 uF capacitor and connect the components in series. Connect the remaining lead of the capacitor to pin 5 and the remaining end of the resistor to ground. This will hold the board in place so the remaining components can be mounted. Complete this stage by placing the 100 ohm resistor and 100 uF capacitor to pin 6 and the 100 uF output capacitor to pin 5. If you wish, you may use 220 K ohm or greater 1/4 or 1/2 watt resistors as tie points to isolate the free ends from the ground plane.

You are now ready for the initial test of the audio output stage. Visually inspect the board to see that all connections have been properly made and no solder bridges have occurred. Make any corrections as necessary. Place the LM386 in its socket. Next connect the supply voltage. With a VOM (20,000 ohms/V or greater), check the voltages at the pins of the IC, not at the socket. With 12.5 VDC you should read voltages ( $\pm 10\%$ ) as indicated in fig. 2. If there is a greater difference, stop and find the trouble. If everything checks out, connect a pair of low-impedance phones between the output capacitor and ground. Chances are, if you listen carefully, you may hear a slight hum or noise. Next touch a metal screwdriver to pin 3 of the IC. The audio output should increase in volume. These results indicate that all is working well.

Now we will wire the audio oscillator.

Start by soldering the transistor to three adjacent pads near the center of the circuit board. Next position the remaining components according to the diagram by placing the small components first and progressively adding the larger components. Plan your work so that you do not leave yourself with a solder connection that will be difficult to make. If you need to cross a pad with a connection, take a scrap of discarded component lead and bend it so that you can cross a pad without touching it. The output of the oscillator is routed through the level control to the input of the audio output amplifier.

We are now ready for final testing. As before, visually check for wiring errors and make any corrections that may be necessary. If everything checks out, connect the power supply and make voltage readings at the transistor. If all is well, you should hear a tone of approximately 800 Hz in the headphones.

Congratulations! You have completed Part I. Feels great, doesn't it?

### Afterthoughts

As you can see, I have described the construction in great detail. Once you have developed proper construction techniques, you can progress to more difficult construction projects with less coaching. I will try to answer all letters that I receive as time permits (SASE, please).

Just a word about reference material. Two books that any experimenter should have are *The ARRL Handbook* and *Solid State Design For The Radio Amateur*. Both are ARRL publications and are "must have" items (contact the ARRL, 225 Main Street, Newington, CT 06111 for more info on these books).

Part II will cover a crystal-controlled CW transmitter for 40 meters. Meanwhile, use this month's project to practice your CW skills, and I'm looking forward to the remainder of our journey

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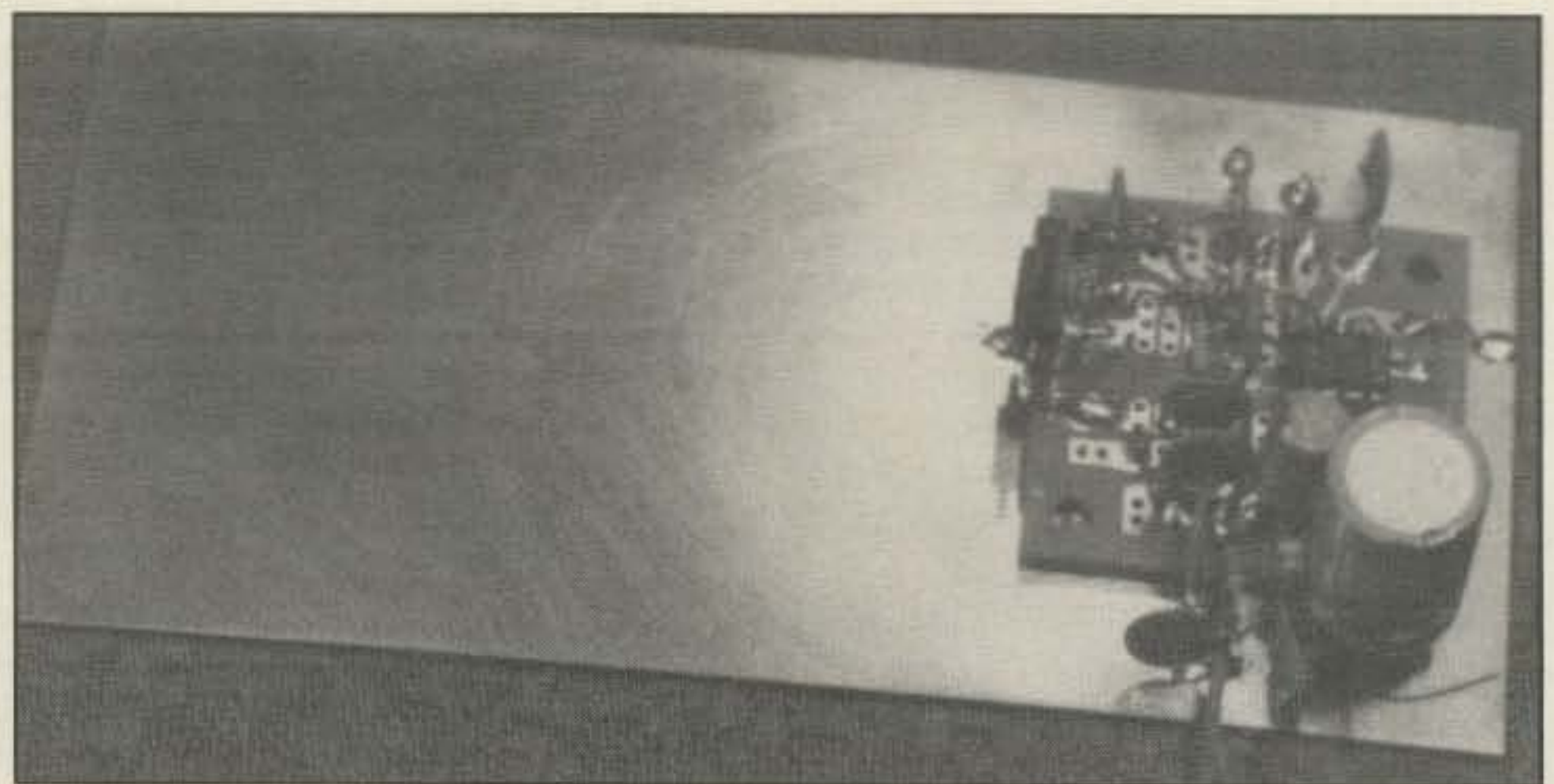
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**Announcing:**

# The 1993 CQ World-Wide RTTY DX Contest

**Starts 0000 UTC Saturday  
Ends 2400 UTC Sunday  
September 25-26, 1993**

I. **Announcing:** The Sixth Annual CQ WW RTTY DX Contest, co-sponsored by *The RTTY Journal*.

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

III. **Contest Period:** 0000 UTC September 25 to 2400 UTC September 26, 1993. The total contest period is 48 hours, but no more than 30 hours of operation are permitted for single operator stations. The 18 hours of *off* time can be taken any time during the contest period, but *off* periods may *not* be less than three (3) hours in length. All *on* and *off* periods *must* be clearly noted in the log and summary sheets.

(a) Multi-Operator Single Transmitter and Multi-Multi stations may operate the entire 48 hour period.

(b) A Single Operator *may* operate more than the 30 hours, but only the *first* 30 hours will count toward the official score. (This allows rarer DX to give their multiplier to more stations.)

#### IV. Operator Classes

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

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

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

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

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

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

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

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

V. **Entry Categories:** Single Operator entries may enter either (A) All Band or (B) Single Band. Single Operator Assisted and Multi-Operator entries can only enter all band.

VI. **Modes:** Contacts may be made using Baudot, ASCII, AMTOR (FEC & ARQ) Packet. (No unattended operation or contacts through gateways or digipeaters.)

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

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

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

X. **Countries:** The ARRL and WAE DX Country lists will be used. **Note: The USA and Canada count as country multipliers.** Example: The first US State and Canadian area you work not only count as a multiplier for the state or area, but also count as a country multiplier for each band.

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

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

*Note:* Canadian areas are VO1, VO2, VE1 N.B., VE1 N.S., VE1 P.E.I., VE2, VE3, VE4, VE5, VE6, VE7, VE8 N.W.T., and VY Yukon.

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

XIV. **Contest Entries and Logging Instructions:** CQ WW RTTY DX logs and forms should be used to facilitate scoring and checking. All logs **must:**

1. Show times in UTC.

2. All sent and received exchanges are to be logged (call sign, RST, Zone, Country, State/VE, points claimed).

3. Indicate State/VE area, Zone, and Country Multiplier only the *first time* it is worked on *each band*.

4. Use a separate log sheet for *each band*.

5. A check list of duplicate contacts for *each band* (dupe sheet).



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RS-20M	16	20	112
RS-35A	25	35	144
RS-35M	25	35	162
VS-35M	25	35	179
RS-50A	35	50	219
RS-50M	35	50	239
VS-50M	35	50	249

A=Plain M=Meters V=variable DC

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207/208/249/346 ..... 88/89/179/169  
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 941E/948/949E ..... 99/119/139  
 962C/986/989C ..... 209/259/299  
 1224/1268/1284 ..... 89/49/25  
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 CA2X4WX/CA712EF ..... 130/90  
 CAABC23/CH32 ..... 100/30  
 CH720C/CH72S ..... 35/27  
 CHL185/CHL23J/CX702 ..... 40/30/80  
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6. A multiplier check sheet for each band.
7. An overall summary sheet showing total QSOs, Points, Zones, Countries, and State/VE areas worked.
8. Each entry must be accompanied by a signed declaration that all contest rules and regulations for amateur radio in the country of operation have been observed.

Contest forms are available from *CQ*, *The RTTY Journal*, and the Contest Director. *The RTTY Journal's* address is 9085 La Casita Avenue, Fountain Valley, CA 92708. Please include a large SASE with 2 units of US first-class postage or IRCs.

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

XVI. **Awards:** Plaques will be awarded to the first-place finishers in each of the operator classes. Certificates will be awarded to second and third. Certificates will be awarded to the first-place finishers in each DX country.

XVII. **Deadline:** All entries must be postmarked no later than December 1, 1993. An extension may be given if requested. Logs should be mailed to: Roy Gould, KT1N, CQ WW RTTY DX Contest Director, P.O. Box DX, Stow, MA 01775, USA.

XVIII. **Plaques (Donors):**

**Single Operator, All Band**

World—AEA, Advanced Electronic Applications, Inc.  
World, Low Power—Eastern Washington Amateur Radio Group

North America—TG9VT Memorial  
South America—The Contest Committee  
Europe—HAL Communications Corp.  
Oceania—*The RTTY Journal*  
Asia—N5JJ Memorial  
Africa—The Contest Committee  
United States—RTTY by WF1B

**Single Operator, Single Band**

14 MHz—Kunihiko Fujii, JH1QDB  
21 MHz—Denis, WD4KXB and Mike, KA4RRU  
28 MHz—The Contest Committee

**Single Operator Assisted**

World—CQ Magazine  
Continents—Open

**Multi-Operator, Single Transmitter**

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

**Multi-Operator, Multi-Transmitter**

World—CQ Magazine  
Continents—Open

**Novice/Tech High Score—N2HOQ Award**

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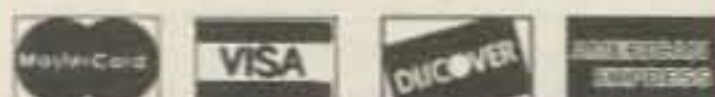
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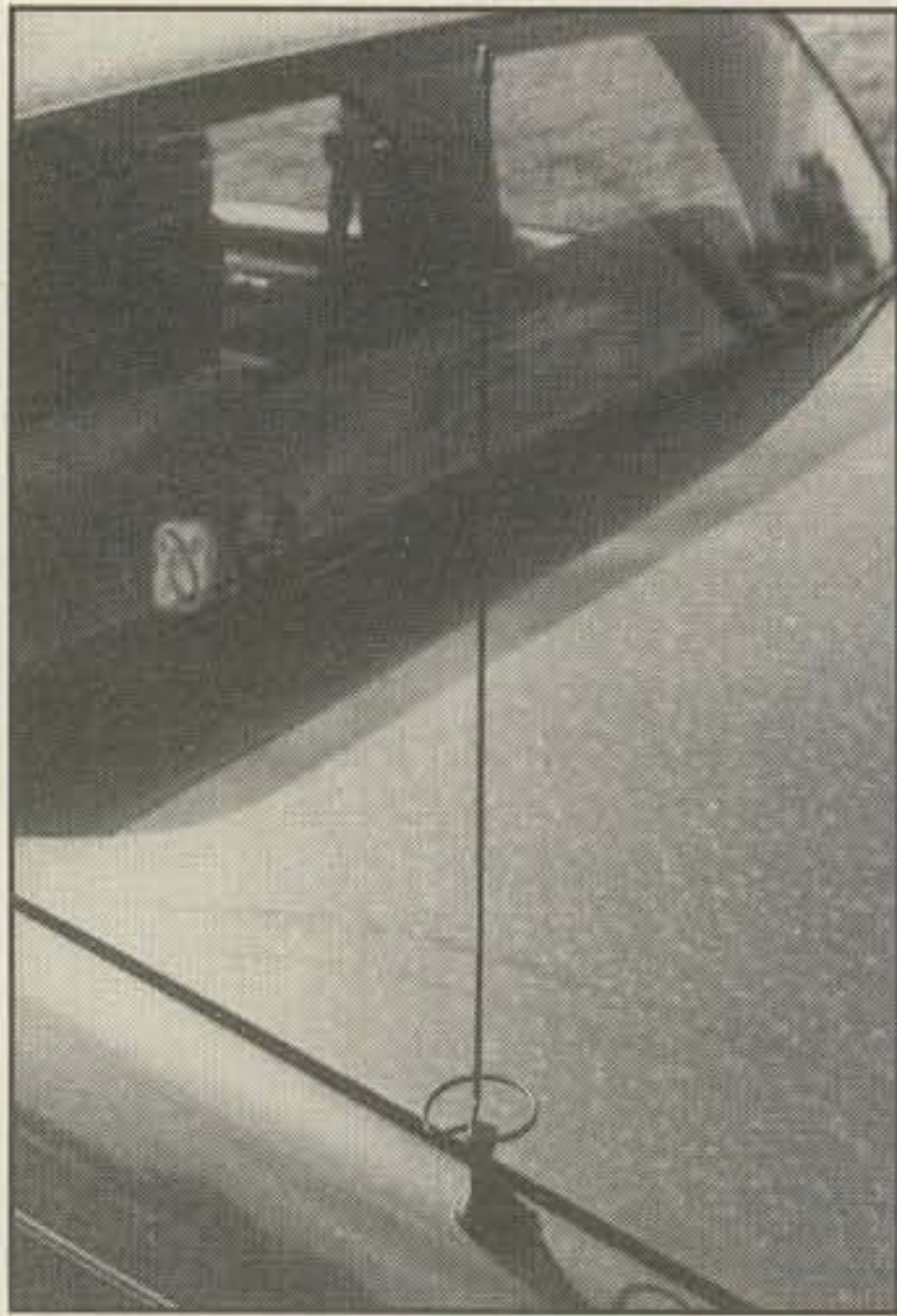
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EUR-AM has introduced the RF-1123 mount, 25 degrees adjustable, with a small footprint of 1<sup>3</sup>/<sub>8</sub>"x1", plus a 144 MHz (52 inches tall, 3 dB gain) antenna. They also

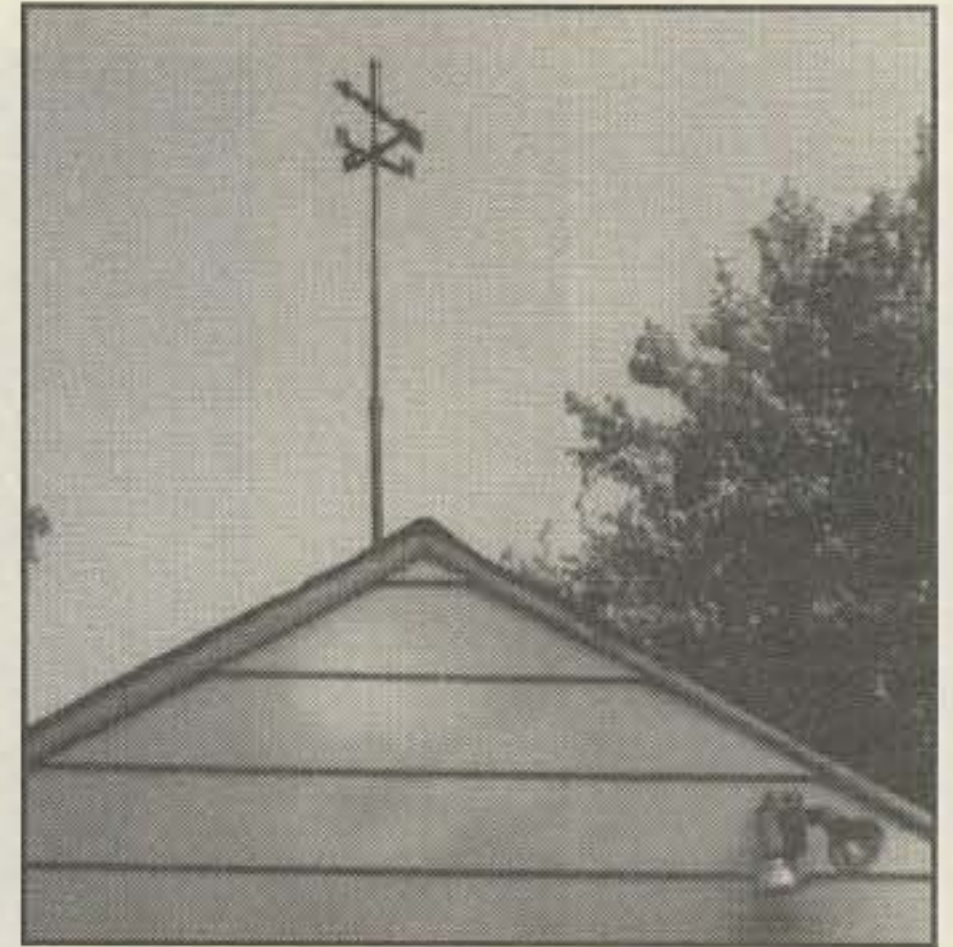
offer a 144/440 MHz dual-band (17 inches tall) antenna. Magnetic and 90 degrees adjustable mounts are also available. The price of the 2 meter fiberglass antenna is \$51 and \$38 for black stainless steel. The dual bander sells for \$49.

For a catalog contact EUR-AM, P.O. Box 990, Meredith, NH 03253-0990 (FAX 603-476-5113) or circle number 110 on the reader service card.

## Rfconcepts Amplifier

The Rfconcepts VHF1-60 amplifier is designed to provide high power for 2 meter HTs. Given 1 to 8 watts input, this amp's sensing circuit detects the HT's output power on 2 meters and automatically switches the amp in-line for 60 watts output. The VHF1-60 features the SineSink™ heat sink and flow soldered assembly. It also provides a 2 meter discriminator to eliminate false keying by out-of-band signals, a high VSWR LED indicator, ALC output power control, transmit LED, and thermal shutdown with thermal LED. When used with a dual-band HT, 70 cm (440 MHz) power is passed on to the antenna without amplification. An optional three-resonator Helical filter, which reduces out-of-band interference, is available for 2-meter-only operation. The VHF1-60 measures 5"x9"x3" and uses 13.8 VDC at less than 14A. Suggested retail price is \$259.

Rfconcepts is a division of Kantronics. Direct U.S. inquiries to P.O. Box 11039, Reno, NV 89510; (702-324-3290; FAX 702-324-3289). International inquiries: 1202 E. 23rd Street, Lawrence, KS 66046 (913-842-7745; FAX 913-842-2021). Or circle number 109 on the reader service card.



## ANT-VENTURES Stealthy Antenna

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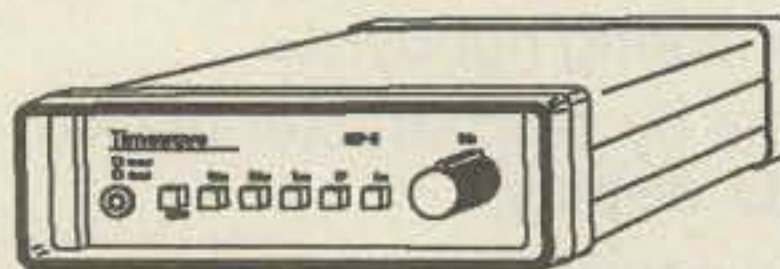
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YOC and NEC/Yagis require a math coprocessor; MN and YO come with both coprocessor and noncoprocessor versions. All except AO run on any IBM PC compatible with graphics. All programs include extensive documentation. Add 7.25% CA, \$5 overseas. Visa, MasterCard, U.S. check, cash, or money order. 3.5" or 5.25" disk.

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For more information on the Stealthy Antenna send an SASE to ANT-VENTURES, P.O. Box 776, McHenry, IL 60051-0776.

## Kantronics KAM Pactor Option

Pactor, available as an option for the Kantronics KAM, is the newest digital mode for HF data communication. This mode combines many of the best features of packet and Amtor, and operates at either 200 or 100 baud. Depending on existing band conditions, it automatically selects the initial baud rate and then adjusts it as required during a link. For more effective throughput, Pactor also features Huffman encoding. Like packet, Pactor uses a 16-bit code to ensure error-free data transfer between stations, even under adverse HF conditions. Utilizing memory ARQ, incorrect frames can be combined to form a good frame, eliminating the need for "perfect" reception, and Pactor offers optional long path connections which allow users to establish links with stations around the world.

The Pactor firmware option for the KAM is available as an EPROM chip to replace existing firmware. Contact your nearest authorized dealer or Kantronics at 1202 E. 23rd Street, Lawrence, KS 66046 (913) 842-7745; FAX (913) 842-2021, or circle number 104 on the reader service card.

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The kit price is \$269.95. For more information, contact S & S Engineering, 14102 Brown Road, Smithsburg, MD 21783 (301-416-0661), or circle number 108 on the reader service card.





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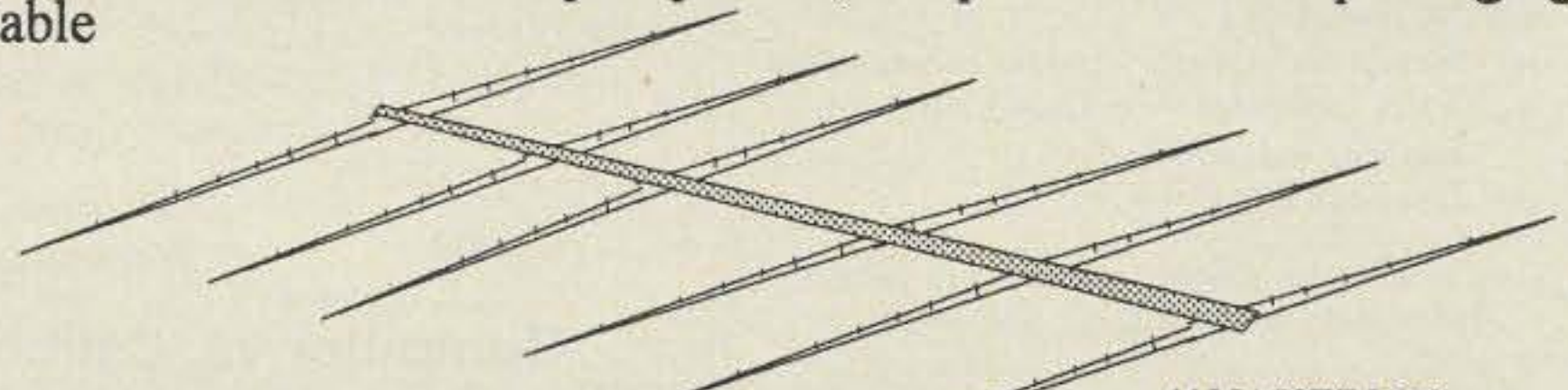
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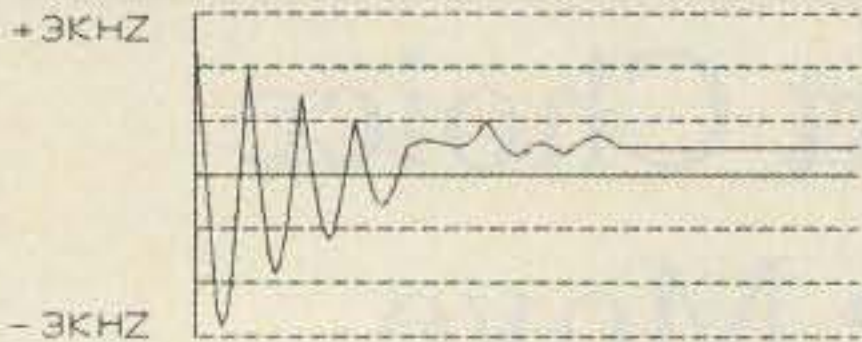
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# OUR READERS SAY

### In Good Company

Editor, *CQ*:

Jerry Sevick's book on transmission-line transformers and his articles are of great interest to me. His article in the March issue of *CQ* is of particular interest.

I was pleased to be honored as a reference, especially being listed with Jerry and Clyde Ruthroff. Ruthroff is remembered for his classic paper of 1959 regarding broadband transformers.

What is interesting is that I have learned much from both of these gentlemen, most recently from Jerry's book, articles, and personal conversation, and fifty years ago from Clyde Ruthroff, when he was an instructor at the Navy's Aviation Radio Material school at Corpus Christi, Texas. Clyde taught a course in IFF (Identification, Friend or Foe) equipment. He was a savvy, no-nonsense teacher and some of the first technical books about radio that I ever owned were purchased used from Ruthroff.

I never, ever expected to be listed in the same list of references with Clyde Ruthroff!

Dick Genaille, W4UW  
Winston-Salem, NC

### Computer vs. Callbook

Editor, *CQ*:

In reference to Leo F. Waelchli, KA3KUP's letter in the February issue, I would take issue

with most of what he is complaining about. Mr. Waelchli probably has reference to the popular Ham Database program widely available on Personal Computers. I am somewhat aghast at Mr. Waelchli's objection to the fact that information is now available on computer that is little more than the information that has been available through the Callbook for several decades. I fail to see what difference it makes that the information is now available on computer.

Amateur Radio has taken its proper place on the leading edge of technology since its inception. In my more than thirty years as a licensed amateur, we hams have welcomed advances in technology such as the transistor, satellite, and integrated circuit. Today, the computer is becoming more and more a part of our wonderful hobby. We have little to fear and much to gain from the many advances computers and computer technology bring to amateur radio.

I personally have greatly benefitted from the Ham Radio database programs. Because of moving and license upgrades, resulting in different call signs, I had lost track of some very good friends. By using the computer to search the database by name, I have thankfully been able to re-establish contact with some of these friends.

Ron Vincent, KF4D  
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equiv. to FNB-11 (1/2" shorter)		
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*Same size as FNB-26 case		
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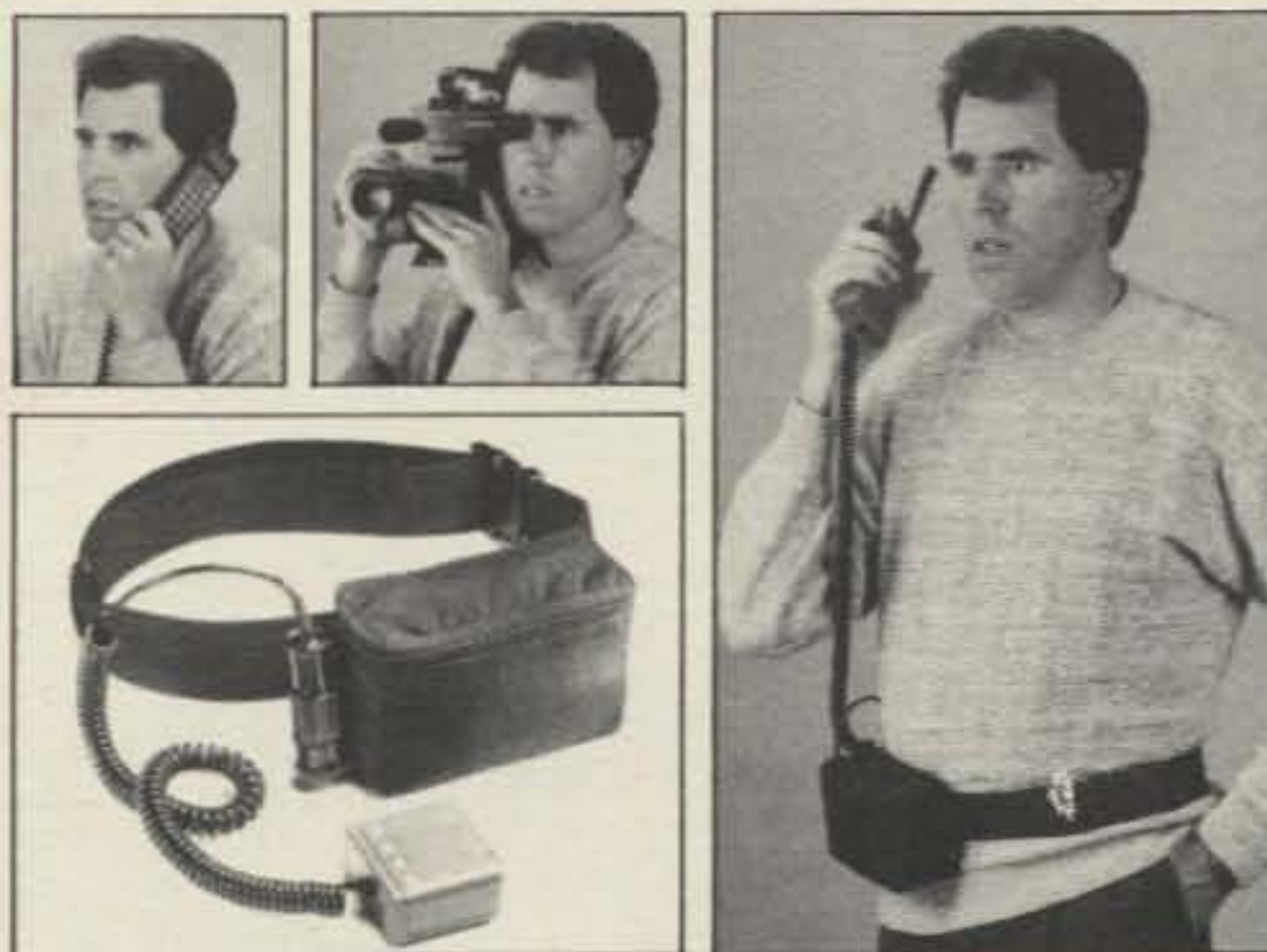
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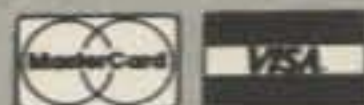
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## WHAT'S NEW AND HOW TO USE IT

### Simplified, Accurate Temperature Measurement

Occasionally, in our experimental endeavors the need to accurately measure temperature arises. Thermocouples and thermistors immediately come to mind, but thermocouples need a precision "cold junction" reference and thermistors are either too non-linear or too non-repeatable.

National Semiconductor Corporation (2900 Semiconductor Drive, Santa Clara, CA 95052; 408-721-5000) has come up with a clever IC that will greatly simplify such measurements. This inexpensive device, called the LM35, is a temperature sensor that covers the range of 0 to 100 degrees C with a basic accuracy of 0.5 degree, and a temperature versus output linearity that does not exceed 0.3 degree, for the military versions. The commercial version relaxes the initial accuracy to 1 degree C and the linearity to 0.5 degree C. What is really unique, however, is that no other circuitry is needed.

The 3-pin device is available in a TO-46 case, a TO-92 case, an SO-8 surface-mount case, and our favorite, a TO-220 housing. This is the same housing used for many common three-terminal regulators. The TO-220 version housing (LM35DP) is nice, as it can be mounted directly to a heat sink, next to a regulator or power transistor, for over-temperature alarm indications. It can also easily be mounted to almost anything that you wish to permanently monitor with its single-screw mounting hole. For those who need a probe, the TO-46 style can be press-fitted or glued into a short length of plastic tubing.

Fig. 1 is a schematic of the basic LM35DP temperature sensor. You will notice that the

c/o CQ magazine

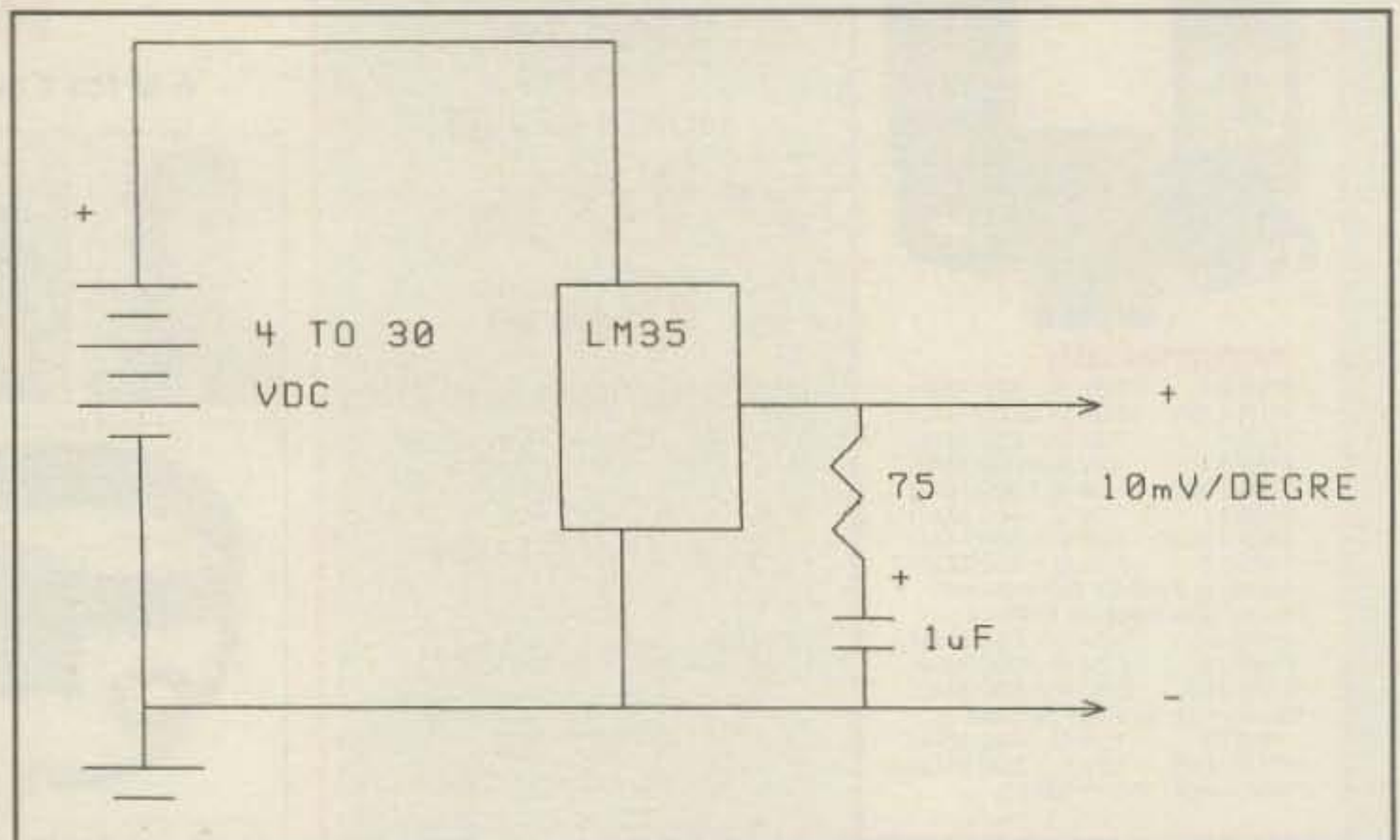


Fig. 1—Basic LM35 temperature sensor.

circuit could not be simpler. Output from the device is nominally 250 millivolts at 25 degrees C and changes at the rate of 10 millivolts per degree C. This works out to 0 volts at 0 degrees C and 500 millivolts at 100 degrees C. Power requirements are anything from 4 to 30 volts DC, and since the device draws less than 100 microamperes, it is ideal for portable or battery-operated equipment. The 75 ohm resistor and 1 uF capacitor, by the way, tend to suppress any noise present on the temperature/voltage output.

Connecting the LM35 to an inexpensive digital voltmeter results in a unique temperature indicator. Simply set the meter to the

one volt range and you can read temperature directly in degrees (C). Two-hundred millivolts is 20 degrees, while 500 millivolts indicates 50 degrees. Mount the TO-92 version in a plastic rod as mentioned, and you have a probe that can be used to measure temperatures of various circuit components to check for overheating.

Representative 1000-piece prices are \$1.26 each for the LM35DP (TO-220) and \$0.97 each for the LM35DM (SO-8). Single quantity prices are somewhat higher. For further information contact National Semiconductor at the above address.

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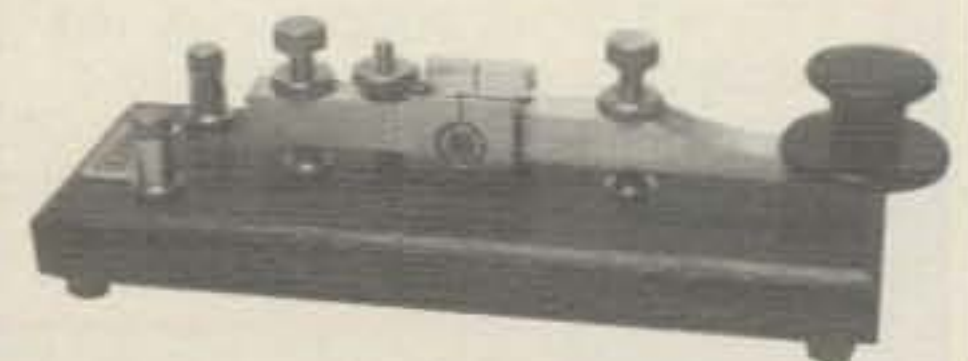
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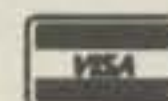
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For more information on Bearcat radio scanners or to join the Bearcat Radio Club, call Mr. Scanner at 1-800-423-1331. To order any Bearcat radio product from Communications Electronics Inc. call 1-800-USA-SCAN.

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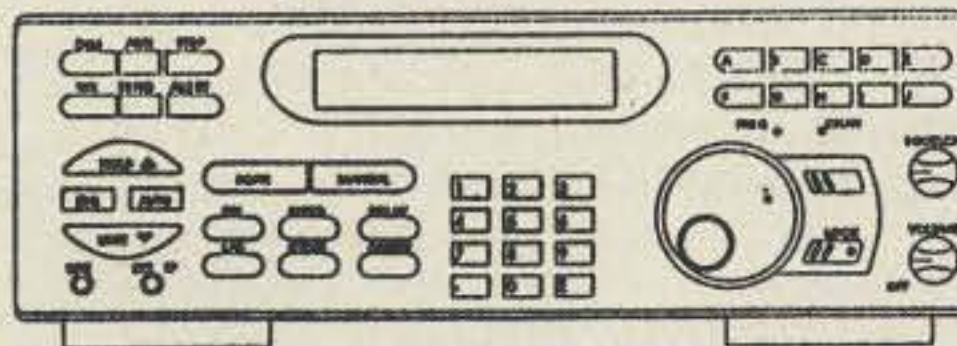
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216.000 - 224.995 MHz (NFM)	12.5/25.0 KHz
225.000 - 399.995 MHz (AM)	12.5/25.0 KHz
400.000 - 511.995 MHz (NFM)	12.5/25.0 KHz
806.000 - 823.995 MHz (NFM)	12.5/25.0 KHz
849.0125 - 868.995 MHz (NFM)	12.5/25.0 KHz
894.0125 - 956.000 MHz (NFM)	12.5/25.0 KHz

The Bearcat 890XLT gives you pure scanning satisfaction with amazing features like Turbo Scan. This lightning-fast technology enables the Bearcat 890XLT to scan and search up to 100 channels per second. Because the frequency coverage is so large, a very fast scanning system is essential to keep up with the action. That's why Uniden's latest technology, *Turbo Scan* is built into our new Bearcat scanners. Other features include *VFO Control* - (Variable Frequency Oscillator) which allows you to adjust the large rotary tuner to select the desired frequency or channel. *Weather Alert* - Lets your scanner function as a severe weather warning radio. *Auto Store* - Automatically stores all active frequencies within the specified bank(s). *Auto Recording* - This feature lets you record channel activity from the scanner onto a tape recorder. You can even get an optional *CTCSS Tone Board* (Continuous Tone Control Squelch System) which allows the squelch to be broken during scanning only when a correct CTCSS tone is received. *10 banks* - Each bank contains 20 channels, useful for storing similar frequencies in order to maintain faster scanning cycles. For maximum scanning enjoyment, order the following optional accessories: *PS001* Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter \$14.95; *PS002* DC power cord - enables permanent operation from your vehicle's fuse box \$14.95; *MB001* Mobile mounting bracket \$14.95; *BC002* CTCSS Tone Board \$54.95. Order your BC890XLT from CEI today.



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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—Part II

**C**ontinuing on in the same vein as last month, here are more antenna items new for '93.

**WB0QCD Alford Slot ATV Repeater Antennas.** In a recent column we took note of *The Complete Amateur Television Workbook*, Revised Second Edition, by Mike Stone, WB0QCD. Mike, of course, is one of the pioneers of amateur television (ATV).

Mike also has introduced the commercial-grade Model AS70 series of modified Alford Slot ATV repeater antennas. These are based on a 1939 Andrew Alford design and further work by Merle Reynolds in the 1980s. The Alford design is well suited for use by low-power TV broadcast stations as well as ATV repeaters and remote transmitters, UHF packet radio links, and individual ATV stations. The AS70's key characteristics are an omnidirectional pattern, horizontal (instead of vertical) polarization, and a wide bandwidth that's favored by the UHF DX community for ATV.

The single-bay AS70 is a two-wavelength, 5.6 dBd gain horizontally polarized omnidirectional antenna; a dual-slot, 8.0 dBd gain array also is available. The antenna is professionally machined, being made out of rugged, 4 inch round, 1/8 inch thick wall aluminum alloy material. Each antenna assembly has a 3 inch long (before threading) solid-core all-metal base plate mounting plug that's triple-bolted inside the bottom of the tubular array and threaded to accept standard, 1.5 inch diameter support pipe.

Included with the AS70 are a Type N female coaxial connector, watertight top cap, rubberized slot opening cover, 100:50 ohm matching harness, and wideband capacitance tuning stub. Optional hardware fittings are available for side-arm tower mounting. The assembly is chemically and electrolysis-dipped for anodizing weatherproofing in either gold, black, or clear colors. A flat SWR and good gain/bandwidth performance over the entire 420–440 MHz band is claimed. The antenna, priced at \$389.95, carries a 5-year warranty. A dual-bay slot version on one 12 ft. tube is \$849.95. Joiner sleeves to combine two AS70 antennas, as well as a variety of mounting and other hardware, are offered.

For detailed specs contact WB0QCD Antenna Manufacturing, 770 Quincy Ave., Clarence, IA 52216-9368 (319-452-3628). A VHS videotape demo is available which shows construction and performance features.

**Directional Wire Antenna.** Just Antennas has introduced a broadband, off-center-fed high-power directional wire antenna that's current-fed with coax. The HF-DX 8010-8 is said to combine the best features and radiation characteristics of the multiband off-



*The Model AS70 modified Alford Slot ATV Repeater Antenna offered by WB0QCD is based on a 1939 Andrew Alford design and later work by Merle Reynolds in the 1980s. The slot design is well suited for use by low-power TV broadcast stations as well as ATV repeaters and remote transmitters, 70 cm packet radio links, and individual UHF stations. The basic antenna is a two-wavelength, 5.6 dBd gain horizontally polarized omnidirectional radiator. A dual-slot, 8.0 dBd gain array also is available. (WB0QCD photo)*

center-fed dipole and the Bobtail Curtain wire array.

The new antenna's characteristics include installation in a 100 ft. maximum space; 80–10 meter coverage, including the WARC bands; claimed typical SWR less than 2.5:1 without an antenna tuner; a power-handling rating of 1500 watts SSB or 1000 watts CW; both horizontal and vertical polarization; a heavy-duty current balun; 50 ohm coax feed; no ground radials or traps; and suitability for SWL use. The antenna is furnished preassembled.

The HF-DX 8010-8 is \$119.95 plus \$8 shipping and handling. Technical notes and a catalog (deductible from an order) are available for \$3 from Just Antennas, 4 Deer Tract Drive, Little Mountain, SC 29075.

**Cushcraft Eight-Band HF Verticals.** Cushcraft has introduced a new, eight-band, quarter-wave HF vertical antenna. The AP8A is 26 ft. tall and covers the 10, 12, 15, 17, 20, 30, 40, and 80 meter bands yet weighs but 9.5 lbs. The clean-profile AP8A claims uncompromising strength for high-wind survivability, being constructed of double- and triple-wall aluminum tubing. High-efficiency traps are used and bandswitching is automatic.

A companion radial kit, the APR18A, is available. It consists of nine multiple- and single-conductor radials with a maximum length

of 31 ft. The small radial "footprint" makes the antenna convenient to use for permanent or portable operation either at ground level or on a rooftop. For more information contact Cushcraft Corporation, P.O. Box 4680, 48 Perimeter Road, Manchester, NH 03108 (603-627-7877).

Note that the quarter-wave AP8A should not be confused with Cushcraft's R5 and R7 verticals, which cover multiple HF bands in a *halfwave* (rather than quarter-wave) mode, and which do not require the use of ground radials.

**Rupp TR-100 Digital SWR and Power Meter.** A peak- and average-power RMS reading digital SWR/power meter with a 3/4 inch LCD display is offered by Thomas R. Rupp, KU8T, of Rupp Electronics, in assembled and kit versions. It sports some novel features.

The TR-100 covers 1.8–30 MHz and reads 1 to 1625 watts PEP. The unit automatically calculates SWR from 1.0:1 to 25.5:1, even during AM, FM, or SSB modulation. The unit samples power and SWR several times each half-second; it only takes .03 second of RF energy to calculate SWR. The TR-100 holds the worst-case value SWR and highest power value, then updates the display every half-second. You can lock the unit into reading SWR or power (or both) via a switch on the

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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.

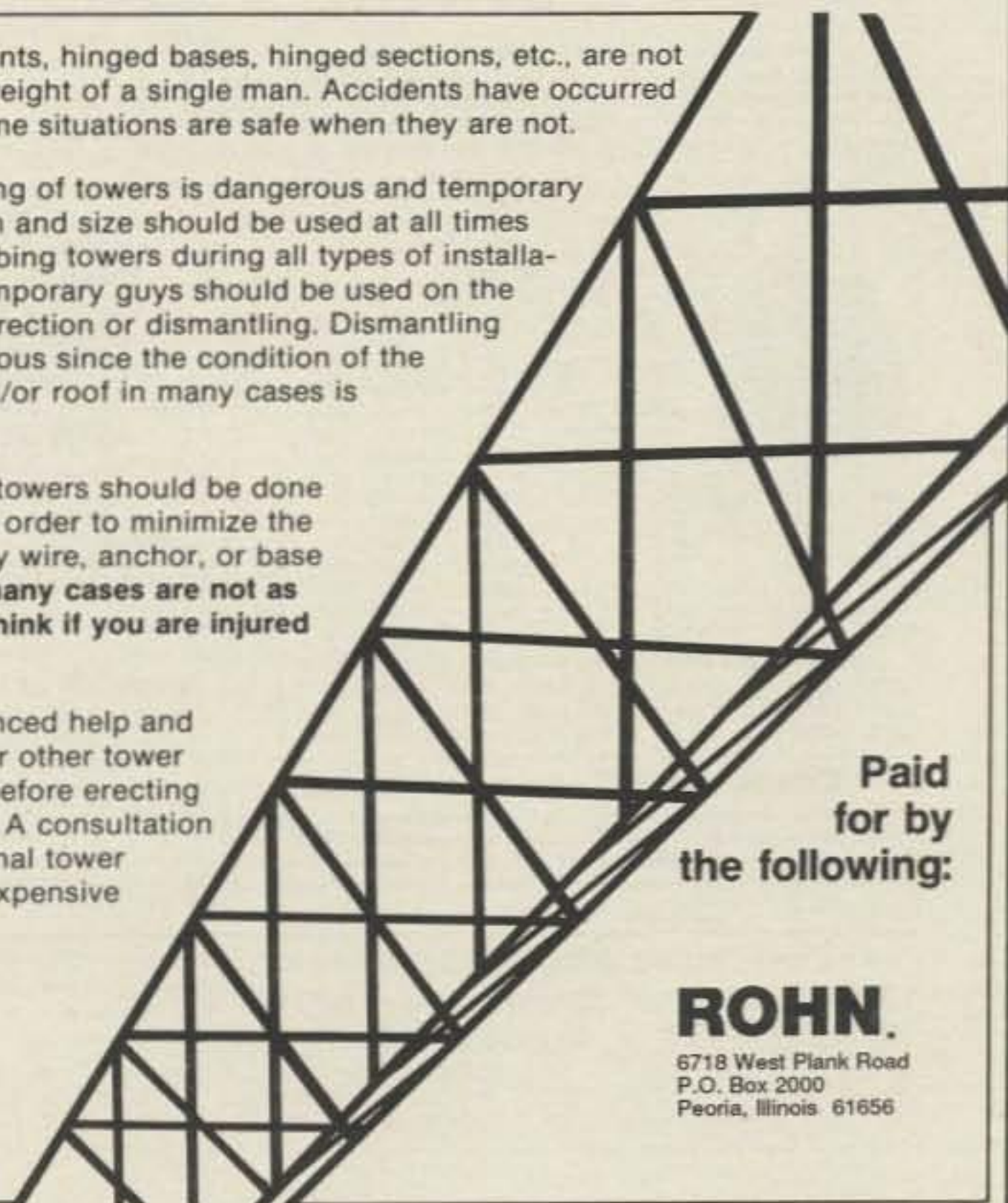
The dismantling of some towers should be done with the use of a crane in order to minimize the possibility of member, guy wire, anchor, or base failures. **Used towers in many cases are not as inexpensive as you may think if you are injured or killed.**

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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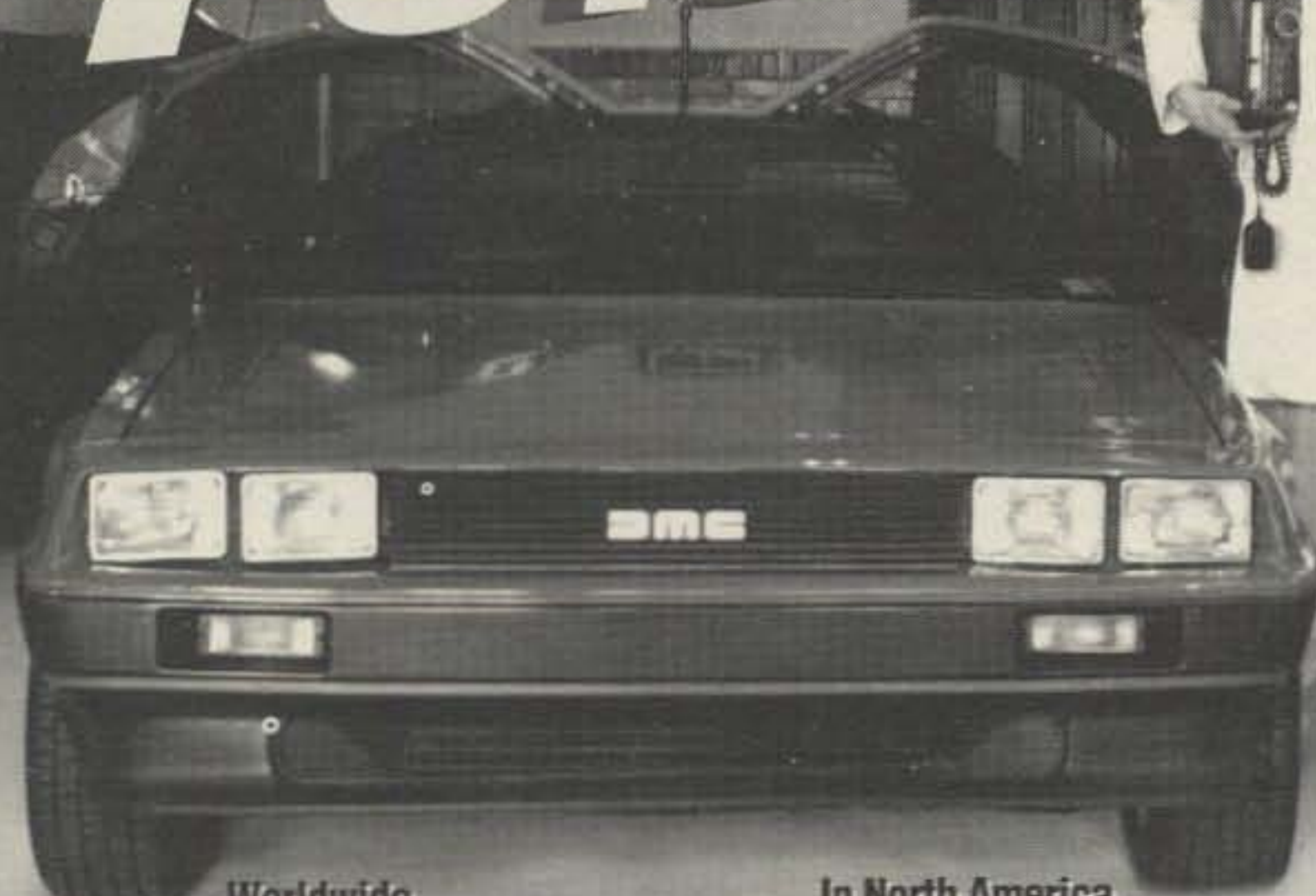
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HT58	50pF	5kv	\$12	HT58	300pF	5kv	\$13
HT58	60pF	5kv	\$13	HT58	400pF	5kv	\$13
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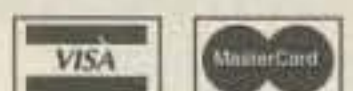
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Amidon offers at least 17 types of high-power ununs; most work over the range 1 MHz to 30 MHz or higher and handle at least .5 to 1 KW continuous RF power and up to 10 KW peak power, depending on the particular model. The line includes two "multimatch ununs" that respond to a variety of matching situations. Also listed are some seven models of high-power baluns that handle balanced-to-unbalanced matching situations.

For a flyer, write to Amidon Associates, 2216 East Gladwick St., Dominguez, CA 90220 (310-763-5770). And for more information on ununs—fairly new products for the amateur community—check out Jerry Sevic's article "The 4:1 Unun" in the January 1993 issue of *CQ*. Also note coverage of the competing Palomar Engineers unun transformers in our February *CQ* column.

**Cable X-Perts RG Mini 8(X) Coax.** A clear-jacketed RG mini 8(X) coaxial cable is offered by Cable X-Perts. The new product has a soft, highly flexible, and ultraviolet-resistant clear PVC jacket. The clear coax blends nicely into practically any surroundings and is claimed to be aesthetically more appealing than traditional black-jacketed cable. The new cable has the same electrical characteristics as the firm's other 95 percent braid coverage black coax but runs 2 to 4 cents more per foot.

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For product information, contact Coaxial Dynamics, Inc., 15210 Industrial Parkway, Cleveland, OH 44135 (1-800-COAXIAL).

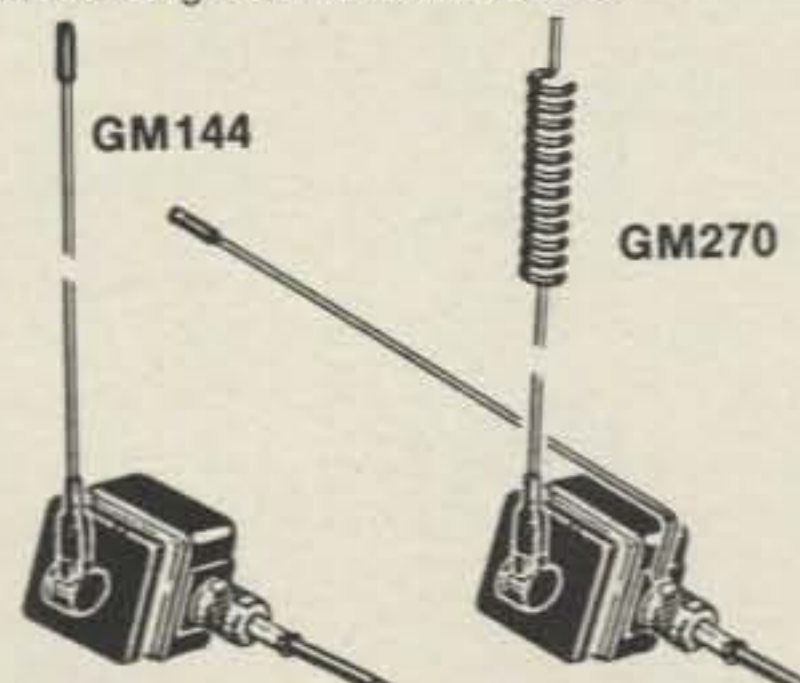
**Solder-It Solder Pastes.** Can there be anything new and high-tech in the world of soldering? Fred Doob, AA8FQ, markets a variety of specialty soldering pastes and tools that says there are indeed some new aspects to that art and science. If you've had trouble soldering coax fittings, aluminum tubing, antenna set screws, and other often cantankerous materials, read on.

The main product that Fred's Solder-It Co. offers is The Solder Kit. The kit contains the necessary fluxes—silver, aluminum, copper, and pot metal (for zinc die-cast and white metals)—plus a pencil butane soldering torch. The idea is to offer a one-stop product that has better holding power than regular solder and that works well at lower temperatures and with hard-to-solder metals. The \$59 kit includes the four solder paste syringes, a refillable butane pencil, and a vinyl storage pouch.

Special fluxes are formulated into each paste, and they are packaged in no-mess applicator syringes which allow one-hand-free soldering. Professional results, including neat, clean joints with superior tensile

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PRO•AM's GM144 is 27.5 inches tall, handles up to 50 watts and covers 144-148 MHz with SWR below <1.5:1 across entire band (tunable via interior coupling unit). Gain is 2.5 dB. Almost doubles your transmitted signal strength and extends receive range accordingly. You will be delighted with the results.



PRO•AM's GM270 is 26 inches tall, handles 50 watts, and covers 144-148 plus 440-450 MHz with SWR less than <2:1 at band edges (tunable via interior coupling unit). Gain is 2.6 dB 2m and 6.3 dB 70cm. A real tiger!

"Stylish, trim, and petite" only begin to describe PRO•AM's exciting new 2 meter, 70 cm, and dualband mobile antennas. They feature a slender black chrome whip and small candy kiss-size base that looks terrific on any auto. Inside the little 1 1/4 inch diameter base is a newly-developed and ultra-strong titanium magnet that holds in place like a bulldog, even at high speeds. These new micro magnet antennas are supplied fully assembled and ready to use, with 9 feet of RG-174 mini coax and BNC connector.

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- Pretuned
- Low SWR
- Wide bandwidth
- 25 watt rating
- Weighs only 4 oz!
- New micro magnet look
- Super trim whip
- Micro-size base
- Titanium magnet
- Ready to use
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### Technical Data

- MM144B 2m: 19" tall  
1/4 wave whip
- MM450B 70cm: 6.5" tall  
1/4 wave whip
- MM270B 2m/70cm: 19" tall  
1/4 wave 2m,  
5/8 wave 70 cm

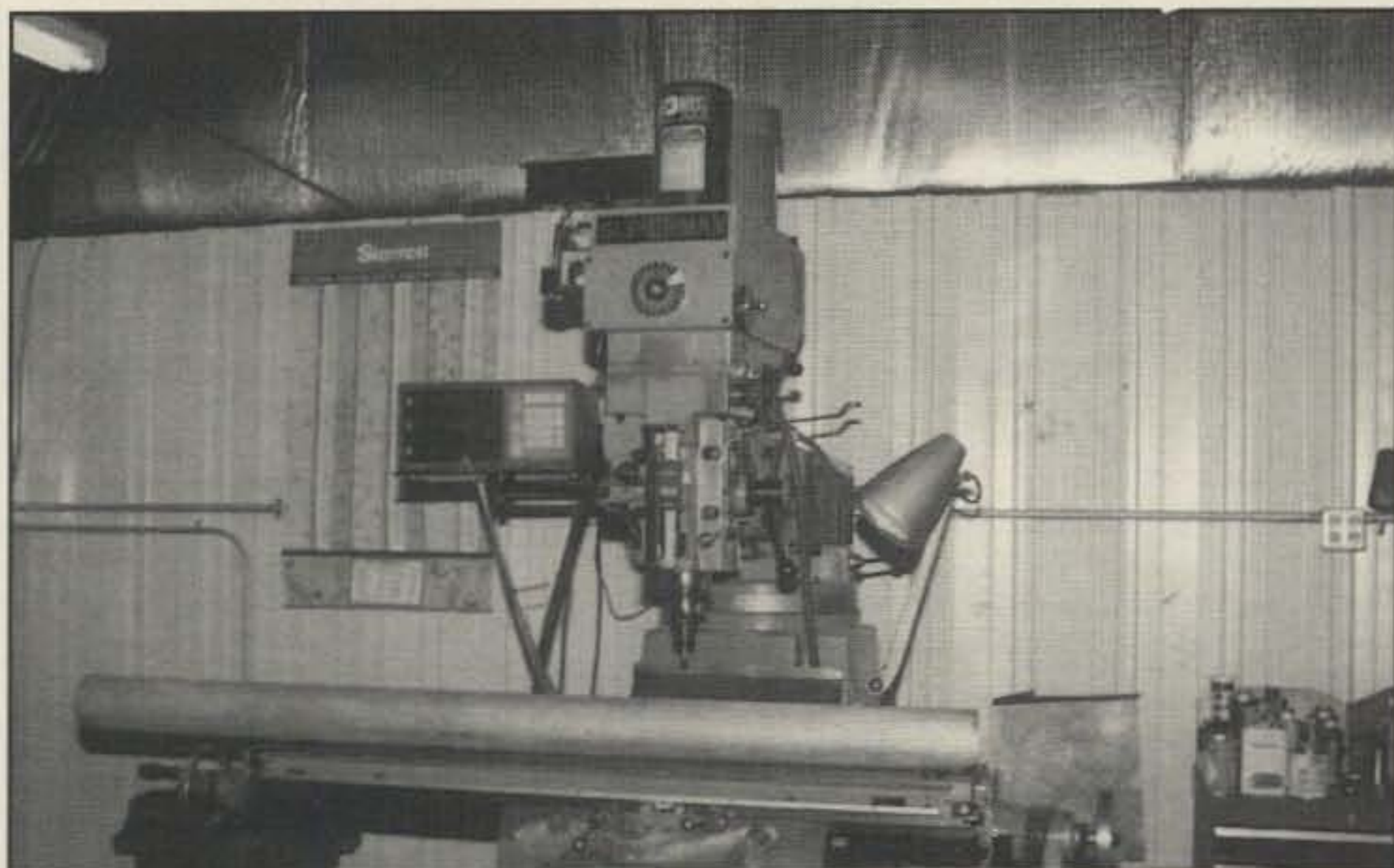


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The AS70 modified Alford Slot offered by Mike Stone, WB0QCD, is professionally machined, being made out of rugged, 4 inch round, 1/8 inch thick wall aluminum alloy material. A VHS videotape is available that shows construction and performance features. (WB0QCD photo)



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Connectors	Type-N, UHF, BNC, Adapters	Stock
CQ RG-8X	95%, Type IIA non-contaminating	23¢
CQ-8X MM	Solid Dielectric, 95%, Type IIA	27¢
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R2 Rotator	8 conductor (2x16, 6x18)	37¢
R4 Rotator	8 conductor (2x14, 6x16)	48¢
#16 Silky	19-strand, Cu-clad, strong, flexible	8¢
#14 Silky	19-strand, Cu-clad, strong, flexible	11¢
#14 HD	Stranded (7x22) hard-drawn copper	8¢
#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¢
450 Ladder	#16, 19-strand, cu-clad, poly, windows	19¢
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B1-5K	5 kW 160-10,	Coax In, Wire Out	\$29.95
Y1-4K	4 kW 160-10,	Coax In, Wire Out	\$24.95
Y1-5K	5 kW 160-10,	Coax In, Wire Out	\$29.95

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B4-1.5K	1.5 kW 80-10,	Coax In, Wire Out	\$19.95
B4-2K	2 kW 80-10,	Coax In, Wire Out	\$22.95
B4-2KX	2 kW 160-10,	Coax In, Wire Out	\$39.95
RemoteBalun	1 kW, Coax-to-Openwire interface		\$28.95

### Line Isolators

4K-LI	4 kW, 50 Ohms, SO-239 In, SO-239 Out	\$19.95
4KV-LI	4 kW, for Verticals, SO-239 In, PL-259 Out	\$26.95

## REFERENCE CATALOG

128 pages of hard-to-find parts and reference data on antennas, baluns, antenna support line wire, cable, and coax. It reads like a magazine. Articles on ground systems, "Budget DXing", "High Performance Wire Antennas," and much more. Order the Reference Catalog and receive our General Catalog, free. Send \$4, cash or check for both catalogs, ppd.

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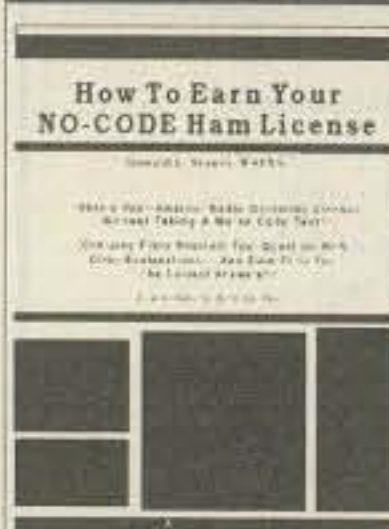
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CIRCLE 173 ON READER SERVICE CARD

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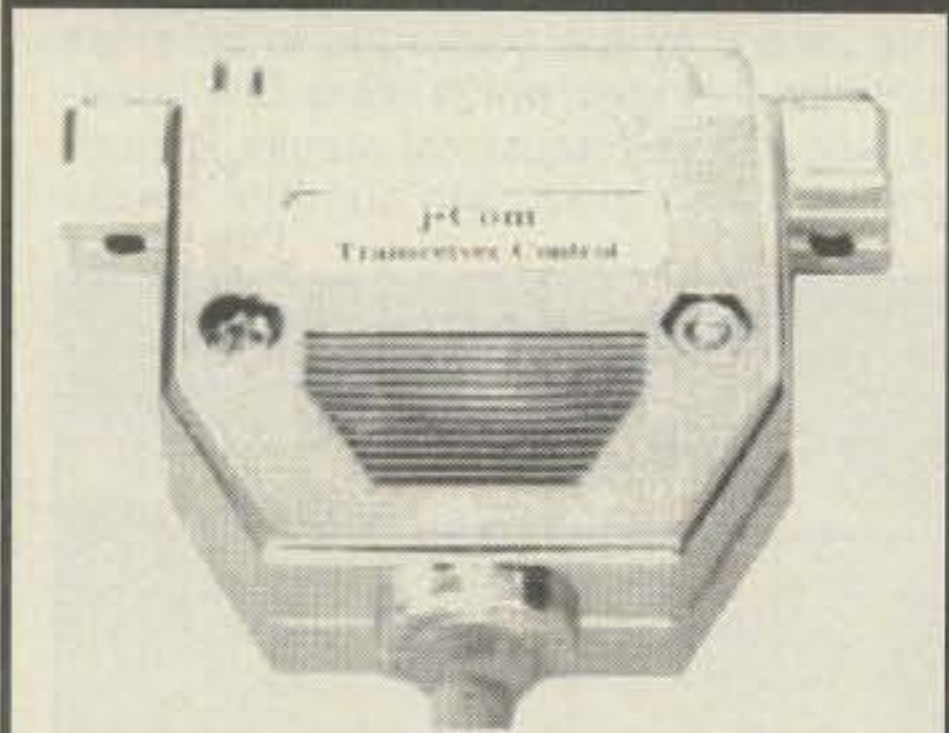
**How To Earn Your No-Code Ham License** is not a memorization book and it isn't loaded with material you won't be asked on your test. "Twin Noise Squelch" explains the theory behind the questions in a simple, easy-to-understand style. The actual questions that will be asked are included at the end of each chapter so you can *test yourself immediately*. Numerous photos and drawings make the information easy to absorb. Great for Novice testing too! **How To Earn Your No-Code Ham License** is an ideal classroom textbook and is supported by testing software for the IBM and Macintosh and an instructors guide, with view foils, for teachers. In stock at all major Amateur Radio dealers or call NARA toll-free for same day shipping. Now only \$9.95 (\$2.00 S&H)



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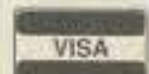
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strength (10,000 to 28,000 psi) and excellent electrical conductivity, are claimed. The low melting temperatures reduce the possibility of metal distortion and insulation melting.

For more information on the specialty soldering pastes and tools as well as some useful soldering hints and tips, contact Solder-It Company, P.O. Box 20100, Cleveland, OH 44120 (216-721-3700), or check out the January 1993 issue of CQ for a product review by my CQ colleague Lew McCoy, W1ICP.

## New Software '93

**Antenna Specialists BBS is Online.** Antenna Specialists has activated a new Bulletin Board System (BBS) that lets you access technical information and individuals in the company's technical services and engineering departments with public and private messaging. The service is free to A/S customers, communications system operators, RF engineers, and radio amateurs.

The new BBS is up 24 hours a day and provides diverse information such as the latest A/S product specifications, digitized A/S antenna patterns, application notes, trade show schedules, seminars, and even an online electronic trivia contest known as "KING." The BBS also offers files and data downloading by users, as well as an online help utility and a complete tutor to familiarize users with the BBS. Modem communication format is 300/1200/2400 bps with N-8-1 settings; call 216-349-8698. The BBS is sponsored by The Antenna Specialists Co., 30500 Bruce Industrial Parkway, Cleveland, OH 44139-3996 (216-349-8407).

**Morse Trainer.** Mike Erskine offers a good Morse tutor program that has its roots in Morse learning techniques suitable for the training of signals intelligence collectors.

The menu-driven program has two basic modes of operation—the "learn Morse" and "practice Morse" options. The learn option sends Morse at whatever rate you select in the user setup. The program sends the simpler letters of the alphabet (such as E, I, S, and H) first. As you gain proficiency, the program adds new letters and adjusts its sending speed by measuring your error rate to maximize the student learning curve.

The practice option is similar, but asks you what letters you want to practice. If you're having difficulty with a letter, or confuse several letters, you can enter the letters that are giving you problems so that only those letters are sent.

The program is available on BBSes and also is offered by the author for a \$5 registration fee. If you want the source Pascal source code, it's \$10 plus an SASE disk mailer with a formatted diskette of your choice. Contact MORSE TRAINER, c/o Mike Erskine, 4301 Jon Cunningham, El Paso, TX 79934.

**N4ZDU Shareware.** Robert L. Gilmore, N4ZDU, offers a catalog-on-disk that contains over 3000 selected shareware, freeware, and public-domain software titles for the IBM PC. The catalog is nicely organized into 86 categories and contains a very easy-to-use "search engine" to help you find appropriate programs.

The catalog also contains a good tutorial on understanding and using shareware files, and there also is a very interesting mini-his-





Antenna Specialists has activated a free, new Bulletin Board System (BBS) that lets you access technical information and individuals in the company's engineering and technical services departments. Modern communication format is 300/1200/2400 bps with N-8-1 settings at (216) 349-8698. The BBS is up 24 hours daily. Here, A/S executives Andy Singer (left) and Al Dolgosh review pattern plot software downloadable from the new BBS. (Photo courtesy The Antenna Specialists Co.)

tory on shareware and freeware. As Robert points out, shareware, freeware, and user-supported software are all terms used to describe a relatively new phenomena in the computer world that only dates from about 1982. Shareware, it's emphasized, isn't just a novel idea; rather, it's a solution to the software author's distribution problems and the consumer's high prices.

The disks are available in 360K or 720K formats and are priced at \$4 and \$5, respectively, per disk. Several CD-ROM discs also are available. These include the entire contents of the catalog for \$149.95 and—or those who would like to enter a sort of "software heaven"—a software-loaded "Monster Database" CD-ROM containing more than 6400 files taking up 654 MB, for \$89.95.

For more information, contact N4ZDU Shareware, P.O. Box 40, Old Town, FL 32680 (904-493-0505).

**WJ2O Master QSO Logging Program Update.** In *CQ* we first discussed Dave Farnsworth's WJ2O Master Log for the IBM PC in the December 1990 column. Dave's logger has a number of impressive features and new enhancements, including data transfer from Lotus 1-2-3 and at least ten other amateur loggers; easy identification of DXCC countries and zones; WAS, DXCC, and WPX reporting; a net operating section; a search and scan capability; menu-driven operation; custom or "stock" QSL card printing and tracking; selectable printouts; several pop-up help utilities; and an 11-chapter, 50-plus page manual. A detailed program review was conducted by Joe Staples, W5ASP, for the *National Contest Journal* and was reprinted in the May-June 1992 *Digital Digest*.

The price has changed since we last covered the program; it's now \$49.95, available from Dave Farnsworth, WJ2O, P.O. Box 16, 2945 Main St., McConnellsville, NY 13401. A demonstration disk is \$2, or Dave will send

you the full 50-plus page manual and the demo disk for \$5 (specify 3.5 or 5.25 inch format).

**Shortwave Navigator Update.** In July 1990 we discussed Shortwave Navigator for serious shortwave listeners and Macintosh users. To recap, Shortwave Navigator is a sophisticated Mac database program to help SWLs track program schedules for their favorite shortwave outlets. There also are computer control features for several Drake, JRC, and Kenwood radios. The program is designed to get the SWL through the first year of on-the-air use; a subscription-like series of upgrades is offered. Many new enhancements have been included in the program in the three years since we first encountered it.

The program lets you track various items of interest such as DX programs, English-language news broadcasts, frequency schedules, broadcaster profiles, and the like. You can customize portions of the program to suit your listening tastes. There also is a built-in program log to record reception of SW broadcasts, as well as a memory manager enhancement feature for users having memory-type receivers. Other program capabilities include automatic broadcast finding, program and frequency finder functions, custom report creation, function and control key macros, utility functions, and printed and bound documentation.

Computer-control features include separate menus for each radio, command keys for menu items, control bar displays, frequency scanning from schedule or log cards, and various scan and sweep functions. Custom receiver cables also are available.

Shortwave Navigator is designed for the Apple Macintosh with HyperCard V2.1 or newer as a necessary application. The program is \$99, which includes shipping and one free upgrade, from DX Computing, 232 Squaw Creek Road, Willow Park, TX 76087 (817-441-9188). A subscription with four an-

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IC-228H 2-Meter, FM, 45 Watt Xcvr. ....	359.00
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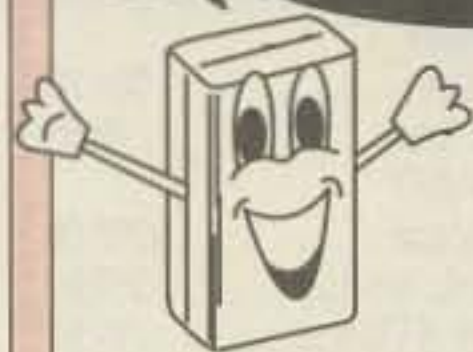
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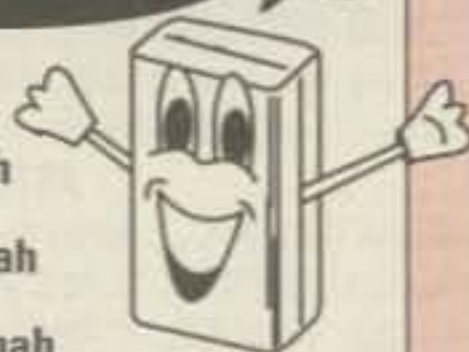
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CIRCLE 166 ON READER SERVICE CARD

C:\EXEC

PREVIOUS DIR4	DOSCLIP COM	MEMCHK COM	SLOW COM
TSRNOTE ASC	ENTER COM	MUSIC COM	SNIPPER COM
BEEP COM	FF COM	NOSLOW COM	SSTAT COM
BOOT COM	FIXCOM COM	NUMLKOFF COM	TOGGLE COM
BROWSE COM	FLASHLED COM	PAN COM	TONTO COM
CHKMEM COM	FORMFEED COM	PARK COM	TSRMAKER COM
COPYQM COM	FREE COM	QT COM	TSRNOTE COM
CPANEL COM	GLOM COM	RAT COM	TUNE COM
CR_LF COM	INPUT COM	RS232 COM	VI COM
DATECHEK COM	IOLITE COM	SB COM	VIEW COM
DDDD COM	IOLITE2 COM	SETMODE COM	WAIT COM
DDIR4 COM	KEYCLICK COM	SHOWTIME COM	WPD COM
DMD COM	LS COM	SIREN COM	YN COM

File Mgt	
8:32:59am	
Caps	Num
Pause	Print
Drives	
Default	C:
Display	C:

Compose	Copy +	Move +	Rename	Erase	Search	Locate	FileMgt2
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C>

Compose	Tree	View	Programs	File Mgt	Faces	Menus	Wonder+
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Use to activate the DOS Command Line

<F9> for Help

Fig. 1—Bourbaki's 1dir+ "two menu face" is illustrated here. It's one of the 11 distinctive display faces the shell offers. This face has two command menus (instead of one), only one of which is active at any given time. It also has a miniature wide directory display and date window. The face is perfect for situations where you can meet all your menuing needs with only two menus. It's also good if you have up to 16 commands that you frequently use and that you want to make available all the time. 1dir+ is my favorite DOS shell, one which I plan not to give up soon—even for Windows.

nual program updates is \$50.

**Two from Bourbaki.** Config-It-All is a multiple configuration and reboot utility offered by Bourbaki, Inc. It's a simple system for creating and editing multiple system configurations, based on variations on the PC's AUTOEXEC and CONFIG files. The program provides a solution to the problem of conveniently booting your PC using entirely different system configurations. With it, you can create matched sets of configuration files and save them as different "named configurations" in the utility's database file.

The program's approach makes it fairly easy to zero-in on optimum setup configurations using DOS 5.0 or third-party memory managers, and to keep track of a series of test configurations. This convenient and easy-to-use utility is \$39.

Saving the best for last, 1dir+ is my favorite DOS shell, and has been since I obtained a PC-XT in 1986. Bundled with my tiny 32 MB hard drive was an early version of 1dir+ with which I fell in love. The program has been through numerous revisions and now is up to at least to V3.5, to which I upgraded.

1dir+ is a powerful, highly configurable DOS utility that integrates your computer operations and applications. It's a combination of point-and-shoot DOS shell, custom menuing, and hard-disk management features. Some attributes are global file operations; a tree display; extensive customization capability, including 11 alternate screen "faces" that display different file and directory information (see fig. 1); individual directory personalization; a command that lets you

automatically run an AUTOEXEC-like file upon selecting a directory; and a pop-up library of 1dir+ commands. It also offers extended filename descriptions and a utility that builds commands for applications.

1dir+ has more than 75 built-in commands that control DOS operations. Most 1dir+ screen faces let you keep the DOS command line prompt on your screen; thus the shell doesn't restrict your access to DOS as do many shells. The 1dir+ V3.5 program is \$95.

Both Config-It-All and 1dir+ are available from Bourbaki, Inc., P.O. Box 2867, 615 W. Hays, Boise, ID 83701 (1-800-289-1347).

**New Books and  
Other Readables '93**

**Amateur Radio RV Antennas.** This new, specialized antenna book by Robert K. Benson, W2HZF, examines a wide variety of recreational vehicle (RV) types, including motor homes, campers, and trailers, plus boats and campground installations. The book puts you in a better position to either build and install your own RV antenna or purchase the commercial antenna that best meets your needs. It describes the antennas that are best for use while driving and those more suitable for campground use. Mounting positions and procedures are detailed, as are tips on the selection and installation of ancillary equipment needed for an efficient RV-based amateur station.

The Benson book has about 65 pages, including three appendixes on mobile anten-



nas and mounts, campground antennas, and boat radio choices. It's \$14.95 plus \$2 shipping from Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147 (414-248-4845).

**Three from Que.** I recently had the opportunity to examine three new computer books from Que, now part of the Prentice-Hall Computer Publishing organization. Let's briefly look at them.

The first title is almost titillating. It's *Real Men Use DOS*, by Mike Miller and Shelley O'Hara (Que, 1992, 302 pages, \$16.95). It's a humorous book that focuses on DOS commands you must know. Miller looks at DOS from a "real man's" standpoint, while co-author O'Hara counters with her female-based DOS interpretations. Included are ten reasons why real men need DOS, why they like the command prompt, and why they put their stamp on DOS. There also are ten opposing reasons why real women don't need DOS, and why they prefer the DOS Shell.

The second is *Oops! What to Do When Things Go Wrong*, by Mike Miller. Miller's book has plain-English explanations to help you recover from hardware and software problems. It contains tips on heading off computer problems and determining what went wrong in various problem areas. Included is a troubleshooting roadmap that refers you to the chapters to which you can turn in order to diagnose and cure problems (Que, 1992, 366 pages, \$16.95).

Third is a monster reference. It's *Upgrading and Repairing PCs*, Second Edition, by Scott Mueller. This massive PC resource is for those who want to repair, maintain, troubleshoot, and upgrade their computers. It offers detailed coverage of the technical specs

and differences of popular IBM PC, PS/2, and compatible systems. The Mueller book also provides thorough information on PC architecture (Que, 1992, 1298 pages, \$34.95).

Brady Books also is under the Prentice Hall umbrella these days. I enjoyed their *Peter Norton's Problem Solver*, Second Edition, by Peter Norton and Robert Jourdain. This desktop reference guides you to solutions to everyday PC tasks and problems. Each chapter starts with a mini-tutorial on how things work. There are chapters on preventing and dealing with computer disasters, recovering damaged or lost data, and coping with hardware malfunctions (Brady Books, 1992, 696 pages, \$29.95).

**Four from McGraw Hill.** I also recently examined several good computer books that carry McGraw-Hill imprints. First on the list is *File & Disk Management: From Chaos to Control*, by Alfred Glossbrenner (Osborne McGraw-Hill, 1993, 752 pages, \$39.95). The book includes a 3.5 inch diskette with many useful software utilities and tools. It's a complete toolkit for maximizing hard-disk performance; both hardware and software aspects of PC performance are covered. Topics include navigating through the system using DOS, menus, and shells; batch file tips; and managing and maintaining your hard disk. It's a very thorough presentation.

Another book by Glossbrenner was equally interesting: *Glossbrenner's Guide to Shareware for Small Business*. If you're a small-business entrepreneur, you might be interested in its money-saving message: the book helps businesses save on software by relying on shareware. It emphasizes applications: accounting, wordprocessing, data-

base, spreadsheet, and communications. Included are several shareware discount coupons (Windcrest/McGraw Hill, 1992, 378 pages, \$27.95, with one 5.25 inch diskette).

I also chanced on Richard B. Levin's *The Computer Virus Handbook* (Osborne McGraw-Hill, 1990, 411 pages, \$24.95). Though not brand new, I found Levin's book surprisingly current and highly predictive of the current state of computer viruses. Also, though I haven't yet reviewed it, there's a new virus book on the shelves, *Rx PC: The Anti-Virus Handbook*, by Janet Endrijonas. The book contains reviews of nine antiviral software packages and a 3.5 inch diskette, making it a complete antivirus toolkit (Windcrest/McGraw-Hill, 1993, 256 pages, \$29.95).

## Short Bursts

**Address Update.** In the January column we mentioned the beginner book *All About Ham Radio*, by Harry Helms, AA6FW, and held it out as an excellent book to introduce newcomers to amateur radio. Recently, we found that Harry's publishing house, HighText Publications, had moved. The new address is 125 North Acacia Avenue, Suite 110, Solana Beach, CA 92075 (1-800-888-4741).

## Wrap-Up

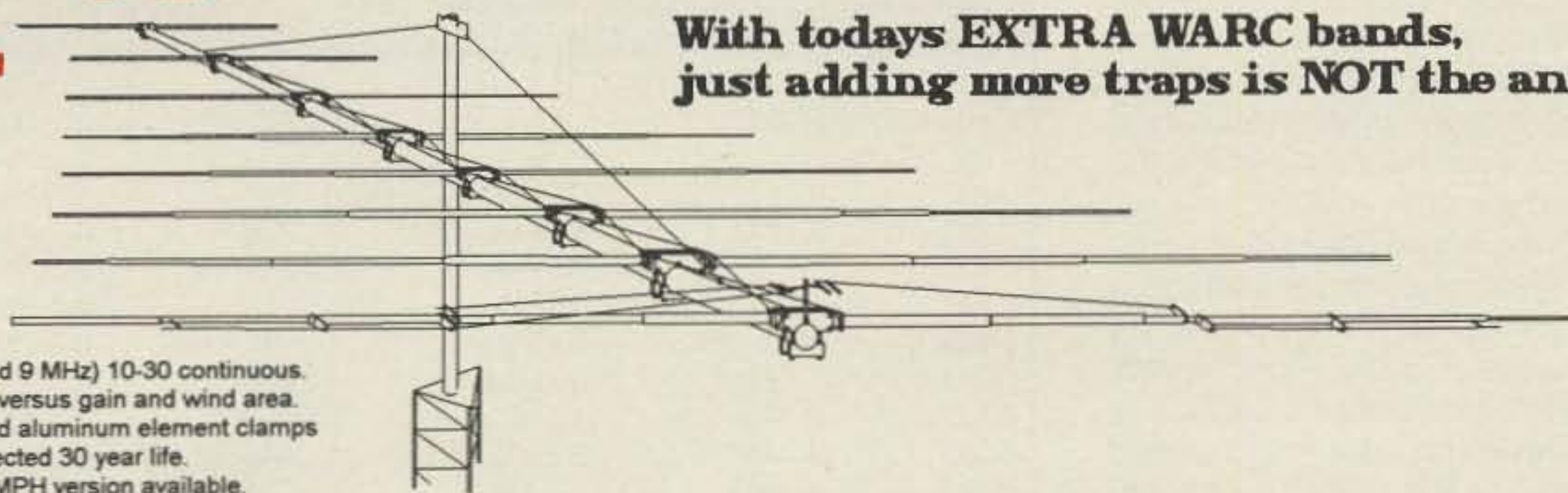
That's all for this month. Next time more Antennas and Accessories topics of current interest. See you then.

*Overheard:* Absolutely nothing is ever so bad that it can't get at least a little bit worse.

73, Karl, W8FX

# M<sup>2</sup>

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## THINKING HAMS ARE FIGURING IT OUT!

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## "HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

### Time

It usually takes a long time for new amateurs to learn that it is better to use Universal Time Coordinated (UTC) in their operating activities than it is to use their local time. However, the advantages related to using the 24-hour UTC system are easily defined. The most important reason for using UTC is that it eliminates confusion among amateurs in different time zones. The use of UTC standardizes and simplifies the times stated in log entries, QSL contact reports, contest times, scheduled one-way transmissions (code practice, bulletins), and personal schedules. The use of UTC enables amateurs throughout the world to eliminate the confusion commonly related to using local times in different time zones. The 24-hour UTC system is also referred to as Greenwich Mean Time (GMT) and Zulu time, but UTC is the correct term.

The 24-hour UTC system is simple. Time is indicated with a 4-digit system. The first two numbers give the hour of the day, and the last two numbers show the minutes of the hour. There are 24 hours in a day and 60 minutes in each hour. One minute into a new day the time is 0001, and 58 minutes later it is 0059. The time shifts from 0059 to 0100 one minute later. This system is repeated through one minute before midnight, which is 2359. Two minutes later it is the next day, and the time is 0001.

Many operators who use UTC and the 4-digit time system neglect to shift to the next date a minute after the point when the time passes 2359. Simply stated, when the UTC time passes 2400, it is afternoon or evening here in the United States. If it is a Thursday and the 4th day of the month locally, it is Friday and the 5th day of the month in accordance with UTC. Failure to observe such a change in the date can cause an operator to look for QSO confirmation data on the wrong page of a log. This is a continuing problem that could easily be avoided.

WWV is our American time and frequency standards station. WWV is heard best on 10 and 15 MHz during the day. Five and 10 MHz are most useful at night. Ten MHz is usually good for receiving WWV day and night. Set your

time pieces according to WWV and you will have set them to the correct time.

The accompanying chart allows you to easily convert between any local USA time and UTC. Eastern, Central, Mountain, and Pacific times are listed in both Daylight Savings Times (DST) and Standard Times (ST). Until you become familiar with your local time's relationship to UTC, you may find it helpful to post a copy of this chart in your shack.

It was interesting to chase the origin of the so-called "military" 4-digit time system. I quickly determined that our Air Force, Army, and Navy-Marine Corps had no inkling of its origin. I received bits of useful information from the ARRL, Consultative Committee International for Radiocommunications (France), International Telecommunications Union (ITU-Switzerland), Maritime Information Centre (England), National Institute of Standards and Technology (WWV-Fort Collins, Colorado), Paris Time and Frequency Observatory (France), and the Union of Radio Clubs (France).

The National Maritime Museum (England) traced the 24-hour time sys-

tem back to around 4000 BC, when the Babylonians developed it. The Babylonians were the great mathematicians of the ancient world. They appear to have worshipped the practicability of number systems. They used a 60-based system for all their calculations (sexagesimal), because 60 can be divided by many numbers (10) without resulting in a fractional remainder. The Babylonians divided the circle into 360 degrees, and they divided the Sun's circling of Earth into the same segments. The 360-degree circle was subdivided into minutes and seconds of arc, with each one being 60 parts of the larger one. The same system also governed Babylonian timekeeping practices. The Sun's orbit was divided into 60-second minutes and 60-minute hours to make up the 24-hour day, the ancient model for the 24-hour clock.

### NARA

The National Amateur Radio Association Awards Program offers an interesting assortment of certificates and

#### TIME CONVERSION CHART

UTC	EDST	CDST/EST	MDST/CST	PDST/MST	PST
0000	8 PM	7 PM	6 PM	5 PM	4 PM
0100	9 PM	8 PM	7 PM	6 PM	5 PM
0200	10 PM	9 PM	8 PM	7 PM	6 PM
0300	11 PM	10 PM	9 PM	8 PM	7 PM
0400	Midnight	11 PM	10 PM	9 PM	8 PM
0500	1 AM	Midnight	11 PM	10 PM	9 PM
0600	2 AM	1 AM	Midnight	11 PM	10 PM
0700	3 AM	2 AM	1 AM	Midnight	11 PM
0800	4 AM	3 AM	2 AM	1 AM	Midnight
0900	5 AM	4 AM	3 AM	2 AM	1 AM
1000	6 AM	5 AM	4 AM	3 AM	2 AM
1100	7 AM	6 AM	5 AM	4 AM	3 AM
1200	8 AM	7 AM	6 AM	5 AM	4 AM
1300	9 AM	8 AM	7 AM	6 AM	5 AM
1400	10 AM	9 AM	8 AM	7 AM	6 AM
1500	11 AM	10 AM	9 AM	8 AM	7 AM
1600	Noon	11 AM	10 AM	9 AM	8 AM
1700	1 PM	Noon	11 AM	10 AM	9 AM
1800	2 PM	1 PM	Noon	11 AM	10 AM
1900	3 PM	2 PM	1 PM	Noon	11 AM
2000	4 PM	3 PM	2 PM	1 PM	Noon
2100	5 PM	4 PM	3 PM	2 PM	1 PM
2200	6 PM	5 PM	4 PM	3 PM	2 PM
2300	7 PM	6 PM	5 PM	4 PM	3 PM
2400	8 PM	7 PM	6 PM	5 PM	4 PM

Table 1—Chart for converting U.S. local time to UTC time.

45527 Third Street East, Lancaster, CA 93535-1802





Here is Arshad H. Quadri (AP2AHQ) of Bagh Larkana, Pakistan. Arshad was addressing the Larkana Amateur and Shortwave Listener's Club. This group is extremely anxious to get amateur radio equipment which will allow its members to get on the air. If you want to help them, please contact them directly: c/o Larkana Library-H-No: 1989/A-1 Shaikh Street, Karma Bagh, Larkana 77150 (Sindh), Pakistan.



Here is twelve-year-old Jennifer Titus, KBØKEA, of Independence, Missouri who passed the Novice, Technician, General, and Advanced examinations in about ten months. Jennifer has also passed the written portion of the Extra Class test. She is a sixth grade student and the student council vice president. Jennifer is also active in Girl Scouts. She is a member of the ARRL, Heart of America Radio Club, Independence FM Amateur Radio Club, Southside Amateur Radio Club, YL International SSB, and 10/10 International. She has worked 32 states and 55 countries among her 200-plus contacts. Her mom is NØSMB and her Dad is NØNTV. Their station includes a Kenwood TS-450S and a Cushcraft R-7 vertical antenna.

walnut plaques to all levels of amateur radio operators. Some of this "wallpaper" is relatively easy to obtain, whereas it may take several years to qualify for the more difficult awards. Each NARA award is available as either a certificate (\$10) or a certificate mounted on a plaque (\$35) and protected by a clear plexiglass cover. Full payment must accompany application.

The NARA-QRP-25 Award is available to any amateur who provides proof of low-power two-way contacts with 25 other amateurs. Those others can be any mixture of domestic (USA) and foreign (DX) amateurs. Written application must include the statement that each contact was made using a maximum of 5 watts output power. Photocopies of the related received cards must accompany the application. Nothing is returned to the applicant. These contacts may be made using any mode, or any combination of modes. Contacts may be through bulletin-board digipeaters, gateways, nodes, repeaters, or any other legitimate amateur radio relay system.

The NARA PR-1000 Award is available to any amateur who submits proof of five newspaper articles, AM/FM radio transcripts, or TV transcripts covering amateur radio public relations successes. The applicant must be directly responsible for the favorable coverage. The applicant may submit a signed statement to the effect that she/he initi-

ated the publicity, since direct proof may be difficult to obtain.

The NARA OSCAR-10 Award is one of two space communication certificates offered by NARA. OSCAR is the acronym amateurs have applied to "Orbiting Satellites Carrying Amateur Radio." We presently have more than 15 amateur satellites which we can use. This award is available to all amateurs. Applicant must submit photocopies of received QSL cards which confirm ten (or more) amateur radio contacts that used one (or more) OSCAR satellites for some portion of each contact. The applicant is permitted to use any mode and frequency that her/his license allows to be used. If a QSL does not indicate OSCAR use, a separate written explanation is required with such a card. If a forwarded message used an OSCAR satellite, include the forwarding path showing LUSAT or PACSAT type headers. It appears to be advisable to include data regarding a few extra contacts, if some of the original group of contacts might be considered to be questionable.

The NARA RS10-1000 Award is the second of two space communications certificates offered by NASA. As the name of the award implies, the applicant is required to submit proof that she/he has earned 1000 points working other amateurs via Russia's Satellite 10. Each proof of contact is worth 200 points; consequently, proof of five such

contacts is required. Gold-leaf endorsements are issued to recognize each additional 1000 point increment, with no upper limit.

The NARA WUSA-50 Award is offered to all amateurs for contacting amateurs in other states. The basic certificate just requires proof of two-way contacts with amateurs in ten states. Use copies of received cards to verify your contacts. Do not send original cards with your application because NARA does not return submitted material. Gold-foil stickers are issued to applicants as they submit proof of working each additional group of ten states. Contacts may be made with different modes. If they are made using a single mode, that fact is added as an endorsement.

NARA invites suggestions and comments regarding other awards, certificates, endorsements, and plaques amateurs believe would be of interest to other amateurs. Some NARA awards are also available to shortwave listeners per special arrangements; if you are interested in getting them, you should request details. The address to use in all related correspondence is the National Amateur Radio Association Awards Committee, 104 Park Road, Suite 6, West Hartford, CT 06119.

The September 1991 issue of *CQ* magazine details the requirements involved in acquiring several operating awards that are of particular interest to newer amateurs. Single copies of this



issue are available at \$2.50 from CQ Magazine, 76 North Broadway, Hicksville, NY 11801.

### Amateur Radio Cartoons

J. Worthington, GW3COI, draws pen-and-ink 8" x 11 1/2" sketches which are suitable for reduction and subsequent use on QSL cards. He charges \$20 per sketch. Tell him what you want him to draw. His address is Penrhyn Back, Abersoch, Gwynedd LL537BU, Wales, United Kingdom.

### RV Antennas

Tiare Publications has published a 64-page book about amateur radio antennas for use with recreational vehicles. This book was written by Robert Benson, W2HZF, and its title is *Amateur Radio RV Antennas*. Three appendices are included in this book; they cover (A) mobile antennas and mounts, (B) campground antennas, and (C) boat radio choices. The domestic price is \$16.95 per book including shipping and handling, and another dollar for foreign delivery, if applicable. The purchasing address is Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147 (414-248-4845).

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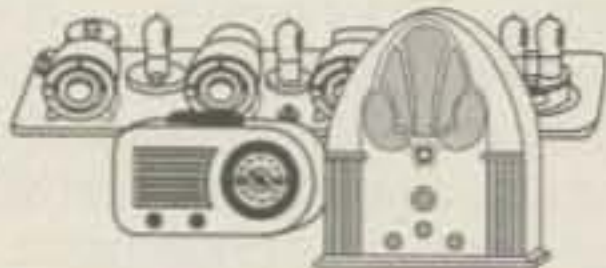
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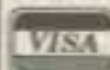
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GW3COI's pen-and-ink sketches are available for use on QSL cards. Just specify what you want him to draw. (For details, see text.)

### Wire Antennas Catalog

The latest Radio Works publication consists of 128 pages that are crammed full of extremely useful antenna information. This is not just a publication which advertises antennas; it tells you more about antennas, and antenna accessories, than the antenna theory books explain. If you are a relatively new amateur, or an old timer who has a limited knowledge of antennas, I advise you to get this book and to read it carefully. Baluns are detailed on 25 pages, including clear explanations of what they do (and don't do) for us. The following balun subjects are included in this booklet: applications, broadband, current versus voltage, loop, measurements, need, remote, selection, specifications, windom, and Yagi.

The following antenna subjects are covered very well in the catalog: Carolina Beams, Carolina windoms, G5RV, half-wave dipoles, high-performance wire antennas, inspections, lengths, loops, multiband, service life, superloops, tower mounting, tree installations (including knots and pulleys), UHF/VHF in-tree verticals, universal, vertically radiating dipoles, and Zepp antennas.

Station grounding is explained in detail in this book, including artificial grounds, ground loops, high RF voltages, and ground systems.

Cable and wire are detailed on 20 pages of this pamphlet. Information includes selection, support line, tables, and weatherproofing coaxial cable. Jim's booklet also covers connectors (8 pages), conversion factors, decibels,

line isolators, plus the budget DXer, and an index.

The cover price of this combination catalog and reference book is \$5. If it is purchased in groups of ten (or more) it is available at \$4 each. This booklet does not list item prices; if you want prices, you should request a copy of the 72-page Radio Works General Catalog. The Radio Works address is Box 6159, Portsmouth, VA 23703. Their facsimile number is 804-483-1873 and their telephone number is 804-484-0140. This book is the first one of several books Jim Thompson, W4THU, will publish to help amateurs gain increased knowledge of antenna-related matters.

### Printed Aids

My previous columns contain information that is useful to new and aspiring amateurs. Many of these items have been reprinted for distribution to students of licensing courses I instruct. For ease of use, these printed aids have been separated into six categories. These categories are introduction, code, theory, station, operating, and miscellaneous. Outdated items are continually replaced with newer material. Fifteen dollars brings a complete set of current printed aids, including shipping costs. A list of these printed aids will be sent to anyone who requests it and sends a business size (#10) self-addressed and stamped envelope to my California address. Licensing-course instructors are welcome to revise and/or duplicate these items to suit their requirements.

73, Bill, W6DDB



## NEWS OF CERTIFICATE AND AWARD COLLECTING

In this issue's Story of the Month we salute:

### Graham Horlin-Smith, VK5AQZ USA-CA #731, All SSB 10-25-91

The first to achieve All Counties from the "Land Down Under" (Adelaide, South Australia), Graham has earned a place on our Special Honor Roll. To tell Graham's story we are going to use material he sent to Dorothy, WB9RCY, last year.

In 1986 Graham operated with the special callsign VK5JSA (Jubilee South Australia) to celebrate South Australia's 150th year of settlement. This resulted in more than 2000 stateside contacts and much QSLing to boot. Another big year, 1988, was the celebration of Australia's bicentennial. This resulted in an additional large dose of QSLs. An overflowing shoebox plus some encouragement from ZL2BCX (John), a county chaser, and the challenge of the chase drew him like a magnet to the magical frequency of 14.336 MHz, the mobile emergency and independent county hunters net.

Three and a half years down the track Graham saw the light at the end of the 3076 county tunnel, and what a trip it turned out to be—" . . . full of fun, frenzy, frolicking, and hard yakka (work)"—with many friends, net controls, and mobile operators met along the way.

Graham's interest in amateur radio evolved from Lionism in the early 1980s when he coordinated "Hunting Lions in the Air," an annual get together of Lions worldwide. With the help of some local Lions, the station was set up. That left obtaining the license. First there was VK5PQZ (novice), then VK5KQZ (limited), and finally VK5AQZ (full license). "Next to my best friend and mate, Heather, and the family, amateur radio became the best thing ever since 'sliced bread.'"

Graham holds WAS and DXCC with 285 countries confirmed and many other prestigious amateur radio operating awards. One highlight of his amateur radio experience has been setting up a phone patch from the center of the city of Adelaide, linking the mayors of Adelaide and Austin, Texas. He then went live to shoppers in Rundle Mall, the main

street of Adelaide. He has also worked "railway mobile" on the Trans-Australian Railway from Adelaide to Perth and back, a 1500 mile trip across southern Australia and the Nullabor Desert. "You could say we had the longest ground-plane in the world as we traversed the continent."

When not working radio and mobiles late at night, around midnight, on weekends and school holidays, Graham is Deputy Principal and teacher at the Maryatville Primary School, having served more than 30 years in the Education Department of South Australia. He also boasts a well-stocked wine cellar of 500 bottles from his earlier hobby, before his interest in radio matured. Graham invites visiting amateurs to check out his wine cellar. Wayne "Skip" Hillegas, W9GYA, and his wife, Cathy, made an impact on the cellar on a recent visit.

County Hunting can really get in the blood. It is understandable that many have started the quest only to discover that the amount of time it takes is just not possible. For those who persevere, the rewards are great. When one considers the fact that band openings to the United States are about 1330Z (2300 hours in Adelaide) and that VK5AQZ had to stay with the net until 0400 or 0500, his achievement is all the more remarkable. Throughout the night nothing can be taken for granted. The incidence of QRM and QRN provides constant threats to good contacts. Local fixed stations also calling the mobiles increase the difficulty in making direct contacts; net controllers and their assistants feed the DX station in. Frustration calls for the exercise of tact and self-discipline, which is the rule most of the time on the County Hunters Net (14.336).

Of course, there would few contacts without the mobile stations running around the states. They are a special breed of amateur. They've been known to cross a state just to give out one or two rare counties to the base stations' operators sitting in the comfort of their homes just waiting to work them. Some special stations Graham mentioned are Ed, W0OWJ, who put out all the Missouri counties; Clarke, WA4NBC, who spent four months on the road; Ed, WA0SBR, for all Kansas counties; and Charlie, WA4IMC, the tobacco-chewing friend of the DXers flitting around Florida working us between jobs. There are many others who do it for the sheer fun of it.

### USA-CA Special Honor Roll

Richard Phillips, N6HJY  
USA-CA All Counties #799  
All 20 M SSB Mobile, 03-26-93

Paul J. Mosher, AB4QD  
USA-CA All Counties #800  
Mixed 05-06-93

Gerald Goff, KO4QZ  
USA-CA All Counties #801  
Mixed 05-06-93

Dave Baker, KI6YX  
USA-CA All Counties #802  
Mixed 05-06-93

### Honor Roll

<b>3000</b>		KO4QZ	1069
N6HJY	824	KI6YX	1070
AB4QD	825		
KO4QZ	826	<b>1000</b>	
KI6YX	827	N6HJY	1267
		K7VAY	1268
<b>2500</b>		WD3P	1269
N6HJY	901	VO1SF	1270
AB4QD	902	AB4QD	1271
KO4QZ	903	KI6YX	1272
KI6YX	904		
<b>2000</b>		<b>500</b>	
N6HJY	977	N6HJY	2671
AB4QD	978	K7VAY	2672
KO4QZ	979	CT1QF	2673
KI6YX	980	RA0FA	2674
		KP4CKY	2675
		OZ1ADL	2676
<b>1500</b>		W9ROK	2677
N6HJY	1067	AB4QD	2678
AB4QD	1068	KI6YX	2679
		VO1SF	2680

The total number of counties for credit for the United States of America Counties 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 magazine, 76 North Broadway, Hicksville, NY 11801 USA for \$2.00. To qualify for the special subscriber rate, please send a recent CQ mailing label with your application. To be eligible for the USA-CA Award, 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.

Then there are the "heavies," drivers of the 18- or 24-wheelers, who traverse the states on long-haul jobs, giving out counties. To mention a few of them: Tim, N9DEH; Dennis, KK7X; Bud, N1EDL; Ralph, WB4FFV; and Mike, K5OUK. Graham singled out Charlie Wooten, WA4IMC, and his navigator, Larry Bromstead, W4GGU, as outstanding

Box 76, Pleasant Mount, PA 18453-0076





Graham, VK5QZ, with second op Jacob (radio name Jake) proudly sharing the USA-CA #731 award in the shack. Graham's certificate was dated 10-25-91, the day on which his grandson Jake celebrated his second birthday.

Then Graham, WA4IMC, and W4GGU worked all the way home, giving Graham 12 of his last 20 counties.

The excitement and fellowship on that trip will never be forgotten. How does an Aussie county chaser repay that kind of effort? Graham says, "My thanks to all who have helped me to become the first VK to hold USA-CA. I feel proud because I have achieved what I set out to achieve, and along the way I have made many new friends. Yes, like many others, I am doing it all over again—the second time around. As it is for many DXers, the task is more difficult for us. But the obsession lingers on, even across the Pacific."

### Awards Issued

We have four new USA-CA holders this month. Richard Phillips, N6HJY; Paul J. Mosher, AB4QD; and Dave Baker, KI6YX, submitted their completed books.

KO4QZ became the first applicant to submit his documentation on floppy disk.

Richard Phillips, N6HJY, received USA-CA All Counties #799 and USA-CA 500 #2671, 1000 #1267, 1500 #1067, 2000 #977, 2500 #901, and 3000 #824.

Paul Mosher, AB4QD, received USA-CA 800, to mark a milestone in our USA-CA program. He also received USA-CA

examples of county hunting. Charlie and Larry planned a trip from Bay County, Florida to St. Paul, Minnesota to attend the annual convention, knowing the counties he required. Day and night they pushed along with contacts for

Graham—county lines at 0200, DX phone calls from Charlie's car to alert me and others of their schedules. Within 24 hours of reaching their destination and a few beers and a joke or two, they turned around and headed for home.

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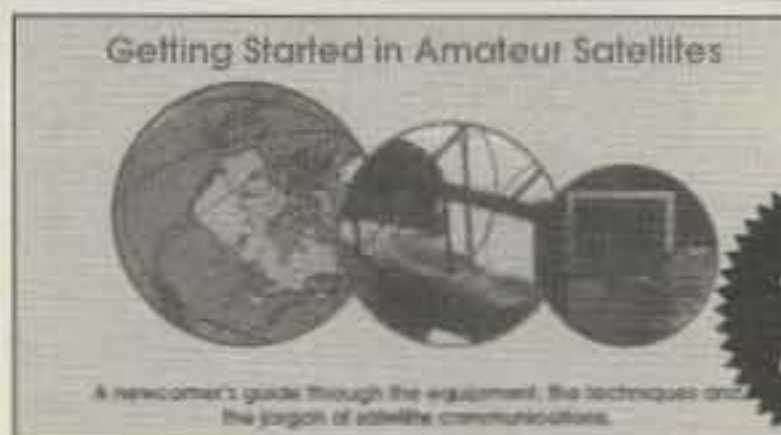
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 YK-88SN-1 1.8 KHz SSB filter (1st IF) . 86<sup>95</sup>



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 YG-455CN-1 250 Hz CW filter (2nd IF) 166<sup>95</sup> 156<sup>95</sup>  
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 DSP-100 digital signal proc. 450/850 . 669<sup>95</sup> 609<sup>95</sup>  
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 KQT-8/TSU-6 Prog CTCSS decoder . . . 46<sup>95</sup>  
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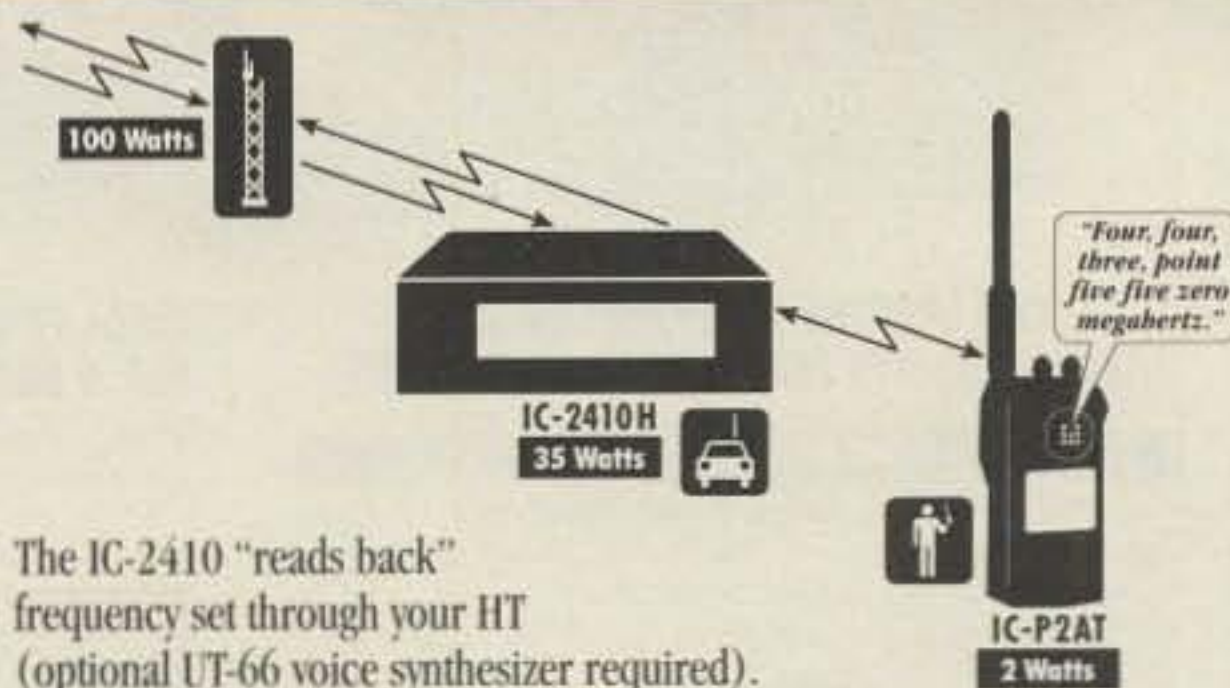
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CIRCLE 20 ON READER SERVICE CARD



500 #2678, 1000 #1271, 1500 #1068, 2000 #978, 2500 #901, and 3000 #825.

Gerald Goff, KØ4QZ, USA-CA #801, received USA-CA 1500 #1069, 2000 #979, 2500 #903, and 3000 #826.

Dave Baker, KI6YX, received USA-CA All Counties #802 along with USA-CA 500 #2679, 1000 #1272, 1500 #1070, 2000 #980, 2500 #903, and 3000 #827. Dave's documentation was a very neat computer printout.

Dennis Pugh, K7VAY, received USA-CA 500 #2672 and USA-CA 1000 #1268.

Jim Watkins, VO1SF, submitted another computer printout to receive USA-CA 500 #2680 and USA-CA 1000 #1270.

The following have submitted good applications for the basic award:

Alberto Santos (79 years young), CT1QF, USA-CA 500 #2673.

Valery I. Baranovich, RAØFA, USA-CA 500 #2674.

Agustin (Augie) Santana, KP4CKY, USA-CA 500 #2675.

Jan Thøegersen, OZ1ADL, USA-CA 500 #2676.

Ronald W. Asbill, W9ROK, USA-CA 500 #2677.

### Awards Available

**Korean Expo '93 Award.** "The Challenge of a New Road to Development" is the theme of The Taejon International

Exposition, Korea 1993. Expo '93 will be held from August 7 to November 7. The Korea Amateur Radio League will operate a special event station, 6K93EXP, during Expo '93. The following rules for the award apply.

**Period:** June 1 to December 31, 1993.

**Eligibility:** All amateur radio stations and shortwave listeners.

**Class of Awards:**

**Class A—**One QSL card from Expo '93 special event station and one card from each Korean call area (HL1, HL2, HL3, HL4, HL5, and HLØ), for a total of seven cards.

**Class B—**One QSL card from Expo '93, and QSL cards from HL stations with the letters T A E J O N E X P O in the suffix of their calls.

**Class C—**One QSL card from Expo '93, and QSL cards from HL and overseas DX with the letters T A E J O N E X P O in the suffix of their calls.

**Class D—**Collect one Expo '93 commemorative QSL card and any HL station QSL card (2 cards).

**Application:** For Korean stations application plus GCR and W1,500. For non-Korean stations application plus GCR and 8 IRCs. Send to Award Desk, Korean Amateur Radio League, Box 162, C.P.O. Seoul 100-601 Korea.

**Ascension Island Awards.** Effective 31 May 1993 the route for Ascension Island Awards will be via Steve Hodgson, GØLII, 6 Broughton Road, West Ayton, Scarborough YO13 9JW, North Yorkshire, England.

### Honor Roll Correction

We inadvertently assigned some duplicate numbers in April and May. N2JNE, USA-CA #2500, should have been 899, and WD3P, USA-CA #1000, should have been 1269. Sorry!

### IDX Award No More

Hillar Raamat, N6HR, writes that Beryl Gosney, KE7C, has informed the Island County (Washington) Amateur Radio Association that the Whidbey Island DX Club is no longer a viable entity and the IDX Award has not been issued for at least four years. All early applications have been returned, and KE7C is no longer associated with the award.

### MARAC Mini-Convention

A mini-convention will be held by the Mobile Amateur Radio Awards Club (MARAC) September 9-12, 1993 at Mt. Horeb, Wisconsin. Contact Arnie Bachmann, K9DCJ, for further information.

That's it for this month!

73, Norm, WA3RT



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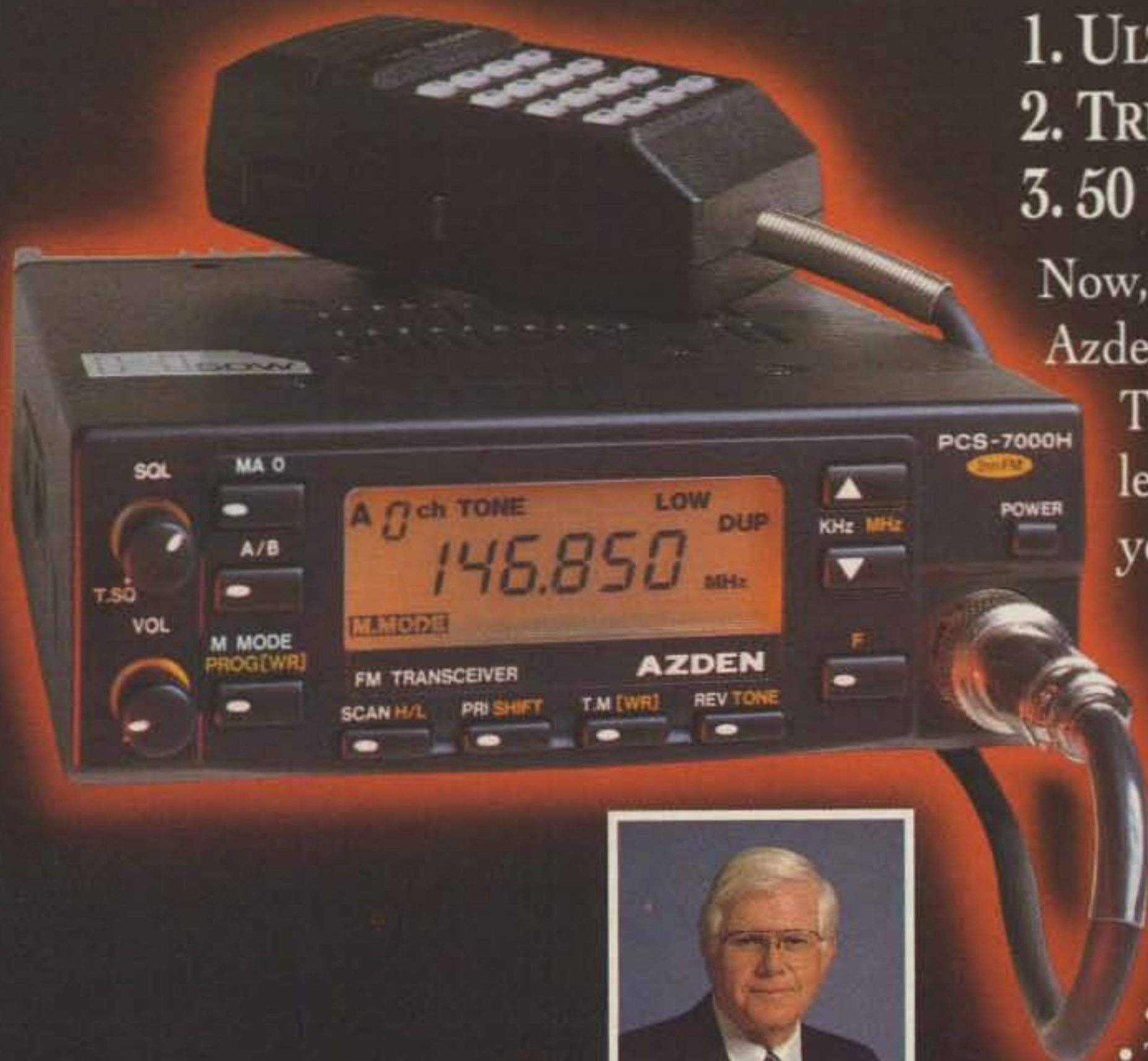
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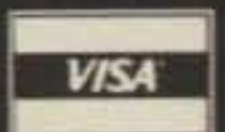
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## THINGS TO LEARN, PROJECTS TO BUILD, AND GEAR TO USE

### How's DX?

**A**mateur radio is entering a new age of communication, propelled by technological developments surfacing in the new art of "wireless." "Wireless" in this sense doesn't mean a spark transmitter and a coherer receiver, but the blending of UHF, computers, fiber optics, satellites, cordless phones, and all that jazz.

Picture this: a DX contest sometime in the near future. The amateur station we'll examine is near Key West (Florida) with the usual complement of stacked Yagis, multiple transmitters, linears, and various operating aids.

The transceivers are computer controlled, and the operator sits at a keyboard (or multiple keyboards) and rarely uses an electronic key. Most of the contest information, reports, serial numbers, etc., are stored in the computer. Antenna switching, band switching as well as transceiver tuning, and the secondary receiver are also adjustable at the touch of the keyboard. In addition, there may be positions for secondary operators.

This contest station is linked by a dedicated land line to a "servant" station in California (probably near San Diego). This installation duplicates the one on the east coast, except that it is unmanned. It is controlled completely from Key West.

The east coast operator, in effect, has the advantage of both east coast and west coast propagation. With his two computer-controlled super stations, he can compete with contesters all over the United States, regardless of location. Using the remote station, he can run rings around the east coast when the bands are open to Asia. And with the Florida station, he can smother west coast stations on the European-Africa path.

The Key West and San Diego locations were deliberately chosen to take advantage of the highest possible MUF in the continental United States. Already plans are afoot to move the "master" and "servant" stations to Puerto Rico and Hawaii to get an even more advantageous geographic "spread."

Better yet, three or four servant stations can be used. They need not be lim-

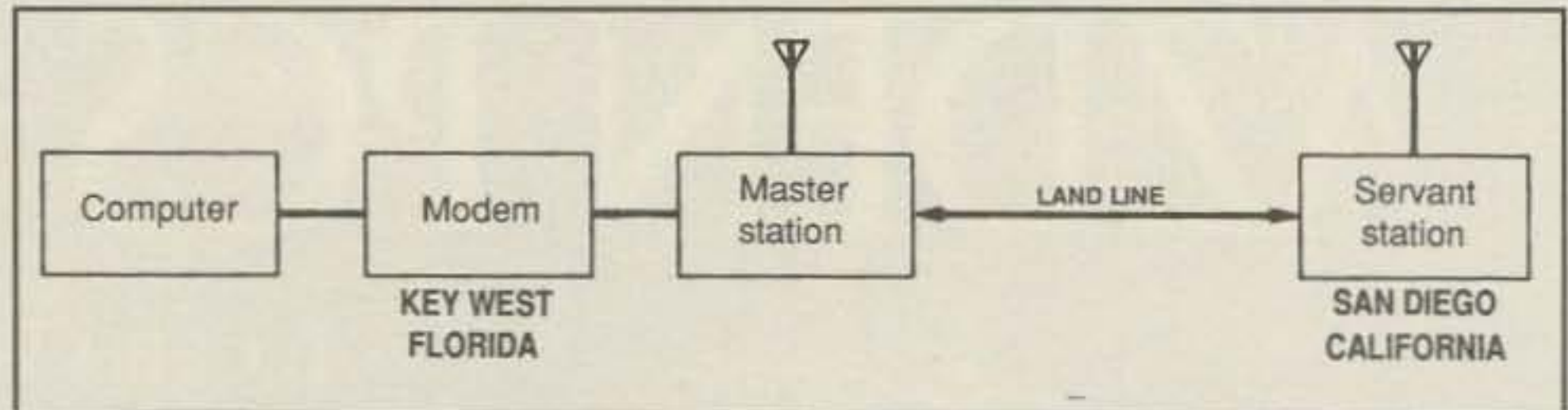


Fig. 1— "Master" and "servant" DX station dominates the DX contest! Computer control over land line is the key to success.

ited to the United States. Your mind's eye can picture servant stations in Europe and Asia controlled from a central location. Want to work into central Asia? Use the servant station in Finland. Africa? The St. Helena servant will do the job. And so it goes. The limit is only your imagination.

Of course, a few minor details remain to be worked out before the super DX station comes to life. Does the servant use the same call as the master station? (Probably. Something like W4XX/A for the master and W4XX/B for the servant.) Will the FCC and contest rules have to be changed to accommodate the super station? (No problem. Rules are made to be changed.)

So there you are. You can figure out the details for yourself. The general scheme is shown in fig. 1.

### The Servant Station Is Here—Today!

Sounds far-fetched? Not at all. Some stations in the marine radio service are using this technique today. The "Cape Cod Chronicle" of Chatham, Massachusetts (3-18-93) laments the partial closing of marine station WCC (Wireless Cape Cod) when MCI International automates the station. Morse code and telex signals will be electronically routed to KPH, located at Point Reyes (California), near San Francisco. KPH will cover the Pacific and Indian Oceans, while WCC will cover the Atlantic Ocean and Mediterranean. Ten of the sixteen full-time employees of WCC will lose their jobs, according to the newspaper. The remainder will go to Point Reyes to coordinate KPH and WCC, or else be transferred to other MCI operations.

And so the remote-controlled "servant" station WCC will be followed by other stations, and some of them will be in the Amateur Service!

Remember: You read it here first!

### "Unique 20/15 Metre Dipole"

That's the title of an article recently sent to me by "Pete" Hoover, W6ZH. The material is from the August 1992 issue of *Amateur Radio* (Australia) and was written by Adrian Fell, VK2DZF.

Basically, this antenna consists of two dipoles connected in parallel at the feedpoint, fed by a single coax line, a portion of which is allowed to radiate (fig. 2). (I discussed controlled feeder radiation in my March 1993 column.) The idea is to allow a portion of the coax feedline to radiate a vertically polarized, omnidirectional signal that fills in the nulls of the dipole pattern.

The VK2DZF antenna consists of a 15 meter dipole which supports a 20 meter

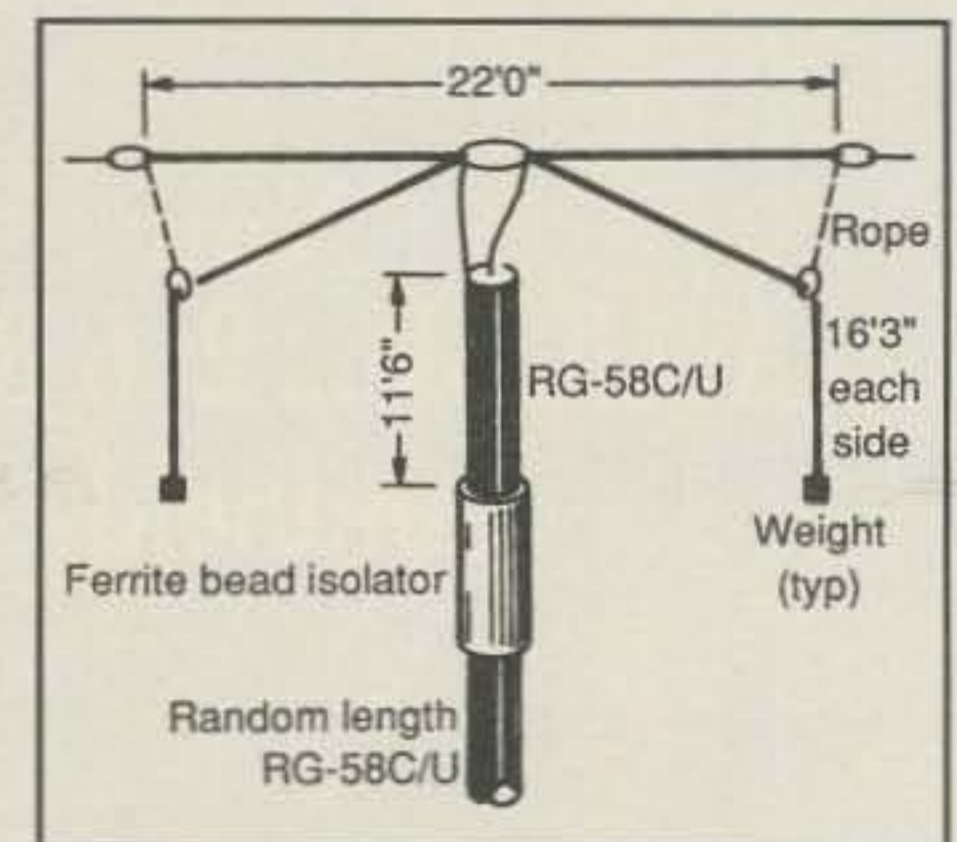


Fig. 2— Computer-optimized version of the VK2DZF two-band dipole. Isolator can be Radio Works Model C1-2K.

48 Campbell Lane, Menlo Park, CA 94025



dipole. The ends of the latter are folded down to conserve space. A portion of the feedline down to a ferrite isolator is permitted to radiate, filling in the dipole pattern on one band. In this case, VK2DZF adjusted the feeder section length to be a quarter-wavelength at 21 MHz. He also hoped the folded-down ends of the 20 meter dipole would provide some vertical radiation to "fill in" the figure-8 pattern on that band. (This is wishful thinking, as a computer model of the antenna shows the vertical sections of the 20 meter antenna contribute very little to the overall radiation pattern.)

In any event, the length of the coax section can be adjusted for either 20 or 15 meters, according to the desire of the builder.

VK2DZF recommends the use of RG-58C/U for the feedline, as it keeps costs down and the light weight of the cable keeps the antenna in shape and easier to keep up in the air.

The center insulator is made of a 4" x 2" block of 1/2 inch thick insulation. The coax is looped through a set of holes to anchor it in position. VK2DZF used 1.5 pound weights to hold down the ends of the vertical sections. The exact weights were not specified, but possible suitable weights (sinkers) could be found in a sporting-goods store.

## COIL.EXE

Some months ago QST ran a Technical Correspondence piece by Hank Meyer, W6GGV, on high-accuracy inductance calculation.<sup>1,2</sup> Hank researched the history of such calculations, which date back to the early years of this century. The upshot of this investigation was the creation of a new, complicated formula far more accurate than the simple formula for inductance determination shown in most handbooks.

COIL.EXE is the new computer program derived by Brian Beezley, K6STI, which takes into account coil Q, form loss, form factor, proximity of metal, skin effect, and details that affect the actual inductance of a given coil. The program is based on the formulas derived by W6GGV and includes the above variables.

COIL.EXE is available on amateur-oriented BBSes across the country, including the ARRL BBS. The program is in its final form, but correct execution is keyed to the individual user's system. The user can play around with the program to determine its "feel" and usefulness to him. However, it calculates incorrectly until the user obtains an activation code from K6STI. The activation code works only on the user's particular computer.

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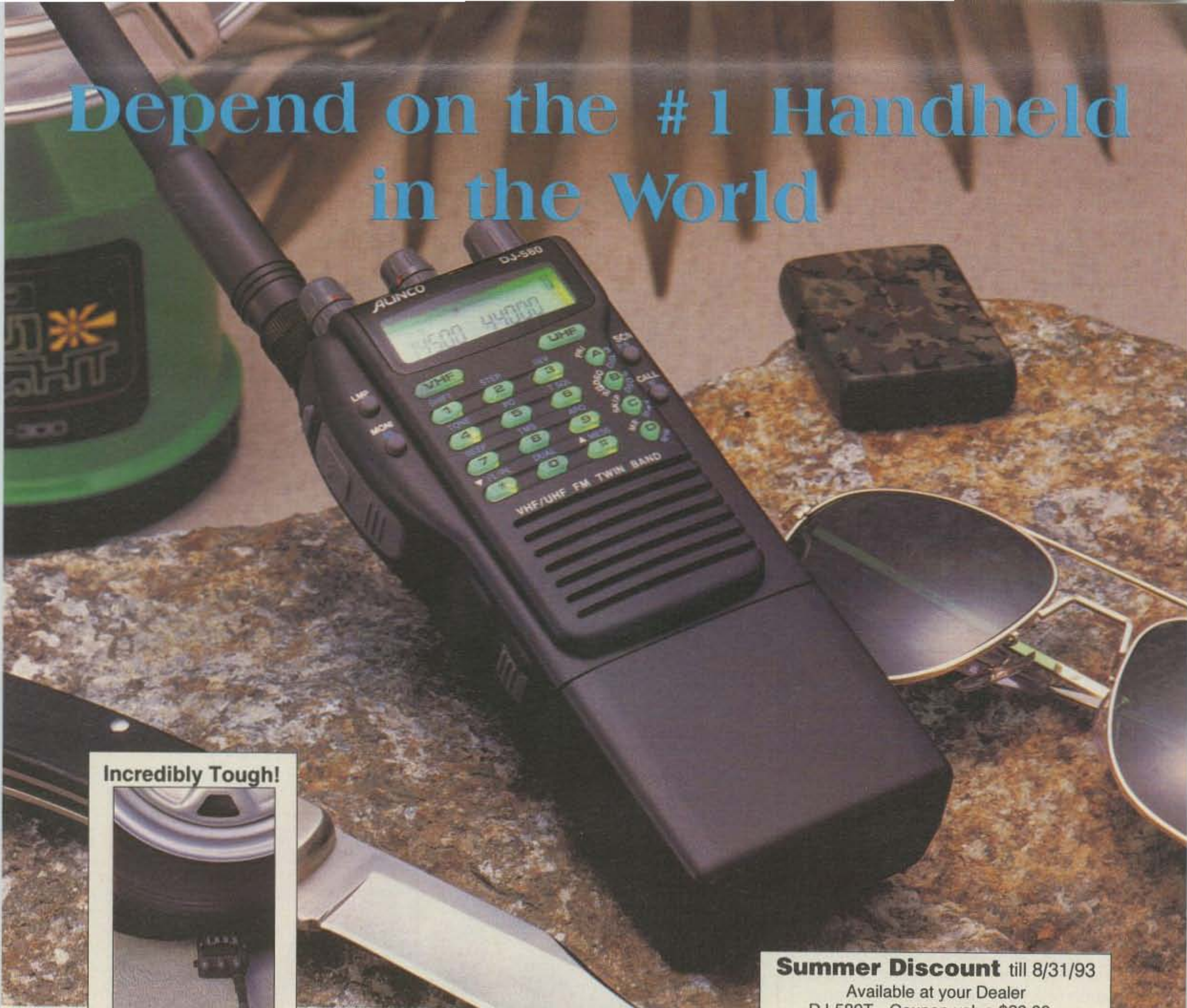
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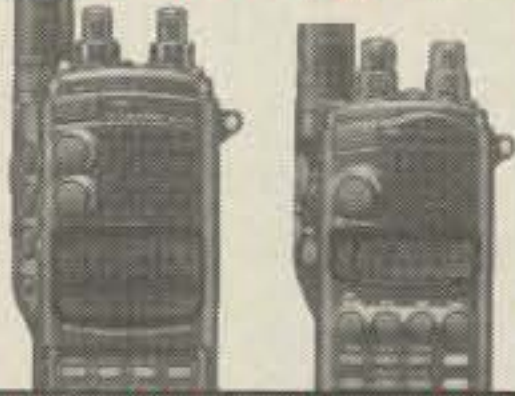


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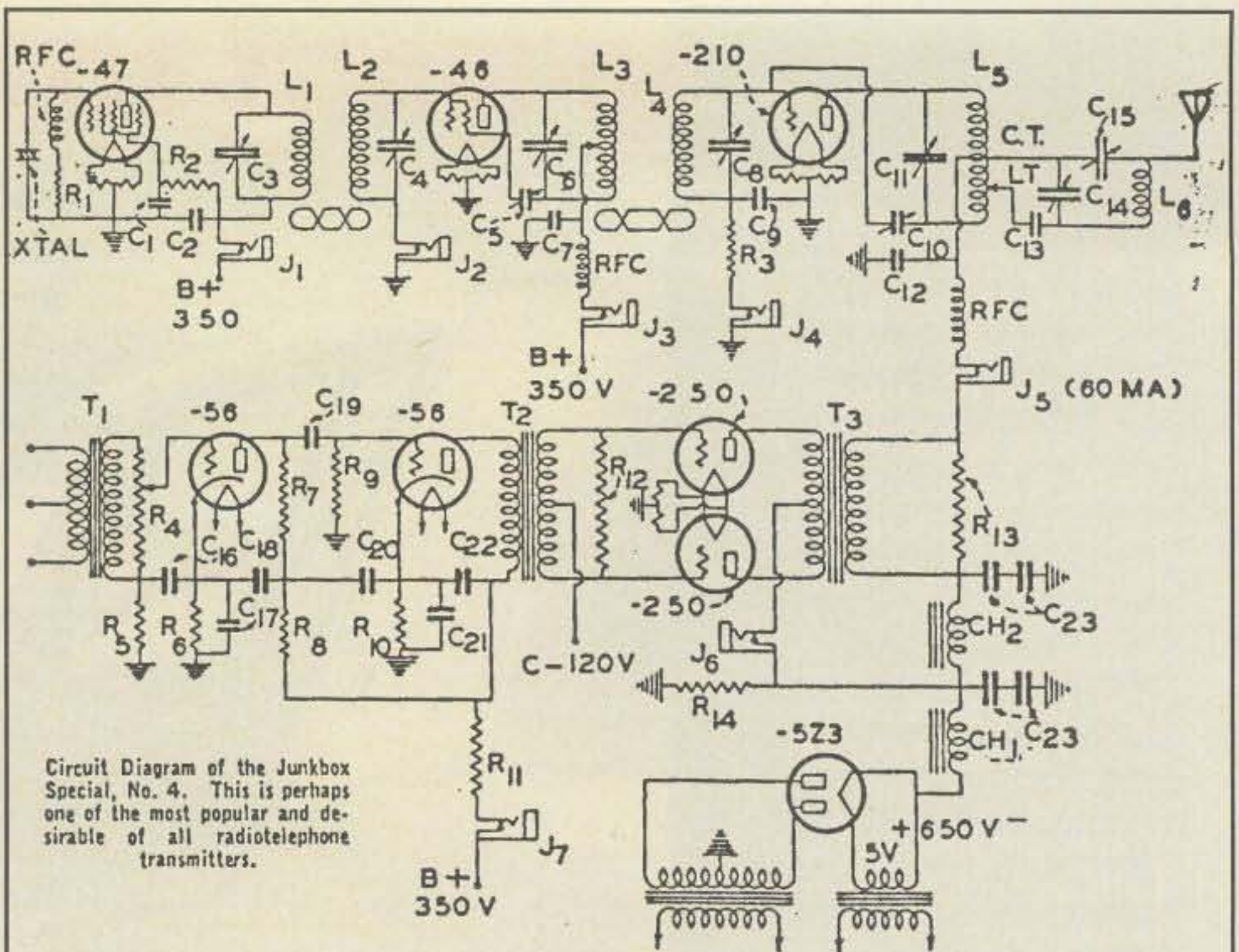
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Circuit Diagram of the Junkbox Special, No. 4. This is perhaps one of the most popular and desirable of all radiotelephone transmitters.

LIST OF PARTS

- R1—Oscillator grid leak, 10,000 to 50,000 ohms. Smaller the better, 2 watt.
- R2—Screen dropping resistor, 30,000 ohms, 2 watt.
- R3—Final grid leak, 15,000 ohms, 25 watt.
- R4—Volume control, 200,000 ohms, tapered potentiometer.
- R5—Grid decoupling, 100,000 ohms, metallized.
- R6—56 bias resistor, 2500 ohms, 2 watt.
- R7—Shunt feed, 100,000 ohms, 5 watt.
- R8—Plate decoupling, 10,000 ohms, 5 watt.
- R9—Grid load, 500,000 ohms, metallized.
- R10—56 cathode bias, 2500 ohms, 2 watt.
- R11—Isolating, 5,000 ohms, 5 watt.
- R12—Grid load, 200,000 ohms, metallized.
- R13—Load stabilizer, 100,000 ohms, 10 watt.
- R14—Bleeder, 30,000 ohms, 100 watt.
- C1—.001 ufd.
- C2—Same as C1.
- C3—50 ufd. midget variable.
- C4—Same as C3.
- C5—Same as C3.
- C6—Same as C3.
- C7—.001 ufd. same as C1.
- C8—Same as C3.
- C9—Same as C1.
- C10—35 ufd. variable neutralizing, 2000 V. breakdown.
- C11—50 ufd. variable tank, 2000 V. breakdown.
- C12—.006 fixed, 2500 V. breakdown. Mica.
- C13—.006 ufd. 2500 V. same as C12.
- C14—350 ufd. variable. (Good BC cond.)
- C15—Same as C14.
- C16—Anything from 1/2 to 2 ufd.
- C17—Same as C16.
- C18—Same as C16.
- C19—Same as C1.
- C20—Same as C16.
- C21—Same as C16.
- C22—Same as C16.
- C23—Filter conds., each 16 ufd., making 8 ufd. 700 V. in series.

Fig. 3—Low-cost 20 meter phone rig for up-to-date 1934 class A operators.

like the program, send a code payment of \$10 and an SASE to Brian Beezley, 507-1/2 Taylor St., Vista, CA 92084 and he will return a custom activation code for COIL.EXE.

The "Junkbox Phone"

As I mentioned in my last column, the old, defunct *Radio* magazine ran a series of low-cost AM phone designs in the early 1930s. Twenty meter phone was just becoming popular, and a schematic for a low-cost, reliable phone rig was sorely needed by the newly licensed "Class A" amateurs. Shown in fig. 3 is such a transmitter, first described in the April 1934 issue of *Radio*.

The line-up uses a 47 pentode as a

crystal oscillator on 40 meters, a 46 dual-grid, high-mu tube as a doubler to 20 meters, and a 210 triode as a class-C amplifier, running about 30 watts input. Link coupling between stages was all the rage in those days, and it is used here.

The modulator consisted of a pair of 250 tubes operating in the class-A mode, driven by a two-stage speech amplifier and a double-button carbon microphone. It provided nearly 15 watts of audio with reasonably low distortion.

Some of my friends built this transmitter on a single breadboard, and it worked like gangbusters. Some problems existed with RF getting into the audio system, but the use of a shielded microphone cord and a few small by-



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pass condensers (capacitors) solved the problem.

Information was given for operation of the transmitter on 160 and 80 meters, as well as on 20 meters. (There was no 40 meter phone operation in those days.) All in all, the little rig was nearly foolproof and a good-quality voice signal was the result of the labors of the amateur builder. It would be interesting to hear one of these rigs on the air today. You might be surprised!

## G8PO Triangular Sloper For 80 Meters

It is always refreshing to get good ideas from overseas experimenters. The April

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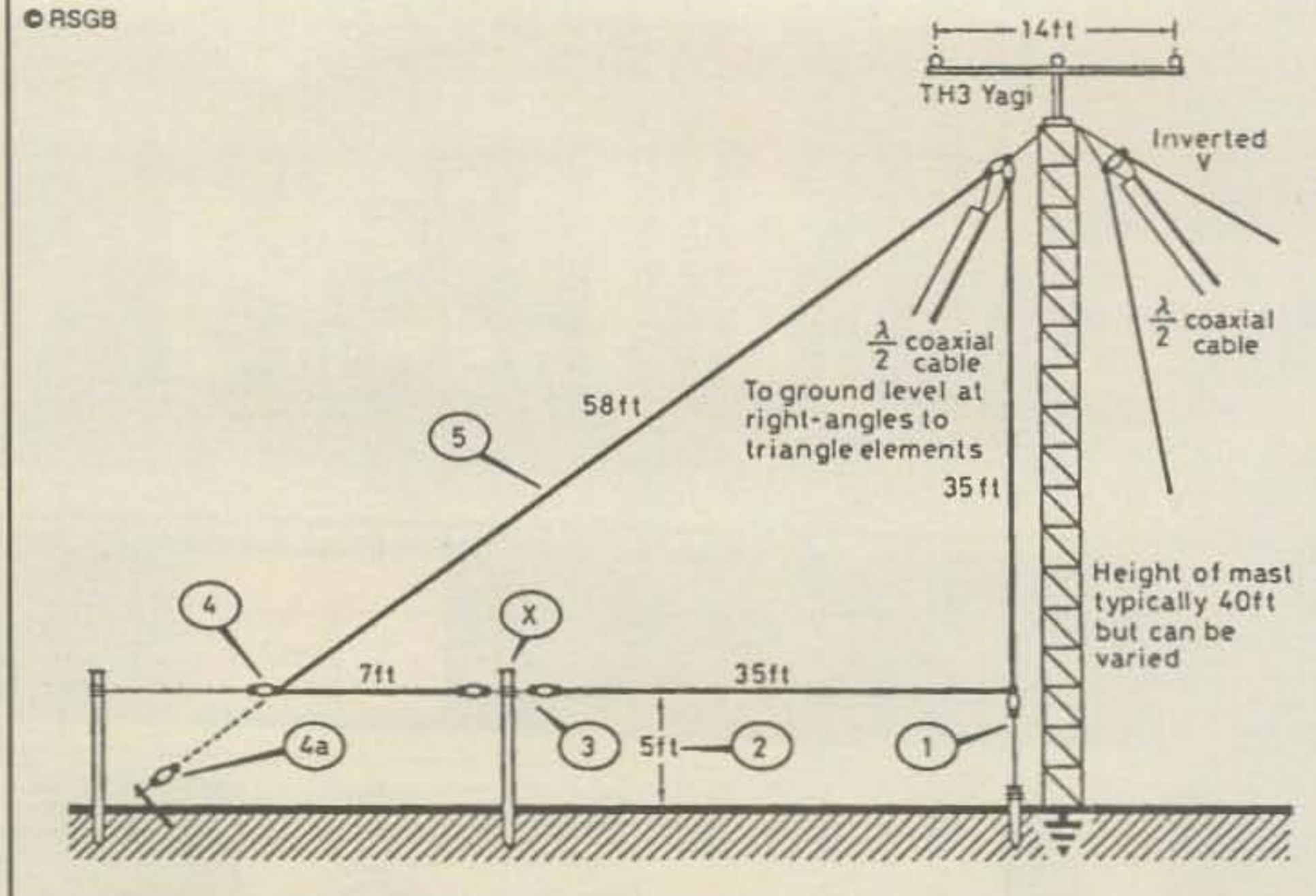


Fig. 4—The G8PO Triangle Sloper for 80 meters. (Drawing courtesy the RSGB)

1993 issue of *Radio Communication*, the flagship publication of the Radio Society of Great Britain, contains a good example. Ted Ironmonger, G8PO, has been running 80 meter long-path tests with New Zealand amateurs for a number of years. His test antennas consisted of an inverted Vee broadside to the path, a sloper, and a shunt-fed 35 foot tower with a triband Yagi atop it. These wire antennas were okay, but increasing competition with 80 meter vertical arrays, quads, and other monster antennas left the simple antennas at G8PO in the dust.

To boost his long-path signal, G8PO converted his sloper into a triangular antenna, as shown in fig. 4. Total length of wire in the new antenna is approximately a half-wavelength. The antenna is coax-fed at the apex, with one leg running down adjacent to the tower. The other leg acts as the sloper wire, with the end folded back to conserve space. Directivity is in the direction of the sloping wire.

The lengths are given as a guide, and overall length and spacing to ground and the tower (points 1, 2, 4, and 4a) can be adjusted for lowest SWR on the transmission line. End spacing and length (point 3) also allows SWR adjustment. The sloper wire (5) is the active element and provides the directivity.

G8PO uses a half-wave of coax line (about 88 feet) to the shack and his SWR meter. He notes that X is a high-voltage point and should be protected from inquisitive fingers!

Ted notes the simple triangle sloper gave much improved results over his old antenna, using the inverted Vee as a

comparison antenna. This looks like a simple, inexpensive, and easy way to boost your 80 meter signal in a given direction.

### June Column Correction

In the June column we inadvertently left out Table I, referenced on page 106. We're sorry for any inconvenience this may have caused, and here it is!

Line Length (λ)	SWR = 3:1	
	R	X
0	16.7	0
1/16	19	-18
1/8	30	-40
3/16	69	-65
1/4	150	0
5/16	69	+65
3/8	30	+40
7/16	19	+18
1/2	16.7	0

Table I—The impedance along a 50 ohm, 1/2-wavelength line given an SWR of 3:1. (Figures courtesy W2DU.)

### Footnotes

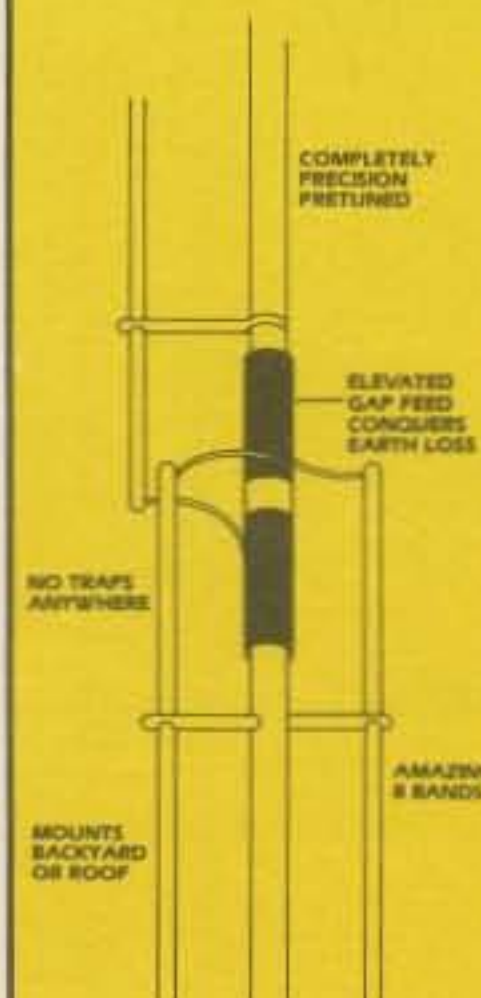
1. H. Meyer, "Accurate Single-Layer Solenoid Inductance Calculations," *QST*, April 1992, pp. 76-77.

2. H. Meyer, "Corrections to Accurate Single-Layer Solenoid Inductance Calculations," *QST*, July 1992, p. 73.

73, Bill, W6SAI

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## CONSTRUCTION PROJECTS, TECHNIQUES, AND THEORY

### The Basics of Simple HF Receivers

Radio amateurs and SWLs are often tempted to construct a receiver for one or several bands, but fear the complexity of such a project. The general outlook seems to be that a homemade receiver needs to deliver performance that is comparable to that of an expensive, commercially made unit. In a like manner, the would-be builder often wants to impart a commercial appearance to his or her product. Although good performance should be a criterion, it is by no means essential to have

the front panel and cabinet reflect the aesthetic quality of a \$1500 receiver. Wes Hayward, W7ZOI, coined an important phrase some years ago—"Ugly Construction." Projects that are not physically works of art offer performance that is superb if the design is of high quality. This article addresses some design approaches that provide inexpensive, easy-to-build receivers.

#### Common Circuits

The options for the experimenter include (1) regenerative receivers (archaic but serviceable), (2) DC or direct-

conversion receivers (known also as synchrodyne receivers), and (3) superheterodyne receivers. What can we expect in terms of general performance from this group? Receivers 1 and 2 operate in a nearly identical manner. The advantages are simplicity, low parts count, and good sensitivity. On the downside of these circuits, we are unable to obtain single-signal reception (upper or lower sideband). These receivers respond to signal energy either side of zero beat, and this doubles the effective QRM in a crowded band. Also, both types of receivers have the LO (local oscillator) operating at the incoming

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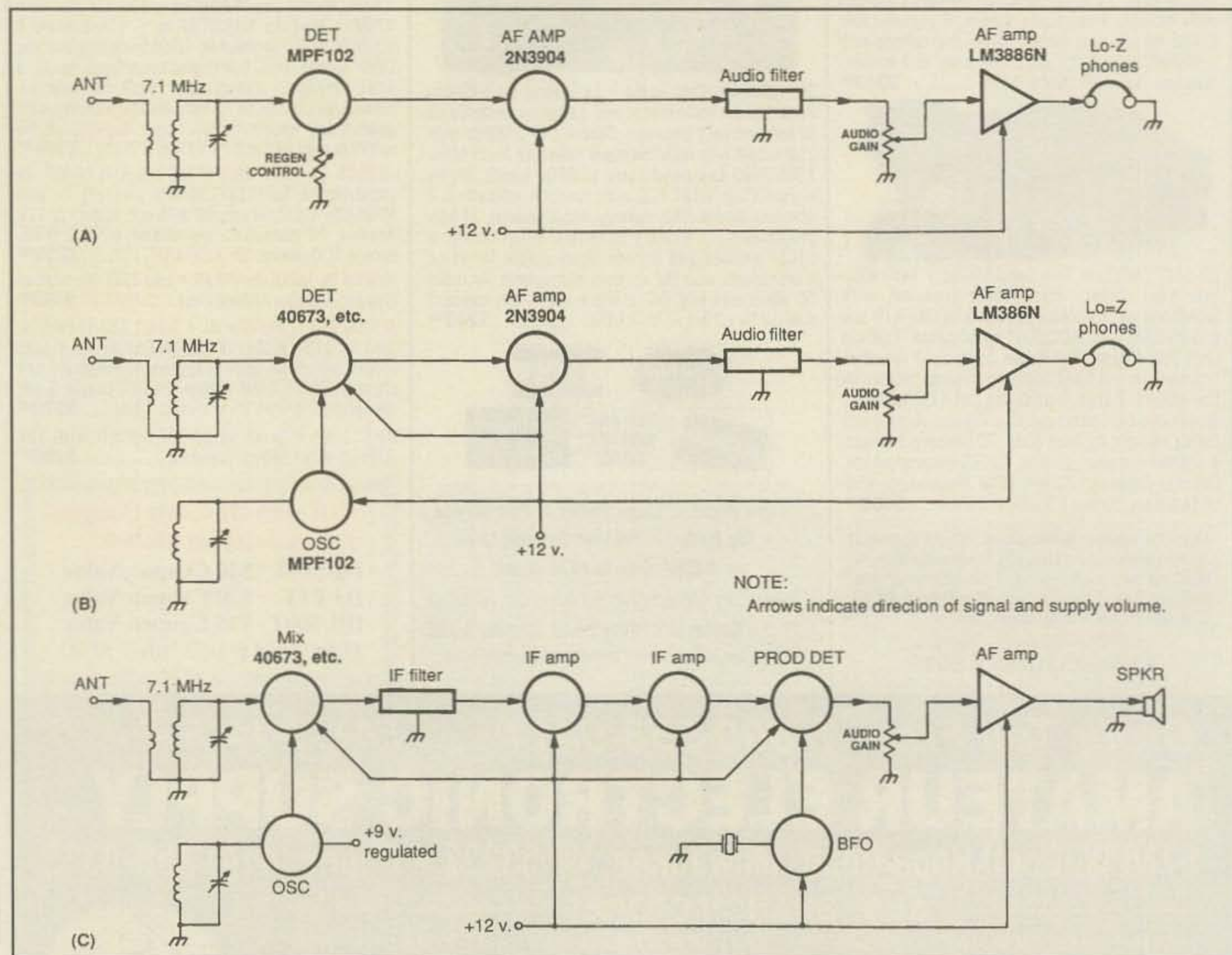


Fig. 1—Block diagrams of a regenerative receiver (A), a DC receiver (B), and a superhet (C). Note that example (A) has a self-oscillating detector, whereas circuit (B) has a separate oscillator.



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signal frequency. This means that the receiver radiates energy via the antenna at the listening frequency. Nearby amateurs can be troubled deeply by the "blank carrier" that may appear on a frequency they are using! Adding an RF amplifier stage ahead of the detector will, however, minimize this effect. Finally, SSB and CW selectivity for these circuits must be introduced in the audio section of the circuit (passive or RC active bandpass filters).

Superheterodyne receivers (option 3) can provide the desired single-signal reception and selectivity that is introduced at the intermediate frequency (IF) by means of crystal or mechanical filters. The LO operates on a frequency that is apart from the incoming signal frequency, and hence there is no troublesome radiation of energy from the antenna

### Overall Gain Considerations

Regardless of the receiver circuit used, it is necessary to ensure adequate overall gain (antenna to speaker or phones). A good ball-park number is 75–100 dB. Too little gain means that the audio circuit must run almost full bore in order to copy weak signals.

In a regenerative or DC receiver the bulk of the gain must occur in the audio

channel because there are no IF amplifiers to contribute to the overall gain. This causes problems with unwanted microphonics in the receiver output. For example, if you tune one of these receivers, you will probably hear a clang in the headphones. This is caused by electrical contacts and components that create minor RF transients when they are physically disturbed. Microphonics seldom appear at the output of a superhet receiver. Fig. 1 contains block diagrams of the three types of receivers.

### Where Do We Get The Gain?

Receiver gain is cumulative. If there is an RF amplifier stage, it may develop up to 20 dB of gain at the signal frequency. The detector in receivers 1 and 2 can contribute 10–15 dB of conversion (RF to audio) gain. Receiver 3 develops 10–15 dB of conversion gain (RF to IF) if an active mixer is used. Conversely, if a diode type of mixer (DBM) is used, there is a conversion *loss* of some 8 dB, and this loss must be made up elsewhere in the receiver.

Additional gain comes from the IF amplifiers. A transistor IF stage may produce up to 15 dB (typically) of gain, whereas an IC IF amplifier may produce up to 40 dB of gain. We must take into account the insertion loss of an IF filter

if one is used. Generally, this amounts to 5 to 10 dB of signal loss, which is determined by the type of filter and the number of sections it contains. Again, this loss must be figured into the overall gain of the receiver.

The remainder of the gain comes from the product detector (if an active one), the first audio amplifier, and the output audio amplifier. A single transistor audio preamp provides roughly 10 dB of gain in most circuits. An IC type of audio output stage, such as an LM386N-1, will deliver up to 40 dB of gain.

### Trade-offs for a Superhet

The builder can obtain quality performance from a superhet receiver without including frills such as AGC, bandpass tuning, IF width, memories, and an S meter. Actually, you do not need to use any IF amplifiers when building a "gutless wonder" superhet. The IF filter is placed between the mixer output and the input of the product detector. I have built a number of these receivers with good results. Of course, this rules out the inclusion of AGC and an IF-derived S meter. However, it is possible to include an audio-derived S meter if it is deemed necessary. Examples of some of these circuits are found in *W1FB's Design Notebook* and *W1FB's QRP*

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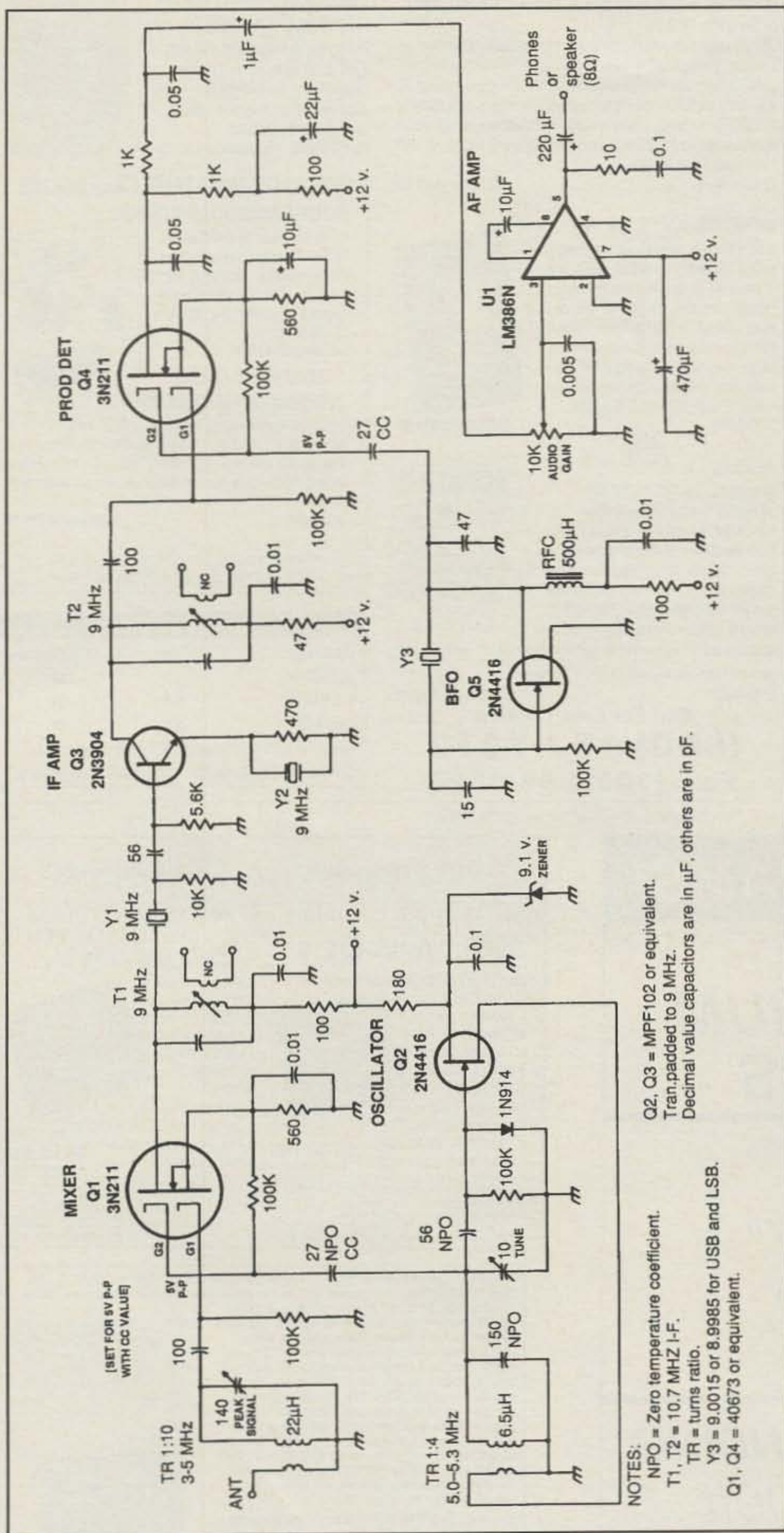


Fig. 2—Circuit example of a bare-bones 75 meter superhet that uses mostly discrete active components (those which require an operating voltage). Filtering is obtained from low-cost surplus computer crystals. This circuit represents a basis for developing a more elaborate receiver and may be used as a test fixture.

NOTES:  
 NPO = Zero temperature coefficient.  
 T1, T2 = 10.7 MHz I-F.  
 TR = turns ratio.  
 Y3 = 9.0015 or 8.9985 for USB and LSB.  
 Q1, Q4 = 40673 or equivalent.  
 Q2, Q3 = MPF102 or equivalent.  
 Tran. padded to 9 MHz.  
 Decimal value capacitors are in µF, others are in pF.

Notebook (2nd edition). These books are available from the ARRL (225 Main St., Newington, CT 06111).

The shortfall associated with a gutless superhet is that the audio chain must be huskier—like that of a DC receiver—to make up for the missing IF gain and filter losses. Microphonics are likely to occur, but I don't find them especially annoying except in mobile equipment where vibration is prevalent. Fig. 2 shows a typical circuit for a minimum-parts superhet. If a simple RF preamp is used ahead of the mixer, it will greatly diminish the effects of microphonics.

### In Summary

Simplicity should be the keynote for any inspired receiver builder who lacks practical experience. The personal satisfaction associated with building a workable receiver far outweighs the time spent in the workshop. It can, in fact, be an exciting experience that will long be remembered. Numerous simple receiver projects, along with accessory circuits, are described in the two books mentioned earlier in the text. PC-board patterns are provided for many of the projects and circuit boards are available, as referenced in the books.

73, Doug, W1FB



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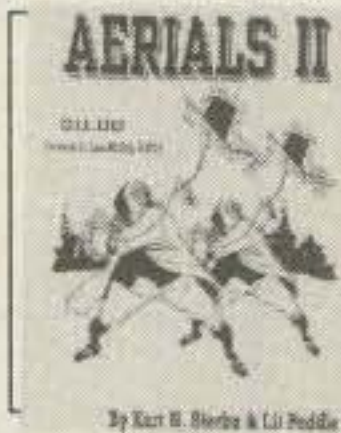
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by Kurt N. Sterba and Lil Paddle  
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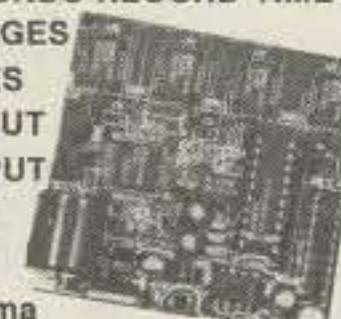
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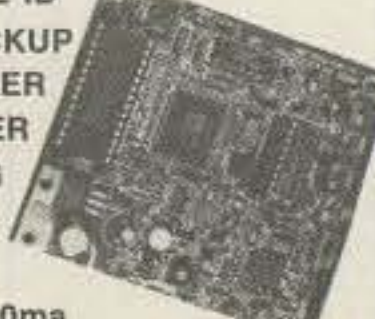
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## NEWS/VIEWS OF ON-THE-AIR COMPETITION

### A Contester's Review of the Dayton Hamvention

**E**very year the Dayton Hamvention brings events and memories that stand out. As testers, I honestly believe that we have a special opportunity to enjoy the event in a unique manner that originates from our common appetite for competing with each other. With competition comes war stories and friendships that can best be fulfilled in person; so were the events of Dayton '93.

Personally, this was a different and unique Dayton. It's distinctiveness began by being on the "other side" of the table in the CQ booth wearing a suit. And no there is no truth to the rumor that K1AR (and K3LR, for that matter) wear suits during contests. That does remind me about the old days at W2PV where we used to razz the competition by telling them that our operations were so "classy" that Jim required all of his operators to wear tuxedos to each operation.

I have read that this year's Hamvention was the biggest ever, with attendance breaking the 35,000 barrier. As usual, from a tester's viewpoint the contest forum and hospitality suites were *par excellence!* I've said this several times in the past, but again I was struck by our age. This year was no exception, as I observed the late-night suite crew donning a few more gray hairs, and for some, less hairs altogether.

There were two events in particular this year that had special meaning: The tribute to G3FXB by Roger Western, G3SXW, at the conclusion of the contest forum, and of course the CQ Contest Hall of Fame inductions. So much has been written about Al in recent months that there is little I can add at this point. It was touching to see the respect that Roger got from his talk as well as the scores of conversations and memories about Al that went well into the night.

This year offered the first annual Contest Banquet. Now I know what you are thinking: Can a large group of testers actually gather in a relatively formal setting and manage to maintain some level of respectability? All kidding aside, I was honored to emcee an event that hopefully will be the first of many more. In addition to providing a venue for inductions into the CQ Contest Hall of

#### Calendar of Events

Jun. 26-27	ARRL Field Day
Jul. 1	Canada Day Contest
Jul. 3-4	Venezuela SSB DX Contest
<b>Jul. 10-11</b>	<b>CQ WW WPX VHF Contest</b>
Jul. 10-11	IARU HF World Championship
Jul. 17	Colombian Independence Day Contest
Jul. 17-18	Seonet CW Contest
Jul. 24-25	Venezuela CW DX Contest
Aug. 7-8	YO DX Contest
Aug. 14-15	Worked All Europe CW Contest
Aug. 14-15	Maryland-D.C. QSO Party
Aug. 21-22	Seonet SSB Contest
Aug. 21-22	New Jersey QSO Party
Sept. 4	Panama Anniversary Contest
Sept. 4-5	Bulgarian DX Contest
Sept. 4-5	All Asian SSB DX Contest
Sept. 11-12	Worked All Europe SSB Contest
<b>Sept. 25-26</b>	<b>CQ WW RTTY Contest</b>
<b>Oct. 30-31</b>	<b>CQ WW SSB Contest</b>

Fame, we had the pleasure of hearing a very funny and insightful talk by Joe Rudi, NK7U. Joe has the unique ability to relate personal success as a Major League baseball player to amateur radio in general and contesting in particular. The availability of twenty door prizes added to the fun, although there were some raised eyebrows when my brother-in-law, K1DG, won a one-year subscription to CQ. Tim Duffy, K3LR, and the co-sponsoring clubs of FRC, YCCC, NCC, and MRRC are to be com-

#### July's Contest Tip

Does the physical size of your QTH keep you from erecting 500+ foot beverages? I have discovered that there are times when existing antennas can enhance receiving quality on 80 and 160 meters. For example, try using your 40 meter antenna on 80 or 160 as a receive array. If stations are loud enough, improved signal-to-noise ratios can more than compensate for reduced signal strength levels and heighten your ability to copy low-band signals—without a beverage!

mended for pulling off a first-class event!

Dayton ended with me being as tired as I can ever recall after a Dayton Hamvention. However, there are only 298 days to go, and I can't wait.

#### CQ Contest Hall of Fame

The CQ Contest Hall of Fame was formed several years ago to honor those who have contributed immeasurably to the sport of contesting. Inductees are not always the best operators or owners of the biggest stations, but they are clearly recognized as furthering the growth and quality of contesting around the world.



A toast being offered at the Dayton tester's banquet in memory of K3VW and G3FXB. (All photos courtesy Scott Jones, WR3G)

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SL-11R	•	•	7	11	2 5/8 x 7 x 9 3/4	12
SL-11S	•	•	7	11	2 5/8 x 7 5/8 x 9 3/4	12
SL-11R-RA	•	•	7	11	4 3/4 x 7 x 9 3/4	13

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RM-35A	25	35	5 1/4 x 19 x 12 1/2	38
RM-50A	37	50	5 1/4 x 19 x 12 1/2	50
RM-60A	50	55	7 x 19 x 12 1/2	60
• Separate Volt and Amp Meters				
RM-12M	9	12	5 1/4 x 19 x 8 1/4	16
RM-35M	25	35	5 1/4 x 19 x 12 1/2	38
RM-50M	37	50	5 1/4 x 19 x 12 1/2	50
RM-60M	50	55	7 x 19 x 12 1/2	60

### RS-A SERIES



MODEL RS-7A

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

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MODEL	Continuous Duty (Amps)			ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
	@13.8VDC	@10VDC	@5VDC	@13.8V		
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 5/8 x 9 3/4	12



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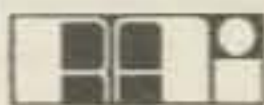
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RG 11U FOAM MIL-SPEC		.42/ft	.40/ft
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C4090 HVY DUTY 2/16-6/20 UV JACKET		.34/ft	.32/ft
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CIRCLE 122 ON READER SERVICE CARD



Molly Lawson receiving a well-deserved round of applause for the accomplishments of Jim, W2PV.



Fred Laun, K3ZO, accepting his CQ Contest Hall of Fame award from Bob Cox, K3EST.

The process of induction is very simple. A volunteer committee was formed by CQ several years ago to evaluate recommended candidates. It consists of CQ WW committee members and representatives from the various CQ awards programs. The committee established a policy several years ago that required Hall of Fame recommendations to come from a group (such as a contest club or operating team) rather than individuals to demonstrate broader support for the candidate. Future submissions should be forwarded before February 1, 1994 to Bob Cox, K3EST. This will provide enough time to complete the process for induction at either Dayton or Visalia next year.

This year's Contest Banquet offered a unique site to induct the new Hall of Fame members. This year we were honored to admit the following outstanding contesters: Jim Lawson, W2PV; Fred Laun, K3ZO; Frank Anzalone, W1WY; Vic Clark, W4KFC; Ed Bissell, W3AU; and Rush Drake, W7RM. We were honored to have Fred Laun, K3ZO, present to accept his award, and especially pleased to present Jim Lawson, W2PV's award posthumously to his wife, Molly.

There is so much that can be said of these fine contributors to contesting and our hobby. What is generally true is that contesting, as we know it, has been profoundly impacted by their contributions. There were the technical achievements and "forward-thinking" station design techniques of Jim Lawson. We should all be grateful for the decades of thankless administrative undertakings by Frank Anzalone in building the CQ WW into the best contest in the world. The advancement of contesting around the world and operating accomplishments of Fred Laun are unparalleled. Rush Drake was a pioneer in multi-multi contesting on the West Coast and "Emerald" many of today's best operators. Ed Bissell belonged to a select group of contesters who implemented a multi-multi station while others were still thinking about it. He provided an operating

training ground for some of contesting's best operators, including K3EST, N4RV, N4IN, W6UM, KT3Y, and scores of others. And who can summarize Vic Clark in a sentence or two? Perhaps winning the CQ WW nine times may stand out in your mind. The old-timers will always remember Vic's characteristic "33 VA" in the ARRL Sweepstakes.

Each of these fine men deserves our thanks and respect for their contributions. Congratulations!

### Final Comments

What's happening with QSO rates? I mentioned the idea a few months back, and most of the data has now been collected. How do rates vary by station location and geography worked? Do shorter callsigns maintain faster rates than longer ones? I hope you find the topic as interesting as I did.

That's all for this time. Please remember that the deadline for the September issue is July 1st.

73, John, K1AR

### Canada Day Contest

0000-2359Z, Thurs., July 1

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

**Classes:** Single operator—all band (high power and QRP), single band and multi-operator.

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

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

**Multipliers:** Credit one multiplier per





W2PV operators' reunion. Front (left to right): K3LR, K1AR, Molly, K1DG, and K2XA. Back (left to right): KC1F, K1VR, K1ZZ, K1ZX, and KR2J.

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

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

### Venezuelan Contest

SSB: July 3-4 CW: July 24-25  
0000Z Sat. to 2400Z Sun.

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

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

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

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

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

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

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

Use a separate log sheet for each band. Each YV call area (9) and each country (DXCC list) should be indicated in a separate column only the first time they are worked on each band.

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

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

### IARU HF Championship

1200Z Sat. to 1200Z Sun., July 10-11

This is the 8th annual IARU World HF Championship. All six bands, 10 through 160 meters, and the full 24 hours may be used by both single and multiple-operator stations. (No WARC bands.)

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

**Exchange:** RS(T) and ITU zone. HQ

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stations: RS(T) and official society abbreviation.

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

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

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

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

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

It is recommended that you check QST (April 1993 issue) for more detailed information. A large SASE with 2 IRCs

(or equivalent) will get you official forms and an ITU zone/prefix/continent map. Mailing deadline for entries is August 10th to: IARU Secretariat, Box AAA, Newington, CT 06111 USA.

### Colombian Independence Contest

0000Z to 2400Z Sat., July 17

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

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

**Exchange:** RS(T) plus serial no. (e.g., 59001).

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

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

**Final Score:** Total QSO points times

the sum of the multipliers from each band.

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

Use a separate log sheet for each band. Indicate the multiplier in a separate column only the first time it is worked on each band. A summary sheet showing the scoring and other essential information, and the usual signed declaration, is also requested. Disqualification rules regarding taking credit for duplicate contacts, violation of rules and regulations, etc., will be strictly enforced.

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

### SEANET Contest

CW: 0000Z Sat. to 2400Z Sun.

July 17–18

SSB: 0000Z Sat. to 2400Z Sun.

August 21–22

This is an annual event sponsored by the Radio Amateur Society of Thailand (RAST). The objective is for amateurs worldwide to work stations in Southeast Asia.

**Bands:** 160–10 meters (no WARC bands).

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

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

**Multiplier:** Multipliers are SEANET country prefixes: A4, A5, A6, A7, A9, AP, BV, BY/BZ, DU/DV/DX, EP, HL, HS, JA, JD1, JY, KH2, P29, S79, VK1–9, VQ9, VS6, VU, V85, XU, XV, XW, XX9, YB/YC/YE, ZK, ZL, ZM1–4, ZL6/ZM6, ZL9, 3B6/3B7, 3B8, 3B9, 4S7, 4X/4Z, 8Q7, 9K2, 9M2, 9M6/9M8, 9N1, 9V. Multipliers are calculated by total number of SEANET countries times three (times 2 for SEANET-SEANET contacts).

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

No update was received by press time. I recommend you send your results to last year's contest manager. Entries must be received by October 31st and sent to: SEANET '93, Eshee Razak, 9M2FK, P.O. Box 13, 10700 Penang, Malaysia. Include 3 IRCs for a copy of the final results.

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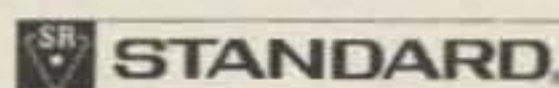


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# PACKET USER'S NOTEBOOK

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BY BUCK ROGERS, K4ABT

## PACTOR—The New Frontier

**W**ithout great fanfare, let's get into the good part of this month's "Packet User's Notebook" and the new, fun mode that is sweeping the digital frequencies with wide acceptance. Read on as we cover the operation and command organization of several multimode controllers which support the new HF digital mode called "PACTOR."

PACTOR is without a doubt the most fun-filled mode of HF digital communications that I've seen in a long time. Combining features from both the packet and AMTOR modes, we are given a means to access higher data throughput at HF that was once reserved for only VHF. The difference is we are operating at HF in a tighter bandwidth environment.

The radio used for PACTOR HF operations must be capable of switching between transmit and receive modes in 130 milliseconds. A radio capable of operating in the AMTOR mode will operate well in the PACTOR mode.

### A Brief Look At PACTOR History

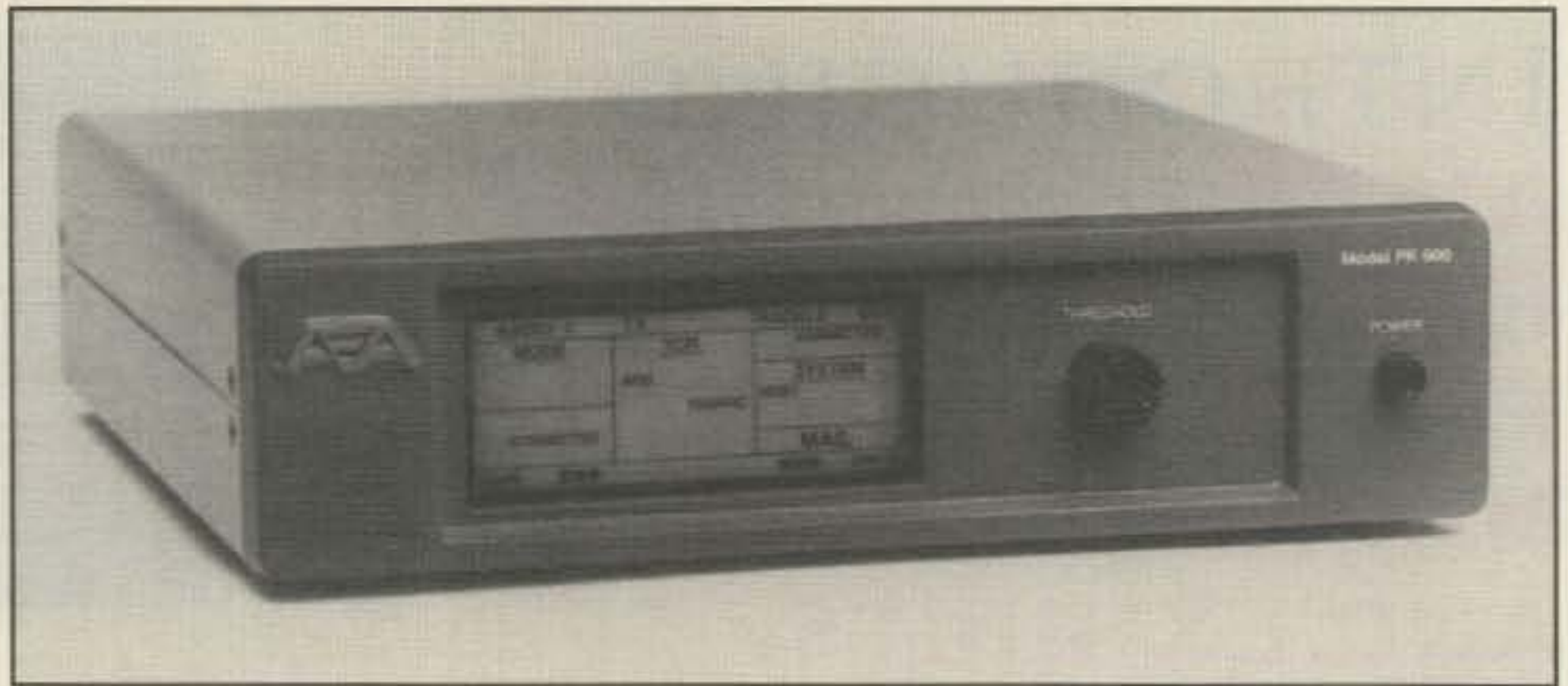
A new approach to HF data communicating, PACTOR opens another means of keyboard-to-keyboard contacts. At the same time it offers the BBS forwarding nets a way to deliver the BBS traffic between forwarding stations faster than the AMTOR mode once did.

PACTOR was developed in Germany by Hans Peter Helfert, DL6MAA, and Ulrich Strate, DF4KV. PACTOR combines the best features of packet with a few of the attributes of AMTOR. In addition, there were other features added which endow PACTOR with a pronounced advantage over other HF digital communication modes. PACTOR operates at 100 to 200 baud, depending on HF transmitting and receiving conditions. PACTOR can selectively implement a data compression scheme called "Huffman encoding" to increase the throughput when transmitting text. Another advantage of PACTOR is that it uses an 8-bit word, thus allowing the use of the full ASCII character set.

### A Few Considerations

In this month's column I will describe several multimode controllers that can be used with PACTOR. Some of these controllers are the same ones you now have. All that is needed to begin operating PACTOR is an upgrade kit from the manufacturer.

In the case of the AEA PK-232, PK-900, and DSP-2232, the MFJ Enterprises MFJ-1278B, and the Kantronics KAM, there are



PACTOR is among the many functions and modes addressed in the AEA PK-900. Note the large display and tuning indicator marquis. All information about the current operating mode is displayed in plain text. (Photo courtesy Advanced Electronic Applications, Inc.—AEA)

retrofit kits which enable you to update these controllers for use on PACTOR with little or no modification to your present controller. In most cases, only the exchange of the EPROM(s) is needed. This is the case with the AEA PK-232, PK-900, and DSP-2232, and the Kantronics KAM.

The Kantronics KAM Plus and the PacComm PACTOR controllers are PACTOR ready and no upgrade is needed. With the exception of the KAM Plus and the PacComm PACTOR units, the just-mentioned controller updates are all priced under \$80. The updates can be user installed, or they can be installed by the manufacturer for a nominal charge.

### PACTOR Operation

Now I'll explain how to operate PACTOR with the AEA, Kantronics, MFJ, and PacComm controllers. At the same time I hope to make some sense of the different command syntax used by each company to address a common command. And I wish to thank the writers who contributed to this advanced HF digital mode for having done a superior job.

### AEA Multimode Controller(s) And PACTOR

Although I make reference to the DSP-2232 in the following PACTOR operating description, the command implementation is much the same for the AEA PK-232, PK-900, and DSP-1232 multimode controllers.

To enter the PACTOR mode using an AEA controller, the command is simple enough. At the **cmd:** prompt type:

**PT <enter>**

The DSP-2232 responds with:

Opmode was **Packet**  
Opmode now **PACTOR**

The marquis on the DSP-2232 will indicate that you have entered the PACTOR OPmode. There are two ways you may proceed from this point. I suggest that you use the **PTL** command, which places the DSP-2232 into the "PACTOR LISTEN" state.

To listen or to copy PACTOR ("PACTOR LISTEN"), type:

**PTL <enter>**

If you prefer to try a contact instead, you may wish to call CQ. To call CQ use the PACTOR SEND command (**PTS**). To call CQ in the PACTOR state, type:

**PTS <enter>**

Use the CQ pattern similar to that which I use, as shown in the following example:

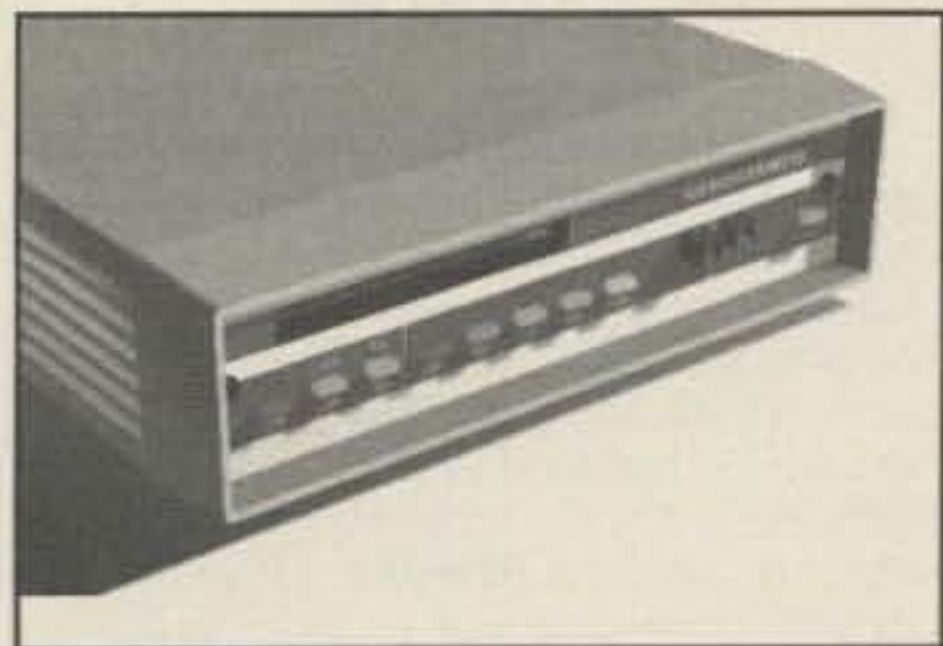
**CQ CQ CQ CQ CQ de K4ABT**  
**CQ CQ CQ CQ CQ de K4ABT**  
**CQ CQ CQ CQ CQ de K4ABT**  
(Be sure to include your callsign)

To leave PTSend, enter a **Ctrl D**. The Ctrl D places the 2232 into the receive condition. However, if you are a fast typist, the transceiver may continue for a brief period until any unsent CQs have cleared the transmit buffer of the DSP-2232. Type **PTL** at the cmd: prompt just to be sure you are in the "LISTEN" state and ready to answer any connects.

**The AEA PACTOR Connect.** The secret of how to make connects with HF Packet,

211 Luenburg Drive, Evington, VA 24550





The KAM Plus from Kantronics comes equipped with PACTOR. New enhancements inside the KAM Plus have improved its digital reception and presentation, making it an outstanding digital all-mode controller. Note that the KAM may be upgraded to implement the features of the KAM Plus (for pricing see text). (Photo courtesy Kantronics)

RTTY, and AMTOR was well kept for some time. That once forbidden method is easy when you are in the PACTOR mode. Let's examine how we enter the PACTOR mode and how we make a PACTOR contact using the AEA controllers.

Let's imagine that N7MBA is tuning around the 14.065 to 14.075 MHz portion of 20 meters and sees my PACTOR CQ at 14.068 MHz. Here is an example of what might be seen at 14,068 MHz on the CRT.

CQ CQ CQ CQ CQ de K4ABT  
CQ CQ CQ CQ CQ de K4ABT  
CQ CQ CQ CQ CQ de K4ABT  
K

Using the AEA PACTOR controller(s) to establish a PACTOR connect to my station, type the following:

PTC K4ABT <enter>

After a couple of tries, the following should appear on your screen:

<CONNECTED TO K4ABT>

In the case of the DSP-2232, the marquis will change from "PHASING" to "IDLE." At this point you are the **Information Sending Station (ISS)**, and you may begin typing to me in the following manner.

K4ABT de N7MBA or (your call)

As you may have noticed by now, we identify our stations with our callsign and the callsign of the station to which we are linked. We do this as we exchange transmissions, and at 9.5 minute intervals.

We continue our PACTOR QSO, and when we wish to turn over the transmission to one another we use **Ctrl Z**. If I am transmitting and I turn over the transmission to N7MBA, I issue a Ctrl Z. This places my station into a state called **Information Receiving Station**, or **IRS**. We continue this exchange until we are ready to disconnect.

By now you've concluded that **Ctrl Z** is the "OVER" character that places the transmit control with the other station. A similar command that you may have used in AMTOR is

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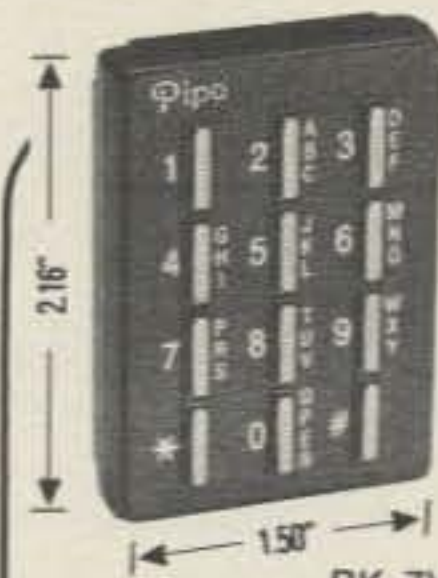
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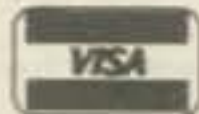
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the + and the ? (+?). In the AEA PACTOR command set the "OVER" transfer is a simple Ctrl Z. After we have exchanged 73, etc., I issue a **Ctrl D** to end our ARQ PACTOR link and place my AEA controller into PACTOR standby, or the "LISTEN" state.

### AEA PACTOR User Command Set

**PT**—Selects PACTOR mode.

**PTList**—Enters the PACTOR LISTEN mode.

**PTSend**—Forces Converse, to call CQ, etc. Example: PTS <enter> (starts transceiver sending/transmit) CQ CQ CQ CQ de K4ABT (send the CQ line about 5 times) Ctrl D (Ctrl D allows CQ to complete and returns to PTList).

**PTHuff 0 OFF**—Prevents Huffman compression.

**PTH 1 ON**—Enables Huffman compression.

**PTOver**—Selects "changeover" character. (Default is Ctrl Z.)

**PT200 0 OFF**—Prevents 200 baud operation.

**PT200 1 ON**—Allows 200 baud operation.

**Special Characters** (may be embedded into transmitted text).

**Ctrl B**—Sends your AAB string as "HERE IS:" (AAB is "Auto Answer Back.")

**Ctrl D**—Stops sending when your transmit buffer is empty.

**Ctrl E**—Sends "Who are you?" request to the other station.

**Ctrl F**—Sends callsign in Morse and shuts off transmitter.

**Ctrl R**—Stops sending, forces PACTOR STBY.

**Ctrl T**—Sends time and date if set in TNC.

**Ctrl Z**—Changes your station from ISS (send) to IRS (receive).

A list of dealers in your area may be obtained from AEA marketing by calling 1-800-243-7388, or by writing to them at Advanced Electronic Applications, Inc., P.O. Box 2160, Lynnwood, WA 98036-2160.

### PACTOR With The Kantronics KAM/KAM Plus

In the PACTOR format there are several common features which should be addressed. Each manufacturer may define them in its documentation in a different way or may use a distinctive manner to describe them. In the Kantronics KAM documentation there are some points that may be helpful for us to explain here.

With PACTOR data communications can occur at either 100 or 200 baud, since the PACTOR protocol can automatically determine the best operating speed to use for a given set of band conditions. If the PACTOR link deteriorates during a 200 baud connect, the KAM will automatically switch to 100 baud. On the other hand, if you are operating at 100 baud and the data transfer is moving without serious error, the KAM will attempt an increase to 200 baud.

PACTOR offers the ability to compress data on the fly using Huffman techniques for compression. At 200 baud PACTOR normally transmits 20 characters of data with each frame. With Huffman compression it is possible to transmit more than 20 characters in a packet.

At 100 baud each frame or packet will carry eight characters, but more than eight characters can be transmitted when using Huffman compression techniques. Huffman compression may be applied to each frame, but on a case by case basis. One frame may contain compression, while the next may not. In the KAM this compression mode is activated by using the **PTHUFF** command. The PTHUFF command may be activated at the user's option. Very similar to packet, PACTOR uses the full ASCII character set to transmit data. Therefore, it is possible to send graphic characters, pictures, and even binary files.

**Automatic Repeat Request (ARQ).** PACTOR has little relation to AMTOR, and is more like the packet mode. Like AMTOR, PACTOR provides both linked mode and Forward Error Correction (FEC) modes. The linked mode is called the Automatic Repeat Request (ARQ) mode. In ARQ the transmitted packets (frames) are acknowledged by the receiving station as good or bad. If a frame is bad, the receiving station asks for a repeat.

PACTOR, unlike AMTOR, enables communication over longer distances by allowing long-path connects. PACTOR also transmits more data per packet, thereby increasing the effective throughput.

First things first, however. We enter our PACTOR call into the KAM by using the special PACTOR callsign command, **MYPTCALL**. The callsign input at the MYPTCALL command may be up to eight characters in length. This is the callsign that is sent to the other PACTOR station immediately when a link is made.

Similar to the TXDelay command used in the packet mode, the KAM enables the transmit delay activate time to be set using the **TXDAMTOR** command. Because each manufacturer may have a different delay period (in milliseconds) for its controller, it is necessary that you check the manual for the correct KAM TXDAMTOR.

**Using the KAM and KAM Plus to Tune and Monitor PACTOR.** Like other digital modes that use the Mark and Space tones, PACTOR signals are tuned in a similar fashion. On the KAM the bargraph will flash at a rate commensurate with the incoming PACTOR signal. The PACTOR signals are on and off, so it will be necessary to practice the tuning of the PACTOR signals until you are familiar with the "beat" of the bargraph tuning indicator. When you link to a station in the PACTOR mode, the **HF CON LED** will light, indicating that you have an established link.

The first thing I do when I enter the PACTOR command mode with the KAM is activate **PTLISTEN**. To activate PTLISTEN, at the cmd: prompt I type:

**PTLISTEN <enter>**

This enables me to see other stations who are QSOing in PACTOR while I'm in the PACTOR command (cmd:) state. This is how I can monitor the PACTOR frequencies for other stations who may be calling CQ.

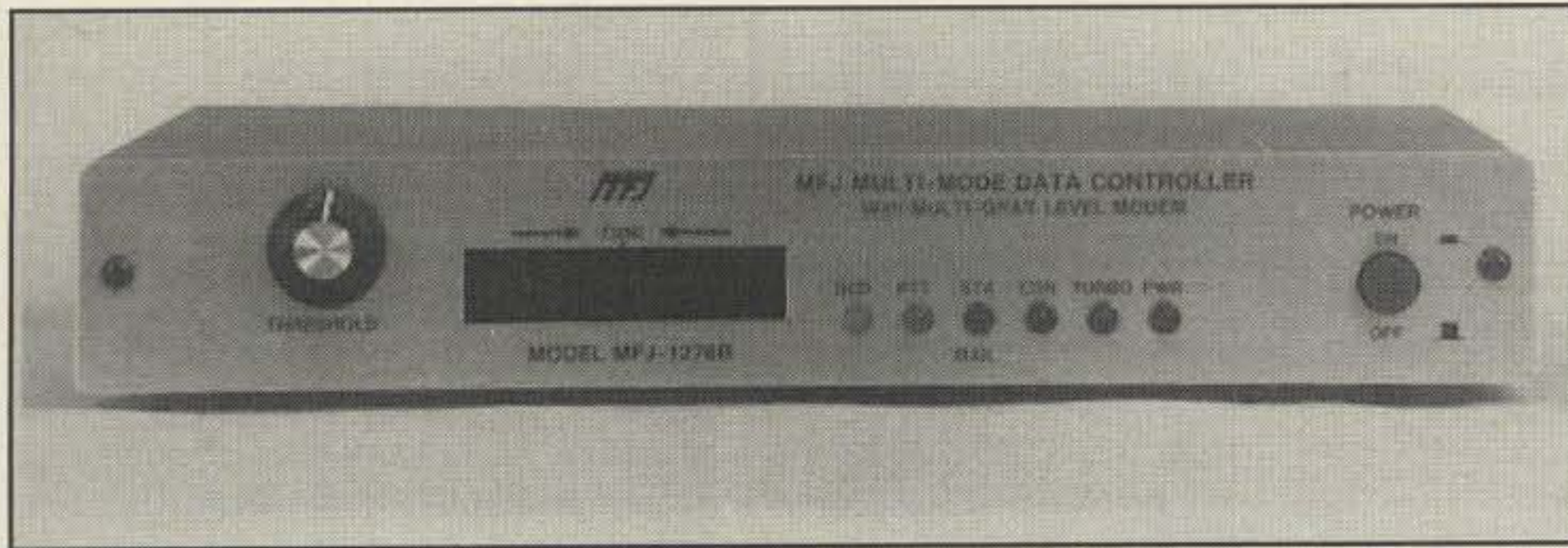
Both ARQ and FEC PACTOR transmissions are monitored in the PTLISTEN mode. To return to the command (cmd:) mode sim-

**PTLISTEN <enter>**

Both ARQ and FEC PACTOR transmissions are monitored in the PTLISTEN mode. To return to the command (cmd:) mode sim-

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With the addition of PACTOR and high-resolution color slow-scan television, the MFJ-1278B multimode controller offers many features for the price. (Photo courtesy MFJ Enterprises Inc.)

ply enter a Ctrl C and then press the X. By now you may have noticed that all PACTOR commands are issued from the cmd: prompt. It is important that the KAM user remember this, as the commands we have just covered and the ones we are about to cover are referenced from the cmd: prompt.

**Calling PACTOR CQ with the KAM.** To issue a CQ in PACTOR you must first enter the PACTOR Standby mode. As I mentioned before, you must issue the command from the cmd: prompt. At the cmd: prompt type **PACTOR** and then press <enter>. The KAM will indicate that you have entered PACTOR by displaying the **[PACTOR STANDBY]** message.

To begin the "transmit" of the FEC CQs, press <Ctrl C> followed by pressing the **T**. Your transceiver should begin transmitting in FEC.

Use <Ctrl C> **1** if there are noisy band conditions (100 baud). If there are favorable conditions, you can use the <Ctrl C> **2** (200 baud) to shift to a higher speed with your CQ. Here is an example of how I call CQ after entering the PACTOR FEC transmit mode:

**CQ CQ CQ CQ CQ de K4ABT**  
**CQ CQ CQ CQ CQ de K4ABT**

(Be sure to include your callsign and be sure your ARQBBS is OFF)

When you have completed typing the CQs

and callsigns, you should return to the PACTOR Standby mode by entering <Ctrl C> **E**. As the **T** places your station into "Transmit" mode, the <Ctrl C> **E** "Exits" to standby and awaits a connect or link from any station who may have seen your PACTOR CQ.

**Linking to Other PACTOR Stations.** In this example I will be the station who was monitoring (PTLISTEN). I have just seen Phil, WØXI, calling PACTOR CQ on 14.072 MHz LSB. After I see the KK at the end of his CQ, I go to [<Ctrl C> X] cmd: and type:

**PACTOR WØXI** [press <enter>]

The KAM begins transmitting the connect frame sequence. Phil's KAM should receive my connect request, and his screen should display:

**<LINKED to K4ABT>**

Because I am the station who initiated the link request, my station then becomes the Information Sending Station (ISS). After I have sent Phil my name and QTH, etc., I issue the <Ctrl C> **E** to exit and pass control to his station. The <Ctrl C> **E** makes Phil the ISS, and I become the Information Receiving Station (IRS). After we enjoy a long PACTOR QSO, I close the PACTOR QSO by passing my 73's and issuing <Ctrl C> **D**. <Ctrl C> **D** sends a

a hard disconnect (QRT) frame to the other station and returns my KAM to the PACTOR Standby mode.

For more information about the Kantronics PACTOR for the KAM, write to or call Kantronics, Inc., 1202 E. 23rd Street, Lawrence, KS 66046 (phone: order number 913-842-7745; and technical support 913-842-4476).

## MFJ Model MFJ-1278B On PACTOR

To place the MFJ-1278B into the PACTOR mode, at the cmd: prompt type:

**MODE PT** <enter>

The MFJ-1278B will respond with:

**Radio:1 Terminal:9600**  
**Mode: PACTOR**  
**[MFJ PACTOR]**

**p\_cmd:**

The cursor will set to the next line.

When the **p\_cmd:** prompt is present, you are in PACTOR mode. Any commands entered, such as TXDELAY or ECHO, will only affect the PACTOR mode.

Many of the commands of PACTOR have the same name as the general commands but do not share the same parameters. At the p\_cmd: prompt, you can monitor AMTOR ARQ requests to your SELCALL, PACTOR ARQ requests, and PACTOR FEC.

Enter your call in the **MYCALL** parameter (up to 8 characters). The format of the MYCALL command is as follows:

**MYCALL n** <enter>

(where "n" is your amateur callsign, up to 8 characters)

**FEC UNPROTO Operation.** "FEC/UNPROTO" packets are transmitted UREPEATS+1 times. Selecting larger values of UREPEATS reduces throughput but enhances reliability. To transmit in UNPROTO mode, issue the appropriate UNPROTO command and type away.

When you are done, break out to p\_cmd: mode and type **D** to terminate transmission. There are two FEC modes—100 baud and 200 baud. Before entering either of the FEC modes ensure your radio is properly tuned up on the frequency on which you intend to transmit. The reason for this is as soon as you initiate an FEC UNPROTO mode, the radio will start transmitting immediately.

To initiate 100 baud FEC, type the following from the p\_cmd: prompt:

**U1** <enter>

The cursor will go to the next line. At this point start typing whatever you want. You normally issue your CQs in the FEC mode. Someone will see your FEC mode CQs and probably try a connect.

When you have finished typing your message or CQs, type a **Ctrl-C** (if using MULTI-COM press F1), then enter the letter **D**, followed by <enter>. This will terminate the UNPROTO session and the p\_cmd: prompt will be issued. If the **p\_cmd: D** command

Status Indicator		PACTOR Status
STA	CON	
0	0	MON: The MFJ-1278B is idling and has not monitored any information packets in the past second RX: n/a TX: n/a
0	1	RX: Sending ack control signal TX: Last packet acknowledged MON: Received new packet
1	0	RX: Dupe rcvd; sending Request control signal TX: Received request control MON: Received dupe packet
1	1	RX: Info packet missing; sending request TX: Control sign missing; retransmitting MON: n/a

Table 1—The different ways in which the CON and STA LEDs will react when you are in the PACTOR mode.





One of the first controllers to introduce PACTOR to the American amateur, the PACTOR Controller from PacComm also includes support for AMTOR and RTTY. (Photo courtesy PacComm Packet Radio Systems, Inc.)

does not work, then press the double D (**p\_cmd: DD**).

The two FEC modes are used with different band conditions. Normally, the **U1 (100 baud FEC)** is used in noisy conditions, while the **U2 (200 baud FEC)** is used during clear band conditions.

**PACTOR ARQ.** For ARQ operation you will need to know the other person's callsign. Normally you can get the other person's call by monitoring the channel for connect requests or other ARQ contacts.

To establish a connect with another station, you must be at the **p\_cmd: prompt**. To initiate a connect, type:

**C <callsign> <enter>**

(where **<callsign>** is the call of the station you want to connect to. Callsigns of up to eight characters are allowed.)

**LC** means **Longpath Connect**. When the station is about 4000 miles away, it may be necessary to connect using the LC command instead of the C command.

**Changeover.** The calling TNC is initially the Information Sending Station (ISS)—i.e., the sender. The other station is initially the Information Receiving Station (IRS). To reverse data direction, either the sender or the receiver must send the changeover character (default: ^Y—changeable).

If the MFJ-1278B is currently the ISS, the changeover takes effect when all pending characters are acknowledged by the remote. When the MFJ-1278B is IRS, the changeover takes effect immediately, and any characters typed prior to the changeover are queued for immediate transmission (type-ahead).

To end an ARQ connection, type **CTRL-C**, then **D**, then press **<enter>**. This will cause a graceful disconnect at the other end. If you do a "dirty disconnect" (DD instead of D), the other station will still be trying to acknowledge your packets. This is considered bad manners. Always do a **D** disconnect, if possible.

**Monitoring.** While in the PACTOR mode, the MFJ-1278B is always in the Listen mode. Therefore, there is no need to issue any command just to listen on a PACTOR frequency.

In order to monitor a PACTOR conversation, just tune in the signal until the yellow DCD light is on solid as the packet is being received. Fine-tune until you get the CON LED on. While monitoring a PACTOR QSO, the CON and STA LED should blink on and off.

To exit the PACTOR mode, at the **p\_cmd: type EXIT** and press **<enter>**.

**MFJ Digital Memory ARQ.** The MFJ-1278B's PACTOR incorporates digital memory ARQ. Memory ARQ enables the reconstruction of a good packet when a retried packet is continuously received with one or more bit errors. Thus, a correct packet may be reconstructed from two or more "bad" packets.

**PACTOR Status Indicators.** While in the PACTOR mode of operation, you have PACTOR mode status indicators available to you. These status indicators are comprised of the **CON** and **STA** LEDs. The LEDs react in different ways according to what is happening. Table I tells how the LEDs will act.

**MFJ PACTOR Command Set.** The following commands are only valid when issued at the **p\_cmd: prompt**. Note that a few of the parameters use the same names as packet commands. The parameters themselves are not shared between the different modes and have completely different formats.

**CONNECT <call>**—Issuing the CON-

NECT command and the callsign of the target station begins the connect sequence. Immediate command. It initiates a connect request to the MFJ-1278B with CALL using regular timing.

**AUtoIF ON:OFF**—Functions the same as in packet mode.

**CBell ON:OFF**—Functions same as in packet mode.

**CHbell ON:OFF**—Default ON. When ON an ASCII bell (0x07) character is sent when the PACTOR link changes directions.

**CHOChar**—nnn: 0 <=nn<=255 (^Y). This is the PACTOR changeover character.

**Disconnect**—Cleanly terminates the ARQ or FEC connection.

**DDisc**—Dirty, immediate termination of connection.

**EAA ON:OFF**—"Echo as ACKd." When ON, the MFJ-1278B echos transmitted data to the terminal upon receipt of the remote's acknowledgement of the same data.

**EEcho ON:OFF**—Functions the same as other modes, except that echoing is deferred when EAA is ON as described above.

**EXactcal**—When ON, the MFJ-1278B responds to connect packets that match all the letters in your callsign and no more.

**FLow ON:OFF**—Function is the same as other mode, except it operates only in **p\_cmd: mode**.

**Monitor ON:OFF**—Functions the same as the other modes when MCON is off.

**MYcall [callsign]**—Install your callsign, up to 8 characters. The callsign placed here should be a minimum of 4 characters.

**NO200 ON:OFF**—Controls whether 200 baud links are to be disallowed.

**PASS nnn: 0<=nn<=255**—Functions the same as the other modes. It *will not work* for ^Y changeover.

**TXdelay nn**—Similar to AMTOR's DELAY and packet's TXDELAY.

**Upgrading Your MFJ-1278 to PACTOR.** The upgrade price is \$69.95. Further information about the PACTOR upgrade is available from MFJ Enterprises Inc., P.O. Box 494, Mississippi State, MS 39762 (601-323-5869).

## PacComm's PACTOR Controller

The PacComm PACTOR Controller is produced under license from the German developers, Special Communications Systems (SCS). It is compatible with the German



The AEA PK-232 may be updated to implement PACTOR operation in addition to its many other digital modes. The modification is simple and straightforward (for price of update EPROMs see text). (Photo courtesy Advanced Electronic Applications—AEA)



firmware (all commands and messages in English).

The PACTOR unit also supports AMTOR and RTTY operation, making it ideal for all modes of HF operation. PACTOR will accept a call in either PACTOR or AMTOR and will automatically respond in the correct mode.

The PACTOR unit also contains a CW keyer function. A unique feature is that the AMTOR and RTTY software in the PACTOR Controller can be controlled completely with the keyer paddle, making a keyboard unnecessary.

PACTOR commands are similar to packet commands and are easy to learn and use. Complete amateur call signs are supported. The AMTOR and RTTY modes use conventional commands.

**Radio Interfacing.** Interfacing the PacComm controller to your radio is similar to the interfacing process of many TAPR TNC-2 controllers. The pin layout is the same number scheme used on the 5-pin DIN connectors. You may find your TNC-2 connector directly matches the PacComm PACTOR/RTTY/AMTOR controller connector. Check and double check the wiring to be sure the signals are correct.

Interfacing the PACTOR Controller to a radio involves connecting the following signals to the 8-pin DIN connector.

**Pin 1**—AFSK or FSK output from the PACTOR Controller to the transmitter.

**Pin 2**—Ground for both audio and standard PTT.

**Pin 3**—Push-to-talk to allow keying the transmitter.

**Pin 4**—Receive audio from the speaker or auxiliary jack.

**Pin 5**—Optional power input or floating relay PTT.

**Pin 6**—No Connection, for future use.

**Pin 7**—No Connection, for future use.

**Pin 8**—No Connection, for future use.

**The LED Indicators.** Sixteen LEDs plus a tuning indicator are provided on the PACTOR controller. The meaning of each LED is explained below.

**HISpeed**—Data is transmitted at 200 baud.

**Send**—This command enables the PACTOR controller to be the current sender of packets.

**CHO**—A changeover is executed. The LED goes off after complete confirmation of the changeover by the other station.

**Connect**—A link to a remote station is established. This LED also serves as a connect indicator. If a remote station contacts this PTC while the operator is not present, this LED blinks until an operator activity is noticed. When a message is deposited in the internal mailbox, the LED blinks in a rhythm twice as slow.

**Traffic**—The system transmits data and there are no repeat requests pending.

**Idle**—There is at least one idle character in the current data packet.

**Request**—The other station is requesting a retransmission of the last information packet or control character.

**Error**—A received packet contains bits with errors and cannot be decoded properly. A packet was reconstructed by memory ARQ.

**ASCII**—The PCT sends or receives packets with ASCII coding.

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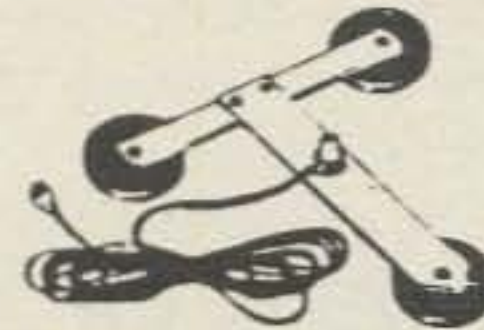
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**Huffman**—The PTC sends or receives packets with Huffman data compression.

**RS-232**—This LED serves as a Power ON LED. It glows steadily when power is on, and flickers slightly when data is present on either the input or output RS-232 lines to the terminal. The flickering is more noticeable at lower baud rates.

**AMTOR**—Indicates the PACTOR Controller is in AMTOR mode.

**RTTY**—Indicates the PACTOR Controller is in RTTY mode.

**ARQ**—Indicates the PACTOR Controller is in AMTOR Mode-A.

**FEC**—Indicates the PACTOR Controller is in AMTOR Mode-B.

**Phasing**—Indicates AMTOR phasing is taking place.

**Listen**—Indicates the PACTOR Controller is in AMTOR Mode-L.

**Tuning Display**—The radio should be tuned to light LEDs near each end of the tuning display.

**PacComm PACTOR Operating Procedures.** With PACTOR it is possible to run contacts with very little power or poor antennas. Signals that are down in the noise (QRM, QRN) can be decoded. The PACTOR controller does all the work.

PACTOR is superior to AMTOR, since the transmission speed adapts to the quality of the link. In addition, the memory ARQ brings advantages over the normal ARQ as used for AMTOR. Compared to AMTOR the throughput is increased fourfold in addition to a much improved error correction.

A "CQ" call in UNPROTO mode (FEC) could look like this:

**CQ CQ CQ de N5MQD  
CQ CQ CQ de N5MQD  
CQ CQ CQ de N5MQD  
PSE K**

You may want to repeat this three to eight times. End with PSE K and switch to standby. Then *turn on* the listen mode to copy possible UNPROTO replies.

While in the listen mode the PTC will also respond to PACTOR ARQ calls to your station. Most contacts will be run in the ARQ mode to take advantage of the error correction and memory ARQ.

The station replying to a CQ starts a PACTOR ARQ call to the callsign listed in the CQ call. Then both stations synchronize. CONTROL Y is the customary changeover sequence for PACTOR.

If the contact was begun on an established calling frequency, both stations should change to another clear frequency as soon as possible.

The QSO is run in the same way as an RTTY contact. However, it is possible to interrupt the other station's transmission by entering CONTROL Y. During normal QSOs this possibility is seldom used.

To end the contact, the station in TX mode enters ESCAPE D, and the PTCs will terminate the link. The station that started calling CQ may start a new UNPROTO call on this or the calling frequency.

If a station-to-station contact is not desired—i.e., a roundtable is established or a bulletin is transmitted—the mode of operation is UNPROTO (FEC).

**Establishing Contact.** The calling station

(master) sends a special synchronization packet which only contains the callsign (address) of the called station (slave). Following synchronization, the slave responds with CS1, or CS4 if the 200 baud bit pattern was also recognized.

Depending on channel quality the connection can be started at the optimal speed without delay. The unpleasant problem of ambiguous selcalls in AMTOR is thus eliminated.

During the synchronization phase the relative shift direction is also determined. The converter or FSK setting of the two stations is irrelevant. Mark/Space conventions can thus be dropped.

After receiving the first CS from the slave, the master begins sending normal information blocks. It has proven useful to send system specific data—such as master callsign, software version number, and other configuration parameter—automatically at the beginning.

**Changing Transmission Direction.** Following each correctly received packet, the receiving station can transmit a CS3 (break-in). In contrast to AMTOR, an intermediate cycle containing no information is not required. The CS3 forms the header of the first information packet.

In the ideal situation, the direction could be changed again in the next cycle, which would be advantageous for mailbox commands. Switching between the two speeds of 100 and 200 baud is normally provided. Since an increase in speed is sensible only during good conditions, and a reduction or a slow information flow such as manual text entry is sensible during bad conditions, each direction is handled differently in the protocol.

Following receipt of a bad 200 baud packet, the receiving station can request a reduction in speed with CS4. While maintaining the time frame, the transmitting station will put the packets together with 100 baud information. The unacknowledged 200 baud information of the previous packet will then be repeated.

**Ending A Contact.** In the normal ARQ protocol (AMTOR), the principle of mutual acknowledgment is violated at the end of a connection. One station sends the appropriate QRT signal and then switches off the transmitter. If the other station does not receive the QRT signal, it sends acknowledgment signals until the internal timer expires.

At the end of a connection, special QRT synchronization packets are transmitted which contain the receiver address in the reversed order. This process is repeated until the sending station has received the acknowledgment.

**Memory ARQ.** Customary FSK RTTY converters route the demodulated received signal via a low-pass filter to a trigger stage, where the binary data for the computer are extracted. Here a weakness becomes evident: The decision whether a signal is a "0" or a "1" is made outside the computer and is thus no longer accessible for "intelligent" analysis.

In an ARQ system such as PACTOR, multiple repeats of an incorrectly received packet can be overlapped to recover the original information.

To handle these cases, the information



contained in the packet header is evaluated. This is inverted in phase with the packet counter in order to guarantee a simple request recognition. Obviously, unusable packets, such as those with a constant bit pattern or a destroyed header, are not added to the summation.

**Monitor Mode.** The requirement that other stations be able to read the content of communications is specified in the amateur radio regulations. This is necessary when there are more than two active stations.

The received bit stream is continuously evaluated and checked for valid packets according to CSC. Since several samples occur per bit and a separate CSC must be calculated for the two possible speeds, the capacity of the Z80 CPU is nearly at its limit in this mode. The result is an uncomplicated read-along operation which works without operator intervention, in contrast to the L mode in AMTOR. Additionally, an automatic CS identification occurs in 5 minute intervals.

**PacComm PACTOR Command Listing.**

The shortest keyword of a command consists of the fewest number of characters that uniquely identify it. The shortest form of each command is printed in boldface capital letters. *Note:* All command inputs are internally converted to upper case, so both character shifts may be used.

Here are some of the PacComm PACTOR-related commands.

**AMtor**—This command switches to the AMTOR mode.

**Auto**—This command is intended for test purposes or special operating conditions. It permits adjustment of the baud rate while in the receive mode. Normally, the PTC operates in the auto speed mode—i.e., the baud rate is automatically adjusted to the receiving conditions by evaluating the packets received.

When in the 200 baud mode the PTC never sends a request for a speed change, even when the link conditions are poor. If the command **Auto 1** is entered during a 100 baud contact, the speed change is executed after the first correctly received block. When in the 100 baud mode the PTC never sends a request for a speed change to the TX, even when the link conditions are good.

**BKchr**—Defines the BREAK-IN character, which forces a direction change from RX to TX (break-in). The PTC accepts the BKchr only in text mode, not after the cmd: prompt. The BKchr may be changed.

**Call**—When entered from STBY, the Call command starts an ARQ PACTOR contact. If the address is omitted, the previous one is taken from the system memory. In the connected state the actual destination address is displayed.

**CHOBell**—CHOB 1 sends a BEL character (ASCII 07) to the terminal and enables the beep. CHOB 0 inhibits the sending of the BEL character to the terminal.

**CHOchr**—This defines the changeover character, which is the command for the change from TX to RX. The PACTOR Controller accepts the CHOchr only when in text mode, and not after the cmd: prompt.

**CWid**—Automatic CW identification after every 7 minutes of transmitting and after terminating the transmission (speed: 40 WPM). The ID is keyed on the PTT line. During the ID, FSK or AFSK remain on the mark tone.

**DAte**—Date is used to set or read the PACTOR Controller calendar. If DATE is entered without a parameter, the current date is displayed. When the date is set, leading zeros must be included. Example: To set Sunday May 2, 1993 enter: DA 020593 and DA \*7.

**DD**—Unconditional STBY (emergency exit). Should not be used to terminate an ARQ contact.

**Disconnect**—Regular termination of a PACTOR contact (only valid in TX mode). In the connected state the shutdown procedure is performed.

**ESCchr**—Defines the ESCAPE character. Use caution changing this character, since it is vital to the controller command.

**HElp**—Gives a short list of all available commands.

**Listen**—This command can be entered

only in STBY mode. Both UNPROTO and ARQ PACTOR traffic can be monitored. The controller can still be connected, but synchronization needs an extra cycle. Listen mode is disabled by a DD, Listen 0, or Call command, or after a connect. When the Listen mode is active, connect packets are also displayed: [CONNECT-FRAME: CALL].

*Caution:* No AMTOR phasing is possible when the Listen mode is active.

Complete operating instructions for the PacComm PACTOR Controller are defined in greater detail in the well-written manual which comes with the unit. For more information contact PacComm Packet Radio Systems, Inc., 4413 N. Hesperides Street, Tampa, FL 33614-7618 (813-874-2980, FAX 813-872-8696).

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## A LOOK AT THE WORLD AROUND US

### Investigating New Areas on a Limited Budget

**S**ay your HF activities are slipping into a mid-summer slump and an irresistible urge to check out new areas is pounding on the old noggin? Hampered by an ultra-low hamming budget? There is good news. This month's column describes some often overlooked "economy pursuits" that may be right at your fingertips or require only miniscule effort and funds to enjoy. I'm talking about working the WARC bands, experimenting with simple wire antennas, and/or IOTA expeditioning to nearby islands. Many amateurs own a recent model (9 band) HF transceiver but have somehow overlooked WARC band operation. Others live within a couple of hours' drive of a slightly off-shore island, but have never experienced the thrill of "being DX." Why lead such a sheltered life when you can go for lighthearted gusto! Inspired? Read on!

The WARC bands are an ideal refuge from more crowded bands such as 40 and 20 meters. The operators are quite congenial, and meaningful QSOs rather than brief signal report exchanges are the rule. A barefoot transceiver connected to a simple dipole or vertical antenna works great for WARC band operations. If your favorite old HF transceiver does not include WARC band coverage, that shortcoming can be turned into an advantage by reworking a classic old-time transmitter and receiver for use on these modern bands. Visualize, for example, teaming up an SX-100 or SP-600 receiver with their beautiful half-moon dials and a Johnson Navigator or Ranger transmitter with red jewel pilot lights. That setup would capture any amateur's heart, and its majestic time-sequence keying would be the envy of the airwaves!

Refurbishing older gear is easy: just replace filter capacitors and add new transmitter tubes. Include a couple of crystals and a frequency warping circuit, and you're ready for action with a real warm glowing amateur radio rig!

#### Working the WARC Bands

Some amateurs use their triband beam

4941 Scenic View Drive, Birmingham, AL 35210

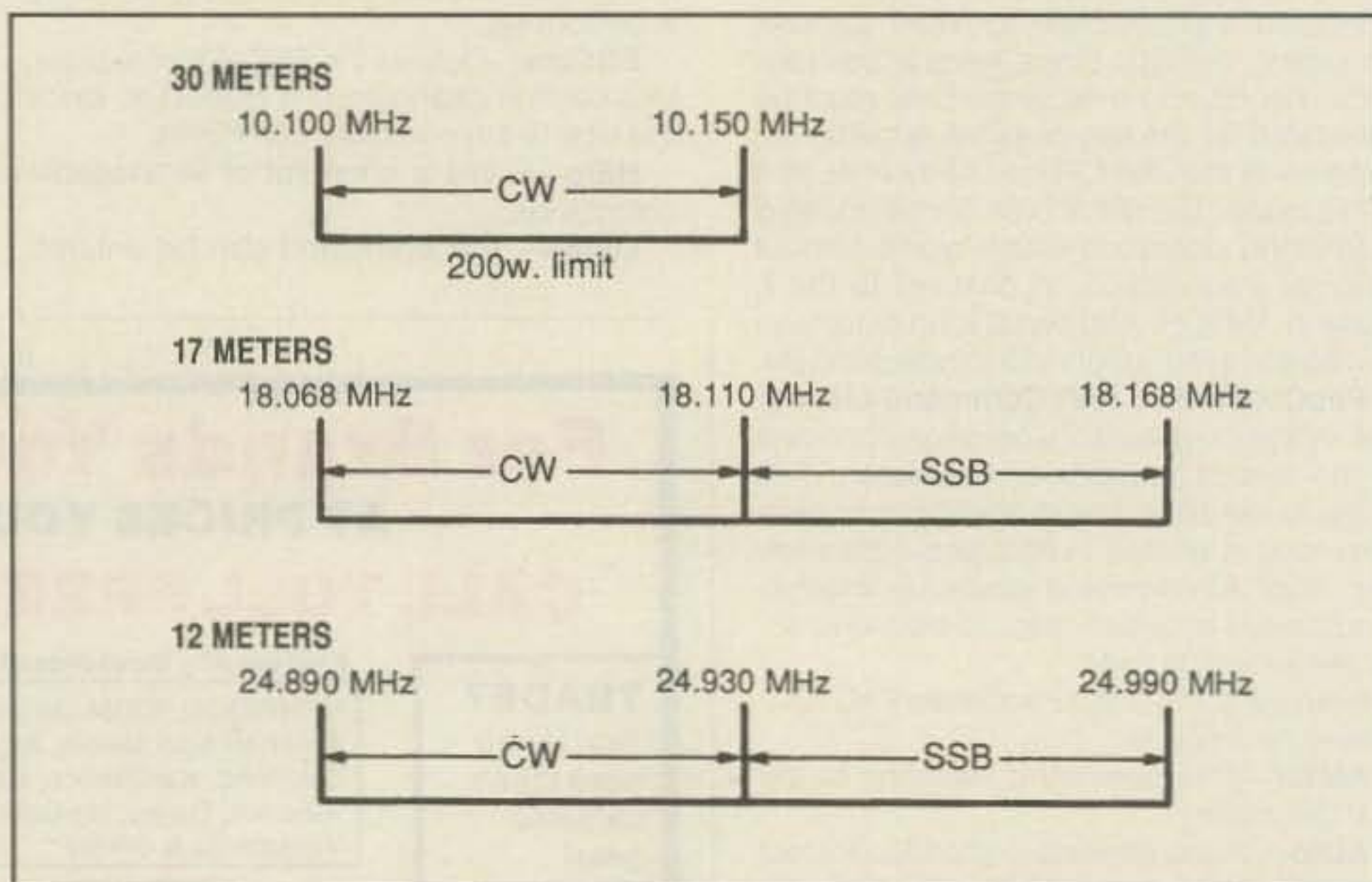


Fig. 1- Frequency allocations for the WARC bands.

or G5RV antenna to initially check out 17 or 30 meters, and consequently hear only the stronger stations on each band. Take time to assemble a dipole or Delta Loop cut specifically for 10.100, 18.100, or 24.900 MHz operation, however, and your WARCing success will increase tenfold. New WARCers usually ask what

the exact frequency ranges and signal propagation effects on each band are, so refer to fig. 1 as we continue.

Thirty meters covers 10.100 to 10.150 MHz, with most of its activity confined to the lower 25 kHz range. This CW-only band has a maximum power limit of 200 watts for U.S. amateurs, and it is truly

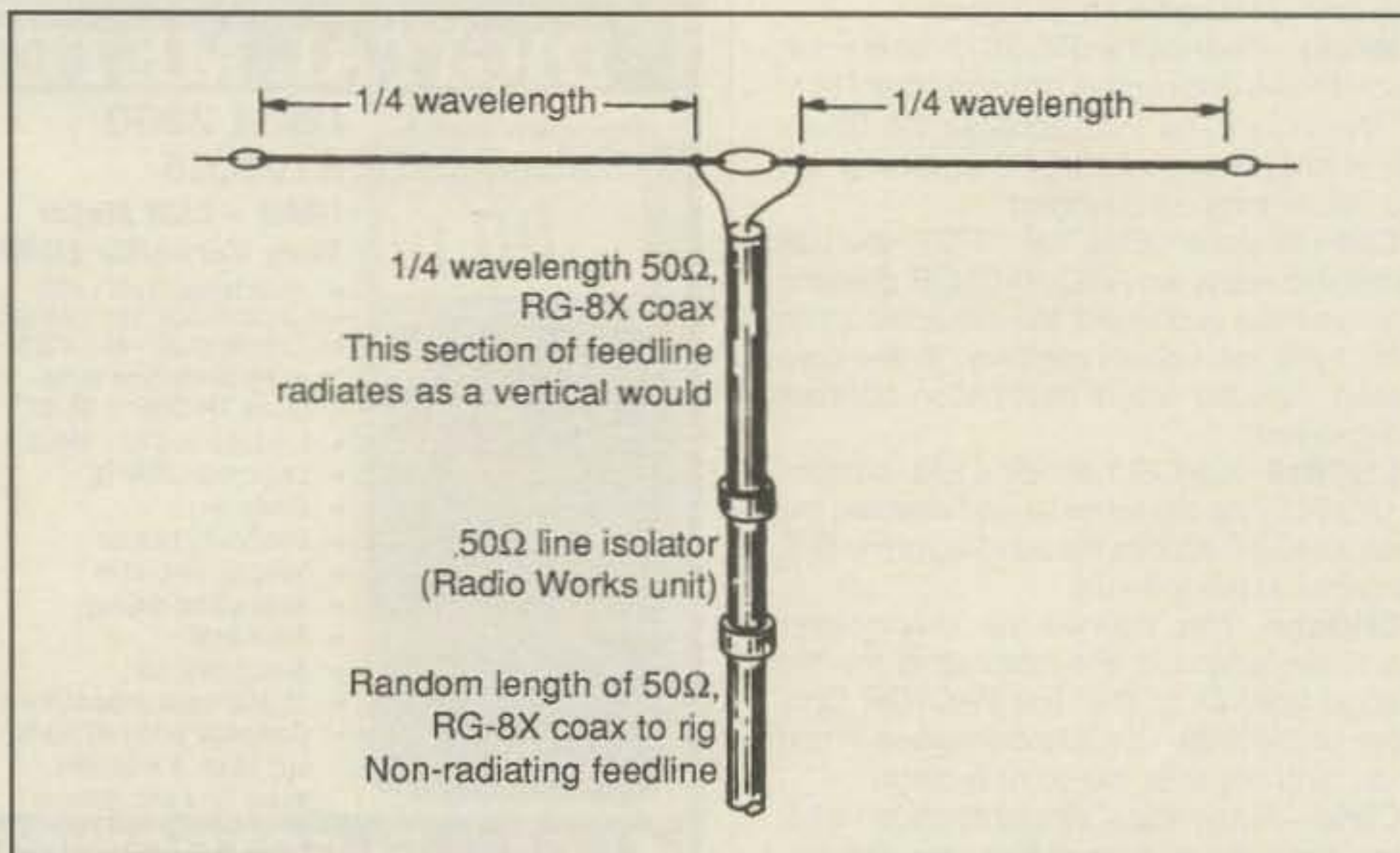
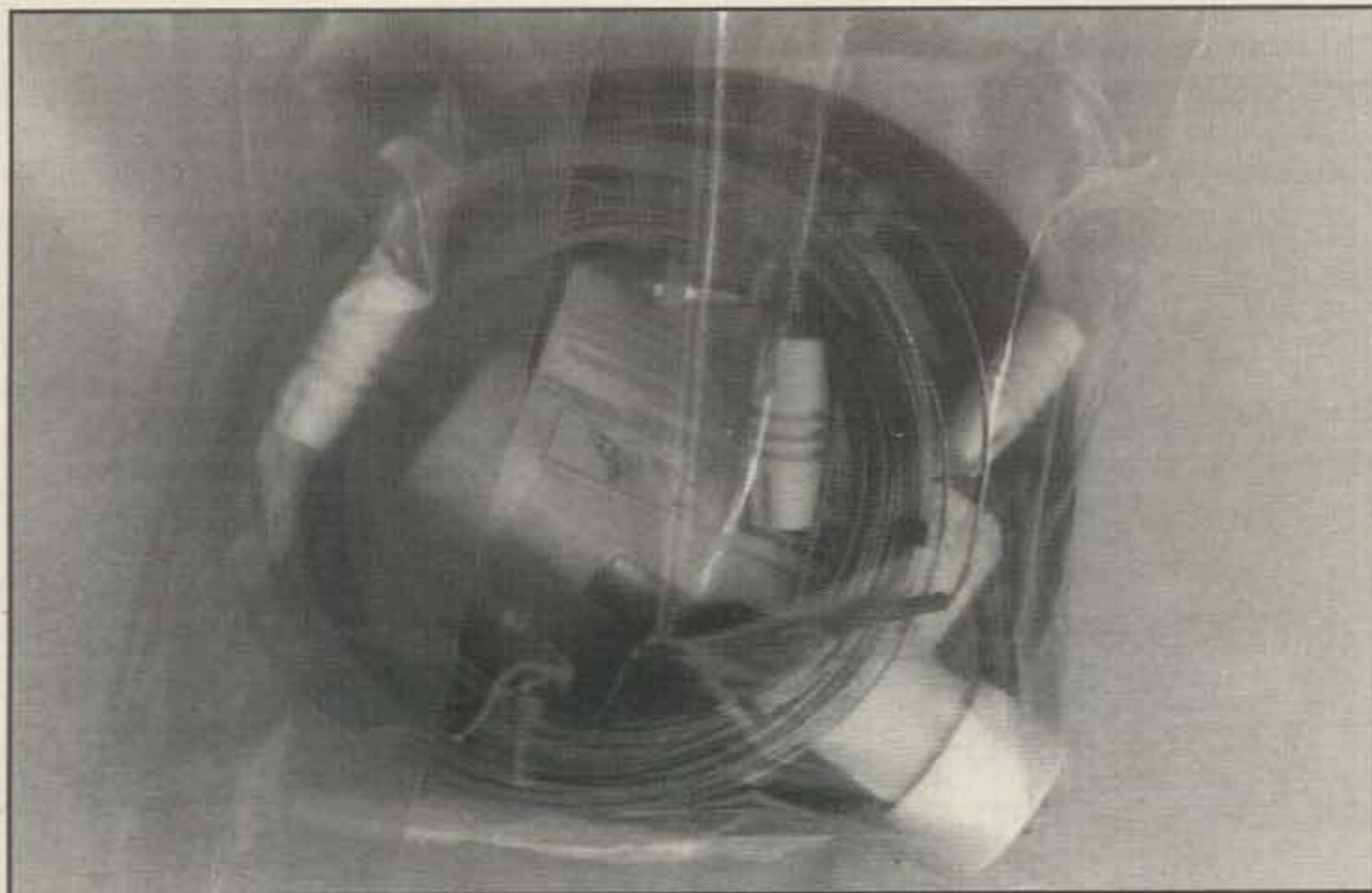


Fig. 2- Outline of Vertically Radiating Dipole available from The Radio Works in Portsmouth, Virginia. This new wire antenna can be installed as a flattop or an inverted Vee, and its low radiation angle is great for DXing.





*The Radio Works new Vertically Radiating Dipole (VRD) as received before unpacking. This high-performance wire antenna is available for any band from 160 through 10 meters, and it is ideal for limited-height installations.*

"king of the WARC's." Thirty meters is typically open 18 to 20 hours of each day, and the band has proven good for DXing throughout a full 11-year sunspot cycle. Amateurs in all continental areas frequent 30 meters, and working the world with QRP is easy on this band. In fact, our good friend N4DKD runs 30 meter CW mobile with a 10 watt rig and has contacts nearly every station he calls. A couple of months ago rain and road grime shorted his mobile whip, and rig output dropped to 2 watts. Brian continued making contacts as usual and

never realized the drop in power. Try that feat on any other HF band!

Seventeen meters covers 18.068 to 18.168 MHz, with 18.110 separating CW and U.S. segments. This band usually opens right after 20 in the mornings and often stays open after 20 closes in the evening. U.S. activity is still light on 17, which means you can call CQ three or four times before receiving an answer. Retune the band after making a contact, however, and you may find a half-dozen or more stations followed your lead and began making contacts. Turn up your



*AA7DG with XYL and harmonic impromptu operating from Orchas Island. A handful of 12 volt HT batteries were used to power the Heathkit transceiver all day. A second transceiver (with WARC band coverage) is inside the Burley trailer.*

receiver gain, and you will also notice a variety of overseas stations right at the noise level (and working them with low power is easy).

Twelve meters covers 24.890 to 24.990 MHz, with 24.930 separating CW and SSB portions. Propagation on 12 is a "cross" of 10 and 12 meters. It supports a creditable amount of DX activity, but U.S. involvement remains surprisingly low at this time. That fact is particularly true for the CW segment of 12 meters. If you really like unique pursuits, consider mobiling on 12 meters (especially CW!). Thus far, I have heard only a couple of U.S. amateurs mobiling on 12, and they "get out" great. Now are you going to just sit in that easy chair and read about all this fun whizzing by? Surely there is some extra antenna wire and a tape measure in your bottom desk drawer, so get cracking!

### **A Clever New Antenna**

If you like being the first kid on the block with a new style of wire antenna, then check out The Radio Works' new catalog (available for \$1.00 from The Radio Works, Box 6159, Portsmouth, VA 23703). Last year owner Jim Thompson generated excitement with his multi-band-optimized Carolina Windom and Carolina (wire) Beam. This year his new Vertically Radiating Dipole is heating up the airwaves.

Basically, the VRD is a horizontal dipole with a specially designed balun/line isolator installed a quarter wavelength from the feedpoint (see fig. 2). This change produces both horizontal and vertical radiation plus a low-signal take-off angle that works like a champ for DXing. Further, the VRD is designed for installation at low heights—a real asset for 80 or 40 meters.

I recently checked out a VRD precut for 30 meters and was favorably surprised with the results. The VRD was hung only 25 feet above ground, but DX performance was equal to my full-wave Delta Loop installed at 50 feet! My first VRD QSOs were the Azores, Mauritius Island, and Australia, all while running only 10 watts. Most impressive! Jim reminded me wire and cable dimensions could be lengthened to enable use of the VRD on 40 meters, but why change perfection? (WARCing and experimenting with antennas is a great combination.) I also like showing visitors my "DX dipole" with its big white balun only one foot above the ground.

### **IOTA Chasing and Expeditioning**

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*Quick-installed antennas used for  
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Island. Although not visible, a home-  
brew 30 meter dipole extends from  
each side of the R-5 vertical to post in  
the sand. Despite low height, all conti-  
nents were contacted on the first day.*

lands On The Air. This award was start-  
ed in England by Geoff Watts. There is  
a 60-page booklet available which lists  
the complete rules for 18 IOTA awards  
and all of the islands included in this pro-  
gram. The 1993 IOTA Directory is avail-  
able for \$8.00 postpaid from Dewitt  
Jones, W4BAA, Box 7, Glen Arbor, MI  
49636. W4BAA is also the U.S. check  
point for the award. Islands and Atolls  
qualifying for IOTA credit range from

prime DX locations such as Galapagos  
(HC8) and Navassa (KP1) to near-U.S.  
vacation spots such as Jekyll Island  
(Georgia), Pine Island in the Florida  
Keys, Santa Barbara Island off the Ca-  
lifornia coast, and numerous other is-  
lands.

Working the islands is great fun, but  
firing up your own expedition from one  
of those DX spots is a real blast, espe-  
cially when working the WARC's. It is  
also the ideal prelude to serious DX-  
peditioning, as it introduces you to many  
"preplanning steps" such as acquiring  
permission to visit a private island, ar-  
ranging round-trip transportation, pack-  
ing supplies and gear, and handling  
QSL duties.

Approximately a year ago Lindel Thie-  
sen, AA7DG, and I learned the unoffi-  
cial and unassigned prefix of 1J1 through  
1J0 was open for use by U.S. amateurs  
expeditioning to nearby IOTA islands.  
That was the final prod! Lindel's expe-  
dition to Orchas Island (AA7DG/1J7)  
was a one-day QRP adventure. He load-  
ed his bicycle and Burley trailer onto his  
pickup, sprung a few bucks for the short  
ferry ride, then fired up from a conve-  
nient landing location on the island. Lin-  
del carried two rigs and a picnic lunch  
in the trailer, worked DX all day, and re-  
turned home for the evening with enough  
memories to last for years!

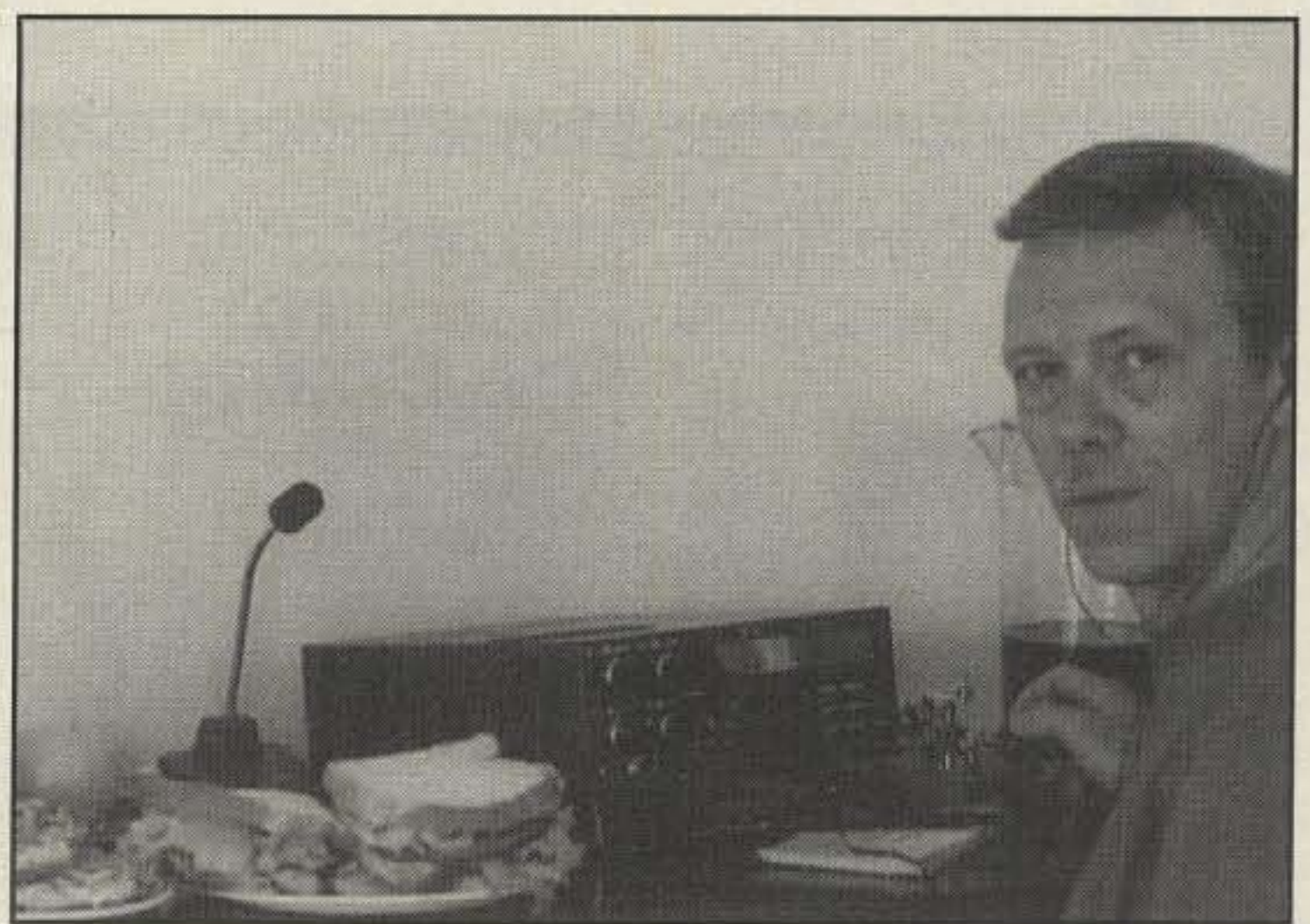
My own expedition to St. George Is-  
land (NA-85) was a bit more challeng-  
ing. XYL Sandy, WB4OEE, and I loaded  
three rigs, two antennas, and food into  
the car and began a full-day trek to ex-  
perience life as K4TWJ/1J4.

St. George Island is approximately  
five miles from the coast of Appalachi-  
cola, Florida in the Gulf of Mexico. It is  
(presently) an undiscovered vacation  
spot with a small shopping center, two  
convenience stores, 100 rental houses,  
and 10 million gigantic mosquitoes (one  
end of the island is total woods). Upon  
arrival, the mosquitoes greeted us in  
droves. Indeed, the critters were pirana-  
has with wings! I am talking about mos-  
quitoes so big they could stand flat-foot-  
ed and look a turkey straight in the eye!  
A hastily purchased can of "Deep  
Woods Off," however, put our mini-ex-  
pedition back on track (and amused na-  
tive islanders watching a stranger blind-  
ly synthesizing an epileptic seizure and  
practicing a strange jungle ritual with a  
spray can). After spray-down, I quickly  
moved gear into a preerented cottage,  
strapped an R-5 Vertical on the deck,  
strung a 30 meter dipole from the anten-  
na's base (corner of the deck) to wood  
tie-offs only a few feet above the sand,  
and fired up the rig. Mosquitoes were  
less hostile during the day, so I operat-  
ed 30 meters outdoors with a little Tejas  
Backpacker I QRP transceiver using





*Sun, surf, and open-air operating the WARC bands with QRP from St. George Island (NA-85). Little Tejas Backpacker I transceiver and dipole contacted all continents.*



*Are you going to stay on the air all night or eat (does that require an answer)? Contacts piled up faster than the sandwiches. Notice the bug on the table. Battery-powered keyers tend to run out of juice, while semi-automatic keys keep on hamming!*

battery power. During the evenings I worked 17 and 30 meters indoors with a Ten-Tec Argo II while Sandy made terrific sandwiches to eat at the rig (her operations were unfortunately foiled by poor 10 meter conditions). Several good contacts were also made on 20 and 15 meters, but even a neat-prefix QRP signal on these high-power bands faced significant challenge compared to the

WARCs. As I discussed earlier in this column, the ratio of DX to U.S. stations on WARC bands really makes for exciting times, especially when IOTA expeditioning!

Both rigs and antennas worked great, and I honestly felt like I was using a full 100 watt setup rather than running QRP. Would I do it again? You bet! In fact, I am now considering visiting a couple of

heretofore unactivated islands. Listen for more K4TWJ/1J4 action during 1994!

We hope this month's column inspired your enthusiasm for working the WARC bands and IOTA expeditioning. Both are inexpensive (or at least realistic!) pursuits you can enjoy on an eclectic or continuous basis. Good luck, and here's hoping we soon QSO on the WARC bands!

73, Dave, K4TWJ



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## NEWS OF COMMUNICATION AROUND THE WORLD

*The Changing Face of Europe*

**O**n April 13, 1993 the ARRL Awards Committee at ARRL Headquarters voted unanimously to add Macedonia 4N5/YU5, the Czech Republic OK/OL, and the Slovak Republic OM to the DXCC countries list, and to delete Czechoslovakia OK-OM. This action was yet another step in a continuing pattern of change in Europe. Increasing numbers of ethnic and religious factions are seeking independent status and generating new DXCC countries. Let's try to recap the action in this area over the past couple of years and have a look at what the future might bring.

The first of the recent changes in the European DXCC map occurred in October 1990, when the German Democratic Republic (East Germany) was absorbed into the Federal Republic of Germany (West Germany). Incidentally, the two ex-Germanies were DXCC countries less than 20 years. They were created in 1973, when the old Germany was deleted, and the two separate countries added.

The European DXCC map really began to change in 1992, based on the break up of ex-Yugoslavia the previous year. Slovenia S5, Croatia 9A, Bosnia-Herzegovina 4N4, and Macedonia 4N5 declared their countries independent of Serbian-dominated Yugoslavia. These actions were acknowledged by Yugoslavia, and ultimately by the world community. The DX Advisory Committee (DXAC) agreed that new countries were coming into existence, and recommended that these four countries be added to the DXCC countries list.

The Awards Committee concurred on the first three countries, and they were added to the countries list from the date of declaration of independence. Thus, contacts with 9A or YU2 stations on or after June 26, 1991 count for the new country of Croatia. Likewise, contacts with S5 or YU3 stations on or after the same date count for Slovenia. Contacts with 4N4 or other valid YU4-prefixed stations on or after October 15, 1991 count for Bosnia-Herzegovina.

The Awards Committee declined to make a decision on Macedonia. That former Yugoslavian republic had been recognized as independent by Yugoslavia, but further international recogni-

tion had been held up by protests from Greeks over the use of the name Macedonia. Finally in April 1993 the United Nations agreed to admit Macedonia under the cumbersome name of "The Former Yugoslavia Republic of Macedonia." This apparently was all the Awards Committee needed to reach a decision, and on April 13, 1993 the Awards Committee announced that contacts with 4N5 or YU5 stations on or after September 8, 1991 would count for the new DXCC country of Macedonia.

Note in all four of these cases DXers need not wait until they work a station with the new International Telecommunications Union (ITU) issued prefix, such as 9A or S5, for DXCC credit for the new country. The important factor is the date of the contact, *not* the prefix used.

At the same time that the Awards Committee announced their unanimous decision to add Macedonia to the countries list, they also unanimously concurred with the DXAC recommendation to delete the old Czechoslovakia and add the new countries formed by the break up of that country: the Czech Republic and the Slovak Republic, with an effective date of January 1, 1993. (The former Czechoslovakia disappeared, and the two new countries came into existence at midnight *local* time in Czechoslovakia on December 31, 1992. This was actually 2300Z December 31. However, the effective date of the new DXCC countries is a first full day of existence, or January 1, 1993.)

This brings the changes in the European DXCC countries list up to date as of the beginning of this year. However, many DXers are following the news reports from the Balkans and wondering if we won't see still more new DXCC countries appearing in the region. As this column is being written in late April, various options to end the bloodshed in the region are being discussed by world leaders. Among these options is the partition of Bosnia-Herzegovina into about 10 separate autonomous regions, some controlled by the Serbs and others by the Muslims and Croats. Will these eventually become new DXCC countries? Also, the Kosovo republic in southern Yugoslavia is almost 90% ethnic Albanian. Perhaps that republic will also split with the Serbian-dominated



*Stojcev Venco, 4N5JA, is active from the new DXCC country of Macedonia. QSL direct to Ivo L. Ribar 92, 92000 Stip, Republic of Macedonia.*

Yugoslavia and form another new country.

Before we look at these possible new DXCC countries, we should take a moment to realize that people are dying in the region, dying by the tens of thousands. While the DXCC country count is of interest to DXers, the formation of possible new countries is a trivial matter compared to the near genocide and "ethnic cleansing" going on in the former Yugoslavia. Let's keep our proper perspective, and wait for an end to the fighting before getting too wrapped up in the DXCC countries list.

With that cravat in mind, let's look briefly at some of the history of Yugoslavia to see what might come out of the region once the dust settles and the killing stops.

Even a cursory review of the history



*Ernest, 4S7EA, is one of the most active Sri Lanka stations. (Thanks to Ron Marra, AA5DX, for the photo.)*



of the region we once called Yugoslavia suggests that there are no easy answers to the numerous territorial and religious disputes. The Serbian Empire was a major force in the region in the twelfth to the fourteenth centuries. The Serbian Empire was then conquered by the neighboring Ottoman Empire. The Ottoman Empire dominated much of the region for more than 500 years, and many of the Balkans converted to the Muslim faith. Many ethnic Serbs fled the Turkish-controlled areas to avoid enslavement by the conquerors. During the nineteenth century Serbia was again an independent country, during a period of prolonged unrest in the region. Following the brief first Balkan War in 1912, Serbia continued a long pattern of expansion, ultimately controlling much of the region.

Then on June 28, 1914 a member of a pro-Serbian group assassinated Archduke Franz-Ferdinand, heir to the Hapsburg throne, in Sarajevo, in the country of Bosnia. This was the match that lit the powder-keg of politics in the region, igniting World War I a month later. At the end of WW I the country that we called Yugoslavia came into existence for the first time, as the Kingdom of the Serbs, Croats, and Slovenes. The King changed the name of the country to Yugoslavia, or the Kingdom of Southern Slavs. The Serbs, twice the major power in the region, were demoted to second-class status in the kingdom. Despite efforts to pull the various factions together into a single country, ethnic hostilities continued. A Serbian deputy from Montenegro shot four Croatian deputies in the Yugoslavian parliament. There were continuing disputes over the borders between Serbian and Croatian territories. King Alexander was eventually assassinated in France by Croatian extremists who feared a more accommodating line toward Serbia.

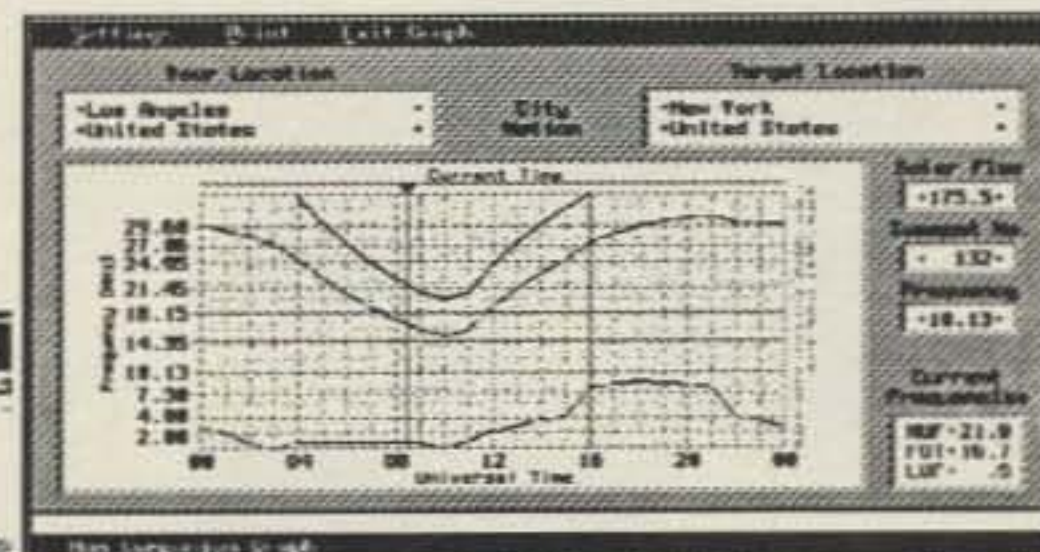
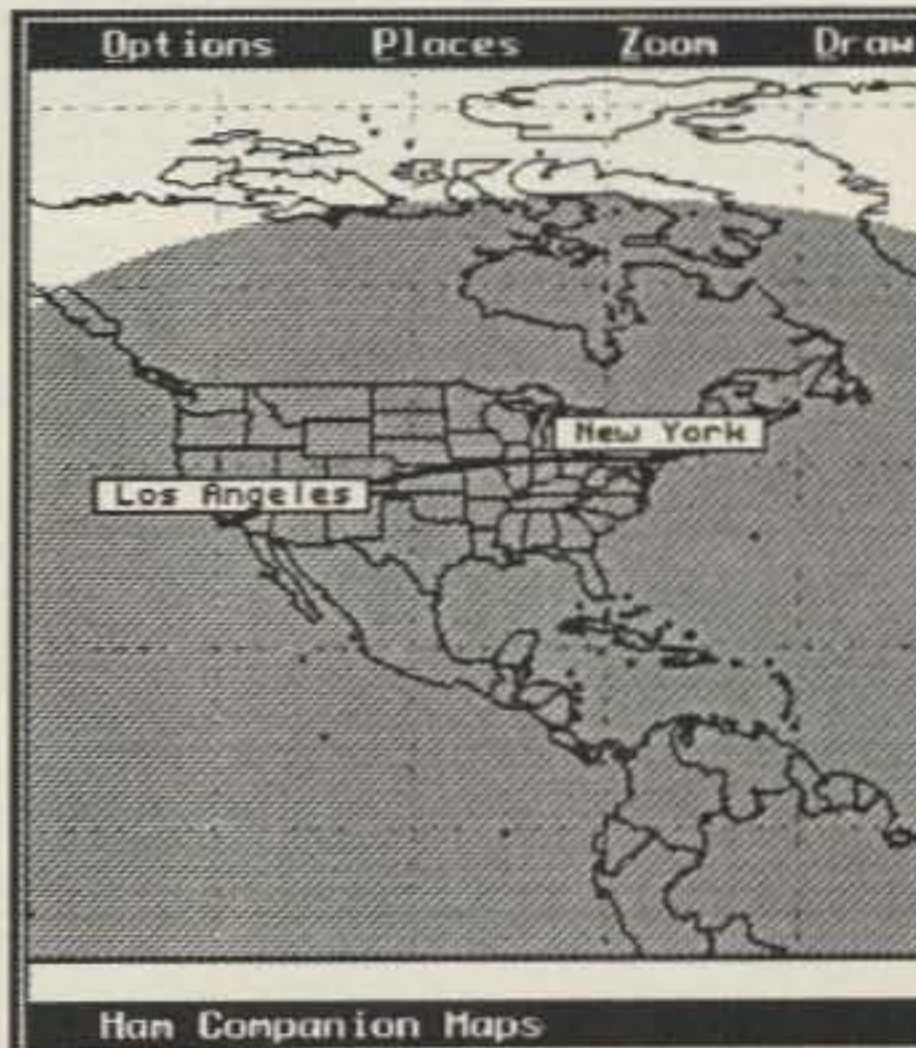
In World War II Croatia and Slovenia became Axis satellites. Serbs suffered severe discrimination, losing their jobs and other liberties. Many were massacred, perhaps as many as 500,000 to 700,000. Serbia was on the Allied side in WW II, so Serbs fought against the Croats and the Slovenes. Following the war, Tito formed the second Yugoslavia. Unfortunately for the Serbs, Tito was strongly anti-Serbian. He specifically drew up the borders for Croatia and Bosnia-Herzegovina to include many Serbian-dominated regions, to weaken the Serbian republic. Tito convinced more than 100,000 Albanians to settle in the Kosovo republic, eventually diluting the Serbian population in that republic to only 12%. The 30% of the Serbs who lived in other Yugoslavian republics were denied either "nation" status or

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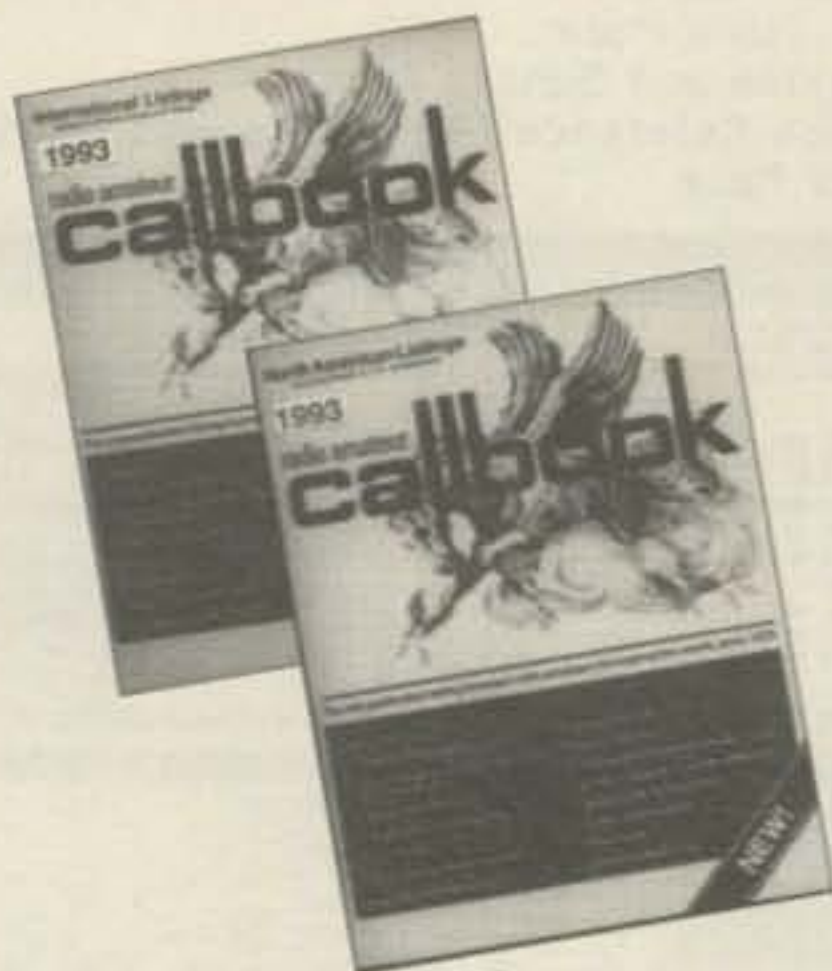


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Larry Vogt, N4VA/S21ZK, taught CW to future Bangladesh DXers during a Foundation for Amateur International Radio Service (FAIRS) operation in March

"minority" status, and were once again second-class citizens in Yugoslavia.

When the individual republics voted for independence in mid-1991, more than three million Serbs were in Croatia and Bosnia-Herzegovina. The Serbs boycotted the vote for independence in Bosnia-Herzegovina, where nearly a third of the population is Serbian. The Serbs moved to form their own separate Serbian Bosnia state, but this action has not been recognized by other than Serbian-controlled Yugoslavia. The current

fighting in Bosnia-Herzegovina by the Serbs is at least partially an attempt to regain territory lost at the end of WW II.

While this capsule summary barely scratches the surface of the long-standing and deep divisions between the various Balkan peoples, it does demonstrate that there will be no quick and easy solutions to the problems. The Serbs will continue to fight to regain their once-dominating control of the region, and the other peoples will defend their territories against the expansionist ag-

## The WPX Program

### SSB

2369.....WB3CQN	2374.....JM2DRM
2370.....KB9BGV	2375.....K0IFL
2371.....DF7HX	2376.....JF1SSM
2372.....KD7RX	2377.....DL8MDN
2373.....KL7FAP	2378.....JA2OCU

### CW

2776.....IK3HUK	2778.....SM2CDF
2777.....WK3Z	2779.....KE2WB

### Mixed

1597.....AA5ZX

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Mixed: 450 JJ1JGI, I0YQV. 500 JJ1JGI, I0YQV. 550 JJ1JGI, I0YQV. 600 JJ1JGI, I0YQV. 650 JJ1JGI, 700 JJ1JGI, WX3N. 750 N4EED, JJ1JGI, WX3N. 800 VE3OMM, N4EED, JJ1JGI, WX3N. 850 VE3OMM, K5IID, JJ1JGI, WX3N, IK2LEY. 900 K5IID, EA1JO, JJ1JGI, WX3N, IK2LEY. 950 K5IID, EA1JO, WX3N, IK2LEY. 1000 HP2CWB, K5IID, EA1JO, WX3N, IK2LEY. 1050 K5IID, KF4FP, EA1JO, WX3N. 1100 AE5B, K5IID, EA1JO, WX3N. 1150 AE5B, K5IID, K0IFL, EA1JO, WX3N. 1200 AE5B, K5IID, K0IFL, EA1JO, WX3N. 1250 AE5B, K5IID, EA1JO, WX3N. 1300 AE5B, K5IID, EA1JO, WX3N. 1350 AE5B, K5IID, EA1JO, WX3N. 1400 K5IID, EA1JO, WX3N. 1450 K5IID, EA1JO, WX3N, WB3DNA. 1500 K5IID, EA1JO, WX3N, WB3DNA. 1550 EA1JO, WX3N. 1600 WX3N. 1650 WX3N. 1750 KS4S, WB4RUA. 1800 KS4S, WB4RUA. 2000 N4UH.

SSB: 350 WB3CQN, KO4VT, KD7RX, JM2DRM, K0IFL, KL8MDN, JA2OCU. 400 WB3CQN, KO4VT, KD7RX, K0IFL, DL8MDN, JA2OCU. 450 WB3CQN, KB4HBH, KO4VT, EA1JO, KD7RX, K0IFL, JA2OCU. 500 WB3CQN, KB4HBH, DO4VT, EA1JO, KD7RX, K0IFL, WX3N, IK5MEQ, JA2OCU. 550 WB3CQN, KB4HBH, EA1JO, KD7RX, N3DRO, VE1ANH, K0IFL, WX3N, IK5MEQ, JA2OCU. 600 WB3CQN, KI6PG,

KB4HBH, EA1JO, KD7RX, VE1ANH, K0IFL, WX3N, IK5MEQ, JA2OCU. 650 WB3CQN, K5IID, KB4HBH, EA1JO, VE1ANH, K0IFL, WX3N, IK5MEQ. 700 WB3CQN, K5IID, KB4HBH, EA1JO, VE1ANH, K0IFL, WX3N. 750 WB3CQN, EA6AAW, K5IID, KB4HBH, EA1JO, VE1ANH, K0IFL, WX3N. 800 WB3CQN, EA6AAW, K5IID, KB4HBH, EA1JO, VE1ANH, K0IFL, WX3N. 850 WB3CQN, EA6AAW, K5IID, EA1JO, WX3N. 900 WB3CQN, EA6AAW, K5IID, WX3N. 950 HP2CWB, WB3CQN, EA6AAW, K5IID, WX3N. 1000 WB3CQN, EA6AAW, K5IID, KF4FP, WX3N. 1050 WB3CQN, EA6AAW, K5IID, WX3N. 1100 WB3CQN, EA6AAW, AE5B, K5IID, IK2AEQ, WX3N. 1150 WB3CQN, AE5B, K5IID, WX3N. 1200 WB3CQN, AE5B, WX3N. 1250 WB3CQN, AE5B, WX3N. 1300 KS4S, WB3CQN, WX3N. 1350 WB3CQN, WX3N. 1400 WB3CQN, WX3N. 1450 WB3CQN, WX3N. 1500 WA6SLO, WX3N, KF7RU. 1600 I6SF. 1750 K4CKS. 1800 K4CKS. 3600 ZL3NS.

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20 Meters: KB4HBH, KV1M  
40 Meters: WX3N, IK2LEY  
80 Meters: W4ZYQ, WX3N  
160 Meters: KO4VT

Africa: S51NU, WB4UBD, WX3N  
No. Amer.: JN3SAC, DF7HX, KB4HBH, KA9BGV, WK3Z, KV1M  
So. Amer.: S51NU, WX3N  
Europe: DF7HX, KB4HBH, WK3Z  
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918 ..... KA0JPM 920 ..... JA1SHE

#### 10 Meter CW

135 ..... W8SR

#### 40 Meter CW

159 ..... K4IQJ 161 ..... JA7BT  
160 ..... WB8ZRL

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72 ..... SM4CAN (40 Zones) 73 ..... ON4ACG (30 Zones)

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gression of the Serbs. The chances of any lasting peaceful solution are minimal.

This means that DXers probably won't see any new DXCC countries coming out of ex-Yugoslavia in the near future, if ever. Nor is Serbia likely to give up the Kosovo republic without bloodshed. The Serbian defeat by the Ottoman Turks in 1389 happened in Kosovo. That defeat, which ended the reign of Serbian domination in the region, is still the most famous battle in Serbian history. The Serbs will not peacefully part with this major portion of their history. Despite being a tiny minority in the republic, the Serbs still feel that Kosovo is part

of their original home territory. They may seek to preserve the "ethnic cleansing" by the Turks and later Tito that drove the Serbs out of Kosovo, by persecuting the ethnic Albanians. Again, there is little chance of the new DXCC country from Kosovo in the foreseeable future.

Meanwhile, even though the fighting continues, DXers are trying to get confirmations for contacts with stations in the new DXCC countries in ex-Yugoslavia. Both Slovenia and Croatia have functioning QSL bureaus, and DXers can simply send their QSL cards via the ARRL Outgoing bureau. Cards for stations in what remains of Yugoslavia may also go via the bureau system. Cards may also go direct to the *Callbook* ad-

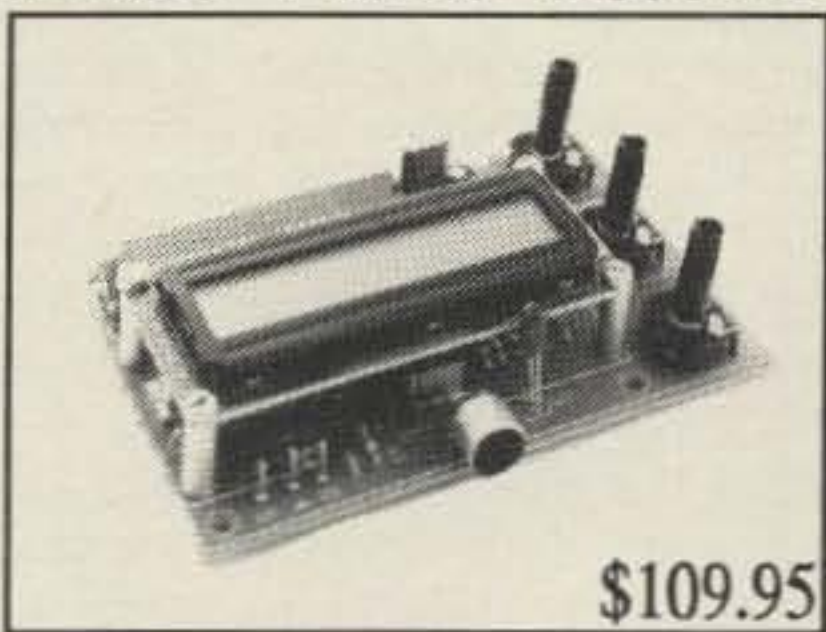
resses in these three countries. Remember to substitute Slovenia for Yugoslavia on YU3/S5 stations, and Croatia for YU2/9A stations.

DXers have had some success confirming contacts with stations in Bosnia-Herzegovina by sending their cards via Croatia. Cards sent via Yugoslavia either aren't delivered, or they are returned to sender. There is as yet no functioning QSL bureau in Bosnia-Herzegovina.

Cards for 4N5 stations may be sent direct, substituting Republic of Macedonia for Yugoslavia in the *Callbook* addresses. While there is still some confusion outside of Macedonia as to the official name of the newly recognized

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Five Swiss pilots operated from Bermuda VP9 last October. From left, rear: Rene, HB9BDG, Ueli, HB9CMN, and Rudi, HB9CTL; front: Walter, HB9BHY, and Markus, HB9JNH. (Thanks to Leo Fry, K8PYD, for the photo.)

independent country, there is no such problem within the country. When questioned on this point at Dayton, Stojcev Venco, 4N5JA, was firm that the name is, and will be, the Republic of Macedonia. "Do we tell you to change your name?" he asked.

While the final chapter of DXCC status from ex-Yugoslavia has yet to be written, perhaps DXers can now be content with the four new countries that have come into existence over the past years, and let the fighting stop before worrying about yet more New Ones.

## July DXpeditions

K8AQM, N8CC, KA8POW, KB8OPT, KD0PF, KB8ECG, and N8TIB will operate /FP0 from St. Pierre & Miquelon July 9-13. They have requested a special callsign for the IARU HF contest July 10-11. They will be on all bands, 160-10 meters, including the new bands, on CW, SSB, and RTTY. QSL all operations via Mark Hinkleman, NU8Z, 108 East Kilbuck, Tecumseh, MI 49286.

4U1VIC will be active June 13 to July 28, with RB Boone, WB4FNH, at the mike. He'll also operate as OE3/WB4FNH. Both operations count for Austria for DXCC and CQ awards, but 4U1VIC is a separate multiplier for some other awards, such as DARC's WAE. QSL this 4U1VIC operation to RB's home address: 3809 13th Ave. West, Bradenton, FL 34205.

Four German amateurs have finalized plans to operate from the Penguin Islands ZS1 (AF-055) July 24 to August 3, on CW and SSB, all bands 160-10 me-

## 5 Band WAZ

As of March 31, 1993, 355 stations have attained the 200 zone level.

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

HB9ATA  
KM1H  
SM3GSK

The top contenders for 5 Band WAZ (zones needed, 80 meters):

N4WW, 199 (26)	N7RT, 199 (34)
K6YRA, 199 (34)	VE7AHA, 199 (34)
PY7ZZ, 199 (34)	W1FZ, 199 (26)
K8CS, 199 (34, 40m)	IK2GNW, 199 (1)
AA4KT, 199 (26)	W9CH, 199 (26)
K7UR, 199 (34)	AC8M, 199 (34)
K9EL, 199 (26)	SM6AHS, 198 (12, 31)
NA8Y, 199 (26)	K1ST, 198 (19, 26)
VE7DX, 199 (34)	4X6DK, 198 (4, 6)
W8PGI, 199 (26)	AB8P, 198 (23, 34)
W2YY, 199 (26)	UA3AGW, 198 (1, 12)
W9WAQ, 199 (26)	KL7Y, 198 (34, 36)
K6EID, 199 (34)	VO1FB, 198 (19, 27)
IK8CNT, 199 (12)	S59VM, 198 (3, 6)
W1JR, 199 (23)	W6TC, 198 (34, 37)
W8SEY, 199 (26)	

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

OE2BZL, 164 Zones	WG8M, 166 Zones
K3ND, 189 Zones	KM1H, 200 Zones
HA7PF, 189 Zones	SM5JE, 174 Zones
W3OOU, 166 Zones	

Endorsements:

812 Stations have attained the 150 zone level as of

DJ8WD, 160 Zones	UY5XE, 196 Zones
K4IQJ, 195 Zones	KA0ZFX, 160 Zones
ON4ACG, 196 Zones	

March 31, 1993.

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 De Marco Rd., Sudbury, MA 01776. Applicants should include sufficient postage for safe return of their QSL cards. The processing fee for all CQ awards is \$4.00 for subscribers and \$10 for non-subscribers. Please make all checks payable to the Awards Manager. In order to qualify for the subscriber rate, please enclose your latest CQ mailing label with your application. Send any questions to K1MEM by mail and include an SASE (please do not telephone).

ters. They are taking two towers, and perhaps an amplifier if weight restrictions permit. They'll operate RTTY if they can borrow a small TNC. Operators are James Clarkson, DJ0WQ, Peter Bertram, DJ2ZS, Roland Hagmann, DJ4LK, and Gunter Hartmann, DK2WH.

Following their Penguin Island operation, the four Germans will operate from Walvis Bay and Namibia V5 until the 13th of August. Exact start date depends on how much trouble they have getting off Penguin (probably August 4th or 5th). More details on both operations as available.

## Future DXpeditions

A core group of the VP8SSI team has planned an expedition to Peter I. The group has transportation, landing permission, and assurance of a license. The group is scheduled to land on Peter I on February 1, 1994. Four HF stations with all-mode and all-legal-band operation are planned. An international team



## CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries for the mode indicated. The ARRL DXCC Countries List is used as the country standard. Honor Roll listing is automatic when submitting application or endorsement for 275 or more countries. Deleted countries do not count and are dropped from listing as they occur. Total number of active countries is now 327. To remain on the CQ DX Honor Roll, annual updates are required. Honor Roll updates may be made at any time, in any number. Updates indicating "no change" will be accepted to meet the annual requirement. All updates must be accompanied by an SASE for confirmation. The fee for endorsement involving the issuance of a sticker is \$1.00.

### CW

K2FL.....327	KZ4V.....324	W2FXA.....322	WA4JTI.....319	W5OG.....315	K2JF.....310	KA7T.....303	G3KMQ.....295	HB9AFI.....278
YU1HA.....327	ON4QX.....323	W8IZ.....322	KB8DB.....319	K8NA.....314	K4CXY.....310	NY5L.....302	N1HN.....294	HA5NK.....278
K1MEM.....327	K6LEB.....323	K9AB.....322	N5FW.....318	I5XIM.....314	KU8S.....310	K9DDO.....302	YV5ANT.....294	KF5PE.....277
K2TQC.....327	K9MM.....323	EA2IA.....322	N6CW.....318	W1NG.....314	N4AH.....309	WA4DAN.....302	IK2ILH.....293	WB6OKK.....277
W9DWQ.....327	N4JF.....323	W4BQY.....321	AA6AA.....318	PA8XPQ.....314	WB5MTV.....309	KA2DIV.....301	KB3X.....289	KA3R.....277
DL1PM.....327	N6AR.....323	K4XO.....321	W8XD.....318	KQ9W.....314	K4IQJ.....309	K4JLD.....301	VE1RJ.....288	OZ5UR.....276
K3UA.....326	K4CEB.....323	OK1MP.....321	N7RO.....318	I8WY.....314	W6DN.....308	VE7DX.....301	WG5G/ORP.....288	W3HQU.....276
N4MM.....326	N4KG.....323	N2KW.....321	IT9ZGY.....317	WD9HC.....313	IT9VDQ.....308	WA8YTM.....300	W1WLW.....288	WF9K.....276
K9BWQ.....326	SM6CST.....323	G4BWP.....321	KD8V.....317	I2QMU.....313	K2JLA.....307	W6YQ.....300	W7IIT.....287	DF3FJ.....276
W8SR.....326	AA4KT.....323	W9WAQ.....320	K9TI.....317	IT9QDS.....312	W9RY.....307	AA2X.....300	WA9RCQ.....286	4N7ZZ.....275
K6JG.....326	W2UE.....323	W8HZ.....320	N7MC.....317	WA2HZR.....312	K1VHS.....306	YU2TW.....300	CT1YH.....284	
WA4IUM.....325	K2OWE.....323	DL8CM.....320	AA5NK.....316	W8JLC.....312	W8URM.....305	G2FFO.....300	N4OT.....284	
I4EAT.....325	DJL3RK.....323	WB4RUA.....320	W7CNL.....316	W4OEL.....312	SM6CTQ.....305	NN4Q.....299	KP4P.....283	
W7ULC.....325	W6PT.....322	N6AV.....319	WA8DXA.....316	IT9TQH.....311	N8MC.....303	OH3NM.....297	AG9S.....282	
K9IW.....324	K9QVB.....322	SM3EVR.....319	F3TH.....315	DJ2PJ.....311	K1HDO.....303	KA5TQF.....295	N3DQN.....280	
K8LJG.....324	K2ENT.....322	W1WAI.....319	W3BBL.....315	NC9T.....311	KB9XG.....303	WD9IIX.....295	W2LZX.....279	

### SSB

YU1HA.....327	W2FXA.....323	VE3GMT.....323	K7LAY.....321	XE1XM.....317	KA6V.....313	KB8O.....308	I2ZGC.....299	WA9BXB.....282
K4MZU.....327	OZ3SK.....323	IBXTX.....323	KB3X.....321	KB3OQ.....317	AA6BB.....313	N6AV.....307	N1CWA.....299	WK3N.....282
DJ9ZB.....327	VE3MR.....323	YV1AJ.....323	KE4HX.....321	SM6CST.....317	W1LQQ.....313	WA2FKF.....307	NW5K.....299	YB3CEV.....282
K2FL.....327	KM2P.....323	I8YRK.....323	WD8PUG.....321	KU9I.....317	W4SSU.....313	WD5P.....307	WB6GFJ.....299	N5HSF.....282
WB1DQC.....327	VE3XN.....323	KB4HU.....323	W7FP.....321	WA4WTG.....317	I8INW.....313	T12TEB.....307	KB2FC.....298	YC3OSE.....282
XE1AE.....327	K6WR.....323	N5FW.....323	K2ARO.....321	YV1CLM.....317	W5XQ.....313	VE3DLR.....307	4N7ZZ.....298	YV1JV.....282
WA4IUM.....327	N4JF.....323	T12CC.....323	WA4ECA.....321	IK1GPG.....317	LU7HJM.....313	F6BFI.....306	SV8CS.....298	TG9EP.....281
W9DWQ.....327	VE3MRS.....323	VE7DX.....323	KR9O.....321	W8MFC.....317	K8CMO.....312	WA2MID.....306	WA8TKJ.....298	VE3NUP.....281
K2TQC.....327	K6YRA.....323	K4POV.....323	IT9TGO.....320	I8LEL.....316	T12KD.....312	XE1MDX.....306	KF5DX.....297	KA1LMR.....281
VE2WY.....327	YU1IAB.....323	I4LCK.....323	K9QVB.....320	W6SN.....316	K8NWD.....312	VK3JF.....306	NP4CC.....297	KD5ZD.....281
CX4HS.....327	N6AR.....323	VK4LC.....323	W6DN.....320	AG9S.....316	KC4MJ.....312	N4KE.....305	VE3CKP.....297	WA8QII.....281
K5TVC.....327	YV1KZ.....323	N2KW.....323	KB5FU.....320	K8ZJU.....316	ZS6BBY.....312	K3LUE.....305	XE1OW.....296	VU2DVP.....281
W6EUF.....327	I8ZV.....323	K2JF.....323	W3GG.....320	DU9RG.....316	N6CGB.....312	WA6DTG.....305	EA5RJ.....296	W8/DL2SCA.....281
W8YDB.....327	W4JVV.....323	I2QMU.....323	AA4AH.....320	KV2S.....316	WA9IVU.....312	WF9K.....305	KA4RAW.....296	NX8I.....280
F9RM.....326	WA4JTI.....323	AA5NK.....323	NJ2C.....320	N4WG.....316	KA5TQF.....312	NI5D.....305	HP1JC.....296	YU1TR.....280
W4NKI.....326	EA4DO.....323	OE2EGL.....323	G4GED.....320	YT7DX.....316	K3NEE.....312	G4NXG/M.....305	VE3XO.....294	K2EEK.....280
KS8Z.....326	WB4UBD.....323	W7OM.....322	NJ8C.....320	WA9RCQ.....316	W8BNC.....312	EA1QF.....304	EA3KW.....294	WN5K.....279
VE1YX.....326	W9OKL.....323	IBKCI.....322	K7EHI.....320	WE2L.....316	I2MQP.....311	K4RIG.....304	W8IYR.....294	WB8TLI.....279
W4DPS.....326	OA4OS.....323	ZS6LW.....322	NY5L.....320	KB9OC.....316	NN4Q.....311	KB1JU.....304	WD9IC.....293	K5AOL.....279
DL9OH.....326	W3AZD.....323	I8AMU.....322	EA1QF.....320	K4JLD.....316	IK2GNW.....311	ZL1BOQ.....304	IT9VDQ.....293	VU2CVP.....278
K3UA.....326	ZL3NS.....323	K4CXY.....322	W6NLG.....320	N4KEL/M.....316	K8HQW.....311	EA3EQT.....304	W8AXI.....293	K4BYK.....277
W9SS.....326	K4XO.....323	KF7SH.....322	IK8GCS.....320	KI3L.....315	N1ALR.....311	N5ORT.....304	T12LA.....292	WA9BDX.....277
N4MM.....326	ZL1AGO.....323	I8AA.....322	W5LLU.....320	KB2HK.....315	XE1ZLW.....311	WA1DHM.....304	K9EC.....292	WB8UFL.....277
K5OVC.....326	N4KG.....323	K9AB.....322	WB5TED.....319	W8LSD.....315	KB2MY.....311	AC8A.....303	KE7UL.....292	WN5MBS.....277
W4EEE.....326	W4UW.....323	K8NA.....322	XE1CI.....319	IK7DBB.....315	KD5ZM.....311	KB9LN.....303	SV1JG.....291	KB9N.....277
W4UM.....326	DL6KG.....323	KS2I.....322	IT9TQH.....319	KC2FC.....315	KE5PO.....311	KB8SY.....303	WA5SUE.....291	I8WYD.....277
EA2IA.....326	K2ENT.....323	KD8V.....322	CX1TE.....319	W8ULU.....315	KF8VW.....311	AB4PY.....303	CP5NU.....290	WP4AFA.....277
K9BWQ.....326	AA4KT.....323	G4ADD.....322	W9JT.....319	N5FG.....315	KA5RNH.....310	I4CSP.....303	I4UFH.....289	KA9I.....277
KZ2P.....326	OE3WWB.....323	W6BCQ.....322	K9TI.....319	WB2JZK.....315	T12JJP.....310	RA3YA.....302	W9TA.....288	CT1AHU.....277
WB3DNA.....326	WA3HUP.....323	PY4OY.....322	K1UO.....319	YV5DFI.....314	I8IYW.....310	W2LZX.....302	YB2OK.....288	WB4UHN.....276
I4EAT.....326	WD8MGQ.....323	LA7JO.....322	WB6OKK.....319	W9RY.....314	VE2GHZ.....310	XE1KS.....302	T15RLI.....287	KJ6HO.....276
K9IW.....326	K9HDZ.....323	OA4ED.....322	W2FGY.....319	KU9Z.....314	N6AHV.....309	WA5HWB.....302	OK1AWZ.....287	VE7HAM.....276
W8SR.....326	K8GT.....323	I4WZK.....322	KF5AR.....319	HR1KAS.....314	I5EFO.....309	WB4TGB.....301	EA8TE.....287	NX4Y.....275
KB8DB.....326	K4MQG.....323	K8YVI.....322	KA9ABC.....318	A92BE.....314	I1POR.....309	VE6PW.....301	N8BJQ.....285	WA4PGM.....275
K6JG.....326	IT9ZGY.....323	CT1FL.....321	KQ9W.....318	K4SBH.....314	KP4P.....309	NO4J.....301	FD1OZF.....285	HP6AYV.....275
WA6OET.....326	4Z4DX.....323	WS9V.....321	WB6PSY.....318	XE1OX.....314	XE1MD.....309	W3SOH.....301	KB7IVU.....285	T12SD.....275
KZ4V.....326	OK1MP.....323	A18S.....321	WB3CQN.....318	OH5KL.....314	WA8YTM.....309	YU2TW.....300	W6SHY.....285	KJ6GC.....275
K2JLA.....325	W4UNP.....323	K8CSG.....321	9H4G.....318	WD8DMN.....314	CE7ZK.....309	N4CRU.....300	IK8BMW.....284	KA5YCM.....275
N7RO.....325	YV5CWO.....323	VE4AT.....321	PA8XPQ.....318	ZS6AOO.....314	PY2DBU.....309	WT4T.....300	NZ7D.....284	K14FW.....275
A18M.....325	YS1GMV.....323	KE4VU.....321	I4ZSO.....318	KB1JU.....314	WB4DBB.....309	W7KSK.....300	KB5RF.....284	WA4OPW.....275
VE2PJ.....325	I8ACB.....323	IK8CNT.....321	G4CHP.....318	KB7VD.....314	KP4EQF.....309	VE3FJE.....300	KD9CN.....284	AB4NS.....275
KA3HXO.....325	N6AHU.....323	KC8EU.....321	IK8IOL.....318	YV5IVB.....314	WD9IIX.....308	WB4NDX.....300	NU4Y.....283	DK5WO.....275
SV1ADG.....325	W8SFU.....323	ON5KL.....321	K1HDO.....318	K4LR.....313	YV2EJU.....308	OE7SEL.....300	KB9AIT.....283	
WZ4I.....324	YV5AIP.....323	IK8BQE.....321	ZL1BIL.....318	K1VHS.....313	N3ARK.....308	N6PTI.....300	VE3IMO.....283	
W2CC.....324	T12HP.....323	K9HQM.....321	WA6DTG.....318	I2EOW.....313	W4BQY.....308	4X4JO.....300	XE1ILI.....283	
W2SUA.....323	OZ5EV.....323	WA4DAN.....321	NC9T.....318	WB4PUD.....313	IN3ANE.....308	I8IGS.....299	AB4UF.....283	
K9MM.....323	VE7WJ.....323	AA6AA.....321	N4CRU.....317	W1NG.....313	W8URM.....308	K5DUT.....299	E16FR.....283	

of 10 operators is scheduled for a 16-day stay on the island. To conduct this operation safely and accomplish all the logistics is, of course, expensive. Contributions are needed and will be greatly appreciated. If the expedition does not occur, contributions will be returned. As with the VP8SSI trip, AA6BB and KA6V will accept and manage the contributions. They will also serve as QSL managers. Special thanks are in order to Norwegian amateurs for helping to make this possible.

Peter I Island is currently at the top of the Most Wanted countries list, with more than two-thirds of all active DXers still needing a 3Y contact. This will be a

very difficult operation to pull off, involving a helicopter, perhaps abandoning gear on the glacier and the operators repelling down the cliff to a tiny, wave-swept landing area, or other scary scenarios. Stay tuned for more news on this operation.

**Mellish Reef:** The planned Mellish Reef operation in September has expanded beyond the capabilities of the yacht *Banyandah*. The operator list now includes VK4CCR, VK2BJL, VK2BEX, P29DX, V73C, WA4DAN, and K5VT. They have now chartered the *Nina Q 1*, a 63 foot schooner, which can carry the planned five HF stations, plus six meters. They still need donations to help

offset the expected \$30,000 cost of the trip. In North America send your donations to Murray Adams, WA4DAN, 403 East 14th St., Greenville, NC 27858. Include an SASE for a copy of their next news update.

### News From All Over

Monk Apollo, the only licensed amateur in Mt. Athos SY, has been off the air for the past 18 months. He says the reason for his absence from the amateur bands is the ARRL's acceptance for DXCC credit of Baldur Drobnica DJ6SI's operation from Mt. Athos. The ARRL did accept a Greek requirement for their per-



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4K2BY to DL6ZFG  
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4K5RRC to UA8FAA  
4L1FHI to UF6FHI  
4N1K to YU1ABH  
4N4ANT to KA9WON  
4N4CA to YU4CA  
4N4EVC to DJ8QJ  
4N4TG to 9A2AJ  
4N5AA to YU5AA  
4N5AD to YU5AD  
4N5CZ to YU5CZ  
4N5FK to YU5DRS  
4N5GB to YU5GBC  
4N5KXY to YU5MB  
4N7M to YU7KMN  
4O1V to YU1DX  
4U/DH3MIG to OH3GZ  
4X/S59PR to 9J2AJ  
4X6UF to 4X4KK  
5H3MT to JH4RHF  
5H3XX to JH3RRA  
5N8ZKJ to OK3WM  
5R8DD to JA1SWL  
5R8DJ to DL7FT  
5W8CW to Y23UO  
5W8UO to Y23UO  
5Z4FO to KB4EKY  
5Z4TT to SP5BUD  
60/G3K0X to G3K0X  
6F8S to AA7FM  
7S4SKI to SM4EAC  
8P9HR to K4FJ  
8Q7AB to JJ1XDL  
9G1AA to PA2FAS  
9H3KA to PA3EON  
9K2GS to WB6JMS  
9K2SH to OE6EEG  
9K2ZZ to W8CNL  
9Q5TE to SM8BFJ  
9U58ZP to G4BZP  
A22FN to W1LQQ  
A22MN to WA8JOC  
A35QC to JF1WQC  
BV4CT to NO8C  
C91J to W8GIO  
CE3CJ to JA3GIY  
CU2AA to KA1HFL  
CU3/K6EDX to KA3B  
CY9DRI to VE7DRW  
D68FT to DL7FT  
D73CW to HL1XP  
DP8GVN to DL1JCV  
DX1HB to JA1KJK  
EA8/DL2H8X to DL2H8X  
ER8F to DF8BK  
ER1/UB5FBV to RB5FF  
ER40WQ to SP7LZD  
FG/JH4NMT to JH4NMT  
FG5FR to FG5BG  
FJ/N9SW to N9SW  
FK/DJ5CQ to DJ5CQ  
FK5C to F6AJA  
FK8GJ to F6CXJ  
FM5WD to W3HNK  
FT4WD to F6AXX  
FT5YE to F1AAS  
GMB/W5ASP to W5ASP  
GU4YB to G3SWH  
H44/W9GW to W9GW  
H80/OE7AJH to OE7AJH  
HC7SK to SM6DYK  
HC8KU to DK5VP  
HK8/AA5AU to AA5AU

HK8/KB5GL to KA6V  
H08/OE2REL to OE2REL  
HR1LW to JA1LW  
HR6/NN7A to NN7A  
HS8/G4UAV to G4UAV  
HS8ZAR to K3ZO  
J28FO/60 to F6FNU  
J52AG to SM8AGD  
JW8E to SP2GOW  
JW8F to SP2GOW  
JW5NM to LA5NM  
JY9ZK to KA5ZM  
KA3KJH/S8 to KA3KJH  
KC6EU to JA2EU  
KC6ME to 7N1RTO  
KC6OK to OKDXA  
KH8/VE8MIA to JH1AJT  
KH2/JE1EGJ to JR1EGJ  
KH2S/6Y5 to JH4RHF  
KH8/DL2RUU to Y23UO  
L3DSR to LU1DVT  
LY758A to LY3BA  
LY75MW to LY2BMW  
LY75Y8H to LY3BH  
N90QS/T5 to WN2R  
NF6S/KP1 to W5IJU  
OA4CWR to K3JXO  
OD5/SP7LSE to SP7EJS  
OD5SK to KB5RA  
OJ8/OH1VR to OH1VR  
OJ8/OH3AC to OH3AC  
OM3T2M to OK3PA  
P29DK to N4EOF  
P29PL to VK9NS  
P4/N4BWS to WB4CKO  
P48P to NX1L  
PJ2/PA8VDV to PA8VDV  
PX2A to PY2KP  
PX8F to PY2KP  
R58SB to UZ4AWB  
RA2FM to DL4DBR  
RT4UA to DK1RV  
S58AL to YU3EF  
S59AA to YU3BC  
S92ST to K4BAI  
T38P to W9IXX  
T38XV to F6EXV  
T14/WN4KKN to AA5BT  
TJ1BJ to K4UTE  
TJ1GA to I2WMB  
TJ1GG to I2EOW  
TK/F6ATQ to F6ATQ  
TL8CK to F6EWM  
TR8LC to FD1PYJ  
TU2QW to F6EXQ  
TU4SR to OH8SR  
TY2AS to I8QLS  
TZ6FIC to FF6KEQ  
TZ6RM to K5UK  
TZ6ZM to K5UK  
UC1AWZ to DL10Y  
UC2AAA to F6AML  
UD7DZ to UD6DC  
UF6FCZ to JP1BJR  
UI8IF to UI8IAJ  
UL7ACI to DL6ZFG  
UM8MGM to I0WDX  
UN7LZ to UL8LWF  
US8U to K8YSE  
V31JZ to NN7A  
V31OB to WH8B  
V31RY to WN8B  
V31WN to KT8F  
V51SW to G1IOV  
V63ME to 7N1RTO  
V63NI to JR7OEF  
V85CJ to G3ORC  
VK9LM to DJ5CQ

VK9X/VK6BFZ to JA8GPT  
VP2EBN to KA3DBN  
VP2M/KD6WW to KD6WW  
VP2MH to KC4DWI  
VP2V/W7YS to W7YS  
VP2VE to WA2HNA  
VP5G to N6JZM  
VP5JM to W3HNK  
VP9MZ to WB2YQH  
VP9YL to WB2YQH  
VQ9AC to WN8O  
VQ9SA to WL7BLD  
VR6BB to JF2KOZ  
VS6FN to AB4MD  
VS6WV to K8TLM  
W1FC/FS to W1FC  
XA5T to XE2DRM  
XK1MQ to VE1BT  
XQ8X to CE3ESS  
XT2BW to WB2YQH  
XU8UN to VK3OT  
XU1SS to JA1UT  
XU2ZP to LA2ZP  
XU9M to JH1KRC  
XX9TFN to DK9FN  
Y88POL to Y32WN  
Y81ARW to W4LCL  
YE8I to Y88FTE  
YI9CW to SP5AUC  
YJ8AMR to W9GW  
ZA1AB to HB9BGN  
ZA1AC to LZ2IP  
ZB2JL to KU6E  
ZC4KS to G8PWR  
ZD8DX to WB2K  
ZD8VJ to G4ZVJ  
ZF2QP to W8BLA  
ZF2SQ to WA8JTB  
ZF2TT to W6NLG  
ZK1FR to Y23UO  
ZK1TB to W7TB  
ZK1UO to Y23UO  
ZL7AA to ZL2AL  
ZP9XB to Pirate  
5T5SN to FD1RUQ, BP 24, 22190 Plerin, France  
5Z4XW to Swedish Embassy, POB 30600, Nairobi, Kenya  
6C1RJ to POB 245, Damascus, Syria  
C53HD to POB 154, Banjul-Gambia W. Africa  
C53GH to POB 28, Banjul, Gambia  
EL2FG to POB 3307, Monrovia, Liberia  
EP2MHB to Mohamad Bahrololoom, Box 16765-154, Tehran, Iran  
F040K to POB 491, Tahiti, French Polynesia  
FP5DX to POB 4202, St. Pierre & Miquelon  
HJ8VGJ to Box 852, San Andres Island, Colombia  
HP2CWB to POB 728, Colon, Panama  
OK8ANZ to Mark Foster, NW4Y, POB 3002, Auburn, AL 36831  
P43MD to Morris Dorbeck, Brandaris Weg 15, San Nicolas, Aruba  
PJ2MI to POB 3383, Curacao, Netherland Antilles  
PJ7JC to POB 26, B-2550, Kontich, Belgium (not K2PEQ)  
RV7L/UA4HTT to POB 3021, Ulyanovsk 432030, Russia  
RW8SR to POB 2595, Irkutsk 74, Russia  
SV5BYR to Box 212, Rhodes, Greece  
T25AO to Birgit, Box 73, Berlin 1020, Germany  
T5CB to KA1PM, POB 1311, Buena Vista, CO 81211-1311  
T5KE to Kent Elliot, Box 6133, Nairobi, Kenya  
TL8FD to POB 265, F-67504 Haguenau, France  
TR8GR to POB 8000, Libreville, Gabon  
TU2XB to POB 81, Abidjan 03, Ivory Coast  
V63DJ to POB V63, Kosrae, FM 96944  
YN1CC to POB 2971, Managua, Nicaragua  
YN5JAR to POB 122, Jinotepe, Nicaragua  
ZL7AA to ZL2AL, POB 54, Hastings, New Zealand, or ZL2A

mission to any future Mt. Athos operation, but the ARRL did credit DJ6SI's operation over the Greek protests. The ARRL simply doesn't remove already existing DXCC credits, even when the legality of the operation falls under a cloud. Thus, Monk Apollo's refusal to

get on the air until the ARRL discredits the DJ6SI/SY operation means that he will never get back on the air. Perhaps the best way to handle this unfortunate problem is to delete Mt. Athos from the DXCC countries list.

On a more possible note, Valery Khar-



## CQ DX Awards Program

### SSB

2007.....W6SHY	2010.....N2PKP
2008.....IK1SLE	2011.....JG2NXV
2009.....WB2ZHB	2012.....K5TVC

### CW

677.....JG2NXV

### SSB Endorsements

320.....VE2WY/327	320.....W7FP/321
320.....W6EUF/327	320.....K2ARO/321
320.....K5TVC/327	310.....NC9T/318
320.....CX4HS/327	310.....W6MFC/317
320.....WB8YDB/327	310.....WB2JZK/315
320.....N6AHU/326	310.....KB7VD/314
320.....K22P/326	310.....K3NEE/312
320.....WB3DNA/326	310.....KF8VW/311
320.....I4EAT/326	300.....KP4EQF/309
320.....K9IW/326	300.....I4CSP/303
320.....KB8DB/326	300.....4X4JO/300
320.....K6JG/326	275.....W6SHY/285
320.....WA6OET/326	250.....G8LRX/250
320.....W8SR/326	150.....IK1SLE/156
320.....KZ4V/326	28 MHz.....N2PKP
320.....K8LJG/326	

### CW Endorsements

320.....DL1PM/327	320.....G4BWP/321
320.....W9DWO/327	310.....KB8DB/319
320.....W8SR/326	310.....W8XD/318
320.....K6JG/326	310.....W3BBL/315
320.....I4EAT/325	310.....NC9T/311
320.....W7ULC/325	300.....K4IQJ/309
320.....K9IW/324	300.....KA7T/303
320.....KZ4V/324	275.....KP4EQF/290
320.....K8LJG/324	275.....WG5G/QR/288
320.....EA2IA/322	275.....HA5NK/278

Total number of active countries is 327. 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.

catching up on his QSL chores after an extended operation as PZ5DX.

QSL **KJ6QO/T5** to Jeff Herbster, 3810 N. Maryvale Parkway #2094, Phoenix, AZ 85031. (The 1993 *Callbook* address is incorrect.)

QSL **HB0/HB9BCK/p** via Albert Zaehner, Scherzinerstr. 23, CH-8595 Altnau TG, Switzerland.

Doug Stark, WA3CGE, is QSL manager for the 1993 ARRL DX contest call of **GD0SLY** and has now taken over QSL chores for **EL2CX** (formerly via N2AU).

Eugene Nadolny, W2FXA, says he is still waiting for logs from two stations for whom he has assumed QSLing duties: **UR8J** and **UB3JWW**. He does have logs up to the first of this year for **CU1AC** and **UB3JX**. SASE or SAE and return postage, please.

KA5EJX now has the logs for **XV3UU** from September 1990. QSL direct only to Rod Huckabay, 4002 70th St., Lubbock, TX 79413.

Kash Kashdin, WB2RAJ, is now QSL manager for **FK8GM**, as well as for **EM3W**, **LZ2TU**, and **UZ3AYR**. His address is 136 Westcliff Dr., West Seneca, NY 14224.

QSL **XU9M** and **XU9R** via Michiaki Watanabe, JH1KRC, Gaien House 702,

2-2-39 Jingumae, Shibuya, Tokyo 150, Japan, or via the JARL bureau.

QSL ex-**YT3T** via Slavko Celarc, S57DX (ex-YU3BG), Ob igriscu 8, 61360 Vrhnik, Slovenia, Europe. Slavko reports that the Solvenia bureau is working well.

**A71AZ** cannot be confirmed via the proported QSL route of SP9UO, who knows nothing about the operation. SP9UO is holding received cards until he learns more about A71AZ.

And **W1AM** says he is not the QSL manager of any DX station; don't send Art any such cards.

The **Russian QSL Bureau** (Box 88 Moscow) is *not* out of business, but does now charge Russian amateurs a fee for the previously free service. Many Russian amateurs decline to pay this fee, and thus no longer receive cards via Box 88.

The **S79S** QSL cards are coming out. This one is worth sending for, even if you don't need the confirmation; it's a striking color photo of a Zebra Lionfish. QSL via Charlotte Richardson, KQ1F, 11 Michigan Drive, Hudson, MA 01749.

DL7FT wants US\$2 or two IRCs for return of his **5R8DJ** QSLs, due to the increase in German postage rates.

73, Chod, VP2ML

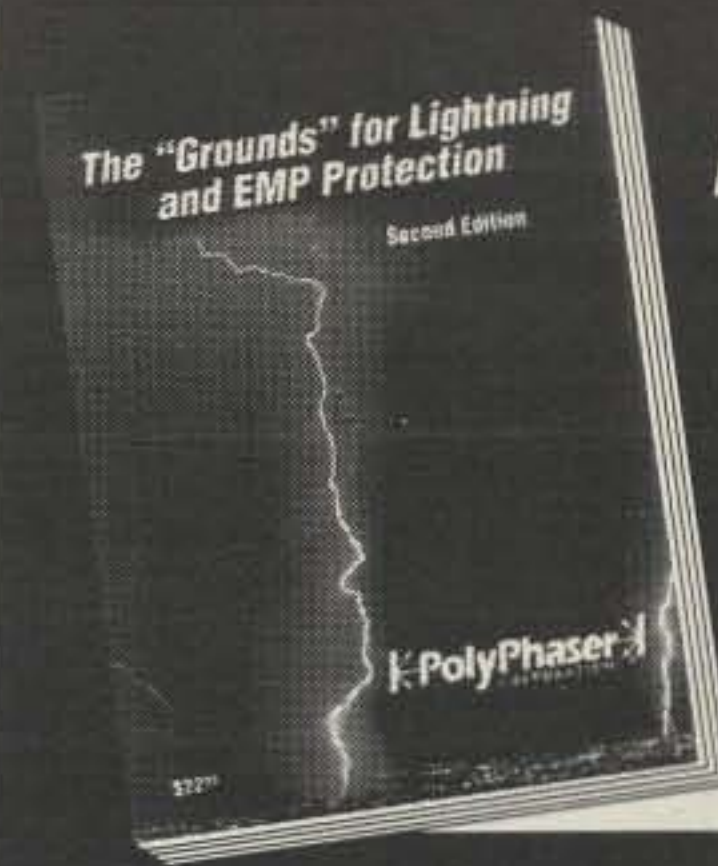
chenko, RA6YR, has checked with the Central Radio Club in Moscow as to the status of the Oblast award, following the break up of the ex-USSR. Mrs. Sviridova, the manager of the Oblast award, says that DXers can earn the new Oblast award by making 100 contacts with Russian amateurs in 50 different oblasts, with the duplicate contacts on different bands. The fee for the new award is 14 IRCs. All contacts must be made on or after January 1, 1992. The old Oblast award continues to be available under the old rules, for contacts made prior to January 1, 1992.

### QSL Notes

Charlie Moreller, K2CM, long-time QSL manager for **BV2A**, has a policy of returning US\$1 included in addition to return postage. He also has a pre-printed note explaining this policy. Three cheers!

QSL **OD5YZ** direct only to the operator: Bernard Toumie, Dalgangen 2, S-17540 Jarfalla, Sweden. Cards previously sent to SM5CAK will be forwarded.

QSL **TG5ITS** to K3BYV, who is busy



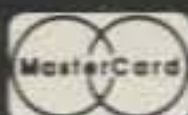


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## ALL ABOUT THE WORLD ABOVE HF

### Please QSL? Why QSL?

**A**s a ham for more than 32 years, I have watched the evolution of the practice of QSLing. When I was first licensed as a kid, I wanted to exchange QSL cards with every amateur I worked. In fact, it was something to even QSL eyeball QSOs. (In those days there was an organization that sponsored awards for so many eyeball QSOs, WAS eyeball QSOs, and even DXCC eyeball QSOs, but it died a natural death a few years after it started.)

After repeaters became vogue and logging requirements went away, I went through a bit of withdrawal in not QSLing everyone I worked (especially if I worked him or her through a repeater). I guess we all felt that a repeater QSO seemed somewhat meaningless and not worth the effort of a card, particularly if we worked the same station day after day.

In some sense, it appears that this has also almost put an end to the practice of QSLing in general. However, there are exceptions to this end. Operators on 160 meters, the WARC bands, and VHF+ plus frequencies seem to be more apt to QSL, or at least to answer a QSL.

I have found that approximately 70+ percent of the operators to whom I send cards respond with one of their own. The percentage goes up even further when I include an SASE (a self-addressed, stamped envelope; more on this later). It seems that in general, the VHF+ operator is interested in QSLing.

Why bother with QSLing, anyway? Notwithstanding that often printed phrase seen on many QSL cards, "The final courtesy of a QSO is a QSL," is it still worth the effort? Judging by the mail I receive for this column, it appears to be so.

Well, then, how do you QSL successfully? There appear to be some unwritten rules that are adhered to more or less by those who respond to cards sent to them. Let's look at these practices as a way of discovering how to successfully receive cards. Keep in mind, however, that these rules will only increase your percentage, not guarantee a response. There are some operators who refuse to even keep a log, let alone QSL anyone they work.

I have been asked to develop a Rogue's gallery of these individuals. However, I am in the business of writing about positive aspects of the hobby and will not make negative comments about my fellow amateurs. Nevertheless, you will soon find out who these people are from your efforts to get a card from them.

First, have a decent QSL card of your own. I have two cards, one which pictures me in a tuxedo with the caption "I got all dressed up for our recent QSO," and the other which is printed for anyone who is connected with the magazine and in my case identifies me

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

as the VHF Editor of *CQ*. QSL cards are not expensive, so there is no excuse not to have a decent card. Make sure, however, that the QSO information is on the same side as your callsign. If it is not, the recipient spends time flipping your card back and forth to look up the data.

Next, fill out the card as soon as possible after you make the contact. If you are lazy (like me) and wait around, the memory (and maybe even the log book) of the other station may disappear. The longer you wait to get the QSLing process started, the less likely you are to receive a return card.

Next, fill out the card properly. Either use a computer-printed label or legible handwriting. The correct date and time are absolutely critical. There is some debate as to what order the date and month should appear. Most, however, prefer the universal order of date, month, year.

The date should be standard (or Arabic) numerals. The month is written either in an abbreviated spelling of its name, or in Roman numerals. The year should be either fully printed in Arabic numerals or abbreviated by listing the last two digits of the year. It is important to denote some difference between the date and the month. Using Arabic numerals for both the date and the month leads to confusion, particularly when the date and month are listed as "10/2." There is doubt as to whether the QSO took place on February 10 or October 2.

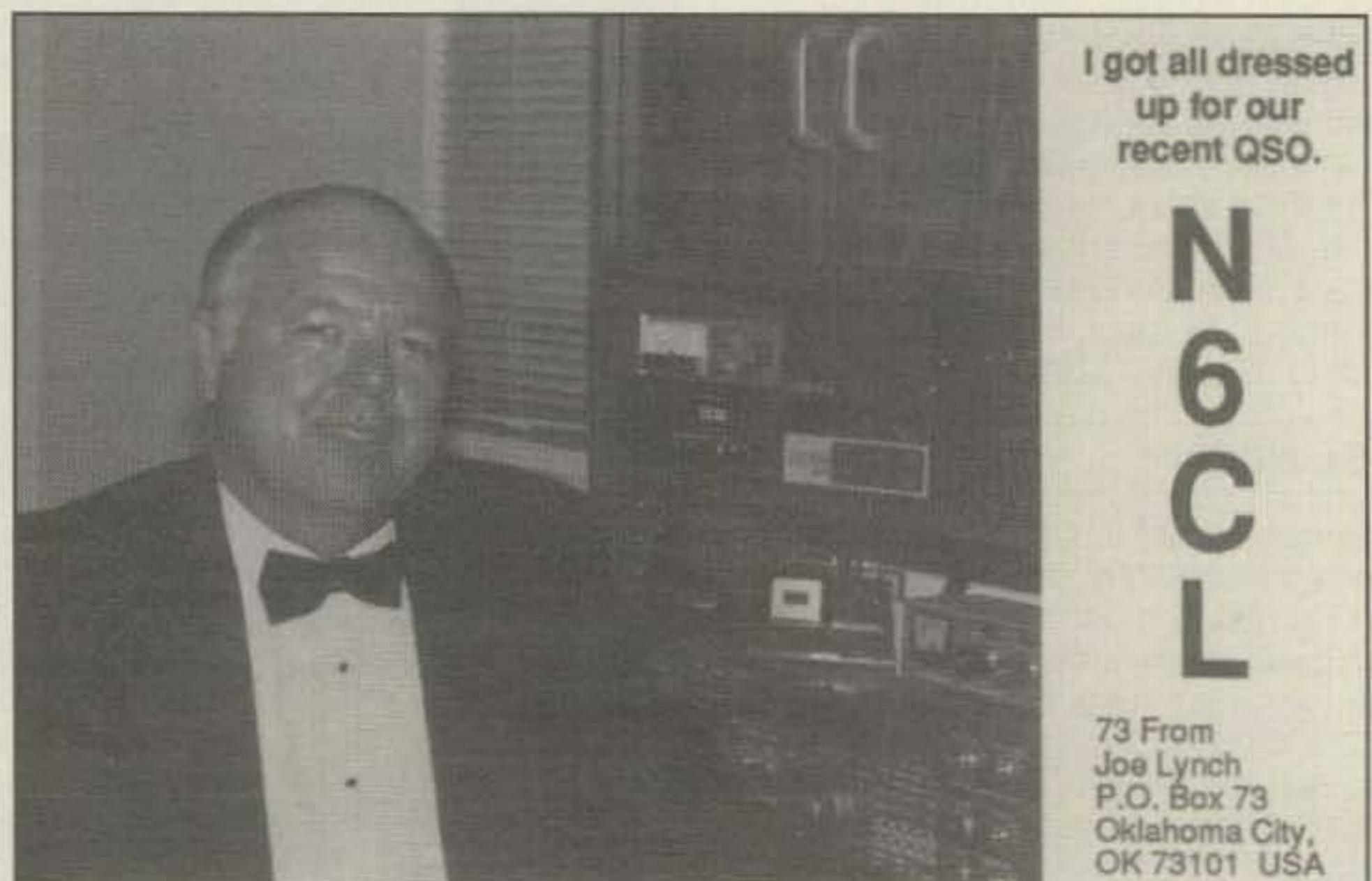
There is also some justification for using Roman numerals for the month. The spelling or printing of the month may be confusing to someone else, particularly in another country. However, because of the universality of

#### VHF-PLUS CALENDAR

July 1-5	W5OZI, KB5IUA, and K5AWK to Mexico for grid expedition. (See text for details.)
July 4	Full moon. Very poor EME conditions.
July 9-12	WV2B possible trip to St. Paul Island. (See text for details.)
July 10-11	CQ WW WPX VHF Contest. (See May issue for rules.)
July 11	Apogee and last quarter moon. Moderate EME conditions.
July 18	Moderate EME conditions.
July 19	New moon. Moderate EME conditions.
July 21	Perigee. Moderate to good EME conditions.
July 25	Good EME conditions.
July 26	First quarter moon. Good EME conditions.
Jul. 29-Aug. 1	Central States VHF Society Conference, Oklahoma City, Oklahoma. (See text for details.)

Roman numerals, there is little doubt as to the character's meaning.

Next, if your card does not already specify "2X" or something else to indicate that the mode was the same both ways, please indicate that when you enter the mode, unless of course it was not the same both ways. It is not as critical on the VHF+ frequencies because most operators are not concerned about the mode, just that the QSO took place.



I got all dressed up for our recent QSO.

**N  
6  
C  
L**

73 From  
Joe Lynch  
P.O. Box 73  
Oklahoma City,  
OK 73101 USA

QSL cards like this one get better results than generic cards. (I am really not this vain, hi.)





Were you among the 118 VHF+ operators and their families at the VHF banquet during the Dayton Hamvention? We enjoyed excellent food and wonderful fellowship, and 18 of us went away with prizes. Thanks to Hal Perry, KC4YO, and Bryan Snyder, WA8MZO, for hosting the event. (Photo courtesy KC4YO)

However, on HF it is another matter. Many awards offer endorsements for "all SSB" or "all CW." And, in some instances, cross-mode contacts are disallowed for award credit. Therefore, it becomes imperative to indicate how the contact was completed both ways. If you made the contact with both of you using the same mode, it is usually simply indicated by writing "2x" or "2 way."

For some, correctly indicating the signal report is most important, especially if you

work someone on meteor scatter and use "S-2" or EME and use M or O as reports. (It caused a small consternation at the DXCC desk the first time these HFers saw these forms of signal reports when the guys applied for their 2 meter DXCC. They got used to it, however.)

Finally, sign the card, or use a signature stamp. The signature attests to the fact that the information is correct. The ARRL and other QSL card checkers treat QSL cards al-

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Christopher Nyiri, the four-year-old son of Jack Nyiri, AB4CR, assisted Hal Perry, KC4YO, in the prize drawings, while Bryan Snyder, WA8MZZ (on the right, in the background), manned the microphone. Questions arose during the course of the drawings, however, when Chris pulled his dad's name out of the hat for a \$20 prize (not really). (Photo courtesy KC4YO.)

most as though they were legal documents and look for that signature for authenticity of the card.

Once you have the card properly filled out, mail it. If you let it sit around, you might misplace it. Then you will have to make out another card all over again.

Thinking about mailing the card brings up a couple of choices. Should you just stick a stamp on the card and mail it? Should you stick the card in an envelope and pay ten cents more in postage? Should you include an SASE? It depends on whether or not you want the other operator's card. If you are responding to someone else sending you a card, you simply can put a stamp on yours and mail it. However, be aware that your card may be eaten up or torn to shreds before it makes it to the other end, if it gets there at all. Therefore, for a bit of protection for your card, put it in an envelope.

Now that you have it inside, the question as to whether or not you should include an SASE arises. If you need the other operator's card, include one, even if the other operator needs yours!

I have heard of two instances where both operators during a QSO acknowledged to each other on the air that they needed the other's grid square, and thus the QSL card. Assuming that the other operator would simply return a card out of courtesy, the first operator sent his without an SASE. After more than a year passed, the first operator ran into the second operator at a hamfest. When queried about receiving a card, the second operator acknowledged receiving the card but added that because no SASE was included he was not going to send a return card until reception of the SASE. The lesson learned? When in doubt, include an SASE.

If you do use an SASE, include sufficient postage for the return trip and make sure your name and address are properly and legibly printed on the return envelope. I once received a card, with an SASE, from an operator in Europe needing confirmation from Oklahoma. He had hand-printed his name and address on the return envelope. I used his envelope to send my card back to him. His

envelope was eventually returned to me as undeliverable!

What about the proper postage? If you are mailing a card to someone in your own country, you know the answer to that question. However, if you are mailing a card to someone in another country, you must check with the post office for that country or with other sources such as DX newsletters or magazines to determine the current amount for that country.

How do you pay for the return postage? There are services that advertise for sale mint postage for a particular country. There are also International Reply Coupons (IRCs). You can purchase IRCs from your own post office. You can also purchase them for around 50 to 60 cents from persons who advertise availability of them. One IRC, by international agreement, pays for enough postage from the other country for surface-rate delivery. If you want airmail delivery, it will require more IRCs. Again, it is necessary for you to determine from the DX country how many are required at the time you do your mailing.

Another method of paying for postage is the use of currency. Often referred to as "green stamps," the use of a U.S. dollar bill is sometimes offered as payment for the return trip. There are two problems with this method. First, it gets expensive quickly. Second, mail to some countries is regularly subject to pilfering. Therefore, your dollar bill may be extracted and the remaining contents discarded long before it ever reaches its intended destination.

Another method of QSLing a DX station is to send your card to the other station's manager. This usually increases the likelihood of receiving a card in return. How do you find out the name of the manager? Listen to the station on the air or look up the name in "The Go List." Published by Jan, K6HHD, and Jay O'Brien, W6GO, this is the most comprehensive list in the world. You may subscribe by mailing \$2.50 for one issue or \$25.00 per year to: The GO List, P.O. Box 700, Rio Linda, CA 95673-0700. Additionally, if you are on packet, you may be able to access their data base, as many SYSOPs subscribe to their data-





Emil Pocock, W3EP, VHF editor for QST, and your editor conducted a joint forum at the Charlotte, North Carolina Hamfest. Look for an encore performance at the Central States VHF Society conference this month.

base service. Another source is the "VHF QSL List," maintained by Harry Schools, KA3B, 1606 S. Newkirk St., Philadelphia, PA 19145. Please include an SASE with your request for a copy.

Finally, be patient. It takes time to process cards, particularly from someone who receives plenty of cards. When I returned from my trip to Montserrat a couple of years ago, I had over two hundred pieces of mail waiting for me. Eventually I received over 350 requests for cards out of 1180 contacts. After ordering cards, entering all the data in my computer, sorting the incoming cards, printing the labels, and mailing everything, fully four months had passed. During that time I received two duplicate requests for cards.

Patience may mean waiting up to a year or more for a return card. However, some day when you least expect it your mail box will greet you with that long-awaited treasure, that return QSL card.

I hope that I have covered all the unwritten rules for QSLing. If I missed anything, drop me one of your cards with a note on the back of it.

### 1993 Dayton Hamvention

Amateur radio's "Magic Kingdom," the Dayton Hamvention, was bigger than ever. For many of the VHF+ operators the convention began Friday night at the Barnsider Restaurant. Co-hosted by Bryan Snyder, WA8MZQ, and Hal Perry, KC4YO, the co-net controls for the Monday night 75 meter VHF net (3843 kHz, 9 PM ET), the banquet was enjoyed by 118 VHF+ operators and members of their families. The highlight of the evening was the prize drawings. Christopher Nyiri, the four-year-old son of Jack Nyiri, AB4CR, assisted Hal in the prize drawings. Among the prizes given away were: a Bird wattmeter, gift certificates for merchandise and services, subscriptions to *CQ* and *Communications Quarterly*, and cash. Questions arose during the course of the drawings, however, when Chris pulled his dad's name out of the hat for a \$20 prize (not really).

The VHF Forums Saturday included a joint talk given by Hal and Bryan on grid expeditions, another joint talk by Jerry Becker, WA8R, and Byron Swainey, WA8NJR, on

their trip with John Walker, WZ8D (who was also scheduled to speak but became ill), to the northern part of Canada. Dave Blaschke, W5UN, gave a talk on his EME array. The talk also included showing a video tape of the array after it was totaled by a tornado in 1991. Finally, Chip Taylor, W1AIM, and Dale Clement, AF1T, who billed themselves as the "Chip and Dale 10 GHz Show," each gave talks on 10 GHz, Chip speaking on FM communications and Dale on SSB communications.

There were in excess of 35,000 participants at Dayton this year. And on Saturday, during the rain, it seemed as if every one of them was inside. Hint: If you want to see Dayton, relatively hassle free, then come on Sunday morning. Most everyone else is sleeping off the effects of Saturday night partying. Nevertheless, come rain or shine, crowded or not, I will be looking for you next year.

### Current Contest

The contest of the month is the CQ WW VHF WPX Contest scheduled for 10-11 July. Complete rules are in the May issue of *CQ*. Here are a few highlights.

There are eight categories you can enter. You can operate from home or you can operate from a portable location. You can operate on every VHF+ band or you can operate on only a few. You can operate QRP, using no more than 25 watts output. Of course, you can be a Rover. Please note, although the rules say "one or two operators," you are allowed to have a non-operator go along as a driver.

Insofar as planned trips are concerned, I have been notified of a Rover trip planned by Ron Hammel, KC6WLC, and Joe Morris, N6RPM. They will start out from DM07 at the beginning of the contest and work their way back to Lancaster during the test. They will be on 6 and 2 meters and 70 cm. Additionally, if my fiancée, Carol King, K5CPZ, decides to go to the YLRL convention in Wichita, Kansas, I will take her up there and then jaunt over to relatively rare EM08 and possibly DM98 for the contest. I will operate 6 and 2 meters and 70 cm. I might be joined by one or more Kansas contest operators, if I can shake them loose for the trip.

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Last year we had close to 90 entries. I hope to see this number double for this year's contest. For logs and entry blanks, send an SASE to CQ Magazine, 76 N. Broadway, Hicksville, NY 11801. After the contest is over, please send the completed logs to me at P.O. Box 73, Oklahoma City, OK 73101.

I have discovered that some entrants to last year's contest did not appear in the results published in February. I am at a loss to explain why, because it is my policy to deposit all contest entries in a special box. Perhaps the post office was so inundated last year that they did not know what to do with all the entries. I have notified them that they should expect to flood my post office box with mail for several weeks following this year's contest. Hopefully, none of this year's entries will be lost. However, if you have any doubts, send yours certified or registered mail (a practice adhered to by some overseas entrants last year, particularly those from the former Yugoslav republics).

### Current Convention

This is the month when the weak-signal operator looks forward to eyeball QSOs. The ever-popular Central States VHF Society Conference, the 27th annual conference, returns to the state of its roots, the Sooner State, Oklahoma. It is scheduled for 29 July to 1 August at the Lincoln Plaza Hotel in Oklahoma City. (These dates were picked to avoid the conflicts of the CQ WW VHF WPX Contest; the ARRL Board of Directors meeting; Ham Holiday; a statewide ARRL-sanctioned amateur radio convention that your editor, as Okla-

homa Section Manager, is obliged to attend; and the ARRL UHF Contest; and to occur before the *Perseids* meteor shower peak.)

The conference is the place for gathering of operators of our specialty. If you want to meet in-person the guys and gals you have worked over the air, then plan to attend the conference. A block of rooms has been reserved for \$59.00 a night at the hotel, along with a large meeting hall for the conference seminars, an even larger hall for the swap meet, and the Stars Room, a dinner-theater type room for the banquet. If you are interested in staying at the hotel, call them (at 405-528-2741) immediately, because the block will be released around 9 July.

There will be plenty of technical topics discussed. The program chairman is Tommy Henderson, WD5AGO. Tommy has arranged an impressive array of speakers. Among them are: Mike Owen, W9IP, Beginning Satellite and Moon Tracking; Denise Hagedorn, AJØE, Rover Operations; Jon Jones, NOØY, VHF Contesting; Emil Pocock, W3EP, The World Above 50 MHz Column; your editor (Emil and I will present a joint forum related to our columns); Mel Graves, WRØI, Measuring Noise Sources Using Computer Software; Barry Malowanchuk, VE4MA, RF Microwave Amplifiers; Jim Volgler, WA7CJO, TWTs; Larry Gray, K9XA, YU 129, 1296 MHz Amplifier; Tommy Henderson, WD5AGO, P SPIC Software; Steve Powlishe, K1FO, 432 MHz Amplifiers; Dave Meier, N4MW, Transceiver Interfacing; Al Ward, WB5LUA; Kent Britain, WA5VJB; plus possibly Arnie Coro, CO2KK, The Future of VHF Amateur Radio Activities in Cuba.



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Conference seminars will begin Thursday night and run through Saturday afternoon. The Thursday evening seminars will be specifically for EME operators, with speakers from 2 meters and 70 cm and up featured. The Friday morning session is tentatively planned for the beginner. Talks on how to get started in various aspects of weak-signal work will be given by experts in their fields.

Friday morning will also be the time to have your antenna measured. Friday afternoon and all day Saturday will get into the more technical aspects of the weak-signal specialty.

Friday evening will feature the usual swap meet in a very large room, plenty of room for you to unload all your goodies. Following the last of the trades will be the traditional SNOTTS meeting. If you are interested in this sub-society meeting specializing in 222 MHz, contact Kent Britain for more information.

Saturday evening will be the traditional banquet with its customary awards and recognitions. Among the awards presented will be the Wilson and Chambers awards.

Featured entertainment for the banquet will be an ensemble from the Church of the Servant Choir. They will be singing selections from their Broadway Show Stoppers II show that they performed for their church in May. This choir alone is worth the price of the banquet ticket. Among their venue was an appearance last summer at Carnegie Hall, where they performed Mozart's Requiem. They also have performed in Washington, DC and in Europe and were the core entertainment for the 1989 Oklahoma Olympic Festival, an official event for the U.S. Olympic program. As a member of the choir, I am prejudiced. However, once you hear them, you will agree that they are great!

The antenna range will be set up in the parking lot to the west of the hotel. There will be enough room to even handle Mike Staal, K6MYC's long-boom antennas. The pre-amp measurement tests will take place in the swap-meet hall on Friday evening. Check with Tommy Henderson, WD5AGO, if you have a device you want measured.

Alternative activities are plenty. The Lyric Theater, White Water, Frontier City, Cowboy Hall of Fame, Kirkpatrick Planetarium, and Oklahoma City Zoo are among the many choices available to members of your family while you are attending the seminars. A full schedule of events and choices will be available at the registration desk at the conference.

Directions to the conference are relatively simple because Oklahoma City is a cross-roads city. Access to it is via air through the Will Rogers World Airport or via freeways either by way of Interstate 40 (east or west bound) or Interstate 35 (north or south bound).

The hotel is located on Lincoln Boulevard, just two miles north of the state capitol building complex. If you are coming from the airport, call for their free shuttle car to come and pick you up.

If you are driving in from the north on I 35, then exit I 35 to I 44 west bound. Then exit the Lincoln Boulevard off ramp from I 44 and proceed south for approximately one mile. If you are driving in from the south on I 35, then exit I 35 to I 235 north. Then exit at the 36th Street off ramp. Go east on 36th Street for one mile. Turn north on Lincoln Boulevard at

the signal light and go approximately one mile to the hotel. The hotel is on the west side of the street. If you are driving in on I 40, either east or west bound, then exit at I 235 north and follow the above directions once on I 235.

If you are totally confused and just happen to have a 2 meter FM radio, tune it to 147.03 MHz (plus offset) and call in. Someone will be able to help you find the conference.

So circle your calendar and plan on attending this year's conference. As this year's president of the society, I look forward to greeting you as you arrive at the hotel this month.

## Rover Controversy Revisited

In the April column I reported on the activities of Rover operators connected with the Hampton County (Connecticut) Radio Club. Following the publishing of that column I received a letter from Jim Smith, WB9EEA, outlining his disagreement with Stan, KA1ZE's opinion that the rules were ripe for abuse. Jim points out that his group in Illinois regularly operates what he calls "Rover Squared." He feels "... that the amount of work involved in making and logging so many QSOs, in building and maintaining so many bands of radio equipment, and in driving and coordinating the actual contest were commensurate with the points that result from such an operation." He goes on to state that those considering any change in the rules should note that "Rover squared operation rewards operation on as many bands as possible. If we want to keep the microwave spectrum we now have, we need to use it more. We strongly disagree with the creation of the 'limited multi-operator' class for VHF contests because of the disincentive for microwave operation created by that class. To change the rover rules to disallow this type of operation would again be to say to the FCC, 'Please take our under-used microwave bands away from us.' We believe increased use of the microwave bands, even as occasional as this would be, is all for the good and should be encouraged."

Additionally, Jim says, "Rover class with rover squared operation makes roving worthwhile for its own sake. Without rover squared operation, the rover class is a captive sub-class that exists only to help the other class." Jim continues by saying, "The only change we would like to see in the Rover class in any VHF or UHF contest would be to allow three-person crews (or non-operator drivers) in rovers."

As I reported last month, I checked with Billy Lunt, KR1R, at the League's contest desk and proposed this possibility to him. He said that he saw no problem in having a third person, a non-operator, to serve as a driver as part of the team. I asked him if it would not be too much of a temptation to use the third person as an operator, considering the rules state "one or two operators." He replied that it all comes back to the operators' ethics. He noted that often when someone "gets a little ambitious" and strays from the rules, peer pressure most likely brings the offender back into line.

Before and since I published that column I have had discussions with VHF contest operators concerning this issue. The "quick

fix" solution to the problem would be to ban Rover-to-Rover QSOs. However, as a Rover operator, I find that solution hard to implement. When I am working a pile-up, I am not going to stop and tell another Rover station who calls me, "Sorry, I can't work you." Also, one need only look at the Class D category (the operator who utilizes his home station from commercial power) for Field Day as an example of evolution. Years ago the rules were such that operators in this category were not allowed to work other class D stations, nor even to call CQ! Well, any Field Day operator knows that this rule has become unenforceable and is all but dropped from the contest.

The other solution that Stan admitted would be workable to him (and would have reduced his score considerably) is prohibiting counting the same multipliers when worked again from the new grid square. The problem is the nightmarish predicament of keeping your log straight, particularly if you make hundreds of QSOs.

Another observation that has been made is, "What is wrong with having Rover stations outscore 'big gun' stations by millions of points?" Both Billy and Jim agree that this might change the way VHF contesting is conducted. Jim feels that should the rules be unchanged and Rovers find that competing among themselves is such an incentive, even "slave" Rovers would be hard pressed to stay captive.

Jim feels that as more Rovers (or potential Rovers) discover the ability to compete, competition will have its own incentive. He states that to win, the Rover stations must operate as much as possible during the trip between each grid corner. And out of necessity, these operators must make contacts with as many other stations as possible. Therefore, winning has a built-in incentive to work outside the "Rover Squared" group.

With his letter Jim included a proposal to operate two stations covering the VHF+ frequencies to 47 GHz. He states that it is possible to score in excess of 4 million points during the course of the contest weekend. Jim's desire is to implement the plan in the January 1994 Sweepstakes contest.

There has been much correspondence directed to members of the Contest Advisory Committee concerning this controversy. Typical have been the letters sent to Dakota CAC member Hans Brakob, KØHB. He reports that initially most comments were for change, any change. Later, most of his correspondence shifted to being against any changes. Some of the correspondents are saying of the ones who want change that their position is: "If it ain't broke, break it."

What do you think? Let your ARRL Division CAC member know. If you do not know who he or she is, contact your Division Director (whose name is on page 8 of any QST) or see page 81 of the April 1993 issue for a list of CAC appointees.

## One More Rover Note

Following the May column I received a note from Shep Shepard, W7HAH. Shep reminded me that he is one of the most active Rover operators in the northwest part of the country. In fact, Shep and I made several Rover-to-Rover QSOs during the June contest while



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each of us was traversing different grid squares. Shep went on to win in the Rover category for that division. Shep also noted it is imperative when you work a Rover station and need a QSL card to include an SASE for the return trip. While not significant, that 29 cent stamp can add up when multiplied by 100.

### 1993 Perseids Meteor Shower A Plan To Reduce QRM

Evidence of this year's shower may appear as early as 15 July. Additionally, because of the annual increase in sporadic meteors, this month should prove productive for the meteor-scatter enthusiast.

An amateur astronomer, Joe Rao, who has observed the *Perseids* meteor shower since 1966, is predicting that the shower may well be a storm. Next month I will cover his predictions, which include when to expect the possible peak.

Considering this possibility, when we were together at the Charlotte, North Carolina Hamfest, Emil Pocock, W3EP, and I discussed ideas to reduce QRM for random contacts during the shower. We have agreed on a plan and to jointly publish it this month.

The plan is rather simple. It requires that operators who are looking west or south transmit on 144.195 MHz and successive frequencies lower in the band. These frequencies should be spaced 5 kHz apart in order to reduce the QRM.

Conversely, operators who are looking north or east transmit on 144.205 MHz and successive frequencies higher in the band. Again, these frequencies should be spaced 5 kHz apart in order to reduce the QRM.

So how does this work? Let's say that Paul Kelley, N1BUG, is going to work the meteor shower. Because he is in Maine, for the most part (except when he wants to work someone on Prince Edward Island), he will be looking either west or south. Therefore, he will look for a clear frequency below 144.195 MHz to transmit his random CQs. Operators south or west of him will be listening for him, or anyone else north or east of them calling CQ.

Another example: If Jack Henry, N6XQ, in San Diego, California, is looking for random contacts, he will transmit on a clear frequency above 144.205 MHz. Operators north or east of him will be listening for him, or anyone else south or west of them calling CQ.

A final example: If Larry Lambert, NØLL, in EM09, in Kansas, is looking to attract stations west or south of him, he will transmit his random CQs on a clear frequency below 144.195 MHz. If he is looking to draw out stations to the north or east of him, he will transmit his random CQs on a clear frequency above 144.205 MHz.

If you think about it, it makes sense. This plan will not necessarily affect scheduled contacts, except that skeds perhaps should be set as far as 30 kHz away from 144.200 MHz, which most operators already adhere to anyway.

This plan is voluntary. Please don't contact either one of us to tell us that we are dictating the way contacts should be made during a meteor shower. We discussed several ideas, and this one seemed the simplest and easiest to implement, considering the spe-

cial conditions of this year's *Perseids* meteor shower. Try it and let us know of your success during the shower.

### Alternate HF Calling Frequency

One other item concerning the *Perseids* meteor shower: Because the predicted peak seems to be set to occur in the afternoon of 11 August, 75 and 40 meters will be relatively ineffective for immediate coordination of activities. It has been suggested that 14.345 MHz be used for the daytime calling frequency. Additionally, it has been suggested that this frequency be used in place of 28.885 MHz because of the decreased effectiveness of this 10 meter frequency. If you use the 20 meter frequency, remember that many others also want to use it. Keep your transmissions short, and quickly find a place to QSY to complete your business. Also, remember that on weekends both the 2 meter and 70 cm and above EME operators hold formal nets. Above all, courtesy is paramount.

### On The Air

**6 Meters:** Beginning 29 April and lasting through copy deadline time (10 May), sporadic-E activity of some sort has been reported on 6 meters. On the evening of 29 April (UTC) stations as far north as NØLL and as far south as KG5UN reported sporadic-E to California and Arizona. The next day stations in Oklahoma reported reception of stations in Arizona. Over the next several days Tom Moore, K5ZXE, reported almost daily activity in the early morning hours both to the northwest and the northeast. Among the contacts made were VE3KKL and VE5LY.

**2 Meters and Above:** A giant VHF-UHF opening occurring between 11 April and 14 April favored the southeast, Mexico, Texas, and parts of Oklahoma. A tropo-induced opening provided plenty of opportunities for VHF+ operators to make contacts on 2 meters and 135, 70, and 23 cm. Typical of the operators was John Godwin, KB5IUA, who, operating from grid square EL29, worked the following: AB4WL, EM63, 144 MHz; KA2DRH, EM64, 432 MHz; KBØY, EM80, 222 MHz; KB3NR, EL89, 144 MHz; KB3NR, EL89, 222 MHz; KB3NR, EL89, 432 MHz; KB4FAI, EM63, 144 MHz; KB4OOW, EM72, 144 MHz; KB4OOW, EM72, 432 MHz; KB5FPW, EM42, 144 MHz; KB5TRW, EM40, 144 MHz; KC4CMH, EM70, 144 MHz; KC4QHM, EL88, 144 MHz; KC4QHM, EL88, 432 MHz; KC4RDP, EL88, 144 MHz; KC4RDP, EL88, 432 MHz; KC4SGO, EL98, 144 MHz; KC4YO, EM75, 144 MHz; KC4YO, EM75, 222 MHz; KD4DLE, EM71, 144 MHz; KD4MXE, EM61, 144 MHz; KD4NUE, EM91, 144 MHz; KD4NUE, EM91, 222 MHz; KD4NUE, EM91, 432 MHz; KF7GV, EM70, 144 MHz; KM4XW, EM75, 144 MHz; NØKBH, EL88, 432 MHz; N4TWX, EL89, 144 MHz; N4TWX, EL89, 432 MHz; N4UYO, EL88, 144 MHz; N4XFL, EM50, 144 MHz; N4XQU, EL87, 144 MHz; N4XQU, EL87, 432 MHz; N7EHU, DM81, 144 MHz; NI4Z, EL98, 144 MHz; W45AMJ, EL86, 144 MHz; W4AQG, EM60, 144 MHz; W4FF, EL96, 144 MHz; W5SUS, EL88, 144 MHz; WA1GUD, EL87, 432 MHz; WA2HGP, EL88, 144 MHz; WA4CHA, EL88, 222 MHz;



WA4CHA, EL88, 432 MHz; WA4CHA, EL88, 1296 MHz; WA4CQG, EM72, 144 MHz; WA4CQG, EM72, 432 MHz; WA4EWA, EM63, 144 MHz; WA4ZEF, EL87, 144 MHz; WA4ZEF, EL87, 432 MHz; WA8KNE, EM90, 144 MHz; WB2QLP, EL96, 144 MHz; WB4JEM, EL89, 1296 MHz; WB4JEM, EL89, 144 MHz; WB4JEM, EL89, 432 MHz; WB4JEM, EL89, 432 MHz; WB4OOJ, EL88, 144 MHz; WB4OOJ, EL88, 432 MHz; WB5KYK, EM51, 144 MHz; WB5NLC, EM91, 144 MHz; WD4IXD, EL98, 144 MHz; XE3EB, EL51, 144 MHz; and XE3EB, EL51, 432 MHz.

Perhaps the longest 2 meter contact during these four days took place between Pete Shugar, N7EHW, in DM81 and KD4NUE, in EM91. Incidentally, for a time Pete was running a pile-up of Florida stations on 144.200 MHz.

Larry Liljequist, WF8C, who moved to the Houston area from Ohio, remarked that he could not believe the S-meter pinning signals over those several days. He reported that at peak times 1 watt was enough to make the path on 70 cm.

### Tech Topics—Feedback

In the April issue I published a modification to the Kenwood TS-680 by Tom Moore, K5ZXE. Now comes word from Allen Jones, K9DZE, of a less invasive method of having two ports. Allen reports that through the purchase of a Comet CF-360A duplexer he was able to connect both his HF and 6 meter antennas through it to the TS-680. He states that the low-pass port will handle 1.3 to 30 MHz and the high-pass filter will pass 49 to

470 MHz and that the maximum power rating on both ports is 600 watts PEP.

I really appreciate Allen sharing this information with me so I could pass it on to you. If you have something for this part of the column, please let me know.

### New FAX and E-Mail

Effective immediately, you can FAX your reports to me. Simply call 405-528-0746 and send your copy. If you send the FAX overnight, the price of the phone call may actually be cheaper than the price of postage to get the same message to me. There is an answering machine on the line if you want to leave a voice message. However, it is best to call my regular telephone number (405-528-6625) for voice messages, as I am more apt to check it rather than the FAX machine for voice messages.

You can also leave an E-mail message to me via CompuServe (user number 72124, 2734).

### Expeditions

Pat Rose, W5OZI, John Godwin, KB5IUA, and Paul Stein, K5AWK, plan to travel to DL98, DL97, DL96, and possibly DL95 between 1 July and 5 July. They will use the call-sign **XE2AWK**. They will operate 6 meters on 50.115 MHz and 2 meters, as warranted. QSLs go to Pat at P.O. Box 393, Junction, TX 76849.

Duane Traver, WV2B, will operate from St. Paul Island (country prefix CY9 and grid square FN97) during the IARU contest, which

is the same weekend as the CQ WW VHF Contest. Arrangements are being made to equip Duane with a 6 meter station to operate at least part of the VHF contest and during other times throughout his stay from 9 July to 12 July. This location is fairly rare both as a country and as a grid square. Hopefully, everything will work out for Duane to be on the air from there. The callsign to be used is **WV2B/CY9**, and QSLs go to Duane at 99 Oregon Hill Rd., Lisle, NY 13797.

### Al Ross, K4CAW, Retires

Al Ross, K4CAW, who is 84 years old and has been active on VHF (2 meters, 70 and 13 cm) since 1970, had been toying with shutting down his station in order to save his daughter the trouble of selling off his equipment when he moves on to the Silent Key category. The storm of the century took down his tower and antennas, thereby taking him off the air. Al has decided that the storm was fortuitous, and he will remain off the air. He did leave open the door for the possibility of satellite operation.

Al was the first North Carolina operator to achieve VUCC on 2 meters and 70 cm. He holds number 26 for 2 meters and number 10 for 70 cm. He also holds a certificate for 13 cm. He has been found in many a VHF+ operators' logbooks. His one regret is that he never got on the moon.

Al remains physically active, however, by bowling five times a week. When asked about his longevity, Al related the story of the guy who was told by his doctor that he was going to live to be 104. When asked why by the

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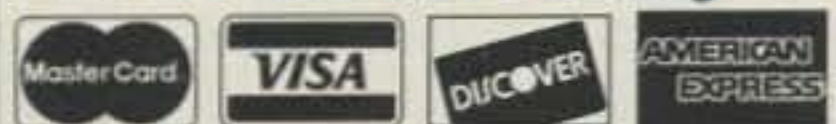
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patient, the doctor replied that he was only 52 years old and only half dead.

If you have a minute and have worked Al sometime in the past, drop him a note and say "thanks" for all the good times.

### Errata

In the "we never seem to get it right" department, I previously published an address for YX0AI. The correct address for forwarding QSL cards is: 1909 North 41st Avenue, Hollywood Hills, FL 33021. Remember, this is not a QSL manager. Your return card will be sent from Venezuela. Therefore, include sufficient IRCs for the return trip from there.

### Arnie Coro, CO2KK Visits Stateside

Just as I was finishing up this column I received a call from Ted Goldthorpe, WA4VCC, advising me that Arnie Coro, CO2KK, was in Chapel Hill, North Carolina, as a guest of the Dean of the School of Journalism at the university. I placed a call to Arnie at his hotel and had a wonderful hour-long chat with him. Out of the conversation I made plans to invite him to the Central States VHF Society conference this month. As of this writing many aspects of his trip have to be worked out. If I have positive word on Arnie coming to the CSVHF conference, I will release that information via the VHF nets and newsletters, as well as through the CSVHF mailing.

Arnie advised me that there is a group of amateurs in Cuba concentrating on VHF+

activities. He told me of their plans to operate the VHF contests this summer, so expect to see them active during this month's contest.

Arnie also told me that his *Callbook* address is good. However, mail sometimes takes months to reach him. Therefore, he is way behind on the news. He often will get with his QSL manager, Joe Schroeder, W9JUV, and if Joe has the time, have him read the latest magazines over the air.

If you are waiting for a QSL card from Arnie, please be patient. When Joe has a contact with Arnie, he will go over the cards he has received in the order they were acquired. Arnie verifies the contact over the air and then Joe sends out the card. It is a bit tedious. However, for the time being, this must be the way things work. Remember what I said above about waiting for QSL cards from DX stations.

### UK Six Metre Group Looking For Members

Are the low sunspot numbers getting you down? Are you starved for good 6 meter news? Well, if the answer to either question is yes, then you need to join the UK Six Metre Group. This organization, more than 800 strong, provides the best in-depth information concerning 6 meter activity worldwide. For only \$22.00 per year you will receive their quarterly newsletter, "Six News," which is stuffed full of information pertaining to the "Magic Band." For your membership send to Mr. C. S. Gare, Secretary UKSMG, "Old White Lodge," 183 Sycamore Road, Farnborough,

Hampshire, England, United Kingdom. Please make out your check in U.S. funds to UK Six Metre Group.

### Ed Dougherty, W3WN Silent Key

Ed Dougherty, W3WN, of Frederick, Maryland, became a Silent Key on December 21, 1992 at the age of 84. Ed was for many years the net control operator for the Maryland-Ohio SWOT net. An active VHF+ operator, he was always ready to help the new operator to these frequencies. He will be missed by many who participated in the SWOT net, as well as by his fellow VHF operators.

### And Finally

With this column I conclude my second year as your VHF Editor. I can hardly believe that the time has passed so quickly. And the amount of support you have given me with this, your column, is incredible. This month I would like to thank the "West Coast VHFer," Auto Call, and so many of you who send me reports of your activities.

While you read this, I am working on the September column. For inclusion of your material in that issue, I must have it by 1 July, so keep those reports coming. Remember, you can now FAX them. Either call 405-528-6625 to speak to me, 405-528-0746 to FAX me, or CompuServe and leave an E-mail message to user number 72124,2734.

Until next month . . .

73, Joe, N6CL

# YAESU

The advertisement displays a collection of Yaesu radio equipment. At the top center is the brand name 'YAESU'. Below it are several models: FT-747 (a desktop transceiver), FT-890 (a desktop transceiver with a digital display), FT-2400 (a desktop transceiver with a digital display), FRG-8800 Receiver (a desktop receiver with a digital display), FT-5200 (a desktop transceiver with a digital display), FT-1000 D (a desktop transceiver), FT-23R (a handheld transceiver), FT-415 (a handheld transceiver), and FT-530 (a handheld transceiver).

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- SWR Protection** -- prevents amplifier damage if you switch to wrong band, use wrong antenna or have high SWR
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- Extremely quiet** -- low speed, low volume fan is so quiet you'll hardly know it's there, unlike noisy blowers used in other amps
- Very Compact** -- 6 x 9 1/2 x 12 inch amplifier takes up less desktop space than your transceiver and weighs about the same -- only 12 1/2 pounds
- Illuminated Cross-Needle SWR/Wattmeter** -- lets you read SWR, forward and reflected peak power simultaneously
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- Front Panel ALC Control** -- exclusive Ameritron feature -- convenient front panel control lets you adjust your output power
- Transmit, ALC, SWR LED indicators** -- keeps you informed
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- Illuminated Cross-Needle Meter monitors voltage and current of 50 VDC line
- Extremely quiet fan
- Very compact 6 x 9 1/2 x 12 inches -- can be placed conveniently out-of-way
- Wired for 120 VAC, supplies 50 VDC at 25 amps to ALS-600 amplifier
- Also use on 100-130 VAC and 220-250 VAC, 50/60 Hz
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Suggested Retail

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- Very Compact** -- just 3 1/2 x 9 x 15 inches -- fits in nearly any mobile installation; weighs only 7 pounds, that's less than some mobile HF transceivers
- Extremely quiet** -- quiet low speed, low volume fan stays off and silent until temperature rises
- Output Power** -- 600 Watts PEP, 400 Watts CW
- Continuous Coverage** -- 1.5 to 22 MHz; 10/12 Meters with easy-to-install optional kit
- Load Fault Protection** -- disables and bypasses amplifier if antenna has excessively high reflected power or if bandswitch is set lower than exciter frequency -- virtually eliminates damage because of operating error; has Load Fault LED indicator
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amplifier if temperature is excessively high; automatically resets when temperature drops to safe level; has Thermal Overload LED indicator

- Excellent harmonic suppression** -- multiple section output network and push-pull output circuit gives excellent harmonic suppression
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# WASHINGTON READOUT

REGULATORY NEWS IN THE WORLD OF AMATEUR RADIO

BY FREDERICK O. MAIA, W5YI

## Teaching and Testing The Amateur Radio Class

One of the greatest rewards in amateur radio comes when you attain enough proficiency to be able to train and examine others so they can participate in the world's greatest pastime, amateur radio! It's like paying back the hobby for all the enjoyment that it has given you. Teaching an amateur radio class is not at all difficult. And there are all sorts of teaching aids available to instructors. Here are some of the common questions we are asked about amateur radio education and examinations.

**Q.** I have heard that if you teach an amateur radio class, then you can't be one of the examiners. Is that correct?

**A.** While it is not illegal for instructors to also be VEs, it is a good idea to have amateur radio classroom students examined by volunteer examiners who did not teach the class. FCC regulations, see §97.515(b), prohibit volunteer examiners from furnishing applicants with any publications that will be used to prepare them to pass an amateur radio license examination. Teachers who participate in administering the class ending test are, of course, VEs if they certify the examinee's Form 610 Amateur Radio Operator application.

The FCC rules do not permit VEs to own or work for a company that makes or distributes amateur radio equipment and training materials, or to distribute publications used to prepare students for FCC amateur radio tickets. On the surface, it appears that the original thinking behind this regulation was to prevent VEs from selling amateur gear and study material in exchange for a passing test mark, but that is not what the rule says. It really needs to be reworded!

This badly written regulation has become very controversial in the amateur radio teaching community, as it singles out teachers—who historically educate and then examine their pupils—as being in violation of the FCC's conflict of interest requirements when they do exactly that. We believe it is absurd to routinely preclude otherwise qualified teachers who pass out lesson materials

from taking part in the final exam, but that's the rule according to a recent FCC interpretation given us of §97.515(b)!

Let's face it. Most amateur radio instructors and "Elmers" are very likely to furnish students with study guides, frequency charts, and other license preparation aids. If they do, they legally can't be a VE to their students. And we are told it makes no difference if the materials are provided by the instructor at no profit or even no cost. The FCC has taken the position that VEs simply cannot distribute amateur radio license preparation "publications" to examinees, period! (By the way, an "Elmer" is amateur jargon for a licensed amateur who coaches an apprentice in amateur radio practices, electronics, and rules.)

There is a way around this questionable rule, however. Simply have someone other than the teacher and VEs provide and pass out the study materials if the teacher is to be one of the examiners. There is no prohibition that says an amateur radio instructor cannot be a VE, only that he or she can't furnish the license preparation publications.

**Q.** I have been appointed training officer for our amateur radio club. How do I get a class started?

**A.** You will need to do some organizing! Beside students, of course, you will

need one or more instructors, training materials, a place to hold the classes, and a way to test your students for their amateur tickets at the end of the class. Most amateur radio license classes are held one or two evenings a week over several weeks, or during a weekend for a longer period at one time.

Check with your local board of education. You may be able to use a school room or a local college class room. In addition, many utility companies allow the public to use their cafeterias and/or meeting rooms to hold amateur radio classes, which they consider to be in the public interest. If your class is profit making, which is legal, then the teacher should not participate in the testing.

Novice classes usually are held for shorter time periods during evening hours over several weeks. This is because Morse code training requires practice and cannot be acquired during a single weekend. The Codeless Technician ticket, however, adapts very well to weekend instruction—for example, all day Saturday and Sunday—since there is no telegraphy requirement. You should, however, arrange for your students to receive pre-study materials to read prior to attending the actual formal classes. The weekend classes in reality become review sessions where

Saturday (8 AM to 5 PM)				
Subelement	Novice	Tech	Total	Time
1. FCC Rules (15)	113	55	168	4 hours
2. Operating Procedures (5)	35	41	76	1 <sup>3</sup> / <sub>4</sub> hours
3. Radio Wave Propagation (4)	12	33	45	<sup>3</sup> / <sub>4</sub> hour
4. Amateur Radio Practices (8)	44	53	97	1 hours
<b>Total Saturday:</b>				<b>8 hours</b>
Sunday (8 AM to 50 PM)				
Subelement:	Novice	Tech	Total	Time
5. Electrical Principles (6)	44	22	66	1 hour
6. Circuit Components (4)	23	25	48	1 hour
7. Practical Circuits (3)	24	11	35	1 hour
8. Signals & Emissions (4)	22	22	44	1 hour
9. Antennas & Feedlines (6)	33	33	66	1 hour
Amateur Radio Testing				2 hours
<b>Total Sunday:</b>				<b>8 hours</b>
<b>Total Saturday/Sunday Hours:</b>	<b>350</b>	<b>295</b>	<b>645</b>	<b>16 hours</b>

Table 1—Lesson plan for two-day (16 hour) review session of the Codeless Technician Class license requirements, including conducting the course ending examinations. The figures in parentheses after the subelement represent the number of syllabus question topics.

National Volunteer Examiner Coordinator, P.O. Box 565101, Dallas, TX 75356-5101 (817-461-6443)



your instructors will be going over the actual questions on the Novice and Technician examinations.

There are nine topics on which your students will be tested. They begin with FCC Regulations and they end with Antennas and Feedlines. The new No-Code Technician Question Pool has exactly 645 questions—350 Novice and 295 Technician questions. See Table I for a breakdown of the recommended instruction time for each sub-element during a weekend. One hour is allowed for breaks and lunch.

**Q.** Where do I get the training materials for the instructors?

**A.** It is very important that you keep the class fast paced and interesting! There are many good visual demonstrations that you can give in conjunction with your class. We strongly recommend two video (VHS format) presentations. One is called "Ham Class" (\$19.95) by Gordon West, WB6NOA; the other is the "No Code Video Seminar" by Frank Muto, KE2WH (\$21.95). Both may be obtained by telephoning 1-800-669-9594; VISA and MasterCard accepted.

The "Ham Class" video tells instructors step-by-step how to conduct a fascinating amateur radio training class. In addition, the presentation contains many exciting live-action demonstrations that can be presented to your students to make radio theory more interesting, fun, and easier to understand.

The feature-length "No Code Video Seminar" divides the Technician Class into nine topics, each about 10 minutes long. Each video section provides a good opening into the various questions on that particular subelement.

In addition, many manufacturers have promotional materials such as coupons, frequency charts, maps, newsletters, catalogs, etc., available at no cost to be distributed to training classes. Check with some of the equipment manufacturers for availability of such items.

Both the American Radio Relay League (203-666-1541) and the National Amateur Radio Association (1-800-468-2426) supply instructors with free handouts such as brochures and other publications of interest to the newcomer. The W5YI Group (817-274-0400) is also in the process of putting together a free instructor's package.

There is plenty of free stuff available from amateur radio equipment manufacturers and associations, and there simply is no reason why your class should not be exciting and top notch!

**Q.** What about study manuals for the students?

**A.** First, you'll have to decide whether you want a theory-oriented or a ques-

tion-oriented study guide. The first is slanted towards learning electronic principles, the other towards passing the license exam. There are several of each variety on the market. Whatever format you decide on, be very certain that you obtain study manuals that contain the new July 1993 Novice and Technician questions. All of the Element 2 and 3(A) questions (that's right, 100%) were changed or revised in some way last December and will start showing up in all examinations administered after June 30th. Be sure your manuals clearly state they are for examinations admin-

istered between July 1, 1993 and June 30, 1997.

The four best-selling No-Code Technician study manuals are published by the Ameco, NARA, Gordon West/WB6NOA, and the ARRL. We estimate that 95% of all Technician license preparation manuals sold today are one of these four. They all retail for \$9.95, except the League's, which is \$19.00. The two best sellers are undoubtedly the ARRL's *Now You're Talking* and the Gordon West *No Code Technician Plus*. Each sold tens of thousands of copies of their previous edition. The ARRL and

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<p><b>CALL US FOR ALL YOUR COMPONENT NEEDS</b></p>	<p><b>Soldering Station Temperature Controlled SL-30 \$99</b></p> <p>Digital Display              Temp Range:              300F-900F              Grounded Tip              Overheat Protect</p>	<p><b>Video Head Tester HT-200 \$44.95</b></p> <p>Tells you if VHS head is defective or worn.</p>	<p><b>Digital Multimeter w/ Inductance &amp; Capacitance \$75.00 LCM-1850</b></p> <p>Ten Functions  <i>by Elenco</i></p>	<p><b>Color Convergence Generator SG-250 \$89.95</b></p> <p>Kit \$69.95              Finest in the industry              10 rock steady patterns              RF &amp; video output</p>													
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<p><b>Sweep/Function Generator with Freq. Counter \$259</b></p> <p>Elenco Model GF-8026</p> <p>Sine, Square, Triangle, Pulse, Ramp              .2 to 2MHz, Freq Counter .1-10MHz              Internal Linear &amp; Logic Sweep</p>	<p><b>Function Generator \$9600 \$28.95</b></p> <p>Provides sine, triangle, square wave from 1Hz to 1MHz              AM or FM capability</p> <p><b>Kit \$26.95</b></p>	<p><b>XK-500 Digital / Analog Trainer</b></p> <p>A complete mini-lab for building, testing, prototyping analog and digital circuits. Elenco's Digital/Analog Trainer is specially designed for school projects, with 5 built-in power supplies. Includes a function generator with continuously variable, sine, triangular, square wave forms. All power supplies are regulated and protected against shorts.</p> <p><b>Power Supplies</b></p> <ul style="list-style-type: none"> <li>■ Variable Power Supply</li> <li>■ +1.25 to 20VDC @ 5 Amp (+1.25 to 15VDC @ 1 Amp)</li> <li>■ -1.25 to -20VDC @ 5 Amp (-1.25 to -15VDC @ 1 Amp)</li> <li>■ +12VDC @ 1 Amp</li> <li>■ -12VDC @ 1 Amp</li> <li>■ +5VDC @ 1 Amp</li> <li>■ 30VAC Center tapped @ 15VAC at 1 Amp</li> </ul> <p><b>Analog - Section</b></p> <ul style="list-style-type: none"> <li>■ Function Generator Sine, Triangular, Square wave forms</li> <li>■ Frequency adjustable in five ranges from 1 to 1000Hz</li> <li>■ Fine frequency adjust</li> <li>■ Amplitude adjust</li> <li>■ DC offset</li> <li>■ Modulation FM-AM</li> </ul> <p><b>Digital - Section</b></p> <ul style="list-style-type: none"> <li>■ Eight data switches</li> <li>■ Two re-bounce logic switches</li> <li>■ 8 LED readouts TTL buffered</li> <li>■ Clock frequency 1 to 1000Hz</li> <li>■ Clock amplitude 5VPP square wave</li> </ul> <p><b>Breadboards \$159.95</b></p> <ul style="list-style-type: none"> <li>■ 2 breadboards, each contain 840 tie points (total 1,680)</li> </ul> <p><b>Assembled \$129.95 Kit</b></p>															
<p><b>Learn to Build and Program Computers with this Kit Model MM-8000 \$129.00</b></p> <p>Includes: All Parts, Assembly and Lesson Manual</p> <p>Starting from scratch you build a complete system. Our Micro-Master trainer teaches you to write into RAM, ROMs and run a 8085 microprocessor, which uses similar machine language as IBM PC.</p>	<p><b>Elenco Wide Band Signal Generators</b></p> <p><b>SG-9000 \$129</b>              RF Freq 100K-450MHz AM Modulation of 10KHz Variable RF output</p> <p><b>SG-9500 w/ Digital Display &amp; 150 MHz built-in Counter \$249</b></p>																

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Gordon West Technician study manuals each contain a Form 610 amateur radio application, which is an advantage to those taking the exam after studying the book.

The National Amateur Radio Association and the American Radio Relay League both have editorial chapters followed by the questions. The *Now You're Talking* textbook has a new rather novel fold-back answer key which also indicates a page reference for each question. NARA's *How to Earn Your No-Code Ham License* manual has the question reference numbers indicated right in the

text. Still, in both manuals you have to hunt for the explanations.

The two most popular question-oriented study manuals are the *Ameco Technician Manual* and the Gordon West *No Code Technician Plus* textbook. These study guides both have a short answer explanation right after the question. The Gordon West *No Code Technician* is much more comprehensive than the Ameco and contains many extra chapters on taking the test, learning the code (yes, even though a no-code book, it covers learning CW!), and more! The *No Code Technician Plus*

study guide also has the most pages of all the \$9.95 textbooks.

Frankly, I prefer a short answer explanation right after the question. It certainly eliminates a lot of going back and forth between the question and finding the explanation and greatly cuts study time! The W5YI Group is a license preparation material dealer for all publishers, and we have elected to take a big position on the Gordon West/WB6NOA *No Code Technician Plus* 240-page study manual.

The W5YI Group will be launching a new instructor program, so if you are an amateur radio class teacher, or would like to be, let us know so you can get on our list to get our "Instructor's Newsletter." To help amateur radio classroom teachers get going, we will be offering a 10% discount when five or more "No Code Technician" manuals are purchased, and 25% on ten or more. That brings the cost down to \$8.95, and to \$7.49 when ten or more are ordered. Furthermore, we will take back unused books if you over-estimate the size of your class. Call 1-800-669-9594 for complete details on the new W5YI Group instructor program.

**Q.** How does learning about amateur radio using a computer compare with learning from a textbook?

**A.** If you have a PC, computer-aided-instruction is the ideal way to self-study both the written examinations and to learn the Morse code and build speed. There are several good ones on the market. A big advantage is that they allow you to take sample examinations right at the computer keyboard, and these are automatically scored, or you can print out actual exams.

Our "No Code Ham Radio" software package (\$29.95 at all Radio Shack stores or may be ordered by telephone) also immediately displays the answer explanation if you answer the question wrong. Even the schematic diagrams appear on screen. You will know when you are ready to pass the No Code Technician exam because your computer will tell you so!

But be very careful about purchasing shareware computer exam software. None of the ones we reviewed at the Dayton HamVention this past April had the new questions. And no one knew what we were talking about when we asked about them!

There is more good CW software on the market than written examination preparation programs. Very few people today use audio cassette courses to learn Morse code if they have a PC. The good computer programs teach code from ground zero, generate random characters, text, and even properly constructed FCC/VEC tests.

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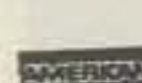
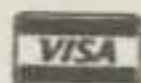
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Different programs have different speed-building techniques; all have their advantages and disadvantages. Overall, they seem to work, however! Some keep a journal of your errors and automatically make adjustments in future transmitted code to give you more practice on your weaknesses! Most CW programs will send perfect code at any frequency, speed, and spacing, some using plug-in ADLIB-compatible sound cards such as Soundblaster or the low-priced external Disney Sound Source firmware.

**Q.** We understand that we will no longer be able to test Novices, since beginners must be examined at a VEC test session.

**A.** I don't know how this rumor got started, but it is simply not true. We have covered this before, but it keeps reappearing. Here are the facts.

Yes, Novice testing—the need of which is now greatly diminished due to the popularity of the code-free Technician class—is scheduled to be folded into the VEC system shortly. This is being done for many reasons, primarily to improve communications between the FCC and the testing community and to eliminate many of the errors that appear on Novice applications. VEC applications contain very few errors (less than one in a hundred) since they must be screened by VECs trained in proper application handling.

The error rate in the Novice program is around 10 percent. Less errors will result in Novice operator licenses being issued faster, since the Form 610 will not have to be returned for correction. In the VEC system the FCC deals with a relatively few VE coordinators who in turn notify their exam teams of changes. It is just more efficient.

General Class examiners presently are authorized to examine Novices. Advanced Class VEs may test Technicians. All other amateur operator classes must be tested by amateur Extra Class level VEs. This will not change. What will change is that examiners who test Novices will have to register (or be accredited) by a VEC so that the coordinator may provide the VE with the proper testing materials and instructions. There probably will be a test fee, just as there is for all other amateur classes. And it will take three, instead of two, examiners.

We (the W5YI-VEC) plan to provide all VEs (General Class and higher) who wish to examine beginners with an (IBM-PC) computer disk at no cost with which they may easily generate properly constructed examinations or even conduct the exam right at the computer keyboard.

Novice-level examiners will still be

able to teach and test applicants just as they have always done. And newcomers and students will not have to be sent to another VEC test session to be examined. Basically, there is very little change. The idea is to improve Novice testing, not make it more difficult for applicants and examiners alike.

If you hold a General or higher class amateur operator license, you may wish to apply to become a VE. Simply request a VE application from: W5YI-VEC, P.O. Box 565101, Dallas, TX 75356. Once received, we will send you back your credentials by return mail. There is no cost (unless you wish a wall certificate: \$1.00).

**Q.** We use two teams of VEs, one for telegraphy testing and another to administer the written examinations. Who certifies the Form 610 when more than three VEs administer the tests?

**A.** Apparently this is more common than first thought. More and more VE teams are simultaneously using more than one examination room, especially when school classrooms are used for testing. One room is used for code, another for the theory. Separate code testing permits faster exam sessions and the CW transmissions don't bother those taking written tests.

The problem is that only three spaces are provided on the Form 610 for VEs to certify test results, however, and applicants are frequently tested in both code and theory. It is very important that the VEs who certify the applications have supreme confidence in the actions of all of the examiners, since the VEs who approve the applications are the ones responsible for the test results.

Most test sessions use only one examination room, however, and alternate between code and theory portions. The code portion is divided into 5, 13, and 20 WPM sections. Those examiners who have only the use of one room may wish to consider the use of personal tape players for each of the examinees.

Radio Shack's Stereo-Mate tape player (Realistic Part No. 14-1065) is only 3 by 4 inches and 1 inch thick. The price is \$19.95 (\$15.00 when on sale). Couple this tape player with Radio Shack's \$5.95 Nova-34 headset and you have an ideal way to simultaneously administer a code test to individuals in the same room where examinees are also taking written exams and code tests at other speeds. A side advantage is that each tape player may be individually adjusted, since each has its own volume control. The cost of these tape players and headsets may be reimbursed from test fees.

These tape players are especially useful when examining at hamfests and conventions. VE teams purchase a half-dozen or more of these tape players and simply snap in an audio cassette code test tape and hand it to the examinee. The tape player is returned to the VE team when the examinee turns in his or her answer sheet. The code test tape can easily be generated using a personal computer—only one test to a tape.

The W5YI-VEC office distributes telegraphy test generating software to our VE teams at no cost. The software does everything, including properly constructing a unique 5 minute code test containing all characters, ejecting a printed transcription for the VE team, a list of ten questions, and a blank answer sheet for the applicant to fill in.

The W5YI-VEC will be conducting testing at the Valley Forge (Pennsylvania) HamShow'93 on August 21 and 22 and will be using these tape players for its telegraphy testing. By the way, we will be offering continuous license examinations at Valley Forge. Applicants will simply walk in to the exam room at any time during the convention to take a test. No appointment needed, and the exam room is inside the convention area right above the commercial exhibit floor. See you there! 73, Fred, W5YI

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## THE SCIENCE OF PREDICTING RADIO CONDITIONS

### Sunspot Cycle Progress

The present solar cycle, the 22nd observed since accurate records have been kept, continues to decrease much as expected.

The Royal Observatory of Belgium reports a mean sunspot number of 70.5 for March 1993. This results in a 12-month running smoothed sunspot number of 80 centered on September 1992. This is a drop of four points from the previous month's level.

There was a corresponding decrease in the 10.7 cm radio solar flux level, as observed at Canada's Dominion Radio Astrophysical Observatory located at Penticton, BC. A level of 134 was reported for March 1993.

The various phases of a solar cycle, based on the 21 previously observed cycles, are arbitrarily defined as follows:

Phase	Smoothed Sunspot Range
Very Intense	Greater than 150
Intense	120 to 150
Very High	90 to 120
Moderately High	60 to 90
Moderately Low	30 to 60
Very Low	0 to 30

A smoothed sunspot number of approximately 58 is forecast for July 1993. This means that the present sunspot cycle has passed through its moderately high range and is now expected to enter the moderately low range. It is likely to remain in this range for approximately 18 months, before dropping into the very low phase of the cycle.

A corresponding 10.7 cm solar flux level of 116 is forecast for July 1993.

#### Annual Mean Sunspot Number For 1992

The Royal Observatory of Belgium has released the official final day-by-day sunspot count for 1992. The highest count, 238, was observed on February 1. The lowest count, 29, was reported on August 25. The annual mean sunspot number for 1992 was 94.3. While the solar cycle is measured by the 12-month smoothed sunspot numbers, the annual mean numbers closely follow the same pattern. The following are annual

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#### LAST MINUTE FORECAST

Day-to-Day Conditions Expected for July 1993

Propagation Index.....	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 9, 14, 17-18, 20	A	A	B	C
High Normal: 1, 7, 13, 19, 26, 28	A	B	C	C-D
Low Normal: 2, 5-6, 8, 10, 12, 15-16, 21, 23-25, 27, 29	A-B	B-C	D	D-E
Below Normal: 3-4, 11, 30-31	B-C	C-D	D-E	E
Disturbed: 22	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 (B) on July 1st, good-to-fair (B-C) on the 2nd, fair-to-poor (C-D) on the 3rd and 4th, good-to-fair (B-C) on the 5th and 6th, good (B) on the 7th, etc.

mean values reported during Cycle 22. These values are shown graphically in fig. 1.

Year	Annual Mean Sunspot Number
1985	17.9
1986*	13.4
1987	29.4
1988	100.2
1989**	157.6
1990	142.6
1991	145.7
1992	94.3

\*First year of Cycle 22.

\*\*Peak year of Cycle 22.

#### July Propagation

With long hours of daylight and the sun high in the northern sky, HF propagation conditions are generally more stable during July than at any other time of the year.

Twenty meters is expected to be the optimum band for long-distance propa-

gation during the month. The band is expected to remain open practically around the clock to one area of the world or another, with peak conditions forecast for several hours after local sunrise, and again during the late afternoon and early evening hours. Fifteen and 17 meters are forecast to open fairly frequently during the late afternoon hours, especially on more or less north-south paths. A few 10 and 12 meter openings should also be possible during the afternoon hours, mainly to southern and tropical areas.

During the hours of darkness, 20, 30, and 40 meters are expected to open to many areas of the world, but seasonally high static levels may often make DX reception difficult on 40 meters. High static levels are also expected to result in somewhat poorer DX conditions on 80 meters, although some long-distance openings are forecast during the hours of darkness. Not many DX openings are predicted for 160 meters during July because of seasonally high levels of static and solar absorption.

This month's column contains detailed Short-Skip Propagation Charts valid for July and August 1993, as well as charts centered on Hawaii and Alaska. The Short-Skip Charts contain forecasts for openings between 50 and 2300 miles. For detailed DX forecasts over greater distances refer to the DX Propagation Charts for July, which appeared in last month's column. For an assessment of day-to-day conditions expected during the month, see the Last Minute Forecast which appears at the beginning of this column.

#### Short-Skip Openings

July is generally the month in which sporadic-E ionization is most intense. This should result in a considerable increase in short-skip openings on almost all of the HF amateur bands, and on 6 and 2 meters as well.

Look for frequent short-skip openings on 10, 12, 15, and 17 meters between distances of 500 and 1300 miles. During the afternoon hours, skip may extend to beyond 2300 miles as a result of F-layer reflection. Short-skip openings should range between 250 and 2300 miles on



Annual Mean Sunspot Numbers-Cycle 22

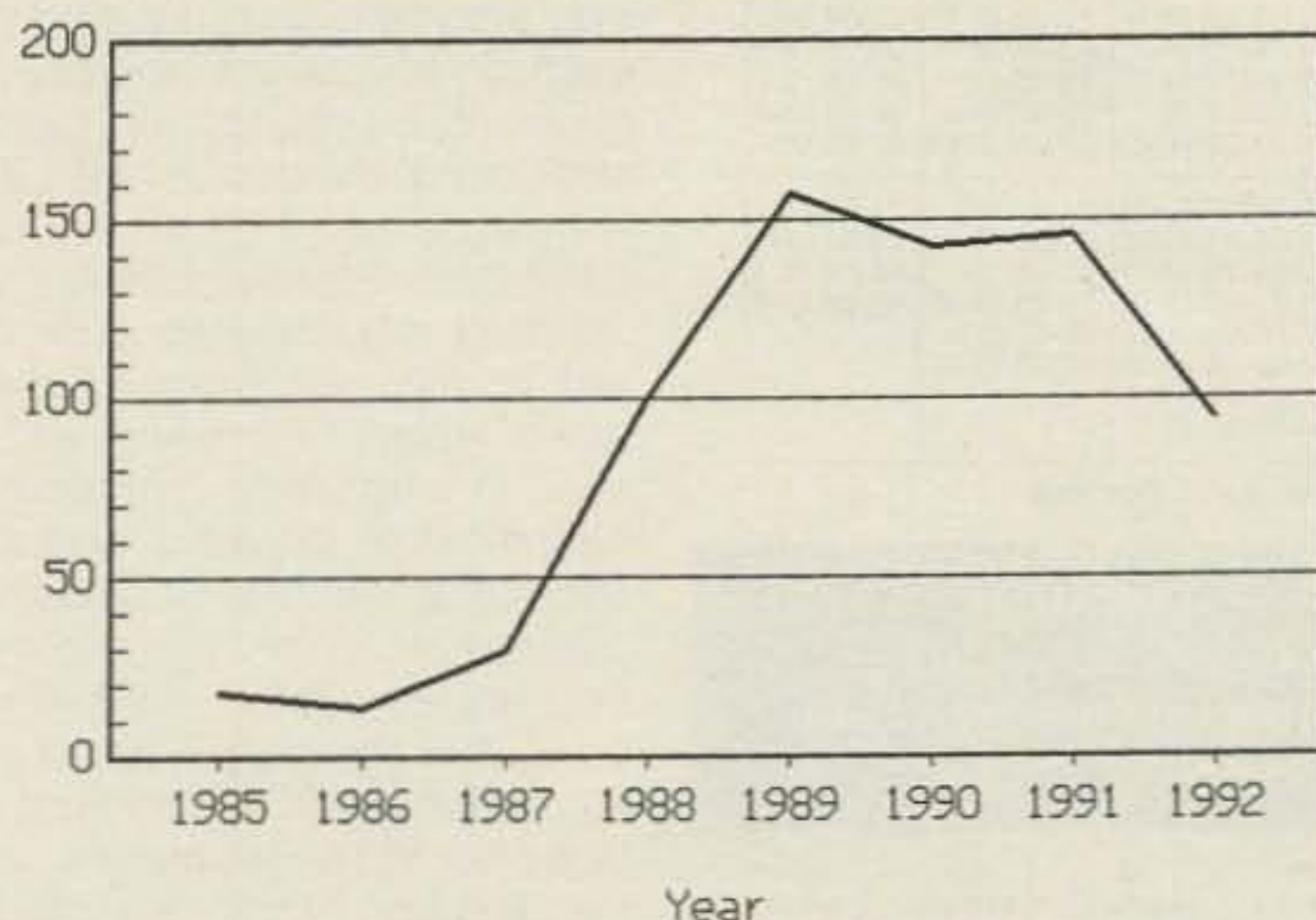


Fig. 1- Annual mean sunspot numbers for Cycle 22.

the 20 meter band. Peak conditions are most likely to occur during the late morning and again during the late afternoon and early evening hours, but openings could be possible at just about any time. Daytime openings on 40 and 30 meters should range between approximately 100 and 600 miles, increasing to between 250 and 2300 miles after sun-down. Look for openings up to about 300 miles on 80 meters during the daylight hours, extending out to the maximum short-skip (one-hop F-layer reflec-

tion) of 2300 miles during the hours of darkness. While no 160 meter ionospheric openings will be possible during the daylight hours of July, expect some openings between sunset and sunrise for distances up to approximately 1300 miles, and at times somewhat beyond this range. Seasonally high static levels will at times make reception difficult on 40, 80, and 160 meters.

### VHF Ionospheric Openings

Within the normal E-layer region of the ionosphere there frequently form "clouds" or "patches" of abnormally intense ionization which are capable of reflecting radio waves of frequencies much higher than those reflected by the regular E or F layers. These clouds usually take the form of thinly ionized areas covering a rather small geographical region approximately 50 to 100 miles in diameter. They occur more or less at random and are relatively short lived, usually dissipating within a few hours. This sporadic ionization usually occurs about 60 miles above the earth's surface at about the same height as the regular E layer. For this reason it is called *sporadic-E*, or  $E_s$ .

Although sporadic-E ionization has been studied by scientists and engineers for more than 40 years, its nature and origin still remain largely a mystery. However, some general characteristics about sporadic-E behavior are known.

Statistical studies show that a sharp increase in sporadic-E propagation takes place at mid-latitudes during the late spring and summer months. During July and August short-skip propagation over distances as great as 1400 miles should be possible in the northern hemisphere for approximately 65% of the time on 15 meters, 35% of the time on

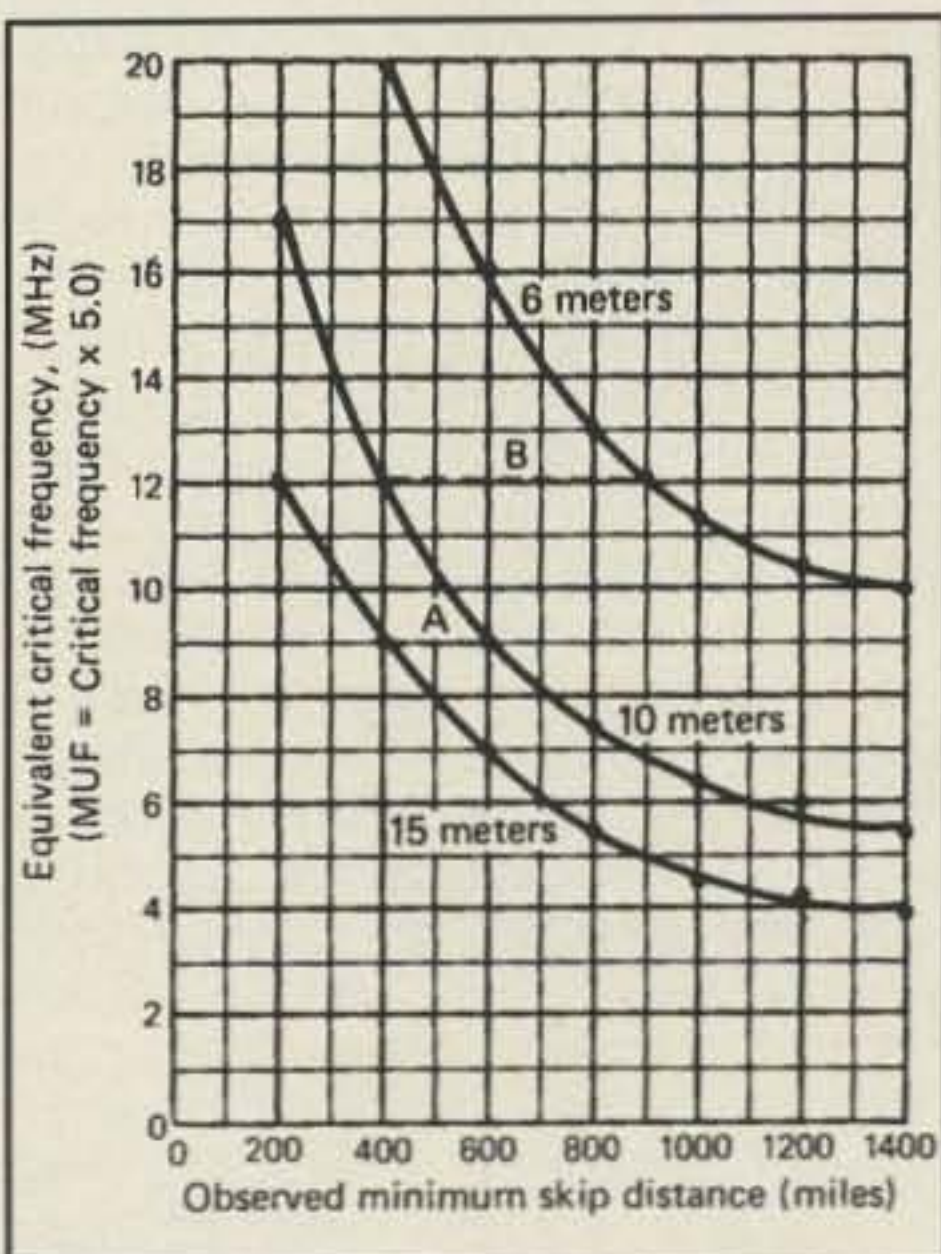
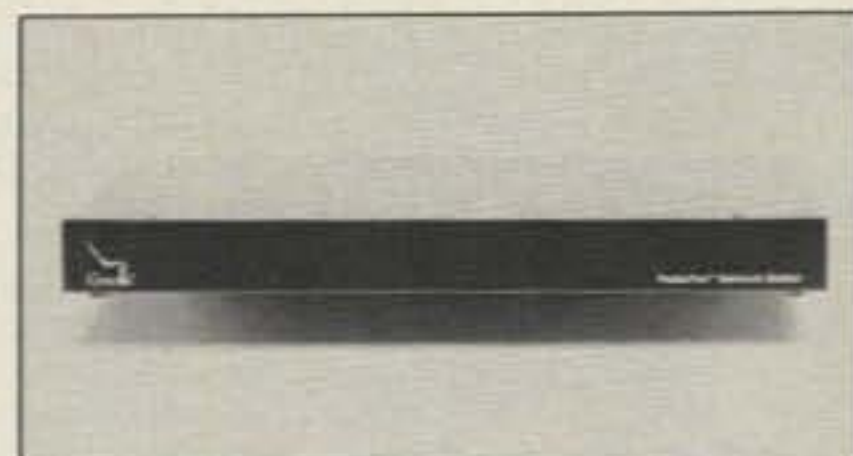


Fig. 2- Observed minimum skip distance versus equivalent critical frequency. (A) and (B) are examples. (A) Minimum skip distance of 400 miles observed on 15 meters; 10 meters should be open with skip greater than 600 miles; no 6 meter opening. (B) Minimum skip distance of 400 miles observed on 10 meters; 6 meters should be open with skip greater than 900 miles.

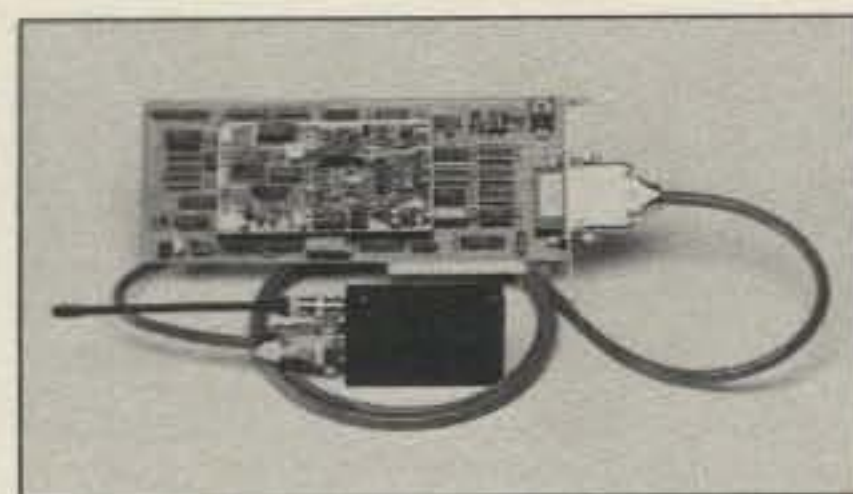
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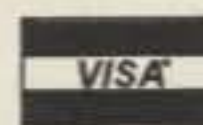
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### HOW TO USE THE SHORT-SKIP CHARTS

1. In the Short-Skip Chart, the predicted times of openings can be found under the appropriate distance column of a particular meter band (10 through 160 meters) as shown in the left-hand column of the chart. For the Alaska and Hawaii Charts the predicted times of openings are found under the appropriate meter band column (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 July & August 1993 Local Daylight Savings Time At Path Mid-Point

Band (Meters)	Distance Between Stations (Miles)			
	50-250	250-750	750-1300	1300-2300
10	Nil	08-10 (0-1)* 10-14 (0-3)* 14-18 (0-1)* 18-22 (0-2)* 22-00 (0-1)*	08-10 (1)* 10-14 (3)* 14-18 (1-2)* 18-22 (2-3)* 22-08 (1)*	08-10 (1-0)* 10-14 (3-1)* 14-18 (2-1)* 18-22 (3-1)* 22-08 (1-0)*
15	Nil	08-10 (0-2)* 10-14 (0-3)* 14-18 (0-2)* 18-20 (0-3)* 20-22 (0-2)* 22-08 (0-1)*	08-10 (2)* 10-14 (3)* 14-18 (2)* 18-20 (3)* 20-22 (2)* 22-00 (1-2)* 00-08 (1)*	08-10 (2-1) 10-14 (3-2) 14-18 (2-3) 18-20 (3-4) 20-21 (2-3) 20-00 (2-1) 00-08 (1-0)
20	10-01 (0-1)*	07-10 (0-2)* 10-16 (1-4)* 16-21 (1-3)* 21-01 (1-2)* 01-07 (0-1)*	07-10 (2-3)* 10-17 (4)* 17-22 (3-4)* 22-01 (2-3)* 01-07 (1-2)*	07-10 (3-2) 10-16 (4-2) 16-17 (4-3) 17-22 (4) 22-00 (3) 00-01 (3-2) 01-07 (2-1)
40	08-12 (1-2)* 12-17 (2-4)* 17-21 (3-4) 21-23 (1-2) 23-08 (0-2)*	08-10 (2-4)* 10-12 (2) 12-17 (4-2) 17-18 (4-3) 18-21 (4) 21-23 (2-4) 23-05 (2-4) 05-08 (2-3)	08-10 (4-1) 10-17 (2-1) 17-18 (3-1) 18-21 (4-3) 21-05 (4) 05-06 (3-4) 06-08 (3)	08-18 (1-0) 18-21 (3-2) 21-06 (4) 06-08 (3-1)

80	07-12 (3-4) 12-16 (4-3) 16-22 (4) 22-05 (3-4) 05-07 (4)	08-10 (4-1) 10-12 (4-0) 12-16 (3-0) 16-18 (4-1) 18-20 (4-2) 20-22 (4-3) 22-07 (4) 07-08 (4-2)	08-10 (1-0) 10-16 (0) 16-18 (1-0) 18-20 (2-1) 20-22 (3-1) 22-05 (4) 05-07 (4-3) 07-08 (2-1)	08-18 (0) 18-20 (1-0) 20-22 (1) 22-04 (4-3) 04-05 (4-2) 05-06 (3-2) 06-07 (3-1) 07-08 (1)
160	18-19 (1-0) 19-20 (1) 20-22 (3-2) 22-00 (4-3) 00-06 (4) 06-08 (3-2) 08-09 (1) 09-10 (1-0)	19-20 (1-0) 20-21 (2-0) 21-22 (2-1) 22-00 (3-2) 00-04 (4-2) 04-06 (4-3) 06-08 (2-1) 08-09 (0-1)	21-22 (1) 22-01 (2-1) 01-04 (2) 04-06 (3-2) 06-07 (1) 07-08 (1-0)	21-23 (1-0) 23-01 (1) 01-06 (2-1) 06-07 (1-0)

\* Predominantly Sporadic-E Openings

### HAWAII July & August 1993 Openings Given in Hawaiian Standard Time #

	70 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	14-16 (1)	06-11 (1) 11-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	13-15 (1) 15-17 (2) 17-18 (3) 18-20 (4) 20-22 (3) 22-02 (2) 02-04 (3) 04-06 (2) 06-09 (1)	18-20 (1) 20-00 (2) 00-02 (1) 21-00 (1)†
Central USA	14-16 (1)	06-08 (1) 08-13 (2) 13-17 (3) 17-18 (2) 18-19 (1)	06-08 (2) 08-14 (1) 14-16 (2) 16-18 (3) 18-20 (4) 20-23 (3) 23-03 (2) 03-06 (3)	18-21 (1) 21-22 (2) 22-01 (3) 01-02 (2) 02-03 (1) 20-22 (1)† 22-00 (2)† 00-02 (1)†
Western USA	11-14 (1) 14-17 (2) 17-18 (1)	07-08 (1) 08-10 (2) 10-12 (3) 12-16 (4) 16-17 (3) 17-18 (2) 18-20 (1)	06-08 (4) 08-10 (3) 10-13 (2) 13-15 (3) 15-20 (4) 20-22 (3) 22-05 (2) 05-06 (3)	18-19 (1) 19-20 (2) 20-02 (4) 02-04 (3) 04-05 (2) 05-06 (1) 19-20 (1)† 20-22 (2)† 22-02 (3)† 02-03 (2)† 03-04 (1)†

# See explanation in "How To Use Short-Skip Charts" which appears in the box at the beginning of this column.

† Indicates best time for 80 meter openings.

For 12 meter openings interpolate between 10 and 15 meter openings.

For 17 meter openings interpolate between 15 and 20 meter openings.

For 30 meter openings interpolate between 40 and 20 meter openings.

Note: The Alaska and Hawaii Propagation Charts are intended for distances greater than 1300 miles. For shorter distances, use the preceding Short-Skip Propagation Chart.

### ALASKA July & August 1993 Openings Given in GMT #

	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	Nil	00-02 (1)	12-15 (1) 22-01 (1) 01-04 (2) 04-06 (1)	07-10 (1)
Central USA	Nil	21-00 (1) 00-03 (2) 03-04 (1)	13-16 (1) 22-00 (1) 00-03 (2) 03-05 (3) 05-06 (2) 06-08 (1)	08-12 (1)
Western USA	01-04 (1)	17-22 (1) 22-00 (2) 00-03 (3) 03-04 (2) 04-05 (1)	13-14 (1) 14-15 (2) 15-19 (3) 19-01 (2) 01-03 (3) 03-05 (4) 05-07 (3) 07-09 (2) 09-11 (1)	07-09 (1) 09-12 (2) 12-13 (1) 09-12 (1)†

10 and 12 meters, and about 10% of the time on 6 meters. Two meter openings may also be possible during periods of intense sporadic-E ionization. While sporadic-E propagation can occur at any time of the day or night, it appears to peak between 8 and 11 AM and 6 and 8 PM Local Standard Time.

Here's a tip that has worked out very well during past years for determining when 10 and 6 meters will open for short-skip sporadic-E propagation. The geometry of skywave propagation is such that as the skip distance decreases on 15 (or 10) meters, the highest frequency (MUF) that will be reflected by the sporadic-E cloud increases. By observing the minimum skip distance on 15 (or 10) meters, the MUF in the direction of the skip can be determined from fig. 2 with fairly good accuracy, as can whether or not 10 (or 6) meters is open and what the minimum skip distances are on these bands.

As an example (example B in fig. 2), the minimum skip heard on 10 meters in a southwesterly direction is observed to be 400 miles (it is the distance to the nearest skip station heard that counts in this case, not the farthest station heard). The intersection between 400 miles observed minimum skip distance and the 10 meter curve corresponds to a critical frequency of 12 MHz, or an MUF of 60 MHz, since the MUF is approximately equal to the critical frequency multiplied by a factor of 5. This means that the MUF is high enough for 6 meter (50 MHz) short-skip openings in a southwesterly direction. The minimum skip distance on 6 meters can be found from fig. 2 by locating the intersection between the 12 MHz critical frequency and the 6 meter curve. The resulting value of minimum skip distance is found to be 900 miles. A useful rule of thumb to remember is that when skip stations are heard less than 500 miles away on 10 meters, or less than 350 miles on 15 meters, the chances are very good that 6 meters will open in the same general direction as the minimum skip heard on these bands.

Check during the last few days of July for the possibility of meteor-scatter openings on the VHF bands. The *Delta Aquarids* shower is expected to take place then, with a predicted maximum meteor count on the order of 20 an hour.

July is a very poor month for Trans-Equatorial (TE) propagation, and few, if any, openings are expected by this mode.

Some VHF short-skip openings are likely to occur during auroral activity. Check the Last Minute Forecast for periods that are predicted to be Disturbed or Below Normal during July. These are the dates on which auroral VHF openings may occur. 73, George W3ASK



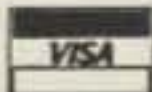

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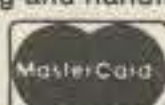
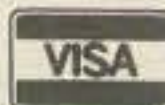
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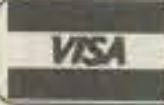
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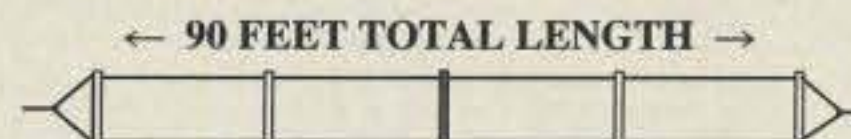
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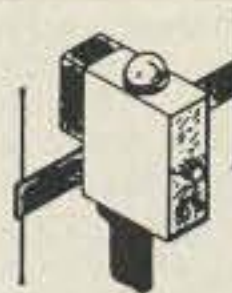
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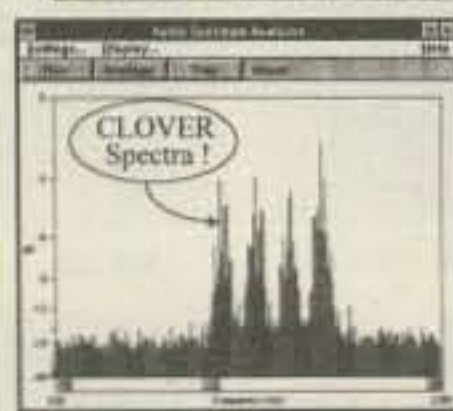
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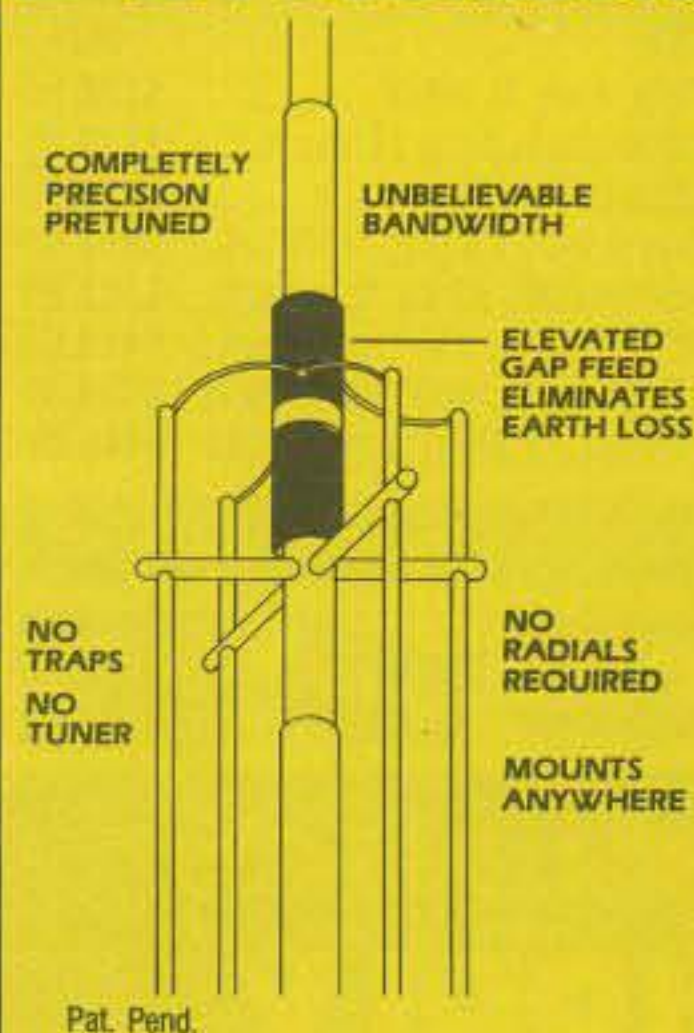
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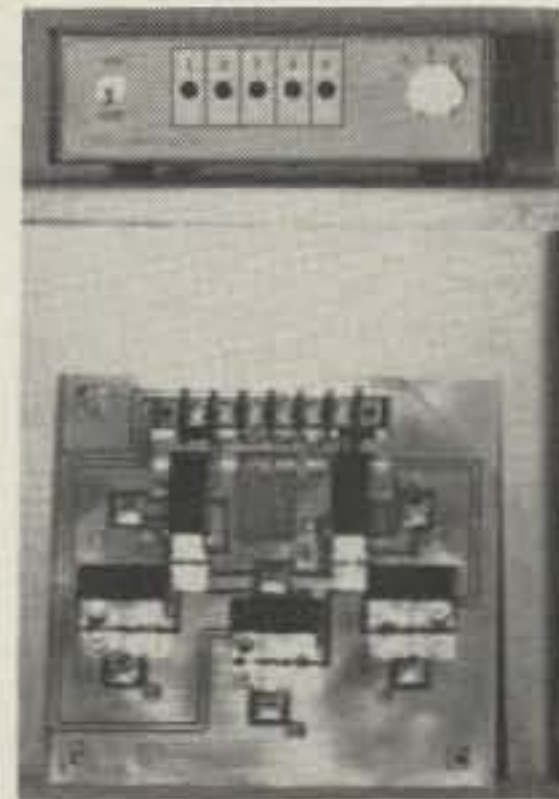
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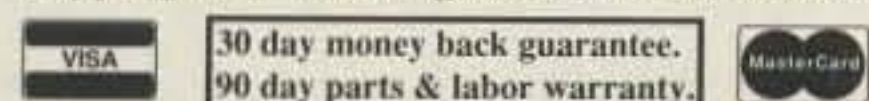
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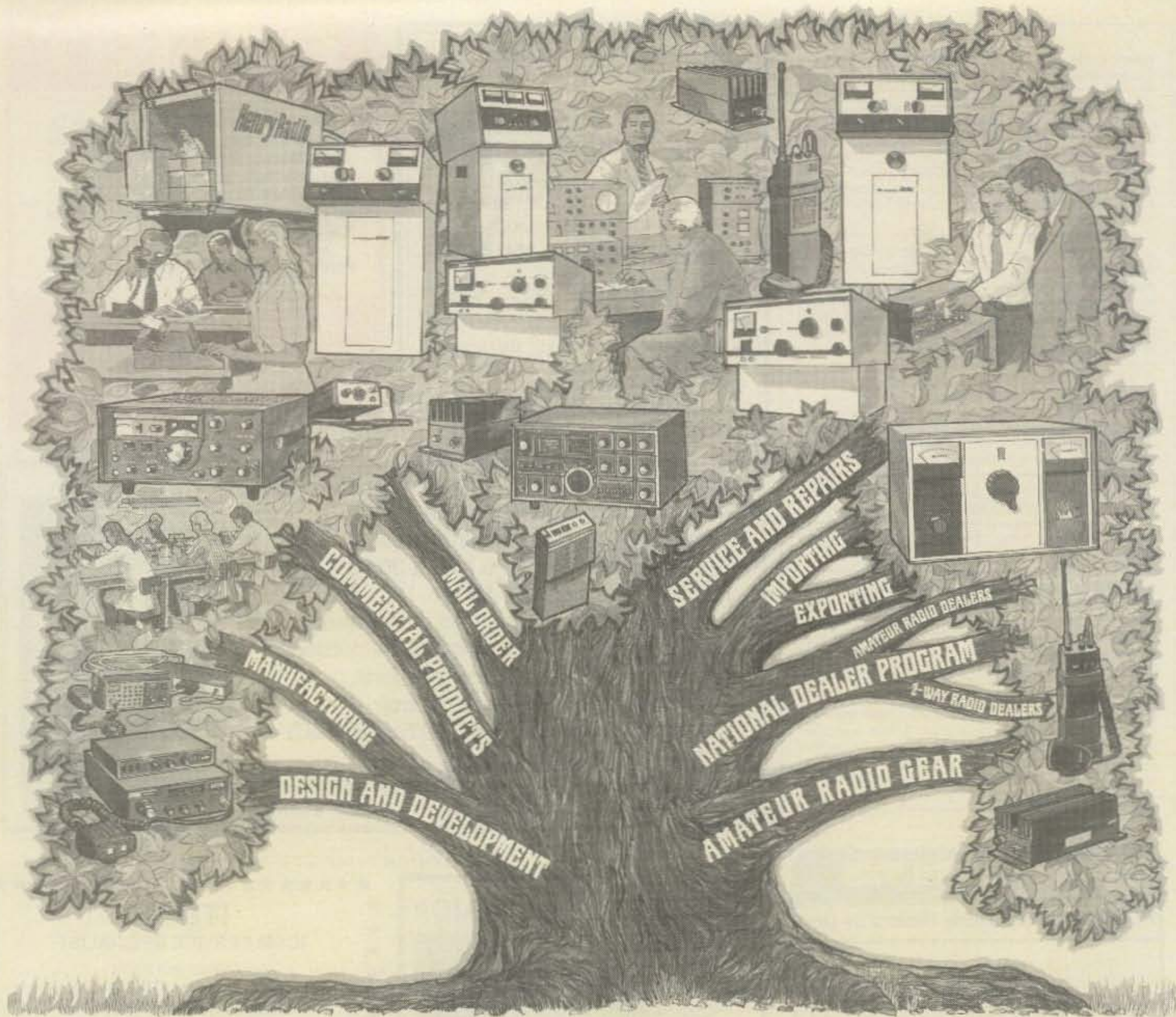
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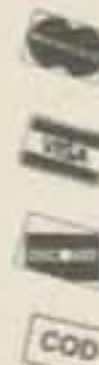
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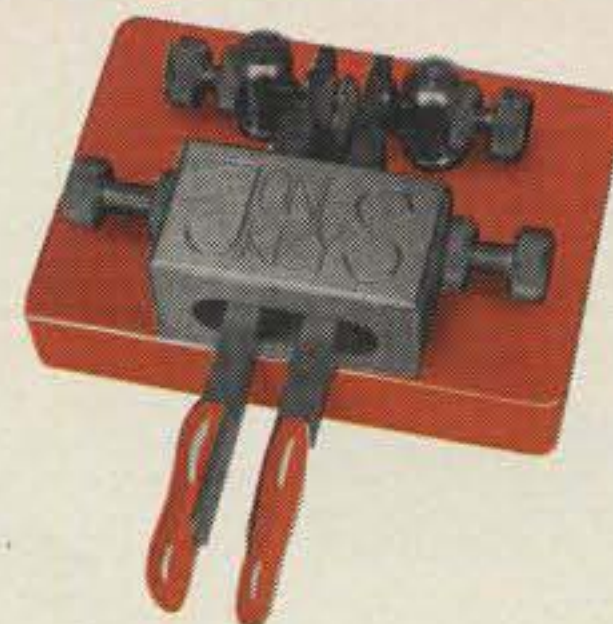
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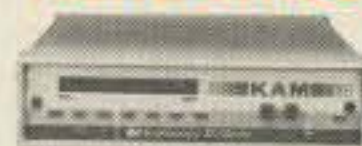
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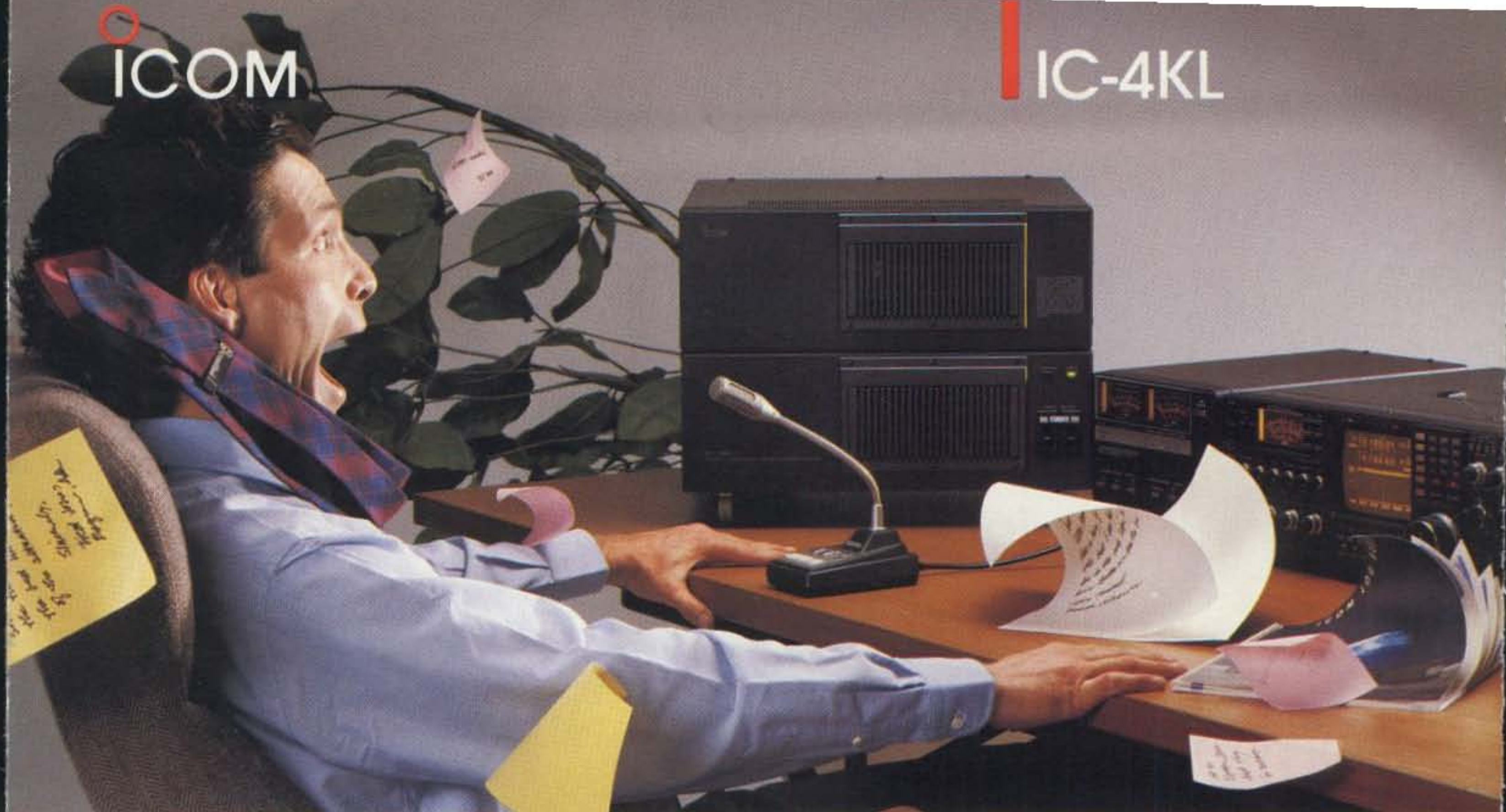
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 Experience the Quality<sup>®</sup>



# FT-2400 Military Spec'd TOUGH

## NOTHING COMPARES...

Whether you're roughing it on the tortuous dirt roads of the Baja 1000 or through the big city canyons, the ruggedly designed FT-2400 is built to take the abuse. In fact, the FT-2400 is the first and only amateur radio to be awarded a MIL-STD-810 rating for the shock and vibration. That's why Yaesu is the official radio of the Nissan off-road race teams.

Exceptional features are packed into the FT-2400 such as: ■ **LCD Display** — the largest display available on any 2 meter mobile ■ **Alpha Numeric** — for entering names or callsigns ■ **Backlit DTMF Microphone** — for making autopatch calls safely at night ■ **31 Memories** ■ **Odd Splits** — on any memory channel ■ **3 Selectable Power Level Outputs** — 50, 25 and 5 watts or user select ■ **Advance Track Tuning**



(ATT) — eliminates big city intermod ■ **Automatic Display Dimmer** — 4 levels ■ **FM Modulation** — for true voice clarity ■ **DTMF Selective Paging (optional)**.

Other features include: Wideband receiver coverage 140-174 MHz RX, 140-150 MHz TX • CTCSS encode built-in and selectable from the front panel • Five scanning functions: Band Scan, Limited Band Scan, Memory Scan, Memory Channel Lock-out with Selectable Scan Stops and Priority Scans • One piece die-cast construction with extra large heat sink • Automatic Repeater offset • Programmable call channel.

Options: DTMF coded squelch and paging (requires FRC-6 paging unit) • CTCSS Decode Unit (FTS-17A).

If you're serious about affordable communications, you'll want the FT-2400. Contact your Yaesu dealer today.



## YAESU

Performance without compromise.<sup>SM</sup>

One-Year Limited Warranty on all Amateur Radio Products.  
Specifications subject to change without notice.

Passed MIL-STD-810  
Shock and Vibration Test





"This FT-890AT is great in the field!"

"Yaesu did it again!"

## FT-890AT Compact HF Transceiver

- Automatic Antenna Tuner Hybrid High Speed Design Covers 160-10 meters
- I.P.O. Intercept Point Optimization
- DDS-Direct Digital Synthesis
- F.S.P. Frequency Shift Speech Processor
- General Coverage Receiver 100 KHz to 30 MHz
- Pass Band Shift and 30db Notch Filter
- Noise Blanker with Adjustable Pulse Width
- Built-In Iambic Keyer
- 32 Memories plus 20 VFOs
- FM Repeater Operation Automatic 10 Meter Repeater Offset w/Selectable CTCSS Encode
- All Mode Squelch
- DFCS-Duct Flow Cooling System
- **Accessories:**  
Contact your Dealer for full details.

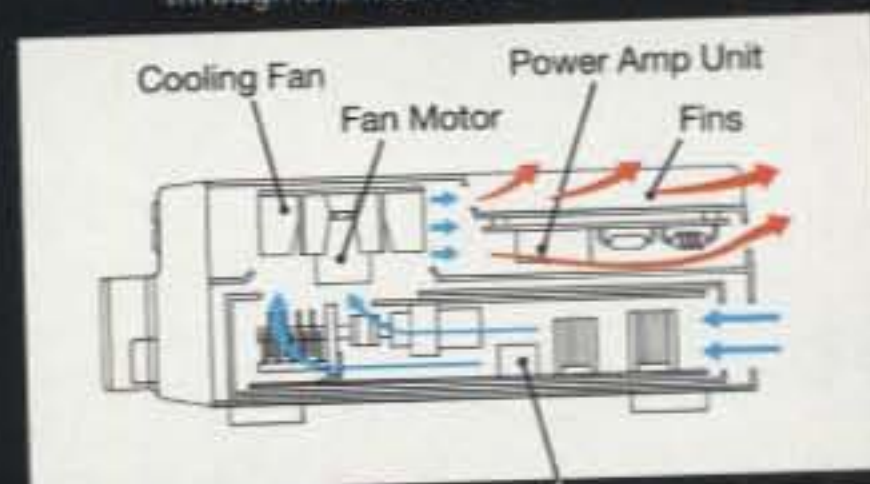
**F**ield days and contesting are challenging. We built the FT-890AT for times when you need the high performance of a base station – like the FT-1000 – but the practicality of a compact, rugged mobile. In fact, the FT-890AT is the mobile version of the FT-1000. Designed to be the world's smallest HF with a built-in antenna tuner, its superior receiving performance is a direct result of FT-1000 technology.

Since field work is demanding, the front panel has been simplified. Seldom used VOX controls are on the back. For faster TX/RX switching, the FT-890AT has two direct digital synthesizers (DDSs). With its unique duct flow cooling system, die-cast aluminum upper case and heat sink, the FT-890AT can't be beat for superior field work and DX-peditions.

Not just a "field" radio, with the optional FP-800 AC Power Supply, MD-1C8 Desk Mic and YH-77ST Headphones you've got a performance-plus base station loaded with features and affordably priced.

To see what that means for you, contact your Yaesu dealer today.

**Duct Flow Cooling System (DFCS)**  
Rugged aluminum top panel heat sink and internal thermally switched fan draws air through the heart of the transceiver.



**Built-in Antenna Tuner**  
Tunes most antennas 160-10 meters.

# YAESU

Performance without compromise.<sup>SM</sup>

# Usually if a rig is this loaded, the price is too.

**\$40.00 OFF**  
SEE DEALER FOR DETAILS

**DVS-2 (Optional)**  
Digital Voice Recorder  
with 16 seconds of memory  
each on RX and TX.

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Specifications subject to change without notice. Specifications guaranteed only within amateur bands. Some accessories and/or options are standard in certain areas. Check with your local Yaesu dealer for specific details.



"The FT-416 comes in black - or gray!"

"New sculpted design, built-in VOX,  
back-lit DTMF pad, Yaesu's  
"Straight A's"! Wow!"

"Yaesu did it again!"

## FT-416/816 2-Meter/70cm Handheld

- Frequency Coverage  
FT-416:130-174 MHz RX  
140-150 MHz TX  
FT-816:430-450 MHz RX/TX
- 41 Memories (Odd splits on any channel)
- 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
- CTCSS Encode/Decode
- ATS, Automatic Tone Search
- ATT, Advanced Track Tuning
- ABS, Automatic Battery Saver
- APO, Automatic Power Off
- Direct 12V DC Input (5 Watts Output) 5 Watts w/FNB-27 Battery
- Back-lit Keypad and Display
- DTMF Paging and Coded Squelch
- Built-in VOX
- **Accessories:**  
Compatible with most FT-530 and FT-415 Series accessories. Selected batteries in gray.

In great design "form follows function." Only then does breakthrough design evolve. Our new generation of HTs exemplifies this with the exciting FT-416.

An industry first, a choice of colors - traditional black or new-age gray, and a dynamic ergonomically sculpted case that fits your palm like a friend's handshake are only the beginning. New ridged Control Knobs with numbered VOL insure perfect tuning. And, there's a new molded PTT with functions so perfectly aligned they respond to the slightest thumb flex.

Packed with features, the FT-416 has built-in VOX, four-way scan, the largest, brightest DTMF key pad in its class and Yaesu's famous "Straight A's": ATS - Automatic Tone Search, ATT - Advanced Track Tuning, ABS - Automatic Battery Saver and APO - Automatic Power Off. And, Power Output up to 5 Watts.

During testing amateurs found this newest evolution in design remarkably unique. "You have to try it to believe it!", they said. So we invite you to do just that. Contact your Yaesu dealer today and find out what true evolution in design means to you.



FT-416 choice of black or gray  
FT-816 black only

**SPECIAL  
INTRO. PRICE  
SEE YOUR DEALER  
FOR DETAILS.**

# YAESU

Performance without compromise.<sup>SM</sup>

# The newest evolution in design.