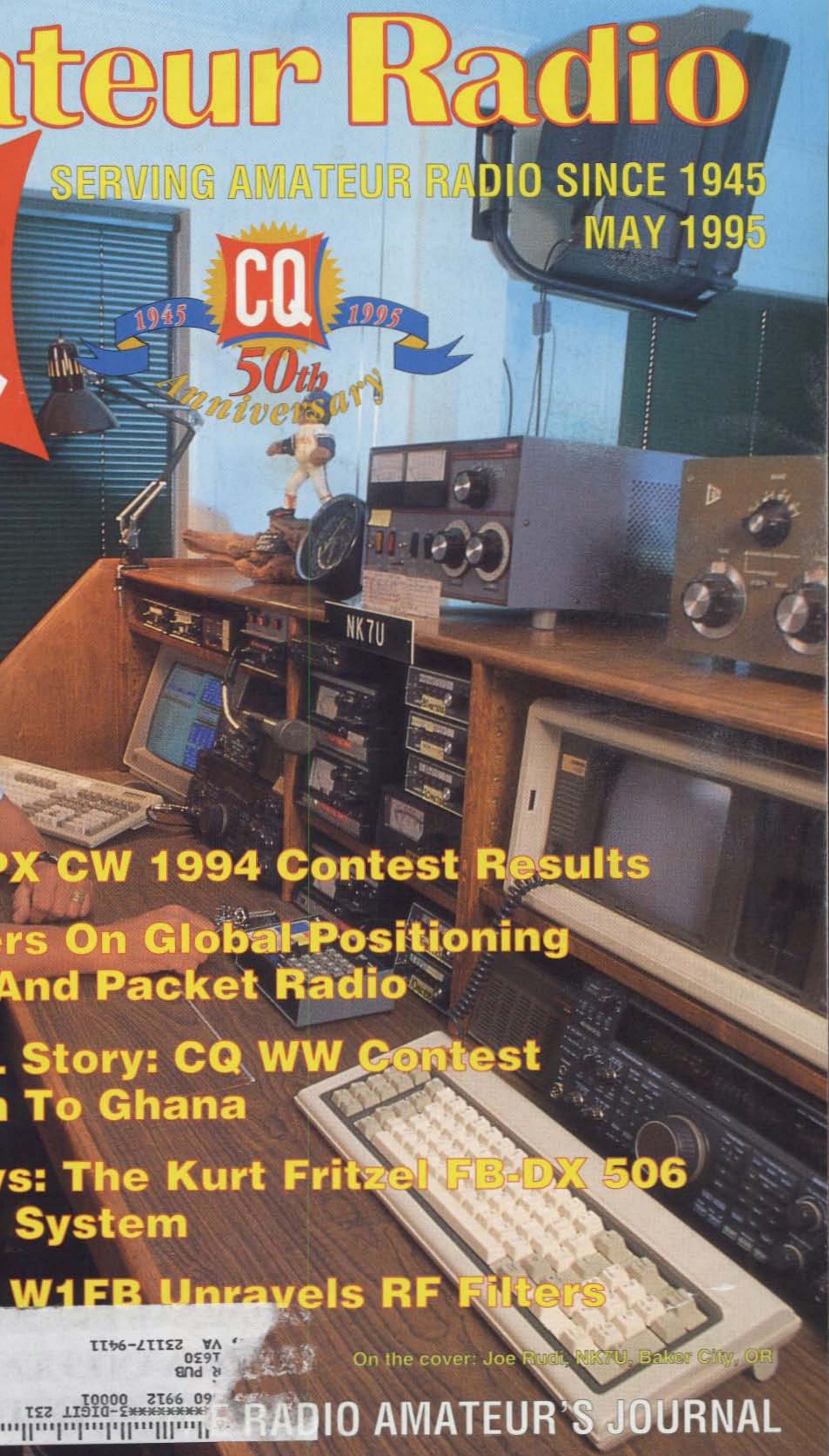
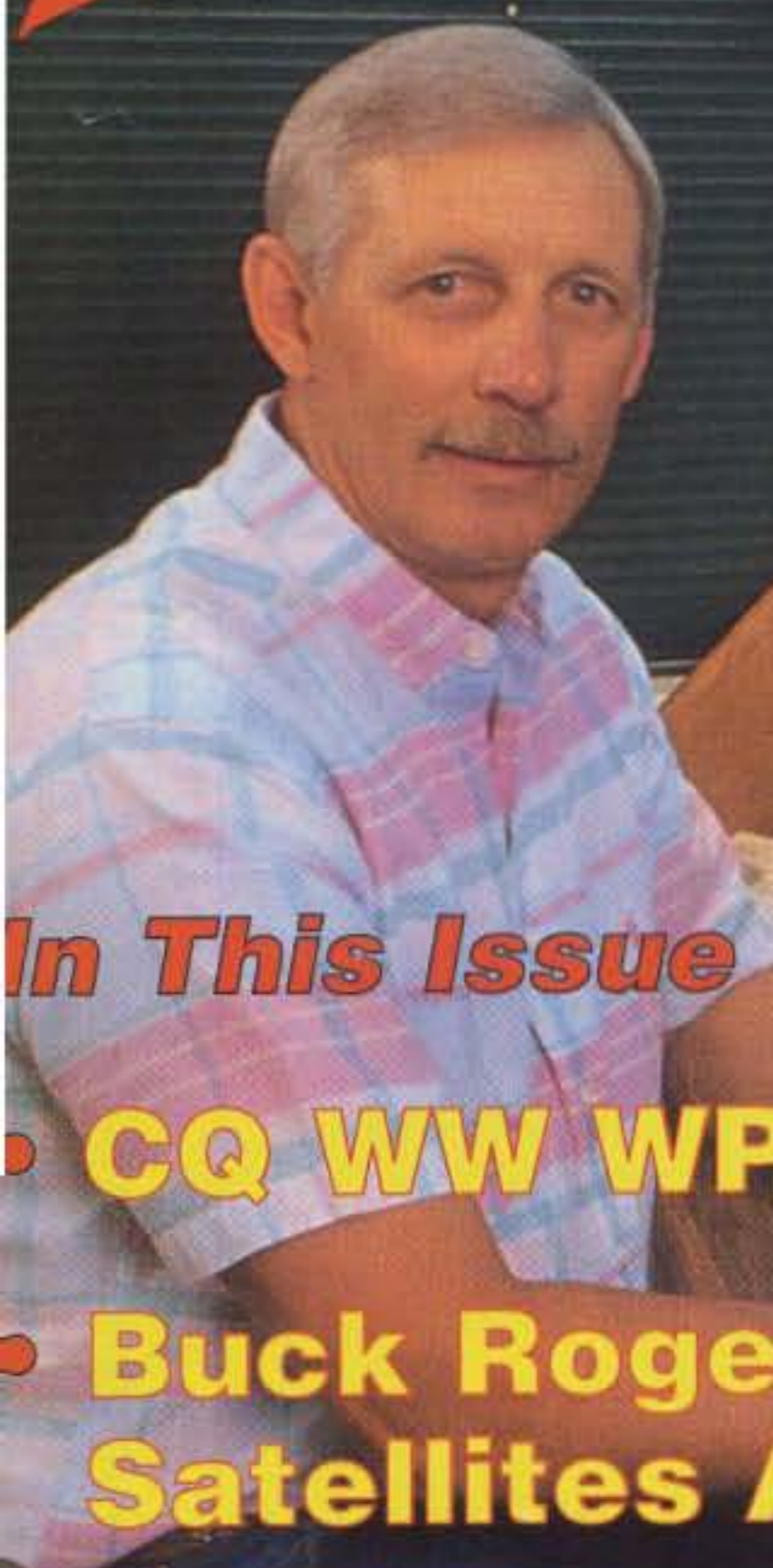


ICD 08241

# Amateur Radio

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MAY 1995



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- **Buck Rogers On Global Positioning Satellites And Packet Radio**
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- **W1FB Unravels RF Filters**

On the cover: Joe Rudi, NK7U, Baker City, OR

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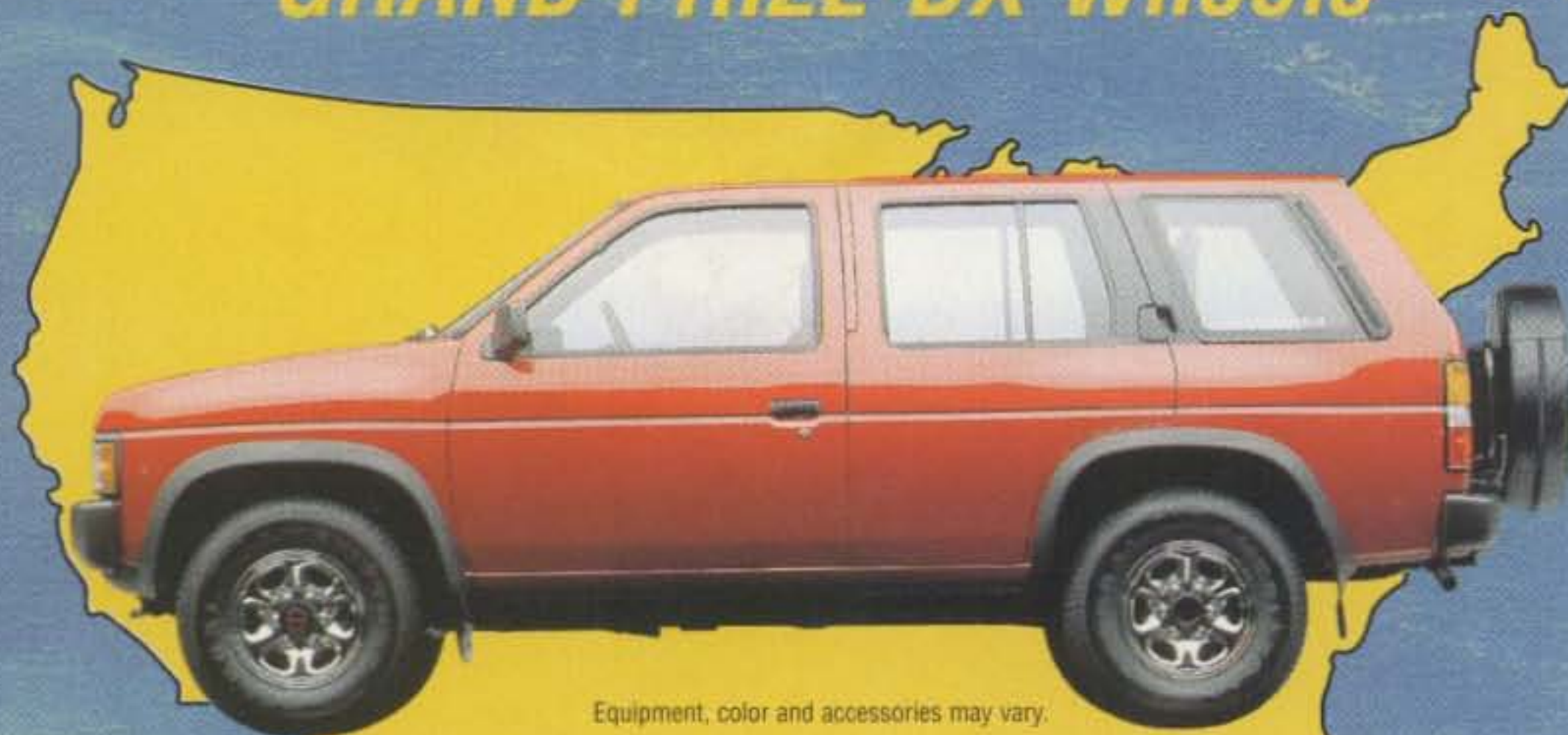
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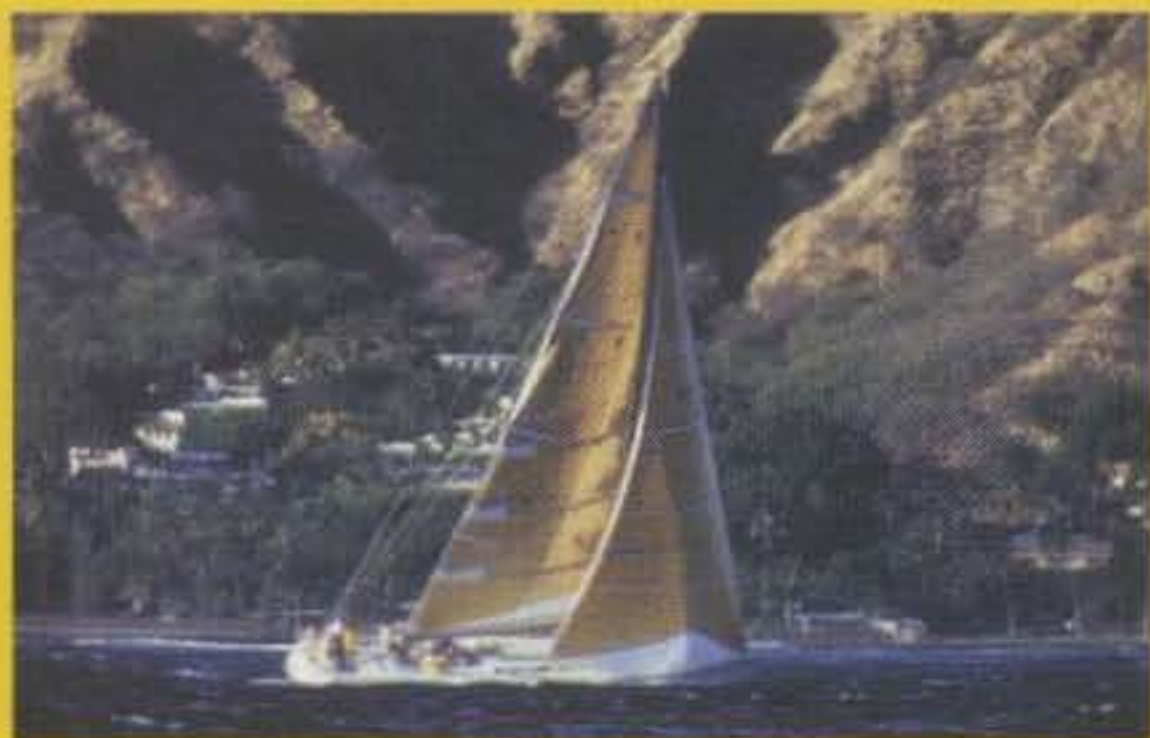
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**The Radio  
 Amateur's Journal**



**ON THE COVER:** Following a highly successful Major League Baseball career, Joe Rudi, NK7U, has assembled an impressive world-class contest station as you can see from his Baker City, Oregon QTH. (Photo by Larry Mulvehill, WB2ZPI.)

**MAY 1995**

**VOL. 51 NO. 5**

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# ZERO BIAS

## EDITORIAL

It happened at the Charlotte Hamfest this past March. I guess you could call it an epiphany of sorts. No, not the religious kind, but the kind that lights the light bulb over your head, and you suddenly understand (or think you do) what's going on.

It started small, like a tiny pebble in your shoe. There were a number of people talking about the vanity callsign program. In the last few months there has been a lot of press on the subject, and some of the amateurs there were interested in changing their calls. To me, it seemed like a lot of noise and a lot of activity, signifying very little other than massaging a few egos. I mean I could really get excited over some definitive legislation (with teeth) on amateur radio antennas or realistic standards set for RFI susceptibility in consumer goods, but not vanity callsigns. It just began to seem ironic that we could spend so much time, effort, and presumably money to modify form rather than substance. I know that amateurs will be happy being able to change their calls, but you also have to be able to operate. It's like being tossed a bone, and that's alright. I guess you can always make soup, but there's no way you can make a sandwich.

I began to feel the small pebble get bigger when I took stock of all the computer and computer-related exhibitors. Years ago they would have been an oddity, but today they comprise at least half of all the hamfests we attend. There's nothing at all wrong with this, and in fact they act as a draw to increase attendance. They attract most people, and especially what we like to call "the future generation of amateur"—the kids. It's not too difficult to see why, once you stop to look. They appeal to a lot of our senses all at the same time. There is noise, there are things on the screen moving in color, and there are keyboards, joysticks, and the ever-popular mouse with which to interact. You can make it do things in front of your eyes, and if you're not sure how, they'll tell you how. It's easy to see how fascinating computers can be.

I think that what came next contributed a great deal toward lighting the bulb. First you have to understand the location of the hamfest. It is held at the Charlotte Merchandise Mart, which can handle two independent shows at the same time. It was reported that in the adjacent wing was a woodworking show featuring all sorts of tools. Well, Saturday afternoon I decided to take a look at some tools. As I walked over, I expected to see all sorts of tools, statically on display, that I could see, poke, and presumably ask questions about. What I found when I entered was a variation on the computer exhibits, but all of my senses were engaged. The air was filled with the smell of sawdust, tools were up and running and available to try (under expert tutelage), and it was like one big carnival of tools. There were displays of everything

you could imagine, each working under the able hands of expert craftsmen (and crafts-women), and everyone was eager to show you how you could do the same in your own house. Let me tell you, Norm or no Norm, you did get turned on and want to buy it all and make countless whatever's just as soon as you could. I barely got out with my check-book intact. I was truly buzzed by the experience. Now that's marketing!

Loaded down with brochures and catalogs, I re-entered the hamfest area, where everything now seemed static by comparison. It was crowded alright, as there were lots of people in attendance and there were lots of exhibitors ready to answer questions, but nothing except the computers seemed to be operating. There was plenty of gear to see and touch, but most of it was just lit and was not really functional or working. You had to imagine how it was going to be once you got it home. If you had never seen some of this stuff before, you had to imagine slightly harder. Granted, the logistics of handling all the RF at a hamfest are different than continually sweeping up sawdust and woodchips, but I have seen it done.

Before some of you take pen in hand to accuse me of leading you down the garden path through some heinous plot to separate you from your hard-earned money, let me state that this really has nothing to do with money. It's attitude and reaching out. Amateur radio as a hobby is really no different than any other pastime people take up. They all cost money and time, which are balanced by the perceived reward, enjoyment, and excitement over what is being done. What I'm talking about is the look on people's faces and their visceral reaction to the experience. If that look and reaction are highly positive, people somehow will find the money.

We as amateurs tend to view things atavistically and long to return to "standards" that used to be (and some that never were). We view things in the light of distorted history, and somehow selectively ignore or filter out change. It doesn't make a number of us too exciting and worthy of emulation. I think it's a safe bet to assume that more amateurs at the Charlotte Hamfest went to the woodworker show than woodworkers were tempted to find out about amateur radio. In real life it doesn't really matter if you become enthralled with the idea of buying the "Super Zoomer 1000" table saw, that you demonstrate a knowledge of capacitor/inductive start motors, three-phase wiring codes, or basic AC theory. It seriously *does* matter, however, that you learn how to operate the saw effectively, efficiently, and safely enough so as not to cut off your fingers. It's not the form, but the substance that keeps you from harm or misadventure. What you eventually build with the saw or express on the air may be equally as meaningless to some people.

It's almost as though we were out to lunch during the CB boom and somehow a hamfest became a hamfest & computerfest during an afternoon coffee break. Who knows what changes can occur by dinner time? I'm not saying that amateur radio is turning into a tontine, where the last guy around gets to keep it all for what it's worth, but we sure like to keep our wagons in a very tight circle. I don't know exactly what it is that we seem to be protecting at the core of that circle, but we do seem to make it pretty hard, if not inconvenient, for people to enter the circle to help defend whatever it is. Maybe we're afraid that if a lot of people find out how much fun some of us are having with amateur radio, they'll want to take part, too.

I'd like to offer the suggestion that clubs and groups putting on hamfests include a booth in a prominent position featuring a working amateur radio station on as many bands as possible. Consider it sort of a mini-Field Day, and advertise to the public the fact that they can come and see (and try) amateur radio first hand. People could be assigned on an hourly basis to operate the station, to assist visitors with questions, and to facilitate their making a contact or two. A little certificate could be issued to commemorate the event, signed off by the station operator. I don't think it takes much imagination to predict that a fair number of these visitors would be turned on to everything else they might see (now with a bit of relevance) and want to seek out a club and further instruction. Positive feedback provides wonderful motivation.

We can continue to use hamfests as a type of closed-end party for ourselves, or for relatively the same amount of time, effort, and money, we can use it also to proselytize what a wonderful thing we have to offer and share. It doesn't take much to reach out and invite people in to see for themselves. People like to try out things and "see" themselves in the role or doing whatever it is before they commit in earnest. As with the woodworking show, not everyone there will be a journeyman cabinetmaker or master craftsman, but they have a chance to see, touch, and try out things they never would have before, thus awakening the dream that all of us have for fun, excitement, and accomplishment. The rudiments and learning process take on some sort of positive meaning, once you see the goal.

I don't think our hobby or our callsigns have much to do with vanity—perhaps vainglorious would be a better choice of word. If you look up the definition of vanity, you'll find a lot of descriptive words that are most unflattering and certainly not the way most of us would like to think of ourselves. If we can only see our continued function as maintaining that tight circle of wagons against all odds, then vanity takes on the correct meaning.

73, Alan, K2EEK

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Optional APRS Adapter Cable lets you save a COM port on your computer when running APRS software.

# ANNOUNCEMENTS

• **CQ Joint Sponsor of "Young Ham of the Year Award"** – CQ is joining with Yaesu USA as a corporate co-sponsor of the "Young Ham of the Year Award," now being administered by the Amateur Radio Newsline. The award has been presented to outstanding young amateurs annually since 1986. This year's winner will receive his or her award at the Huntsville, Alabama, hamfest on the weekend of August 18-19, 1995. CQ will be providing the winner with a VIP tour of Spacecamp/Huntsville and NASA's Marshall Space Flight Center. Nominations for the Young Ham of the Year Award are open to any FCC-licensed amateur radio operator age 18 and younger, living in the United States, who has used amateur radio to significantly contribute to the benefit of the service, to the state of the communications art, to their community, or to the nation. All nominations must be submitted before June 30, 1995 on an official application available for an SASE. Write to: 1995 Young Ham of the Year Award, c/o Newsline, 28197 Robin Avenue, Saugus, California 91350. Applications are also available electronically with an E-Mail request to: BILLWA6ITF on America Online; B.PASTERNAK on GEnie, or billwa6itf@aol.com via the Internet.

• **May 26-29, GWBR**, Paso Robles, California. At the Great Western Bicycle Rally, BMHA, with Ken Wahrenbrock, KF6NC, as moderator, will present a demonstration of equipment and techniques for bicycle-mobile operation. Tailored to an audience of non-ham cyclists, the program will stress the advantages of using amateur radio for communication on group rides and in emergency situations. For more information, contact Bicycle Mobile Hams of America, Box 4009, Boulder, CO 80306.

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

**N1BUZ**, from 125th anniversary of Mashpee, Massachusetts; Mashpee ARA; May 27-28; lower portion HF General and Novice phone and CW subbands. For certificate send QSL and SASE to MARA, P.O. Box 1236, W. Falmouth, MA 02574.

**N1CRE**, from electric battery-powered vehicle in Tour De Sol Road Rally from Waterbury, Connecticut to Portland, Maine; in conjunction with FHUHS Power and Energy Class; May 20-27. For more information, contact Tour De Sol, Northeast Sustainable Energy Association, 50 Miles Street, Greenfield, MA 01301 (413-774-6051).

**W1ACT**, portable from the historic Gay Head Cliffs and Lighthouse, Martha's Vineyard Island, Massachusetts (IOTA NA-046); May 6-7; operation may be on or near IOTA net frequencies and all Extra class privileges propagation permitting. QSL via N1JOY, Roland Daignault Jr., 162 Haffards St., #12, Fall River, MA 02723.

**N2KUU**, from Marconi Memorial Tower Site, Wall Township, New Jersey; The Ocean-Monmouth ARC (OMARC); 1600Z May 27 to 1600Z May 28; CW up 10 kHz from bottom of Novice subbands and 10.145, 14.045, 18.080 MHz, and bottom of General 80-15 and Novice 10 meter phone subbands. For certificate send 9 x 12 SASE (or \$1 U.S.) to N2KUU Callbook address.

**W2CVT**, from Samuel F.B. Morse home, Locust Grove, Poughkeepsie, New York; Poughkeepsie ARC; 1200-2000Z May 27 and 28; 3.703, 7.103, 10.103, 14.250, and 145.75 (K2EK DX cluster). For certificate and QSL send 9 x 12 inch SASE to Don Stein, W2PTF, 3 Little Road, Wappingers Falls, NY 12590-3649.

**W3QLP**, from 151st Anniversary of telegraph message "What Hath God Wrought," Baltimore/Washington area; Bay Area Amateur Radio Society; 1300-2000Z May 20; CW 7.125, 14.125, 21.125, and 28.125 MHz. For 8.5 x 11 certificate, send QSL, or shortwave listeners description of the QSO, along with an 8.5 x 11 SASE to Hal Camlin, W3QLP, The Bay Area Amateur Radio Society, 7506 Jacquill Ct., Glenn Burnie, MD 21061.

**W13N**, from 25th Anniversary of Montpelier Festival, Laurel, Maryland; Laurel ARC; 1400-2100Z May 7; lower 40 and 20 meter General phone subbands. For certificate, send QSL and 9 x 12 SASE to LARC, P.O. Box 3039, Laurel, MD 20709.

**NJ4F**, from 132nd anniversary of the Civil War Battle of Chancellorsville, Chancellorsville, Virginia; The Mt. Vernon ARC; May 6; on General portion of 40 and 20 meter phone bands. For certificate send QSL and SASE to MVARC, P.O. Box 7234, Alexandria, VA 22307.

**WA4USN**, from 50th anniversary of victory in 1945, on the aircraft carrier *USS Yorktown*, Charleston, South Carolina; 1300-2400Z May 6 and 1300-2000Z May 7; on 7.250, 14.045, 14.250, 21.045, 21.250, Novice CW portion of 40 meter band. For QSL, send QSL and SASE to Sheila Frank, KC4UDD, 614 Longstreet Circle, Summerville, SC 29483.

**KK4WW, US5WE, UA4LCQ, 8R1WD, S21AM**, from 4th anniversary of FAIRS, from their own countries; The Foundation for Amateur International Radio Service (FAIRS); 1400Z May 6 to 1400Z May 9; on the General portion of 40, 20, and 15 meters. For certificate send QSL and 9 x 12 SASE to FAIRS, P.O. Box 341, Floyd, VA 24091.

**AB5EE**, from Rooster Days, Broken Arrow, Oklahoma; Broken Arrow ARC; 1500-2300Z May 20; lower 25 kHz of General phone subbands and upper portion of General CW subbands on 15, 20, and 40 meters. For certificate send QSL and SASE to BAARC, P.O. Box 552, Broken Arrow, OK 74013.

**N5QDE**, from Reenactment of the Siege of Vicksburg Civil War Battle, Vicksburg, Mississippi; The Vicksburg ARC; May 27-28; in General phone portions of 40, 20, 17, and 15 meters and 28.465. For special QSL, send QSL and SASE to Ed Magruder, 2485 Warrenton Road, Vicksburg, MS 39180.

**W5ZDN**, from 125th anniversary of the Waco Suspension Bridge, Waco, Texas; The Heart O' Texas ARC; 1500-2300Z May 20; in lower General 40 to 15 meter phone subbands and Novice 10 meter phone subband. For certificate send 9 x 12 SASE to HOTARC, Inc., P.O. Box 45, Waco, TX 76703.

**K5GH**, (K 5 Galaxy Hunters), from the 17th Annual Texas Star Party, near the University of Texas's McDonald Observatory, Davis Mountains of west Texas; May 22-27; on 28365, 21365, 14265, and 7265; SSTV and CW on request. For an astronomy theme QSL card, send QSL/SWL report and SASE to K5GH-TSP, 2619 Bordeaux, McKinney, TX 75070.

**W6JBT**, from commemoration of Civilian Conservation Corps activity, San Bernadino National Forest, San Bernadino, California; Citrus Belt ARC; 1700Z May 20 to 1700Z May 21; General portion of 80 to 15 meter phone, Novice 10 meter phone subbands, and 2 meter packet. For certificate send QSL and 9 x 12 SASE to W6JBT, P.O. Box 3788, San Bernadino, CA 92413.

**KM6TN/NJVT**, from 50th Anniversary of VE Day, the *USS Pampanito*, San Francisco, California; 0000-2359Z May 8; lower portion of General class phone bands. Personalized certificates will be sent to all confirmed contacts. The radio crew of the *Pampanito* will appreciate receiving QSL cards. Mailing instructions will accompany certificates.

**KQ7E**, from Annual Iris Festival, "Iris Gardens," Sumter, South Carolina; Sumter ARA; May 27-28, 2 PM on the 27th to 2 PM on the 28th; lower 30 kHz on General portions of 75, 40, 20, and on 28.300-28.500 (all times are in EDT), and 147.015 and 444.150 on VHF and UHF. For certificate signed by repeater custodian and special event chairman, send \$1 to The Sumter ARA, P.O. Box 193, Sumter, SC 29150, Attn: Special Event.

**KL7HKX**, from Armed Forces Day, Kodiak Island, Alaska; The United States Coast Guard ARC; May 20; operations in the General class bands. Look for operators on the 20 M band on 14.260 (IOTA freq.). For Coast Guard ARC QSL, send SASE (or via ARRL Bureau) to United States Coast Guard ARC-KL7HKX, P.O. Box 190421 USCG, Kodiak, AK 99619-0421.

**N8BIB**, from Memorial Day, Yankee Air Museum, Belleville, Michigan; May 29; operation on SSB 7.270, 14.270, 21.235, 28.480. For certificate, send QSL and 9 x 12 SASE to Frank A. Nagy, 24315 Waltz Road, New Boston, MI 48164-9380.

**AA8KP**, from 11th Wildlife Festival of Clare County, Clare, Michigan; Clare County ARES/RACES; May 27 and 28; lower portion of General bands 15-80 and Novice 10 meter voice. For certificate, send QSL and a 9 x 12 SASE to Clare County EC, P.O. Box 262, Farwell, MI 48622-0262.

**W8BAP**, from Feast of The Flowering Moon, Chillicothe, Ohio; the Scioto Valley ARC; 1300-2100Z May 27-28; General portions of 40, 20, and 15 meter bands. For certificate, send QSL and 9 x 12 SASE with 2 units of postage to SVARC, Box 353, Chillicothe, OH 45601.

**K8OAA**, from Tulip Time, Holland, Michigan; Hol-

land ARC; May 7-21; operation in lower portion of the General 20 and 15 meter subbands and 28.400. For certificate send QSL with call signs worked and 9 x 12 SASE to Barbara Siebelink, N8NXX, 6418 Otis Road, Saugatuck, MI 49453.

**W9DUP**, from Armed Forces Day, First Division Museum, Cantigny, Wheaton, Illinois; 1600-2300Z May 20; SSB 7.250, 14.290, 28.400, and 145.25 repeater; 7040 CW. For certificate send QSL and SASE to Jack Carr, NV9S, DARC, P.O. Box 71, Clarendon Hills, IL 60514.

**W9IKN**, from annual running of the Valley Fox Trot, Elgin, Illinois; Elgin ARS; 1200-1700Z, May 29; lower portion of General subbands on SSB and CW and 6 meters SSB. For certificate send QSL and business size SASE to EARS, P.O. Box 1351, Elgin, IL 60123-1351.

**WB0HSI**, from Lewis & Clark Rendezvous; St. Charles, Missouri; St. Charles ARC; 1300-2100Z May 20-21; on 7.265, 14.265, 21.365, 28.465, 146.67, AO-13 Modes B and J, as propagation and QRM permit. For certificate send QSL and 9 x 12 SASE to St. Charles ARC, P.O. Box 1429, St. Charles, MO 63302-1429.

**WB0WXY**, from VE Day commemoration, site of WW II German POW camp, Concordia, Kansas; Kansas, Nebraska ARC; 1600-0300Z May 8; lower 25 kHz of General phone portion of 75, 20, 15 meters. Send QSL and SASE to Kansas, Nebraska ARC, 1220 Spruce St., Concordia, KS 66901.

**VP9RND**, from 200th anniversary of the Royal Naval Dockyard, Sandys Parish, Bermuda; the Radio Society of Bermuda; 1200Z May 20 to 2000Z May 21; all HF bands for CW and SSB. For confirmation of a QSO, send 4 IRCs with QSL card to Bob Nadolny, WB2YQH, P.O. Box 73, Spring Brook, NY 14140.

• **The following hamfests, etc., are slated for May:**

May 6, **Western Colorado ARC Hamfest**, Liff Auditorium, Mesa State College, Grand Junction, Colorado. For more info, send SASE to Earl L. Surad, WB6MUQ, 2999 Gunnison Ave., Grand Junction, CO 81504. (Exams.)

May 6, **Southern Tier Hamfest**, Marvin Park Fairgrounds, Owego, New York. Contact STARC, P.O. Box 7082, Endicott, NY 13761-7082. (Exams.)

May 6, **National Expo's Electronics Fair**, Emidio & Sons Center, Cuyahoga Falls, Akron, Ohio. For info send SASE to National Expo, Inc., 30799 Pinetree Rd., Cleveland, OH 44124 (phone 216-442-1776 or 216-292-7744; FAX 216-442-1776 or 216-292-7746).

May 6, **Arrowhead RAC Annual Swapfest '95**, multi-purpose building, Head of the Lake Fairgrounds, Superior, Wisconsin. Contact George Mead, KA0BUM, 4152 Ugstad Road, Hermantown, MN 55811-3620 (218-729-6882).

May 6, **The Skywide ARC Annual Spring Hamfest**, Westway United Church, Etobicoke, Ontario, Canada. Contact Gary Westhouse, VE3NIT, 416-233-2669, or Maury Scott, VE3TEY, 416-231-1816.

May 6, **Keno ARC Hamfest**, National Guard Armory, Klamath Falls, Oregon. For more information, send SASE to Keno ARC, P.O. Box 653, Keno, OR 97627. (Exams.)

May 6, **Pearland ARC 8th Annual Hamfest**, League City Civic Center, League City, Texas. Contact PARC '95 Hamfest, P.O. Box 2654, Pearland, TX 77588-2654. (Exams.)

May 6-7, **ARRL West Texas Section Convention & Hamfest**, Abilene Civic Center, Abilene, Texas. Contact Peg Richard, KA4UPA, 1442 Lakeside Drive, Abilene, TX 79602 (915-672-8889). (Wheelchair accessible; exams.)

May 7, **Amateur Radio Auction**, Suffolk Community College, Selden, Long Island, New York. Call Emil Tillona, KD1F, 516-696-0610, or John Mark, KB2QQ, 516-689-6343.

May 7, **Giant Electronic Flea Market**, Lincoln High School, Yonkers, New York. Call Otto Supliski, WB2SLQ, 914-969-1053, or send SASE to METRO 70 CM Network, 53 Hayward Street, Yonkers, NY 10704. (Exams.)

May 7, **21st Annual Hamfest**, Middletown Grange Fairgrounds, Wrightstown, Pennsylvania. Contact Woody Woodside, N6XES, 215-672-8482 between 9 AM and 9 PM, or write to him at 665 St. Davids Ave., Warminster, PA 18974. (Exams.)

May 7, **Paul Bunyan ARC Annual Hamfest**, Bemidji Eagles Club, Bemidji, Minnesota. Contact Dave



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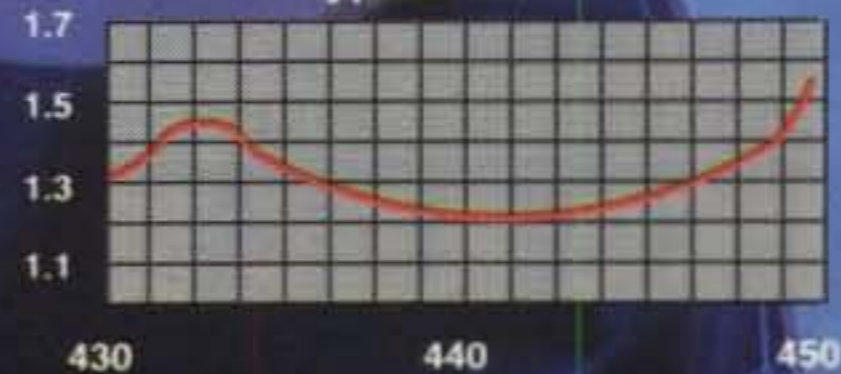
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- \* Key lock function
- \* Built-in Duplexer
- \* Remote Microphone Control Application
- \* Bell Function
- \* Tone Burst Function
- \* LITZ Function  
(The US First Emergency Alert Monitoring Feature)
- \* MARS/CAP Modifiable (Proper FCC licensing required)

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| <b>NEW CASTLE, DE</b> 19720<br>1509 N. Dupont Hwy.<br>(302) 322-7092<br><b>(800) 644-4476</b><br>John, N1IFL, Mgr.<br>RT.13 1/4 mi., So. I-295  | <b>SALEM, NH</b> 03079<br>Boston, MA area<br>224 N. Broadway<br>(603) 898-3750<br><b>(800) 444-0047</b><br>Chuck, KM4NZ, Mgr.<br><a href="mailto:CWYRICK@CWYRICK.MV.COM">CWYRICK@CWYRICK.MV.COM</a><br>Exit 1, I-93;<br>28 mi. No. of Boston |

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 Prices, specifications, descriptions, subject  
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# PEAK PERFORMANCE

## LOW POWER

The KPC-3 offers more performance than any other TNC in its price range. No wonder it's the #1-selling TNC on the market today. And now, the KPC-3 can connect to GPS receivers with an NMEA-0183 interface. And it's the only TNC with enhanced GPS operations, including multiple string parsing; storage of outgoing data in tracking buffers; time-

slotted broadcast-  
ing based on the  
GPS clock (so  
multiple stations  
can report without  
collision);  
and remote access  
to reconfigure the  
GPS unit. Like  
all Kantronics  
TNCs, the KPC-3

is thoroughly contemporary; it can run on a 9-volt battery, and it's portable. It also provides more than 20K of personal mailbox space that inexpensively expands to 100K.

Get your own KPC-3 today.  
It's just the lift you've been needing.

## ENJOY THE RUN



Kantronics KPC-3

# Kantronics

For more information, contact your  
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1202 E. 23rd St., Lawrence, KS 66046-5006  
913-842-7745 FAX 913-842-2031.

# MFJ-949E Deluxe 300 Watt Tuner

*More hams use MFJ-949's than any other tuner in the world! Why settle for an imitation when you can have the real thing?*

**In Stock at ham dealers everywhere!**

Pick one up at your favorite dealer -- no shipping, no waiting, no hassles

MFJ-949E  
**\$139<sup>95</sup>**

Call your dealer for your best price  
Includes FREE AC adapter for meter light



**More hams use MFJ-949's than any other antenna tuner in the world!**

**Why?** Because the world's leading tuner has earned a worldwide reputation for being able to match just about anything.

MFJ-949's have been highly refined and have years of proven reliability.

Every MFJ-949E comes with... MFJ's famous one year *No Matter What*™ unconditional guarantee... first-rate performance...

... unbeatable quality... the best tuner value in ham radio -- all from the world's most trusted name in antenna tuners.

Now the latest MFJ-949E gives you even more features and more value than ever at a new lower price.

Why take chances with an imitation when you can have the real thing from the world's most trusted name in antenna tuners.

**More reasons why more hams use MFJ-949's than any other antenna tuner in the world...**

### Full 1.8-30 MHz Operation

1000 volt tuning capacitors, extra heavy duty inductor switch, Teflon® insulating washers and proper L/C ratio gives you arc-free no worries operation with up to 300 watts from 1.8 to 30 MHz.

### Lighted Cross-Needle Meter

MFJ's lighted Cross-Needle Meter shows you SWR, forward and reflected power simultaneously. It reads both peak and average power on 300 or 30 watt ranges.

The meter is illuminated for easy reading in dim light and has an ON/OFF lamp switch. The meter lamp uses 12 VDC or 110 VAC. A free AC adapter is included at no extra cost.

### Tunes any Antenna

The MFJ-949E tunes out SWR on dipoles, verticals, inverted vees, random wires, beams, mobile whips, shortwave receiving antennas... nearly anything!

Use coax feed, random wire or balanced lines. Has oversized heavy duty 4:1 balun.

### Super Antenna Switch

MFJ's 8 position super antenna switch lets you select two coax fed antennas, random wire/balanced line or built-in

dummy load for use through your MFJ-949E or direct to your transceiver.

MFJ's Cross-Needle SWR/Wattmeter is always active for monitoring forward and reflected power and SWR.

### QRM-Free PreTune™

MFJ's QRM-Free PreTune™ lets you pre-tune your MFJ-949E off-the-air into a built-in dummy load without causing QRM. Pre-tuning into a dummy load makes

### Superior Materials... Superior Construction

Every MFJ-949E use Teflon® insulating washers, countersunk screws for meter bracket, wing-nut for ground post, fire-retardant epoxy glass PC board (not canvas based), heavy .063 inch thick aluminum chassis (not flimsy .050 inch), heavy gauge wire used throughout (not small gauge), custom cabinet (not multi-purpose with unused holes and internal protruding screws).

### No Matter What™ Guarantee

Every MFJ-949E is backed by MFJ's famous one year *No Matter What*™ unconditional guarantee. That means we will repair or replace your MFJ-949E (at our option) no matter what for a full year.

Others may give you a limited warranty on defects in material and workmanship.

But what do you do if it burns up and they say, "Sorry, your limited warranty does not cover that?"

### Continuing Service

Only MFJ gives you a direct toll-free technical help line -- not merely a sales line. It's answered by electronic technicians who are experts in antenna tuners. We're here to help keep your MFJ product performing flawlessly -- no matter how long you own it -- just call toll-free 800-647-TECH(8324).

### Call your dealer for your best price

In stock at ham dealers everywhere!

Order your MFJ-949E today or simply pick one up at your favorite dealer or hamfest -- no shipping, no waiting, no hassles.

## Why take chances?

Why take chances with an imitation when you can have the real thing from the most trusted name in antenna tuners?

tuning your actual antenna faster and easier.

### Full Size Dummy Load

The MFJ-949E has a full size non-inductive 50 ohm dummy load measuring 3/4 inch diameter by 5 inches. It easily handles 300 watts of abusive tune-up power.

You'll find it handy for tuning, testing and repairing your rig, setting power level, adjusting your mic gain and more.

Watchout for cheap midget size dummy loads that changes resistance as it heats up -- marginal ones could burn up your transceiver.

### Custom Inductor Switch

The inductor switch is the most likely component to burn up in any antenna tuner.

The inductor switch in the MFJ-949E was custom designed to withstand the extremely high RF voltages and currents that are developed in your tuner -- it's not a flimsy plastic switch made for small signals and wired with tiny gauge wire.

### Superior Cabinet

Each MFJ-949E cabinet is chemically treated and has a new tough scratch-proof vinyl cladding -- not paint that can scratch or chip off. You won't find a tougher, longer lasting finish anywhere.

Detailed logging scales and legends are permanently silk screened on a real aluminum front panel and back panel -- it's not merely a plastic decal or glued-on paper strip that can peel off.

### Free MFJ Catalog

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

Nearest Dealer/Orders: 800-647-1800

24 Hour FAX: (601) 323-6551

Technical Help: 800-647-TECH (8324)

**MFJ** MFJ ENTERPRISES, INC.  
P. O. Box 494, Miss. State, MS 39762  
(601) 323-5869; 8-4:30 CST Mon.-Fri.  
76206.1763@compuserve.com

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**MFJ... making quality affordable** CIRCLE 159 ON READER SERVICE CARD

# Pocket Morse Code Trainer

*Learn Code Faster & Easier  
Better than code tapes  
Take it anywhere to practice  
Ideal for beginners to advance  
Light weight & compact*

## The Standard Pocket Morse Code Trainer

- \*Selectable code rates from 3 wpm to 31 wpm
- \*Plays standard or Farnsworth
- \*Size 1" x 3.8" x 2.4"
- \*Runs 40 hrs on one 9 volt battery



- 1) Plays continuous fresh random code (Selectable letter groups, ie A-Z, 0-9, & more)
- 2) Random code practice test (Check your answers against the answer key)
- 3) Interactive training (Excellent for beginners to help learn the code)

## The Deluxe Pocket Morse Code Trainer

*In addition to the same features as The Standard Pocket Morse Code Trainer, the deluxe has three additional modes of operations*



- 4) Continuous newly generated QSO (The QSOs are similar to the General exam)
- 5) Practices Code exams just like the real code exam. (Include answer key to check accuracy)
- 6) Continuous random words (randomly plays different words)

## The Ultimate Pocket Morse Code Trainer

*It has all the above features plus a LCD display which shows the characters that are playing, an internal amplified speaker, a stereo head set & a mono ear piece.*



The ultimate & deluxe pocket morse code trainer has more power than most PC morse code software programs, yet can still fit in your shirt pocket

## The Pocket Keyboard or Paddle Keyer

*The Pocket Keyboard Paddle Keyer allows you to hook a standard IBM keyboard or paddle to your radio. The Keyer has two memory banks to store two separate messages. It also has selectable code rates from 5 to 30 wpm*



**Call 214-350-0888 to Order**

Add 2.50 for a mono ear piece & 3.50 for a stereo head set  
Visa/MC accepted Add \$5.00 S/H + 8.25% Texas  
Computer Aided Technology, 10132 Monroe Dr, Dallas, Tx 75229

## TROPHY WINNERS

### SINGLE OPERATOR, ALL BAND

**World:** Steve Bolia, N8BJQ Award. Won by: **John Crovelli, P4ØW.**  
**USA:** Steve Bolia, N8BJQ Award. Won by: **Tyler Stewart, KF3P.**  
**Oceania:** Tom Morton, KT6V Award. Won by: **Michael Sato, AH6MZ.**  
**Canada:** Radio Amateurs of Canada (RAC) Award. Won by: **John Sluymmer, XL3EJ.**  
**Canada Low Power:** Amateur Radio League of Alberta. Won by: **Gary Caldwell, XL7NTT.**  
**Japan:** The DX Family Foundation Award. Won by: **Satoshi Hara, JH5FXP.**

### SINGLE OPERATOR, SINGLE BAND

**World:** Pedro Piza, Sr., KP4ES Memorial Award (Pedro Piza, Jr., NP4A donor). Won by: **Martin Monsalvo, AZ4F (LW9EUJ).**  
**World 7 MHz:** William D. Johnson, KVØQ Award. Won by: **Bob Furzer, 9K2ZZ.**  
**World 3.5 MHz:** Lance Johnson Engineering Award. Won by: **Pavel Vachal, OK1DXS.**  
**Oceania:** D. Craig Boyer, AH9B Award. Won by: **Boyet Lorenzo, 4F3AAL.**  
**USA:** Kansas City DX Club Award. Won by: **John Yodis, K2VV.**  
**USA 28 MHz:** Bernie Welch, W8IMZ Memorial Award (Walt Smith, K1DWQ donor). Won by: **Phil Koch, K3UA.**  
**USA 21 MHz:** Wayne Carroll, W4MPY Award. Won by: **Scott Jones, WR3G.**

### MULTI-OPERATOR, SINGLE TRANSMITTER

**World:** Ron Blake, N4KE Award. Won by: **Station ZXØF operated by PYØFF & YU1RL.**  
**USA:** Austin Regal, N4WW Award. Won by: **Station WC4E operated by WC4E, K1ZX, G4BKI/W4, WB4BBH, W1CW, W1YL.**

### MULTI-OPERATOR, MULTI-TRANSMITTER

**World:** Dick Frey, K4XU Award. Won by: **Station 9A1A operated by 9A2OG, 9A2DQ, 9A2EU, 9A2LJ, 9A2NJ, 9A2KL, 9A2AJ, 9A3GW, 9A3TW, 9A3NR, 9A3TF, 9A3MJ, 9A4WW, F2CW, S58KW.**

### CONTEST EXPEDITION

**World:** Ed Roller, K4IA Award. Won by: **Station HV4NAC operated by I2UIY & I2VXJ.**

### COMBINED SSB/CW

**World:** Al Slater, G3FXB Memorial Award. Won by: **Jim Neiger, N6TJ (ZD8Z).**  
**Europe:** Les Nouvelles DX Group Award. Won by: **Gerard Parat, F6FGZ.**  
**USA:** Oklahoma Comm Center Award. Won by: **Tyler Stewart, KF3P.**

### CLUB (SSB & CW)

**World:** CQ Magazine Award. Won by: **Northern California Contest Club.**  
**USA:** Oklahoma Comm Center Award. Won by: **Yankee Clipper Contest Club.**

multi-multi champ, with UU5J second and KL7Y third. USA champ WW2Y finished fourth, with EM2I rounding out the top five.

WC4E returned to the top of the US multi-single stations, with AG6D in at number two, followed by WX3W, N5GM, and N5OK. Most of the US multi-op activity seems to have been concentrated in the multi-multi class with six entries. WW2Y at 7.7 million points was the US champ, followed by WZ1R, NQ4I, WXØB, WJ7R, and AD6C.

## The Rest of The Story

As they have for the past several years, the Northern California Contest Club won the world club championship. Second in the world and the winner of the US club trophy was the Yankee Clipper Contest Club, who moved up from third in 1993. Each year the YCCC scores are creeping closer to those of the NCCC. Finishing a very strong third was the Slovenia Contest Club with 62 million points, followed by the North Texas Contest Club at 55 million and the Frankford Radio Club at 53 million. More than 230 clubs were represented in 1994. If you belong to a club, please mark it on your summary sheet so that the proper credit can be given.

Electronic submission of contest logs via

Internet will continue. My primary address is SDB@AG9V.AMPR.ORG. There is a possibility that for a short period that address will be inactive. If your mail gets returned, you may also E-mail to STEVEB4622 at America On Line or 73743,104 at CompuServe.

Again, thanks to N6AA and N6TR for their help with the callsign database, and to WR3G, EA3DU, and N9AG for helping with the logs. Without their help, this would not be possible. We are still encouraging disk submission of logs, and will start requesting a disk from most stations who do not send one in.

A check of the WPX CW Records (found elsewhere in this issue) shows that there are still some very old records just waiting to be broken. Many of them are low band records and have been around since 1984 or 1985. Now would appear to be the time to go after the low band records. For the next couple of years, we can expect to have some decent low band openings.

Omitted from the SSB results was the new trophy sponsored by the Amateur Radio League of Alberta for the Canadian Low Power single operator, all band winner for both modes. The SSB winner was VO1SF with 2,046,264 points. More trophy donors are needed, especially for the Low Power and the new Assisted categories. If you are interested,



# MFJ HF/VHF SWR Analyzer™ with RF Resistance Meter

Read your antenna SWR from 1.8-170 MHz... 10-digit LCD frequency counter... RF Resistance Meter™... smooth reduction-drive tuning... simple-to-use...



**MFJ-259**  
**\$219<sup>95</sup>** If you work with antennas, MFJ's revolutionary new **SWR Analyzer™** is the best investment you'll ever make! Now you can diagnose a wide range of antenna problems instantly with one easy-to-use instrument.

## What the MFJ-259 Does

The MFJ-259 gives you a complete picture of your antenna's performance anywhere between 1.8 and 170 MHz -- you can even check SWR outside the ham bands without violating FCC rules. Set the bandswitch and tune the dial--just like your transceiver. SWR is displayed instantly!

## RF Resistance Meter™

Does 2:1 SWR mean 25 ohms or 100 ohms? *The new MFJ-259 tells you at a glance!*

Now you can measure RF resistance up to 500 ohms at minimum SWR -- instantly -- on MFJ's *exclusive* side-by-side RF Resistance and SWR Meters!

Take the guesswork out of building matching networks and baluns for your antennas.

Watch the effects of spacing on radiation resistance as you adjust your antenna.

## Here's What You Can Do...

Find your antenna's true resonant frequency from the shack.  
Tune the antennas on your

tower and watch SWR change instantly as you make each adjustment. You'll know exactly what to do by simply watching the display.

Tune critical HF mobile antennas in seconds -- without subjecting your transceiver to high SWR.

Measure your antenna's 2:1 SWR bandwidth on a single band, or analyze multiband performance over the entire spectrum from 1.8 to 170 MHz!

Measure inductance, capacitance, resonant frequency of tuned circuits, transmission line velocity factor/impedance/loss. Test RF chokes, transformers, baluns.

Adjust your tuner for a perfect 1:1 match without creating QRM.

And this is only the beginning! The MFJ-259 is really *four* test instruments in one: an accurate RF signal generator, a high resolution 170 MHz frequency counter, *RF Resistance Meter™* and an *SWR Analyzer™*.

## Free Manual

MFJ comprehensive 18 page instruction manual is packed with useful applications -- all explained in simple language you can understand!

## 1.8-170 MHz SWR Analyzers™



**MFJ-249** **MFJ-249 HF/VHF**  
**\$199<sup>95</sup>** **SWR Analyzer™** has all the features of MFJ-259 but less RF resistance meter. Includes 1.8-170 MHz continuous coverage, 10-digit LCD frequency counter and smooth vernier tuning.



**MFJ-209** **MFJ-209 HF/VHF**  
**\$109<sup>95</sup>** **SWR Analyzer™** is same as MFJ-259 without LCD frequency counter and RF resistance meter. Has jack for external frequency counter. MFJ-249/MFJ-209 are 4x2 1/2x6 3/4 inches and uses 8 AA cells or 110 VAC with MFJ-1312B, \$12.95.

## Carrying Pouch



**MFJ-29** Tote your  
**\$19<sup>95</sup>** MFJ-249, MFJ-259 or MFJ-209 **SWR Analyzer™** anywhere with the MFJ-29 custom Carrying Pouch.

Made with a special foam-filled fabric, the MFJ-29 cushions blows, deflects scrapes, and protects knobs, meters and displays from harm.

Wear it around your waist, over your shoulder, or clip it onto the tower while you work--the fully-adjustable webbed-fabric carrying strap has snap hooks on both ends.

Protect your investment and keep your analyzer safe and looking like new!

## Dip Meter Adapter



**MFJ-66**  
**\$19<sup>95</sup>** Plug a dip meter coupling coil into your **MFJ SWR Analyzer™** and turn it into a sensitive and accurate bandswitched dip meter.

With a dip meter you'll save time and take the guesswork out of winding coils, measuring inductance and capacitance, measuring velocity factor and electrical lengths of coax. Determine resonant frequency of tuned circuits and measure Q of coils. Set of two coils cover 1.8-170 MHz depending on your **MFJ SWR Analyzer™**.

## Free MFJ Catalog

Write or call... 800-647-1800

## 10-160M 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 10-160 Meters 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. 7 1/2x2 1/2x2 1/4 inches.



## 2 Meter SWR Analyzer™

**MFJ-208** **MFJ-208 2 Meter VHF**  
**\$79<sup>95</sup>** **SWR Analyzer™** finds the SWR of any antenna from 138-156 MHz. Jack for external frequency counter. 7 1/2x2 1/2x2 1/4 inches.

## For Commercial VHF Radio

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

## MFJ Antenna Bridge



**MFJ-204B** Great for determining  
**\$79<sup>95</sup>** feedpoint resistance of antennas and for designing impedance matching networks. Measure RF resistance up to 500 ohm. Covers all ham bands 160-10 Meters. Built-in resistance bridge, null meter, tunable oscillator-driver, frequency counter jack. 7 1/2x2 1/2x2 1/4 inches. Use 9 volt battery or 110 VAC with MFJ-1312, \$12.95

## 440 MHz SWR Analyzer™



**MFJ-219** Read SWR of any antenna  
**\$99<sup>95</sup>** 420 to 450 MHz -- just plug coax of your antenna into SO-239 connector, set frequency and read SWR. Uses microwave integrated circuits and microstrip technology. Jack for external frequency counter. 7 1/2x2 1/2x2 1/4 in. **MFJ-219N**, \$99.95, same as MFJ-219 but with "N" connector.

MFJ-219/218/217/208/207/203 uses 9 volt battery or 110 VAC with MFJ-1312B, \$12.95.

## 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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(601) 323-5869; 8-4:30 CST, Mon.-Fri.

FAX: (601) 323-6551; Add s/h

**MFJ... making quality affordable**

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



## Bandswitch Dip Meter™

**MFJ-203** The MFJ-203 is a  
**\$99<sup>95</sup>** sensitive **Bandswitched Dip Meter™** that covers all hams bands from 160-10 Meters. There are no plug-in tuning coils to keep up with or break.

Has detachable coupling coil, dual FET oscillator, op-amp meter amplifier and jack for external frequency counter. 7 1/2x2 1/2x2 1/4 in.

# RADIO WORKS

## Antenna Fever

Band conditions are poor - Here are the solutions.

**CAROLINA WINDOM™** the wire antenna choice of DXers and DXpeditions all over the world. Low height requirements. Trapless, multiband operation. Full horizontal element plus its Vertical Radiator works on all bands. The Vertical Radiator is the performance secret. It works like an inverted vertical to produce unusually low radiation angles. It's the high performance choice for DX or multiband use. 1.5 KW, feed with 50 ohm coax.

CAROLINA WINDOM 80-10, 132' horiz, 22' vertical \$79.95  
 CAROLINA WINDOM/2 40-10, 66' horiz, 10' vertical \$79.95  
 CAROLINA WINDOM 160 160-10, 252' horiz, 22' vertical \$109.95

**SuperLoop™** Super performance is yours with the SuperLoop, version 3. If you need a serious signal on all bands, especially 80 & 40, you need this antenna. The SuperLoop automatically switches between fullwave, multiwave, and Bi-square configurations for maximum gain on each band. Use with a transmatch for full 80-10 m coverage. 112' long, 30' high, easy installation. 1.5 KW, feed with 50 ohm coax. **\$99.95**

Check out our 80 page General Catalog. Everything in parts and accessories for your antenna systems is in there!

## Current Baluns



18 models fit every application  
 Large, saturation resistant cores  
 High power, good output balance  
 Outstanding Load mismatch tolerance  
 Teflon insulation in high pwr. models  
 Laboratory specifications published  
 Internal wires brought outside case for direct connection to your antenna.

B1-2K	1:1	2 KW	80-10 m	General Purpose	\$18.95
B1-5K	1:1	5 KW	160-10m	Precision	\$29.95
Y1-5K	1:1	5 KW	160-10m	The YagiBalun™	\$29.95
B4-1.5K	4:1	1.5KW	80-10m	General Purpose	\$22.95
B4-2KX	4:1	2 KW	160-10m	4:1 Current Balun	\$39.95

**RemoteBalun™ High Pwr, Current-type 160-10m \$47.95**  
 Line Isolators, 50 Ohms, High power  
 4K-LI 4 KW 160-10m SO-239 in, SO-239 out \$19.95  
 4KRF-LI 4 KW 160-10m PL-259 in, SO-239 out \$25.95  
 4KV-LI Vertical Antenna Isolator, 160-10m \$26.95

## Antenna Wire and Parts

PL-259	Silver-Teflon, USA	\$1.29 or \$25/25
PL-259	Gold-Teflon, USA	\$1.49 or \$30/25
N/9913	For 9913, 9086, Flexi, etc.	\$3.25
N/9913S	As above but silver & Teflon	\$4.25
N-200	Silver-Teflon, install like PL-259	\$3.25
CQ-8X	95% shield, Type IIA non-contaminating	23¢
CQ-8XMM	Solid dielectric, tinned, 95%, Type IIA	27¢
CQ-1003	RG-8X, loss like RG-312, double shield	32¢
CQ-213	Enhanced RG-213, 96%+ braid	40¢

**RG-8X 95%, Premium 16¢**  
**RG-213 95%, Mil-type 35¢**  
**CQ-Flexi Flexible, 9913-type 59¢**

R1 Rotator	8 conductor (2 x #16, 6 x #24)	20¢
R2 Rotator	8 conductor (2 x #16, 6 x #18)	37¢
R4 Rotator	8 conductor (2 x #14, 6 x #18)	48¢
#14 HD	Stranded, 7 x 22 hard-drawn	8¢
#14 CW19	19-strand, copper-clad, tinned	10¢
#13 CW	19-strand, copper-clad, insulated	16¢
450 Ladder	Stranded #16 cond., poly, windows	19¢
450 Ladder	Stranded #18 cond., poly, windows	15¢

Coax and cable must be in 50-foot multiples for sale prices

## Antenna Support Line

MilSpec Dacron, solid, single braid, sun resistant line.  
 3/16" 700# test 100' hanks \$8

## The RADIO WORKS

Orders & Technical (804) 484-0140

FAX (804) 483-1873

Order Hotline (800) 280-8327

VISA and MC welcome. Give card #, exp. date, signature.  
 Add shipping (figure 10%, \$6 min) Prices subject to change.

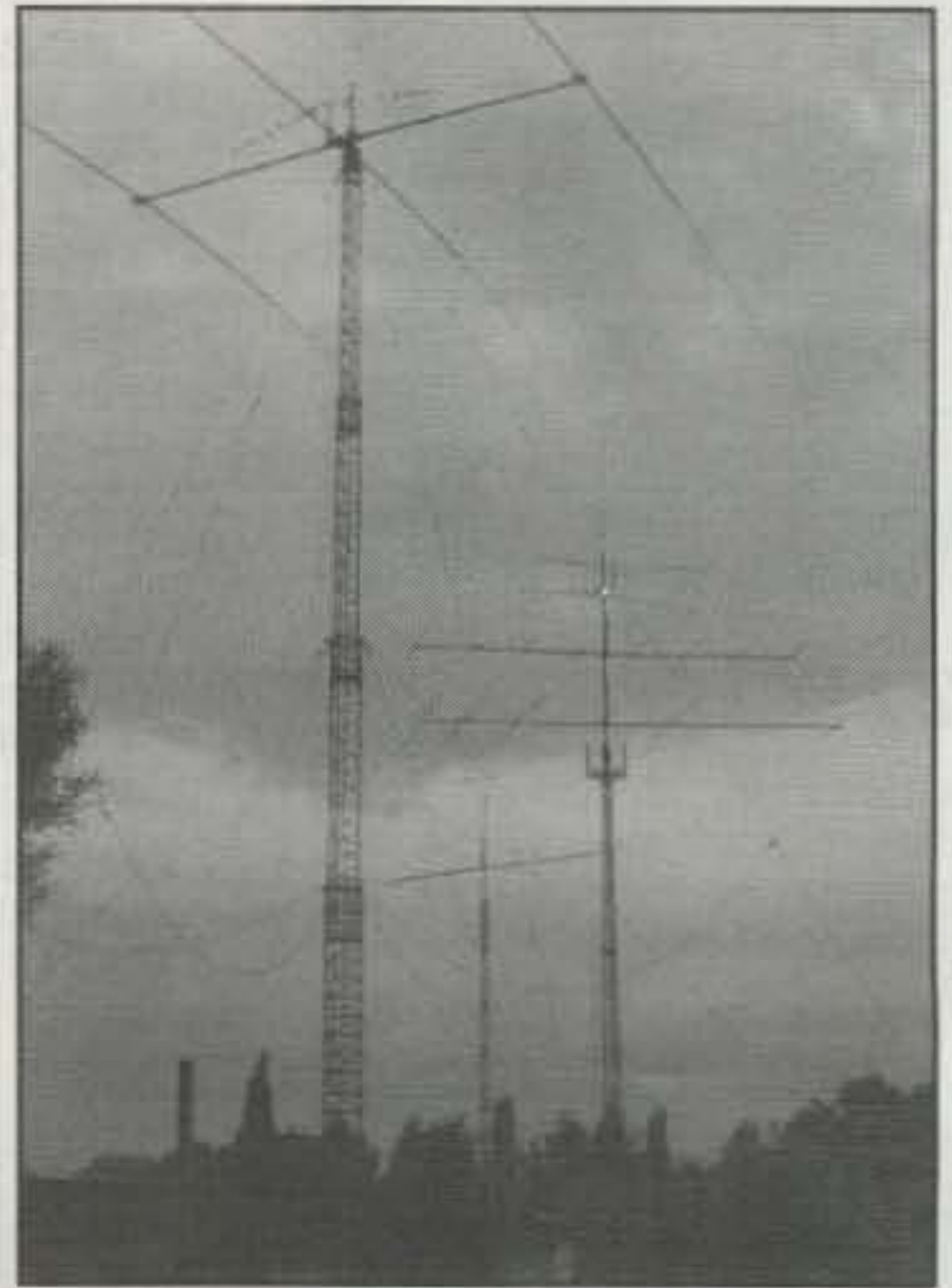
### REFERENCE CATALOG

128 pages of hard-to-find parts and reference data on antenna, baluns, antenna support line, wire, cable and coax. It reads like a magazine. Articles on ground systems, high performance wire antennas, and much more. Only a few hundred copies left. Still only \$4 ppd (\$8 foreign) including a copy of General Catalog.

Free 80 page General Catalog. Allow 4 weeks for Bulk Mail delivery, or send \$2 for General Catalog by priority mail.



This is Sean, KF9PL, who put the 6Y7 prefix on the air for the first time. Sean finished fourth in the Low Power class.



The antenna farm at club station SP6YAQ. SP8NR used them to take first place in Poland.

CIRCLE 96 ON READER SERVICE CARD

# AMIDON, INC. W2FMI BALUNS AND UNUNS TRANSFORMERS

## HIGH POWER (2Kw - 10Kw) BALUN TO MATCH 50Ω COAXIAL TO:

IMPEDANCE MATCH	DESCRIPTION	PART NO.	PRICE
12.5Ω Balanced	Direct Connect Yagi Beam	4:1-HB50	\$49.95
50Ω Balanced	1/2λ Dipole or Yagi Beam	1:1-HBH50	\$49.95
75Ω Balanced	1/2λ Dipole at 0.22λ above Ground	1.5:1-HB75	\$69.95
100Ω Balanced	1/2λ Dipole at 0.22λ, 0.33λ & Quad Loop	2:1-HB100	\$69.95
200Ω Balanced	Folded Dipole, Log Periodic Beam	4:1-HBM200	\$49.95
200Ω Balanced & Unbalanced	Off Center Fed Antennas	4:1-HB/U200	\$69.95
200Ω Balanced	10Kw Antenna Tuners & G5RV Log Periodic Beam	4:1-HBHT200	\$69.95
300Ω Balanced	300Ω Ribbon Folded Dipole	6:1-HB300	\$69.95
300Ω Balanced & Unbalanced	Off Center Fed Antennas	6:1-HB/U300	\$89.95
450Ω Balanced	Twin Lead/Ladder Line	9:1-HB450	\$89.95
600Ω Balanced	Rhombic & V-Beam Antenna	12:1-HB600	\$199.95

UNUN: for ground fed antennas, verticals, slopers, inverted L

PART NO.	IMPEDANCE MATCH	PRICE
2:1-HDU50 (2 Ratios) (connecting 50Ω coaxial to junction of two 50Ω parallel coaxial)	50:22Ω 50:25Ω	\$49.95
2:1-HDU100 (2 Ratios)	112.5:50Ω 100:50Ω	\$49.95
1.5:1-HU75 (connecting 50Ω coaxial to 75Ω coaxial)	75:50Ω	\$49.95
4:1-HCU50	50:12.5Ω	\$49.95
9:1-HU50	50:5.56Ω	\$49.95
1.78:1-HDU50 (2 Ratios)	50:28Ω 50:12.5Ω	\$49.95
1.56:1-HDU50 (2 Ratios)	50:32Ω 50:18Ω	\$49.95
1.78:1-HMMU50 MULTIMATCH UNUN		\$69.95
BEV-U50 Beverage Ant. Unun 50Ω:800Ω, 612Ω, 450Ω		\$69.95

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NOTE: OTHER BALUN & UNUN TRANSFORMERS AVAILABLE. PLEASE CALL OR WRITE FOR ADDITIONAL DETAIL.

BOOKS: 1) "Transmission Line Transformers Design Handbooks", by Jerry Sevick, W2FMI, Amidon Associates, Inc., 1991. \$8.00 ea.  
 2) "Transmission Line Transformers", by Jerry Sevick, W2FMI, APRIL, 1990. \$20.00 ea.

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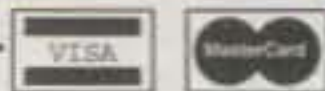
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please contact me for details.

Winner of the World Combined SSB/CW trophy was Jim, N6TJ, who operated ZD8Z to a first-place finish in the SSB contest and the top African score on CW. Ivo, 5B4ADA, gave Jim some competition, with fine finishes as 5B0A in the SSB contest and C48A in CW. Gerard, F6FGZ, was the winner of the Les Nouvelle DX Group European combined trophy, followed by YU7AV, who used 4N70AV in both contests. Tyler, KF3P, was the winner of the Oklahoma Comm Center USA combined trophy, with a second place in the SSB contest and his first-place finish in the CW contest. Second place went to Fred, K3ZO, who just seems to be at or near the top every year. Since these are combined trophies, to win one, you have to take part in both contests. The only category is single operator all band. The award goes to the operator, so you may use a different call in each contest.

As in every contest, there are several stations who go out of their way to get a special prefix or go on an expedition to some exotic (or fun) place. There were several contest expeditions this year, with P40W, PJ8H, C6AHY, VP2EJ, 6Y7M, P49V, HV4NAC, ZX0F, and OH0AAQ among them. In addition to the expeditions, many special prefixes were on, as well as some good DX catches. Thanks to

CIRCLE 22 ON READER SERVICE CARD



9K2ZZ, UU5J, T9A, TM9C, CM8ZZ, 6W1/F5PHW, TR8/F5JDG, ZD8Z, C48A, A61AF, BY1QH, VU2PTT, GM0/W5ASP, LX/DL1VJ, A35RK, and AH0T, along with a host of special prefixes from Canada. These folks help to make the contests interesting. Please take a minute to thank them next time you work them.

The 1995 contest will be held on 27 and 28 May GMT. Please mark it on your calendar and spend some time on the air. Log sheets and summary sheets can be obtained from CQ for an SASE. See you in the May contest!

73, Steve, N8BJQ

### Corrections to WPX SSB Results

QRP/p: EA4CRI was EA4CRU (score 110,290; QSOs 270; prefixes 209). The Slovenia log was omitted from the SSB results: S53EA (single op., 14 MHz, score 2,005,146, QSOs 1471, prefixes 627). WA9BOW should have been listed as Low Power. WA0ETC should have listed as a 7 MHz entry.

### Random Comments

Nice to be again in WPX CW contest. CUL next year ... YU1BO. First WPX contest—great sport. The more

stations worked the tougher separating the wheat from the chaff ... WA7FAB. Condx FB on Saturday, stinko on Sunday. Oh well. At least there was one good day ... WD8LLD. Sending logs via Internet is biggest news since computers was found. I love it. Congrats ... S50A. Despite the terrible conditions, I had a very good time, and since I expect conditions can't really get worse, I think that you can count on me again ... PA3DUA. Nice to be called by FO5OU on 40 ... F6FGZ. Surprised what 100 W can do on CW even in poor condx! ... S56A. WOW, where did all the sunspots go? EU hrd calling Carribean on 10 but no EU CQs hrd ... K4PQL.

Poor conditions in the contest compared to ARRL and WPX SSB ... AZ4F. Sure miss 15 and 10 meters!

### WORLD TOP SCORES

SINGLE OPERATOR ALL BAND		LOW POWER ALL BAND		MULTI-OPERATOR SINGLE TRANSMITTER	
<b>P40W</b> .....	<b>14,168,115</b>	<b>K3UA</b> .....	<b>16,240</b>	<b>ZX0F</b> .....	<b>12,280,162</b>
C48A .....	8,304,940	*S59ZZ .....	15,360	P49V .....	10,121,936
PJ8H .....	4,856,171	LY3BU .....	132,112	<b>HV4NAC</b> .....	<b>6,879,240</b>
*C6AHY .....	4,712,408	*S57DX .....	104,920	IQ4A .....	6,022,536
<b>KF3P</b> .....	<b>4,197,134</b>	UY5BA .....	101,880	ED3DU .....	5,992,613
NR1E .....	4,183,990	US7ZM .....	74,710	TM9C .....	5,325,936
K3ANS .....	4,172,490	*DL5MHB .....	34,428	T9A .....	5,286,060
*NP4Z .....	4,162,368			LZ5W .....	5,075,025
S59AA .....	4,143,482			ZA1A .....	4,434,246
*VP2EJ .....	4,019,488			OH0AAQ .....	4,396,968
K3ZO .....	3,919,656			RU6L .....	4,381,540
NS0Z .....	3,632,587			J45X .....	4,103,050
F6FGZ .....	3,625,720			OH0X .....	3,860,325
RZ9UA .....	3,609,362			OM3A .....	3,854,778
KT3Y .....	3,230,471			UT7W .....	3,490,155
OA4CWR .....	3,215,784			R3F/9 .....	3,383,068
4N70AV .....	2,904,552			RK9AWN .....	3,370,311
*6Y7M .....	2,581,695			OM3RKA .....	3,296,313
<b>XL3EJ</b> .....	<b>2,490,537</b>			DF0KW .....	3,215,646
EA2IA .....	2,375,566			<b>WC4E</b> .....	<b>3,116,421</b>
<b>28 MHz</b>		<b>21 MHz</b>		<b>MULTI-OPERATOR MULTI-TRANSMITTER</b>	
LP4F .....	485,739	L50D .....	1,744,624	<b>9A1A</b> .....	<b>13,800,576</b>
*L7DX .....	296,172	YZ1AU .....	893,481	UU5J .....	10,131,314
PR5W .....	104,160	YT9C .....	641,516	KL7Y .....	8,076,140
OZ2RH .....	18,054	*LU4FD .....	628,125	WW2Y .....	7,755,876
*HA8ZO .....	16,450	IR3DX .....	510,756	EM2I .....	7,050,868
<b>K3UA</b> .....	<b>16,240</b>	*RW6HZ .....	386,451	WZ1R .....	6,761,360
*S59ZZ .....	15,360	*IR9AF .....	364,224	LY7A .....	5,505,936
		*EA8ADJ .....	363,394	PA6WPX .....	5,042,016
		*LU3FSP .....	315,480	NQ4I .....	4,753,788
		UT11A .....	303,072	WX0B .....	4,131,340
<b>14 MHz</b>					
UN2L .....	3,608,410				
VE9ST .....	3,216,672				
<b>K2VV</b> .....	<b>2,238,790</b>				
S53EA .....	2,005,146				
*3G1X .....	1,923,112				
UF6VM .....	1,793,616				
YU1EXY .....	1,773,122				
YT1R .....	1,762,660				
9A7A .....	1,695,170				
OH6KIT .....	1,683,612				
<b>7 MHz</b>		<b>28 MHz</b>		<b>ASSISTED</b>	
<b>AZ4F</b> .....	<b>4,496,980</b>	L7DX .....	296,172	DK3GI .....	2,475,306
<b>9K2ZZ</b> .....	<b>3,383,676</b>	HA8ZO .....	16,450	ED1WPX .....	1,763,069
S50A .....	3,293,004	S59ZZ .....	15,360	K3WW .....	1,656,630
		N5NMX .....	6,586	KN6M .....	1,552,692
		PY2DUN .....	4,840	YT1AD .....	1,547,891
				KM0L .....	1,016,736
				EA4KA .....	990,040
				K1JKS .....	989,298
				KT6V .....	888,160
				IK0HBN .....	631,442
				IK5TSS .....	215,502

\*Denotes low power.



## CW & SSB CLUB COMPETITION

<b>NORTHERN CALIFORNIA CONTEST CLUB</b>	<b>87,248,749</b>	KIEV ICAE CONTEST GROUP	3,943,406
<b>YANKEE CLIPPER CONTEST CLUB</b>	<b>70,697,476</b>	FRASER VALLEY DX CLUB	3,745,867
SLOVENIA CONTEST CLUB	62,444,161	SP DX CLUB	3,712,803
NORTH TEXAS CONTEST CLUB	55,600,604	THE NORHTERN LIGHTS	3,570,688
FRANKFORD RADIO CLUB	53,225,668	BLACK HOLE CONTEST CONSPIRACY	3,485,292
CROATIAN DX CLUB	48,034,524	EINDHOVEN STUDENT RADIO AMATEUR CLUB	3,482,292
UKRAINIAN CONTEST CLUB	41,103,151	FOX CONTEST CLUB	3,454,292
ARAUCARIA DX CONTEST GROUP	40,304,160	SULTANS OF SHWING	3,447,500
SOUTHERN CALIFORNIA CONTEST CLUB	34,196,402	CANBERRA DX CLUB	3,302,352
POTOMAC VALLEY RADIO CLUB	29,985,575	MARCONI AMATEUR WIRELESS SOCIETY	3,284,156
RADIO CLUB ROSARIO	25,728,125	GLOUCESTER COUNTY ARC	3,270,814
RHEIN RUHR DX ASSOCIATION	22,072,341	LZ CONTEST GROUP	3,245,578
LES NOUVELLES DX GROUP	21,488,383	425 DX GANG	3,218,453
HA DX CLUB	18,500,000	TOP OF EUROPE CONTESTERS	3,064,318
BAVARIAN CONTEST CLUB	17,075,609	RADIO CLUB VENEZOLANO	2,734,632
NORTH COAST CONTESTERS	16,337,173	MAD RIVER RADIO CLUB	2,651,277
KAUNAS UNIVERSITY OF TECHNOLOGY RADIO CLUB	14,264,621	CASCADE CONTEST CLUB	2,633,400
SANTA CATARINA ISLAND DX ASSOCIATION	13,938,821	RADIO CLUB POSADAS	2,632,104
THE THRACTAN ROSE CLUB	12,894,983	KANSAS CITY DX CLUB	2,512,096
NICOSIA RADIO CLUB	12,300,000	LEFT COAST CONTEST CLUB	2,482,089
RADIO CLUB ARGENTINO	11,780,898	SHIZUOKA DX RADIO ASSOCIATION	2,454,155
RADIO CLUB PARAGUAYO	11,200,000	SCHENECTADY AMATEUR RADIO ASSOCIATION	2,448,368
GRUPO DX PANAMERICANO	10,700,000	SOUTHERN CALIFORNIA DX CLUB	2,258,650
VARGINHA DX GROUP	10,600,000	ALBANY AMATEUR RADIO ASSOCIATION	2,238,780
TAGANROG CONTEST CLUB	10,235,276	CENTRAL ARIZONA DX ASSOCIATION	2,180,424
VOJVODINA DX CONTEST GROUP	9,999,199	CANADIAN INTERNATIONAL DX CLUB	2,145,745
EASTERN CANADIAN DX ASSOCIATION	9,878,088	KALMAR RADIO AMATEUR SOCIETY	2,144,288
TEXAS DX SOCIETY	9,850,643	ST CROIX AMATEUR RADIO CLUB	1,877,675
CHILTERN DX CLUB	9,832,119	THE EXILES	1,873,125
ALPHA FOX CONTEST GANG	9,315,829	WESTERN WASHINGTON DX CLUB	1,871,589
MONTE CAPRA DX GANG	8,931,000	RADIO CLUB CORDOBA	1,864,680
MINNESOTA WIRELESS ASSOCIATION	8,882,178	CENTRAL ONTARIO DX ENTHUSIASTS	1,846,572
DELTA MIKE CLUB	8,797,950	SUDACA'S CONTEST GANG	1,744,624
CONTESTGROUPE OUDE MAAS	8,429,988	DAUBERVILLE DX ASSOCIATION	1,716,696
CENTRAL VIRGINIA CONTEST CLUB	7,612,366	SALT CITY DX ASSOCIATION	1,686,946
MOSCOW DX CLUB	7,534,681	SOUTHWIRRAL CONTEST GROUP	1,673,250
OKLAHOMA DX ASSOCIATION	7,154,432	FLANDERS DX CLUB	1,500,852
SOCIETY OF MIDWEST CONTESTERS	6,889,746	PLATINUM COAST ARC	1,491,336
MILE HIGH DX ASSOCIATION	6,691,120	RED DRAGONS CONTEST GROUP	1,473,868
SOUTHEASTERN DX CLUB	6,518,087	PERUGIA DX CLUB	1,395,216
UNION FRANCAISE DES TELEGRAFISTES	6,265,724	CCCDXC	1,379,343
A.R.I.	6,166,944	LONG ISLAND DX ASSOCIATION	1,348,040
LYNX DX ASSOCIATION	6,154,006	OREGON NOCTURNAL CHORDAL CORPS	1,317,876
FLORIDA CW CONTEST GROUP	6,096,568	TUPY DX GROUP	1,274,424
ZE POVINHO CONTEST GROUP	6,073,740	RADIO CLUB DE CHILE	1,265,103
BC DX CLUB	5,853,456	SAAR LORAINÉ DX CLUB	1,259,789
RADIO CLUB RC540	5,700,096	GROUPE HF DE L'OUTAOUAIS	1,252,240
CT3M RADIOSPORT TEAM	5,187,480	SAAR PFALZ DX CLUB	1,248,480
CALGARY AMATEUR RADIO ASSOCIATION	5,169,918	SAN DIEGO DX CLUB	1,231,134
CAMERON LABS DX CLUB	5,104,800	CLUB DE RADIO EXPERIMENTO DE BAJA CALIFORNIA	1,231,134
DIXIE DX'ERS CONTEST CLUB	5,004,048	PANAMA CONTEST CLUB	1,204,281
HARVARD WIRELESS RADIO CLUB	4,958,215	MANGALORE AMATEUR RADIO CLUB	1,173,706
A.R.I.	4,696,230	MACEDONIA CONTEST GROUP	1,092,679
SOUTHWEST OHIO DX ASSOCIATION	4,582,759	ROCHESTER DX ASSOCIATION	1,084,154
OK2-OH+2YLS CONTEST GANG	4,434,246	LOW BANDS CONTEST CLUB	1,017,288
CONTEST TEAM LUXEMBOURG	4,117,086	PRIE NERIES	991,851
LITHUANIAN DX GROUP	3,987,754	KENTUCKY CONTEST GROUP	973,434



Between snacks, LU6BEG made the best of his special LP4F call to finish number one in the world on 15 meters.

... WS8O. Traveled 1400 miles across the country for WPX CW. Visited K3LR and K5ZD/1. What an amazing difference in propagation as I moved farther east ... WX3N/1. K3LR has a beautiful station along

1-80! ... K3LR (Op. WX3N). Final operation after 8 years at this FB QTH. Great condx. especially on 40 and 80 meters ... P40W. Many WPX new I get ... JA2IU. No competitor, just a Sunday driver, enjoy the action ... AE2N. I was only able to be active Saturday for the contest because I was busy with my professional work (broadcast technician) on Sunday ... TR8/F5JDG. Good propagation of first part, strong QRN on second day, but very good contest ... YO6FGN.

Contrary to my initial impression, there "is" quite a bit of strategy involved in the WPX contest ... AC1O. It was not easy (in theory impossible) to work Europe with fixed NW-SE dipoles. 80 meters was very noisy here ... KP4VA. I am very happy I can send my contest log to the contest manager ... JG5OYU. First contest in my life. I think that was the best way to begin! CU all next year ... PY2DUN. Made the bad mistake of going single band 21. Couldn't hear any Europeans and very little from the USA ... VK2AYD. I kept going outside to see if my antenna fell down ... NJ3K. I became a proud father of a baby girl in March. QRM from little Ashely made it hard to run sta-

tions ... XL6HPT. Had a great start with over 200 QSOs the first night, then the hot water tank sprang a serious leak, and that ended the 1994 WPX test for me ... AA7FK.

Took twice 150 km drive to operate A61AF for 1.5 hours (Sunday is a work day in Arab countries). Hope I could give out a new multiplier to some ... A61AF. I could not be active for the full time as I had to drive over 1200 km on Monday. Let us hope the minimum will come soon and condx improve ... OM3EA. Trx for a fun weekend, getting to use new radio and CT9, lots of fun ... W6TKF. Trx for this very nice contest. It is fun to work "big DX" with my small dipole! ... DL4FDM. Was 200 QSOs ahead of record pace Saturday afternoon and then the band folded ... K2VV. I did not very good this year, but I will be there next year ... VE2CHI. It's hard to sort out a repeated two-digit serial number in tough conditions. Why not stick to the rule and three-digit serial numbers? ... DK3GI.

Tried out my new IC-736. Fifteen meters was as quiet as 10 meters had been a year before ... W2CRS. Operated 36 hours, 294 more QSOs, but only 36 more

CANADIAN DX ASSOCIATION	928,800	NOL CONTEST CLUB	221,140
NORTH SHORE AMATEUR RADIO CLUB	896,636	PNG AMATEUR RADIO SOCIETY	215,897
SOUTHERN OREGON DX ASSOCIATION	854,531	THE EASTERN NEW MEXICO ARC	196,482
VECIO PIAVE TEAM	843,971	NORTH COUNTRY AMATEUR RADIO CLUB	196,345
CENTRAL SHENANDOAH VALLAEE CONTESTERS	841,617	VAN WERT AMATEUR RADIO CLUB	195,024
TENNESSEE CONTEST GROUP	800,938	RIVER CITY CONTESTERS	194,351
NOVIOMAGUM CLUB	798,438	WEST PARK RADIOPS	175,265
G.A.C.W.	795,343	NASHUA AREA RADIO CLUB	174,570
CALIFORNIA CENTRAL COAST DX CLUB	741,748	BRIGHTLEAF AMATEUR RADIO CLUB	170,400
WICHITA AMATEUR RADIO CLUB	727,754	TOKYO INTERNATIONAL AMATEUR RADIO ASSOCIATION	158,724
WILLAMETTE VALLEY DX CLUB	713,006	CASPER AMATEUR RADIO CLUB	157,048
SHORT CIRCUITS	700,875	SOUTHEASTERN MICHIGAN DX ASSOCIATION	150,682
REDXA	698,832	EUROPEAN DX CLUB	147,323
WESTERN NY DX ASSOCIATION	685,905	NDXC	138,720
RADIO AMATEURS OF CANADA	676,776	CODEFEGNUETON CONTEST CLUB	136,713
BEEMSTER CONTEST CLUB	673,002	MAGNOLIA DX ASSOCIATION	132,888
FOND DU LAC AMATEUR RADIO CLUB	664,683	NORTHERN ARIZONA DX ASSOCIATION	130,042
QRZ RC	658,031	SMHARC	125,402
YV DXPERTS TEAM	648,742	BUHCAREST RADIO CLUB	123,840
TSINGHUA UNIVERSITY AMATEUR RADIO CLUB	632,060	CFARS	121,737
PORTUGESE DX GROUP	611,992	LINCOLN AMATEUR RADIO CLUB	119,799
NORTH ALABAMA DX CLUB	596,008	SAN FERNANDO VALLEY RADIO CLUB	113,564
SAKHALIN ISLAND RADIO CLUB	592,424	G.H.R.C.	106,190
DDXG	591,200	SDXRA	104,580
NORTH SHENANDOAH DX ASSOCIATION	575,522	MCKEAN COUNTY ARC	103,912
SOUTH COAST WIRELESS SOCIETY	575,397	ORDER OF BOILED OWLS	87,291
SAWYER COUNTY FISHING AND CONTEST CLUB	564,571	MT VERNON AMATEUR RADIO CLUB	81,375
SDXG	553,226	NORTH JERSEY DX ASSOCIATION	79,344
THREE OP WINNERS CLUB	543,490	G-QRP CLUB	73,340
ISLAND COUNTY AMATEUR RADIO CLUB	535,631	DX HUNTER CLUB	69,083
CENTRAL GERMAN CONTEST GROUP	534,786	NORTH FLORIDA DX ASSOCIATION	65,340
KHARKOV REGIONAL AMATEUR RADIO SOCIETY	532,309	TALLAHASSEE AMATEUR RADIO SOCIETY	64,370
S5SSC DREAM TEAM	514,080	SOUTHERN ARIZONA DX ASSOCIATION	63,360
SANTA BARBARA CONTESTERS	502,920	HENRY FORD COMMUNITY COLLEGE ARC	63,027
UBC AMATEUR RADIO SOCIETY	496,563	DNIAPER CONTEST GROUP	60,984
KENWOOD EMPLOYEES RADIO CLUB	492,264	EASTERN IOWA DX ASSOCIATION	60,645
NELSON & DISTRICT AMATEUR RADIO SOCIETY	467,116	CITY OF BRISBANE RADIO SOCIETY	53,846
VICKSBURG AMATEUR RADIO CLUB	435,954	VALLEY RADIO CLUB EUGENE	50,874
CT DX GROUP	424,650	R.C.C.	47,436
CENTRALIA WIRELESS ASSOCIATION	417,410	INDIAN RIVER AMATEUR RADIO CLUB	46,107
LITHUANIAN CONTEST GROUP	407,082	HOOSIER CONTESTERS	42,636
CENTRAL RADIO CLUB OF UKRAINE	406,461	SHORE POINTS AMATEUR RADIO CLUB	29,120
MISSISSIPPI VALLEY DX/CONTEST CLUB	403,920	KETTLE MORaine RADIO AMATEURS	28,269
AMSTERDAM DX GROUP	389,888	NORTHERN OHIO DX ASSOCIATION	28,035
PIKES PEAK RADIO AMATEUR ASSOCIATION	367,850	LA DX GROUP	26,640
MOSCOW RADIO CLUB	351,110	POWAY AMATEUR RADIO SOCIETY	24,582
SP QRP CLUB	350,973	LES BACORES DX	20,352
ST. LOUIS AMATEUR RADIO CLUB	348,688	CENTRAL FLORIDA DX ASSOCIATION	20,022
ARCTIC AMATEUR RADIO CLUB	345,554	PUNTO FIJO DX CLUB	19,392
NORTHROP RADIO CLUB	323,314	NORTHERN CALIFORNIA DX CLUB	17,766
TROMSOEGRUPPA CONTEST CLUB	322,292	DELTA MIKE DX GROUP MILANO	10,780
NIAGARA PENNINSULA AMATEUR RADIO CLUB	315,828	SHASTA DX & CONTEST CLUB	10,293
G.A.D.X.	296,172	WYOMING DX CLUB	10,194
CENTRAL TEXAS DX & CONTEST CLUB	273,742	MELSDUNGER CONTEST TEAM	8,763
TELEGRAPIY FRIENDS CLUB	270,864	OCEAN MONMOUTH ARC	8,216
NORTHSEA DX CLUB	270,680	RADIO CLUB OF TALLINN	6,555
BERLIN-BRANDENBURG DX CLUB	267,376	WESTERN PA DX ASSOCIATION	2,312
ACTIVITY GROUP OF BELARUS	265,540	PIERRE ARC	2,106
IOWA DX & CONTEST CLUB	233,334	DAYTON AMATEUR RADIO ASSOCIATION	1,590
EASTERN HIGHLANDS AMATEUR RADIO CLUB	229,770	SOUTH JERSEY RADIO ASSOCIATION	1,292

prefixes over last year . . . VE9ST. Bought 486SX Friday afternoon. No more paperwork . . . C48A. The solar flare on Saturday morning sure shut me down . . . WB0O. This was my first CW contest, and won't be my last. Had a lot of fun . . . KA1ILG. My first attempt at WPX CW. Lots of fun, but should have spent Sunday morning on the beach, as condx were marginal! . . . VP2EJ. Someday I will run this contest with no outside interruptions; 19.5 hours is not enough . . . KW2J. My last contest before my long visit to the USA . . . UT4UZ. Nice conditions until 1900Z Sat., then the bottom dropped out and the Europeans disappeared . . . WB9HRO.

Condx first half were a blast, died second half . . . K7SV. 9A6P for the first time in a contest. It was interesting and successful, wasn't it? . . . 9A6P. My first contest entry. It was fun! . . . KE5IR. Great contest. Lots of fun. Looking forward to the next one . . . KA4RRU. It been great pleasure to be sending new prefix RN0 for the first time . . . RN0F. House lost power twice during test. Thank God for CT's savelog feature . . . K7NPN. Murphy's law—selected wrong operating times . . . XO1XX. If you missed the first 16 hours

or so, you missed the contest . . . N8II. My first international contest in a DX country. Very good contest but no propagation except in night and evening . . . 6W1/F5PHW.

YU1EXY was my last QSO two years in a row . . . K8SJ. First high power entry. Enjoyed the 20 meter running at the beginning. Band faded out completely on Sunday . . . DL1IAO. Band conditions were poor, but I had FUN! . . . AH6MZ. WPX is always fun. Makes having an odd call worthwhile . . . WY0Z. A real challenge to work the contest on a straight key . . . ON4AUC. Never worked a contest where so few Europeans heard . . . W4OGG. The disturbance skewed a lot of European signals to the south and increased the MUF over the equator . . . K3ZO. My last contest from HL! . . . HL9UH. What an experience using CT for the first time. GREAT! . . . DF3IAL. The new DSP-9 made operating a real pleasure . . . W6BIP. Operated only 30 hours; guess that means I didn't read the rules this year . . . NP4Z.

Please QSL via KA9WON . . . T92X. New antenna does not help when conditions are bad . . . XO1SF. I enjoyed it alot, but it was swet en tairs for me! . . .

ON6ZX. Still love CW after 43 years at sea as "sparks." It's the CW virus inside me . . . PA3GNO. Couldn't believe working Europeans on 28 MHz with beam southwest . . . K3UA. Nice to collect prefixes on this relatively new (for me) band . . . 4Z4TA. Condx not good, but I enjoyed the contest . . . G5MY. Worked Assisted so I could work P40W on as many bands as possible in the time I had to operate . . . K3WW. Many thanks to WR8C for use of his station and to KC8MK for his work on the beverages . . . KV8Q. My next goal will be to break the 1000 Q mark (which will be a challenge with my 120, 40 meter dipole, and "no one beaming Australia") . . . VK1FF.

The "Killer Koronal Hole" sure nailed all bands on Sunday. My goal to break 1 million points and 1000 QSOs was destroyed because of it . . . KC6X. First WPX for me. Very interesting contest . . . N4YDU. This was my first try at WPX and I enjoyed it, in spite of the rotten conditions on Sunday. That was an opportunity to get pizza . . . K1JKS. My first WPX. Got in on the spur of the moment. Great fun! Good to be back in ham radio after 27 year absence . . . AA7VG. This was my first time operating as the DX. What fun. This





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**TM9C:** F5IN, F5LGE, F6ARC, F6DZS **UT7W:** US-W-7, UT7WZ, UR5WAN, UUSJWJ, UU9JH & UU9JBZ **UX8IXX:** US-1-700, US-1-6-1, US-1-603, **VX3BB:** VA3CW, VE3ABG, VE3YBH, VE3FJB, VE3VSM, VE3NDA. **WC4E:** WC4E, K1ZX, G4BK/W4, WB4BBH, W1CW, W1YL. **WF1L:** WF1L, WE1B, AA1FN, N1JAC, N1KKY. **WG4F:** WG4F, KX4I, KD4Y, K4JYD. **WO1N:** WO1N, KT1Q, KB1AFX, WA1TET, NF1A, WB1ELA, WT1T, W1MJ, K1TWF. **WS1F:** WS1F & WA1PMA. **WX3M:** WX3M, WX3L, N8RHV, K8CC. **WX3W:** A9X, K9RS, AA5B, WX3W. **XL2ZP:** VE2ZP & OH1VR. **Y06KNW:** Club Group. **YT7P:** YT7WA & Zoran, Sale, Mile. **ZA1A:** OK2SPZ, OH1MKT, OK2ZW, Jana, Josi, Sarka. **ZX0F:** YU1RL & PY0FF.

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**OZ5EDR:** OZ5AAH, OZ5ABD, OZ8NJ. **P49V:** A16V & K6XC. **PI4ZLD:** PA3EOB & PA3GCU. **R3F/9:** UA3AO, RU9CK, RU9CZ, RA9CU, RW9CZ, RK9CK. **RK0SXF:** RU0SN & UA0SMM. **RK3UWA:** Vladislav & Serge. **RK9AWN:** UA9AR, RA9AA, RA9AX, UA9AU, RA9ANR, RA9ATU, RA9ATW. **RU0L:** RW0LZ, RU0LAX, UA0LS, UA0107-696. **RU3A:** RA3AUM, UA3AFS, RV6HY/3, RX3ACS, RK3DT. **RU6L:** UA6LO, UA6LV, UA6LFO, UA6NP, RU6LG, UA6-150-262. **RW1A:** UA1AAF, UA1AQF, UA1-169-2391, UA1-169-900, UA1-169-1312. **RZ4AYT:** UA4ALI, UA4AIY, RA4AI. **SM6LPF:** SM6LPF, SM6LPG, SM6REA, SM6MCW. **SN0PR:** SP6FER, SP6HAO, SP6VXA. **SN7L:** SP7MTR & SM7NIX. **SV9/HA6NL/P:** HA6NL, HA6NY, HA6ZV. **T9A:** T93M,

**9A1A:** 9A2DG, 9A2DQ, 9A2EU, 9A2LJ, 9A2NJ, 9A2KL, 9A2AJ, 9A3GW, 9A3TW, 9A3NR, 9A3TF, 9A3MJ, 9A4WW, F2CW, S58KW. **AD6C:** AD6C, N6DX, N6VR, N8SR, N6RVZ, WA6CDR. **CZ7Z:** VE7AV, VE7CV, VE7EME, VE7PTT, VE7QD, VE7RBL, VE7SK, VE7TCP. **EM2I:** UR3IKY, US1ITU, UT2ID, UT2II, UT2IM, UT2IO, UT2IV, UT2IZ, UT8IM, UX11A, UY3IM. **IR5R:** IK5QDE, IS8G, IS5ER, ISJHW. **JA1YDU:** JH0NZN, JJ1DYR, JD1RUR, JF7TFK, JJ2UYK, JQ2NJ, JR0XHL, JR0UUU, JE0BKI. **KL7Y:** KL7Y, KL7PJ, KL7AF, KL7U, NL7G, NL7GP, N7DF, K0MVL. **LY7A:** LY1DF, LY2FN, LY2UF, LY2MW, LY3BN, LY3BCC, LY2NK, LYR 346, LYR 728, LYR 1751. **NQ4I:** NQ4I, W0MHS, W1UA, KB4GID, KF4CI.

**OZ5WQ:** OZ1BIZ, OZ3PE, OZ3ZW, OZ5WQ. **PA6WPX:** PA3BBP, PA3DMH, PA3ERC, PA3ELX, PA3FRN, PA3GBQ, WM2C. **UU5J:** UU1JA, UU2JQ, UU2JZ, UU3JD, UU3JM, UU3JW, UU4JKK, UU4JKO, UU5JR, UU0JX, UB7-067-2, UB5-067-2000. **V73S:** V73C. **WJ7R:** WJ7R, WA6BXH, K16FE, AA7NX. **WW2Y:** WW2Y, N2NU, K2WI, N2RM, KA2AEV, WM2H. **WX0B:** NM5M, NA5Q, KN5E, AA5OR, WX0B. **WZ1R:** WZ1R, KY1H, KB1W, WM1K, AA1AS, K1MBO, N1RFE, KA1NCN, KA2CW, KB2R.

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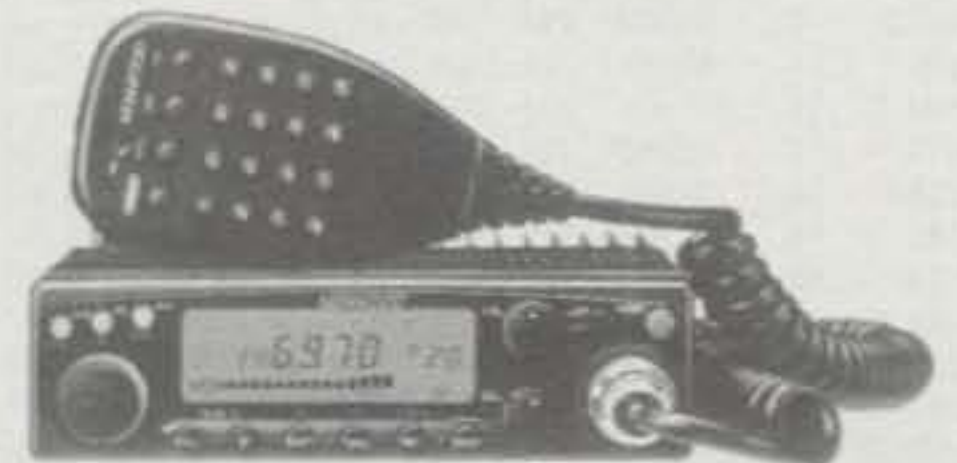
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# The 9G5TL Story

## The Central Arizona DX Association's CQ WW DX Contest DXpedition To Ghana

BY WARREN HILL\*, KF7AY

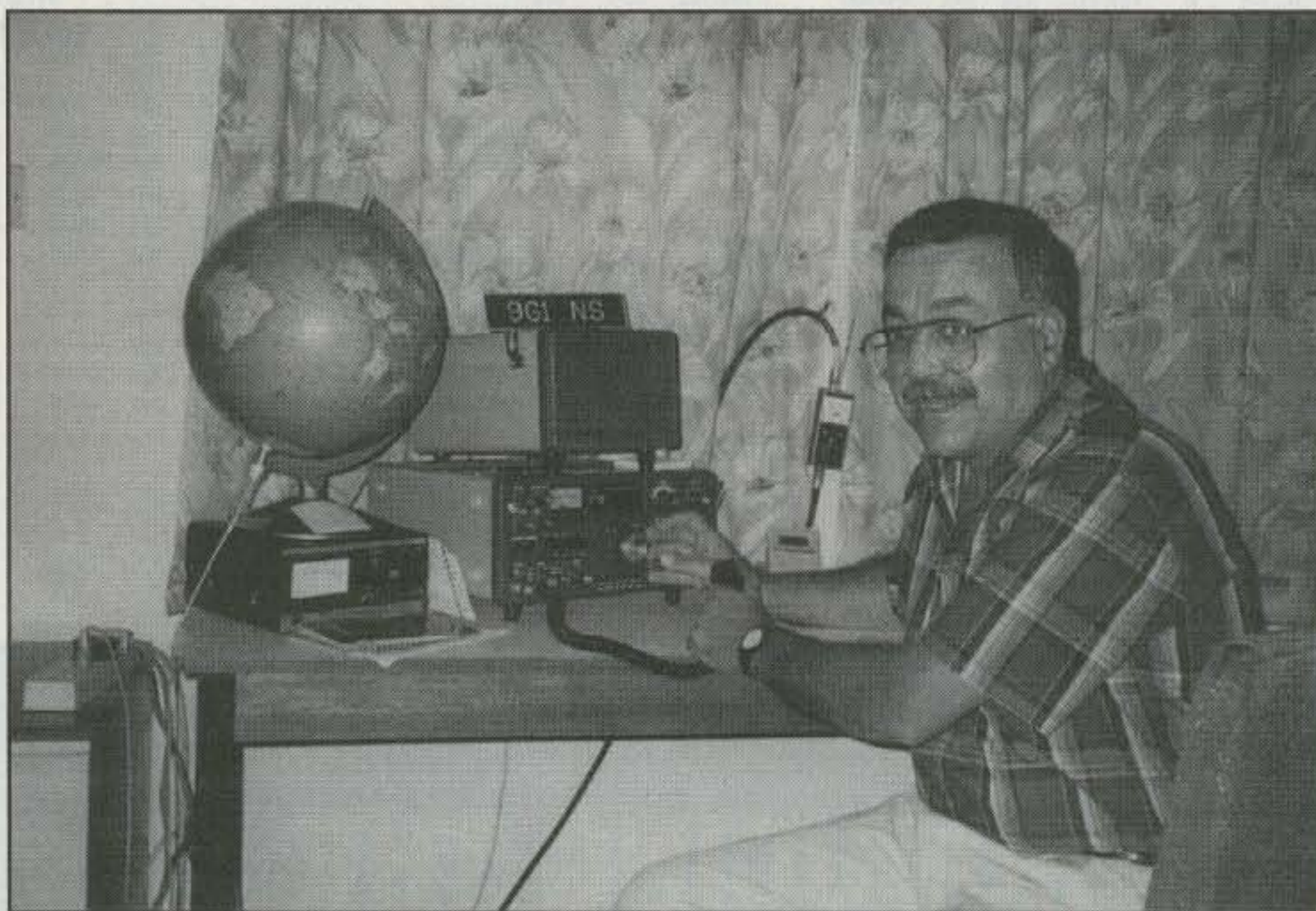
**Z**one 35 is well suited for DXpeditions. Its open and friendly people, easy access from Europe and North America, and dependable propagation make it a pleasure to operate from this part of the world. With AA7NO and N7BG, I visited The Gambia for the 1993 CQ WW DX SSB Contest. In the months that followed, a search began for another sub-Saharan country from which to operate the CQ WW. Ghana soon became an obvious choice. Following more than a decade of silence, the recently renewed activity from 9G made this a very desirable location.

When it became known that 9G was being considered as a destination, fellow Central Arizona DX Association members Mike Bill, AA7NO; Vince Thompson, K5VT; Rod Mack, NZ7E; Millie Thompson, WY7K; and Jack Reed, WA7LNW, all expressed an interest, and planning began in earnest many months in advance of our arrival. From the very beginning, it was decided that not only would a serious SSB contest effort be mounted, but we would also run an extensive CW operation and concentrate on RTTY, a much-needed mode from West Africa.

### Planning

At the 1994 Dayton Hamvention, the well-known contest DXpeditioner Roger Western, G3SXW, suggested that our group consider sharing licensing, customs paperwork and antennas with his all FOC team from the United Kingdom and the United States. It was soon decided that GM3YTS, N7BG, K7GE, KC7V, and G3SXW would follow us by one month for the CQ WW DX CW from our location. This is the same group of operators who took first place as ZC4Z from Cyprus in the 1992 CQ WW DX CW Contest. This was an interesting proposal, knowing full well how much is involved in doing just one operation.

\*7525 E. Broadway Road, Mesa, AZ 85208



Samir Nassar, 9G1NS, our host.

<b>Ghana:</b>	Western Africa, zone 35. Population: approximately 15 million.
<b>Capital city:</b>	Accra (5°33' N, 0°15' W), located along the Gulf of Guinea.
<b>Local time:</b>	Same as GMT.
<b>Languages:</b>	English (official); Ga, Twi, and Ewé are widely used in the capital Accra. Throughout Ghana 46 different languages are spoken.
<b>Location:</b>	Bordered by Burkina Faso, Côte d'Ivoire, Togo, and the Gulf of Guinea.
<b>Climate:</b>	Proximity to the equator makes it tropical. The rainy season is from May to September. October (CQ WW SSB) and November (CQ WW CW) see little rainfall, although the weather remains quite hot and very humid.
<b>Currency:</b>	The Ghanaian Cedi is the official currency. Approximately $\text{¢}1,000 = \text{US}\$1$ . Interestingly, the $\text{¢}1,000$ Cedi note is presently the largest bill available.
<b>Visa:</b>	Embassy of Ghana, 3512 International Drive, NW, Washington, D.C. 20008. Yellow fever vaccination certificate, valid passport, and proof of return ticket are required. Two week turnaround. Telephone: (202) 686-4520.
<b>Diseases:</b>	Current immunity to yellow fever, hepatitis, and typhoid are strongly recommended. Malaria prophylaxis is begun two weeks before leaving and is continued for six weeks after returning. Consult your physician before leaving.
<b>License:</b>	Reciprocity with United States, Great Britain, and others. Information can be obtained from: Secretary, Ghana Frequency Registration & Control Board, P.O. Box 1627, Castle Annex, Accra, Ghana, West Africa.

Table I - Brief overview of Ghana.



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Connector....	Type N	Type N

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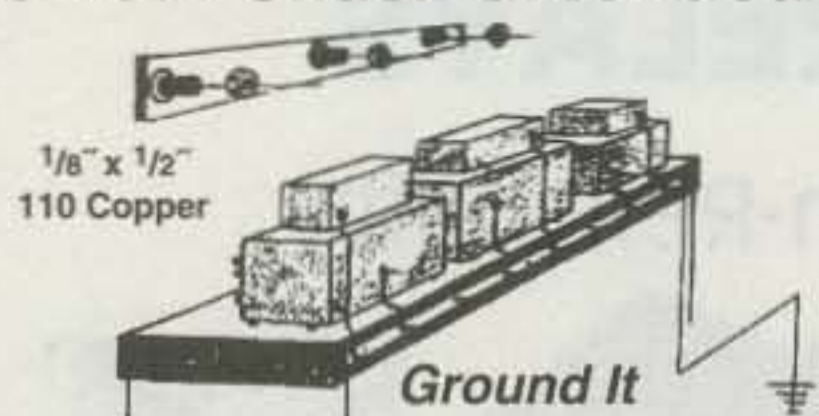
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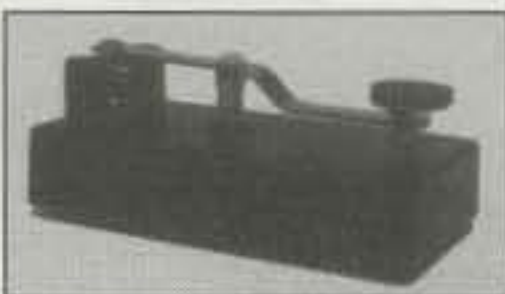
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**Ghana**

The true nature of this part of the world is unknown to most Americans. Africa is indeed a very large place and conditions in its many countries range from some of the most extreme examples of human misery to rapid emergence into the first world. At the present time, Ghana is somewhere in between.

The Republic of Ghana is an independent African nation of about 15 million people. With 92,000 square miles, it is about the same size as the United Kingdom, bordered by Burkina Faso, Côte d'Ivoire, Togo, and the Gulf of Guinea. Accra, its capital, is approximately five degrees north of the equator and almost directly on the zero degree meridian. English is the official language, but Twi, the language of the Ashanti people, Ga, and Ewé are widely spoken. Forty-six other languages are used throughout the ten regions of this country.

The Portuguese were the first Europeans to reach what is now Ghana in the late 15th century. The discovery of rich gold deposits led to the region taking on the name "Gold Coast." As regrettable as it was predictable, the slave trade soon became established and continued for more than two centuries. For this reason, many of Ghana's inhabitants look strikingly like the African-Americans who now live in the United States, as well as Central and South America and throughout the Caribbean.

In the late 19th century the area known as the Gold Coast formally became a British colony. After it gained independence from

Great Britain in 1957, it took its name from the ancient trading empire that once dominated western Africa. Until just recently ruled by a military leadership, it has since returned to civilian rule with an elected president serving four years. One is immediately struck by the hopefulness of the Ghanaian people, now that their country has become "free and open," as it is often described. Emergence into the first world is still far off in the future, but optimism is the emotion of the day.

Any contest operating site in Ghana should be equipped with a back-up generator. Power interruptions are not only frequent, they are scheduled. Due to low water levels at the Akosombo and Kpong hydroelectric dams on Lake Volta, power throughout the country has recently had to be interrupted by scheduled shut-downs as the distribution of electricity is rationed. At present, one day out of four the entire capital is without power. This likely will improve in the future.

I recommend that visitors from North America politely decline offers to sample even the smallest amount of the local pepper sauce known as *chito*. 9G1NS told me it is so hot that the dried and ground form of the pepper used in its preparation is commonly known as "gun powder. Although K5VT thinks that it may not be quite as dangerous as the hot peppers he was served in Eritrea and the Comoros, I am certain that it would get the attention of any XE visitors who stop by my home in Arizona.

At first none of us were sure just how this kind of arrangement would be accepted by a government who less than two years previously had viewed amateur radio as an illegal activity. To propose to the Ghanaian regulatory authority that they license two large foreign contest groups was to begin this project with more than just a few uncertainties. From the start, it was obvious that something like this could not be accomplished without the help and advice of others.

**Help From Others**

Early on in the planning stages, Randy Martin, KØEU, of the 9G1XA operation and Henk van Oosterhout, PA3AWW, of the 9G1AA operation offered important insights that later led to contact with Mr. Kofi Jackson, 9G1AJ, then the Secretary of the Ghana Frequency Registration and Control Board in Accra. This was an important first step of many steps to follow.

Sometimes luck is more responsible for success than planning. Four months before our arrival, one of our team, WY7K, ran into 9G1NS on 20 meters. During that QSO he offered us local assistance and his telephone number in Accra. We could hardly have imagined the impact that this single QSO would have on everything that followed.

Samir Nassar, 9G1NS, turned out to be a member of the Executive Committee of the Ghana Amateur Radio Society. From the time of our first telephone conversation, it was obvious that his contribution to our effort would make all the difference. He quickly became a close friend and strong ally, helping to solve countless logistical problems.

After five months of correspondence, we were pleased that licenses were finally granted: 9G5TL for our SSB group in October and 9G5AA for the CW team that would follow us in November. Individual licenses were also issued for operating outside the contest. With a renewed interest by foreign radio amateurs in operat-

Hr.	Sat.	Sun.	Hr.	Sat.	Sun.
to 01	175	50	13	125	130
02	130	30	14	125	150
03	115	50	15	110	130
04	95	70	16	130	130
05	95	35	17	130	160
06	115	70	18	130	150
07	115	90	19	110	130
08	95	90	20	50	120
09	130	135	21	110	110
10	150	175	22	110	150
11	150	130	23	150	150
12	125	130	24	150	110

Table II- 9G5TL average QSO rate by hour and day.

# Ameritron *no tune* Solid State FET Amplifier

*No tuning, no fuss, no worries -- just turn on and operate . . . Incredibly low \$1299 includes AC power supply, 600 Watts output, continuous 1.5-22 MHz coverage, instant bandswitching, no warm up, no tubes to baby, fully SWR protected, extremely quiet, very compact*

● Ameritron's revolutionary ALS-600 is amateur radio's only linear amplifier that uses four rugged TMOS RF power FETs -- gives unequalled *no tune* solid state performance

● \$1299 includes Ameritron's *no tune* FET Amplifier and a 120/220 VAC, 50/60 Hz AC power supply for home operation

● Instant bandswitching, no tuning, no warm up -- just turn on and operate

● Output Power -- 600 Watts PEP, 500 Watts CW

● Continuous Coverage -- 1.5 to 22 MHz; 10/12 Meters with easy-to-install optional kit, \$29.95 plus s/h

● SWR Protection -- prevents amplifier damage if you switch to wrong band, use wrong antenna or have high SWR

● Over Power Protection -- if output forward power or reflected power exceeds safe level, output power is automatically reduced to prevent amplifier damage by controlling ALC to exciter

● 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

● Operate/Standby Switch -- lets you run "barefoot", but you can instantly switch to full power if you need it

● 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

● 12 VDC output jack -- lets you power low current accessories

● Separate ALS-600PS power supply (included) can be placed conveniently out of the way and plugged into your nearest 120 VAC outlet -- no special wiring needed

● Made in USA

● Enjoy 600 Watts of *no tune* solid state power. Call your favorite dealer for your best price and order your ALS-600 with power supply today

ALS-600

**\$1299**

Suggested Retail  
(Includes AC  
Power Supply)



## ALS-600PS Heavy Duty Power Supply

ALS-600PS power supply included with ALS-600 amplifier



● Massive choke input filter greatly improves voltage regulation and reduces peak AC line current ● Ameritron's exclusive Multi-Voltage Power Transformer lets you compensate for stressful high line voltage and performance robbing low line voltage ● Step-Start Inrush Protection™

stops damaging inrush currents and extends life of power supply components ● 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 ● Draws less than 12 amps at 100 VAC and less than 6 amps at 230 VAC ● Includes prewired cable to plug into ALS-600 amplifier ● Made in USA

# Ameritron *no tune* Solid State Amplifier

*Ideal mobile amplifier -- uses 13.8 VDC mobile electrical system, very compact 3 1/2 x 9 x 15 inches, extremely quiet, 500 Watts output, continuous 1.5-22 MHz coverage, instant bandswitching, no tuning, no warm up, SWR protected*

ALS-500M

**\$799**

Suggested Retail



● Mobile *no tune* Solid State Amplifier -- uses four rugged 2SC2879 high power linear RF power transistors

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

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

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

● Output Power -- 500 Watts PEP, 400 Watts CW

● Continuous Coverage -- 1.5 to 22 MHz; 10/12 Meters with easy-to-install optional kit, \$29.95 plus s/h

● 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

● Thermal Overload Protection -- disables and bypasses

Exact power output of amplifiers may vary on each band.

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

● Excellent harmonic suppression -- multiple section output network and push-pull output circuit gives excellent harmonic suppression

● DC current meter lets you monitor collector current

● ON/OFF Switch -- bypasses amplifier for "barefoot" operation without having to disconnect high current power supply cables

● Remote ON/OFF Control -- lets you remotely control ON/OFF function for out-of-the-way mounting of amplifier

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

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

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	PS120M	PS140II	RS300	RS40X	PS50TM
Voltage (VDC)	3-15	13.8	1-15	1-15	13.8
Current (ICS)	12	14	30	40	5.2
Current (cont.)	9.2	12	24	32	4.2
Ripple(max.)	3mV	3mV	3mV	3mV	3mV
Regulation	1%	1%	1%	1%	2%
Cooling Fan	NO	NO	NO	YES	NO
Size(inch.)	5x4x9	5x4x9	7x6x9	11x5.5x9	6x3x9
Weight (ilbs.)	11	11	18	22	6
Meter	YES	NO	YES	YES	YES

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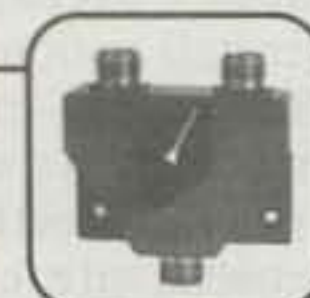
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Isolation	60 dB 600MHz	50dB 1 GHz	60dB 300 MHz
Connector	SO239	N	N

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**SD-416II** 16 Amps ♦ **SD-303FII** 30 Amps

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**CNW 420** 1.8-30MHz, 11 Bands 200 W CW 3.5- 30MHz

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Kofi A. Jackson, 9G1AJ, at his station in Accra. Mr. Jackson is the immediate past secretary of the Ghana Frequency Registration and Control Board.

ing from 9G, our visit triggered a review of the call assignment system by the licensing authority. Beginning with this operation, foreign nationals operating in Ghana would be assigned the new prefix 9G5.

Planning for both operations went very

smoothly, with our group benefiting greatly from the years of experience and insights of G3SXW. At the time of this writing, the CW group (9G5AA) has just finished their contest weekend with an outstanding score of more than 11,000 contacts and a score in excess of 23 mil-

Country .....	QSOs
W, N, K .....	1,923
DL .....	479
I .....	420
EA .....	277
UA .....	213
G .....	145
OH .....	122
SP .....	112
OK .....	95
SM .....	94
VE .....	64
S5 .....	57
All Others .....	1,379
<b>Total.....</b>	<b>5,380</b>

Table III- 9G5TL QSOs by country.

lion points as a multi-multi operation. Considering the significant cost and lengthy paperwork involved in planning a trip to an unusual location, the economy of scale possible by a cooperative effort may be something for future contest groups to consider.

### Equipment

For our equipment, we made plans to bring a FT-1000D, two TS-930's, and two Alpha amplifiers. A PK-232 and a laptop computer would be used for RTTY contacts. Two A3S three-element Yagis would handle 10 through 20 meters. A 40-

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		PB-18 7.2v 1400mah	\$49.25
<b>YAESU:</b>	FT-11R/41R	FNB-33 4.8v 1200 mah	\$53.25
		FNB-38 9.6v 600mah	\$66.90
<b>ICOM:</b>	W21AT/W21ET	2GXA/GXE/2XAT/GXET	
		BP-132 12v 600mah	\$54.00
		BP-132A 12v 600mah	\$54.00

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	160	80	40	20	15	10	Total	%
Europe	2	8	91	830	1,062	905	<b>2,898</b>	54
N. America	0	54	240	1,152	501	20	<b>1,967</b>	36.5
Asia	0	1	4	115	40	34	<b>194</b>	3.6
Africa	5	13	29	57	30	34	<b>168</b>	3.1
S. America	0	5	14	61	34	21	<b>135</b>	2.5
Oceania	0	0	0	12	5	1	<b>18</b>	0.3
<b>Total</b>	<b>7</b>	<b>81</b>	<b>378</b>	<b>2,227</b>	<b>1,672</b>	<b>1,015</b>	<b>5,380</b>	<b>100</b>

Table IV- 9G5TL QSOs by continent.

2CD two-element Yagi and Windom wire antenna would be used for 40 meters. A WARC-band dipole was planned for the three new bands, and  $\frac{1}{4} \lambda$  slopers and dipoles would give us signals on 160 and 80 meters. Information provided in advance by the hotel showed that several areas of their roof would be at the 85 foot level. With even modest mast supports, it was exciting to imagine that our antennas could end up as some of the highest objects in the Accra skyline.

### Travel and Customs

By an incredible coincidence, Eunice Rawlings, the travel agent who handled our arrangements, was familiar with DXpeditioning. In fact, her 94-year-old father is not only a ham, but previously worked out of the UK as a ship-board CW operator and was once even employed by Marconi himself! It was all the more easy for us not to have to explain why we needed top-floor hotel rooms and special consideration from the airlines, which she arranged. Mrs. Rawlings also obtained a layout of the hotel roof, allowing us to plan antenna placement well in advance of our arrival. Now that's a DXpeditioner's travel agent!

Following four connecting flights that included stop-overs in Dakar, Senegal and Abidjan, Côte d'Ivoire, we arrived at Accra's Kotoka International Airport 25 hours after leaving Phoenix. Our host, 9G1NS, was waiting to walk us through customs.

I can hardly over-emphasize the importance of doing all customs paperwork in advance, as well as having someone familiar with local protocol available to lend assistance. Through the help of the Ghana Amateur Radio Society, and with the cooperation of the Ghana Frequency Registration and Control Board, it was possible to arrange all customs paperwork well in advance. I have to admit that I briefly was concerned when the first question asked by airport personnel was "Are you bringing into Ghana any electronic devices?" We were grateful that 9G1NS was at our side to offer an explanation to local authorities. However, a mild panic set in when we discovered that our antennas were nowhere to be found!

### Lost Antennas

While organizing our equipment for customs officials, it was determined that the

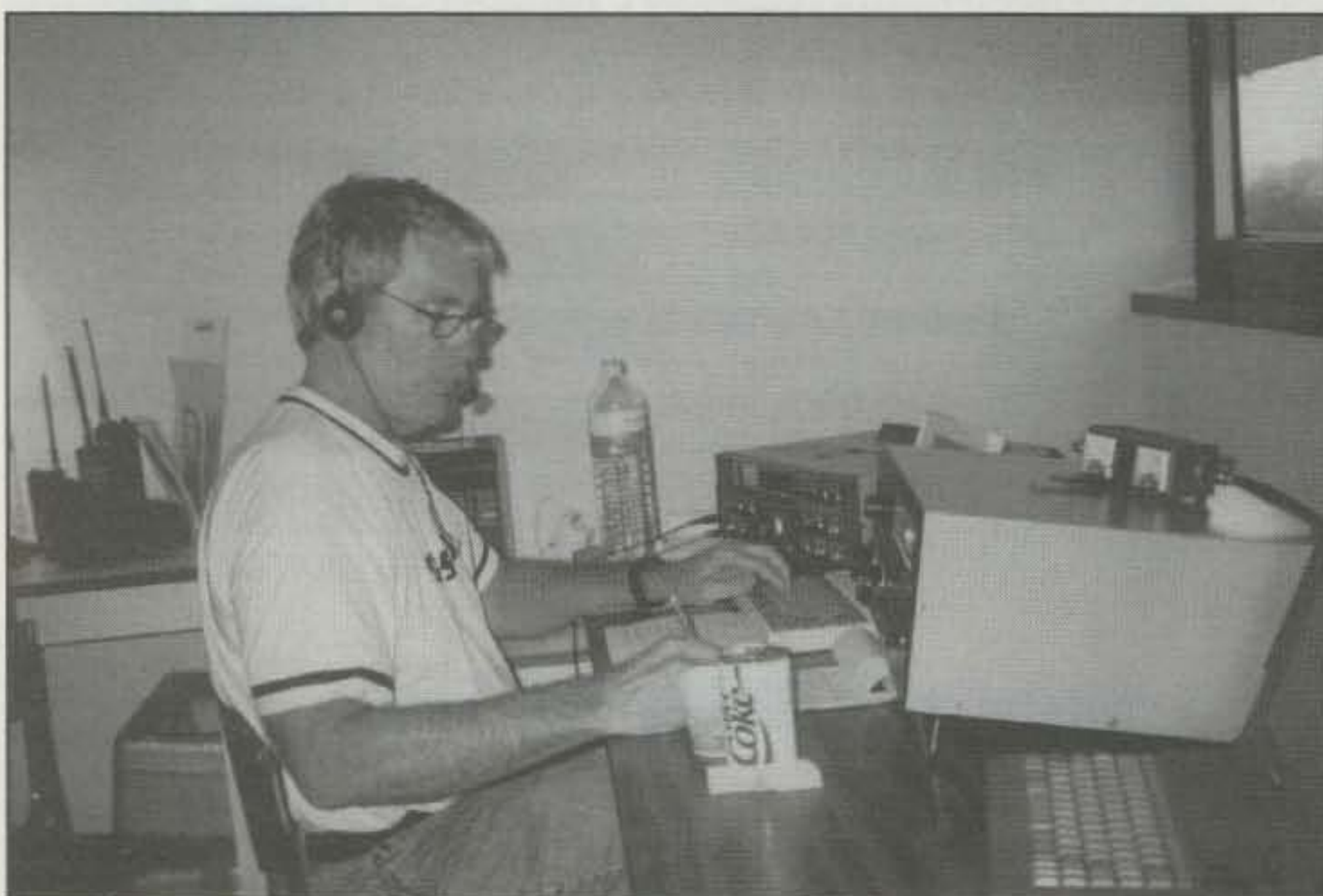
three large PVC tubes used to transport our antennas had not been off-loaded from the last leg of our flight. By the time this discovery was made, our plane had already departed Accra and was on its way to Lagos, Nigeria. Anyone who has recently passed through the Lagos airport will know that this is one of the last places you would want your equipment to be sent mistakenly! Further complicating matters, the city of Accra was without power, rendering telephone, telex, and FAX machines inoperative. 9G1NS, K5VT, and I spent the next hour with airline officials, but we were unable to make any progress, having no means of regular communication available.

Between city-wide power outages we were able to get a FAX out to our QSL manager, KG7XC, in Arizona. Through a series of telephone calls and FAXes to airlines and airports across western Africa, Jack was able eventually to locate the wayward antennas several days later at a baggage storage area in Abidjan. Our frustration was heightened by the fact that he could call Abidjan from Arizona, but for the first two days we were unable to make the same call from Accra! KG7XC arranged for the last of our equipment to be placed on an Air Ghana flight, arriving at the Accra airport 26 hours before the start of the contest. This left little time for testing and changes. With the antennas back with us, we could hardly wait to get started.

### Getting Started

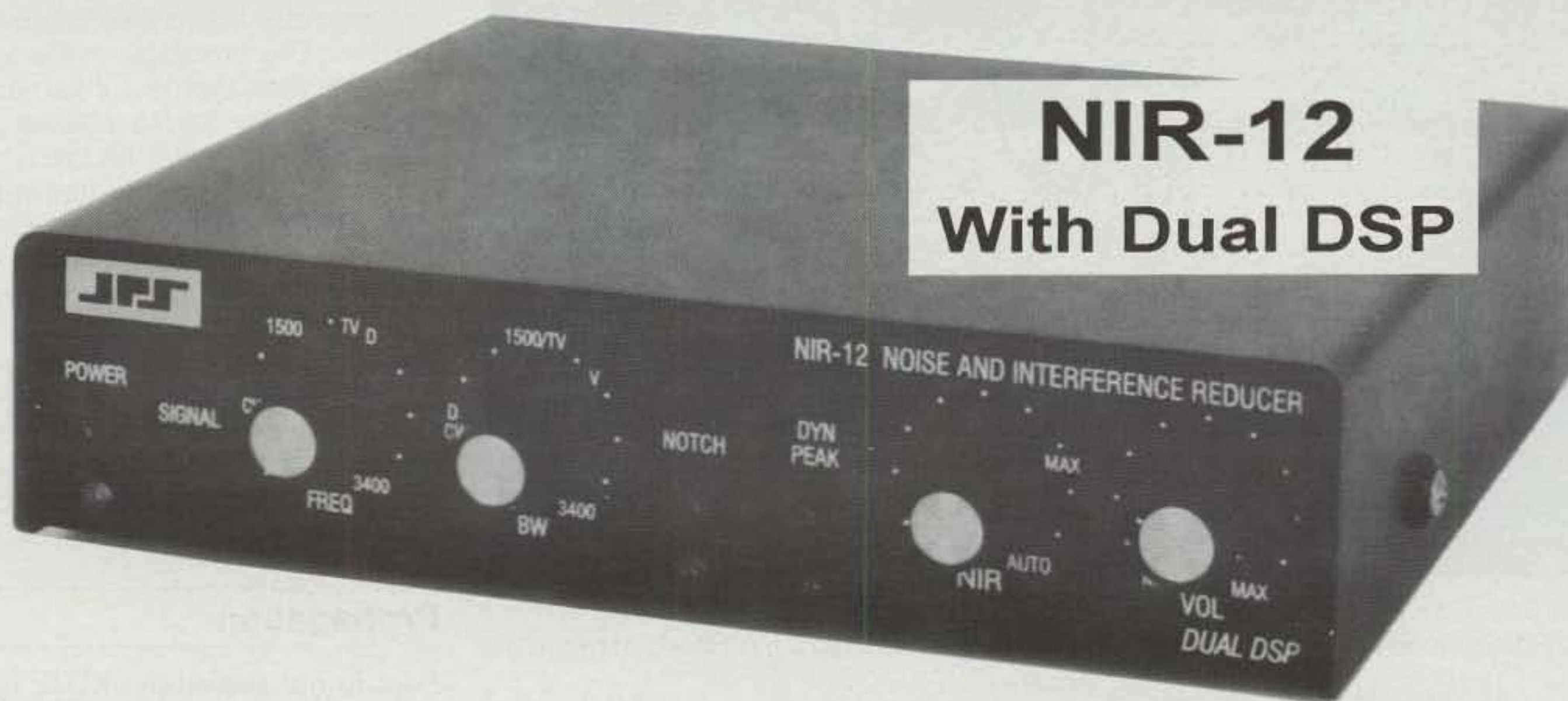
Magali Souyris, the Room Division Manager of the Accra Novotel, was most accommodating with room assignments and unlimited access to the hotel roof. She even assigned the chief engineer and several of his staff to assist us. Compared to previous trips, this was almost too easy!

The day before the contest AA7NO, NZ7E, and K5VT assembled the three Yagis, confirming resonance and bandwidth with an antenna analyzer. The two tribanders and the 40 meter Yagi were spread out over the 160 foot length of the hotel roof and tied to available structures. To save time, all of the antennas had been assembled, tuned, and marked back in Arizona. In spite of a metal roof, each Yagi tested fine, with no surprises. This same type of metal roof had badly detuned all of our antennas in The Gambia during the 1993 C56V operation. We were grateful that we didn't have to face the same problem once again. From our vantage point, we could look over almost every other building and directly out into the Gulf of Guinea. All of our Yagis were now at the 95 foot level. NZ7E ran outstanding  $\frac{1}{4} \lambda$  slopers for 160 and 80 meters down to the light poles of a near-



Vince Thompson, K5VT. He will be recognized instantly by anyone who has an interest in DXpeditioning. He is one of the best-known DXpeditioners in the world.

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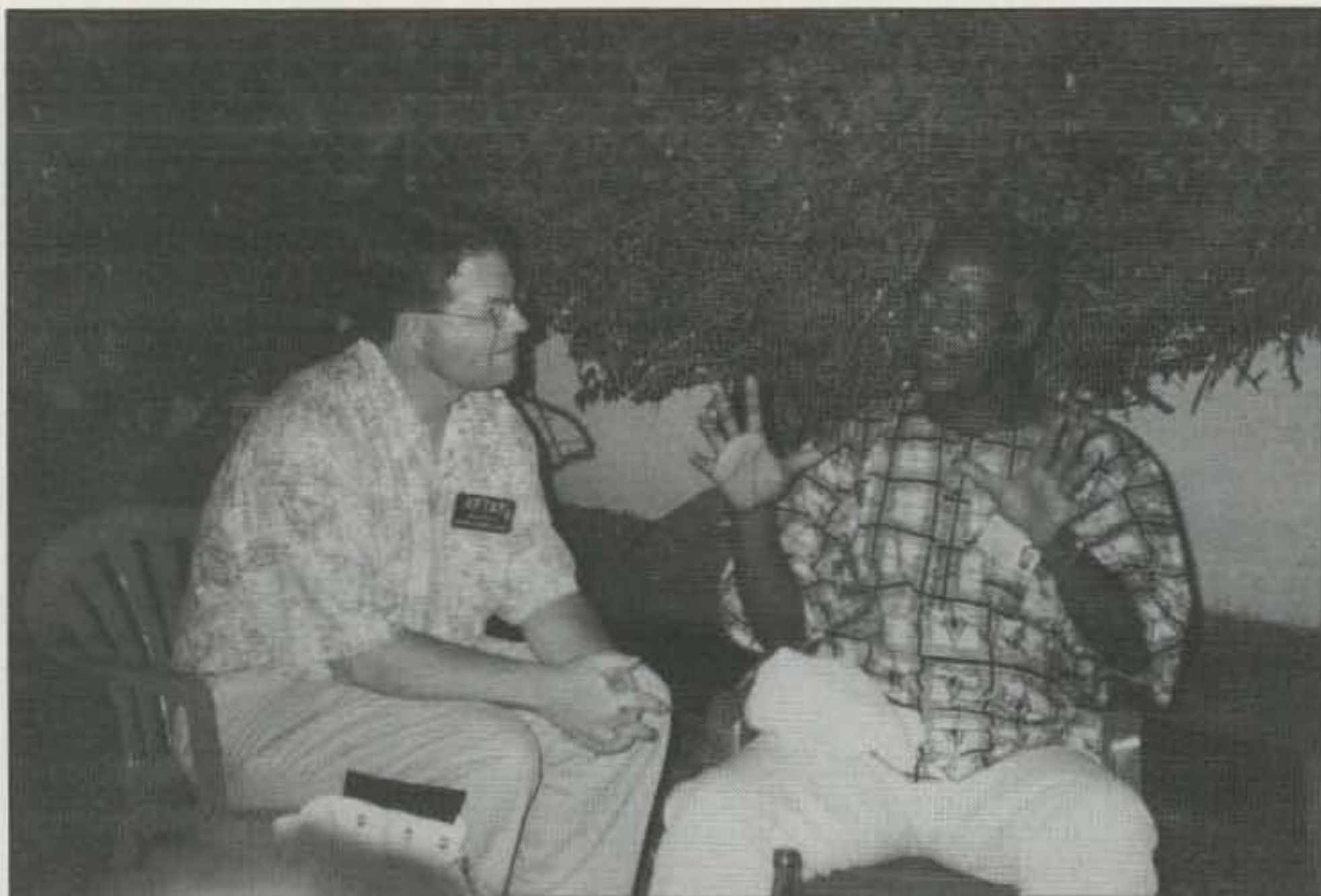
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KF7AY with 9G5RQ at a reception for the 9G5TL team given by the Ghana Amateur Radio Society and the Ghana Frequency Registration and Control Board at the home of 9G1AJ.

by tennis court, using the metal roof and hotel grounding system as a counterpoise. By the time every antenna was up and resonant, we felt ready for just about anything. However, we hadn't stopped to consider what so much concentrated RF

could do to the hotel electrical system. We were about to find out.

### Lights Out

With our antennas up and equipment in

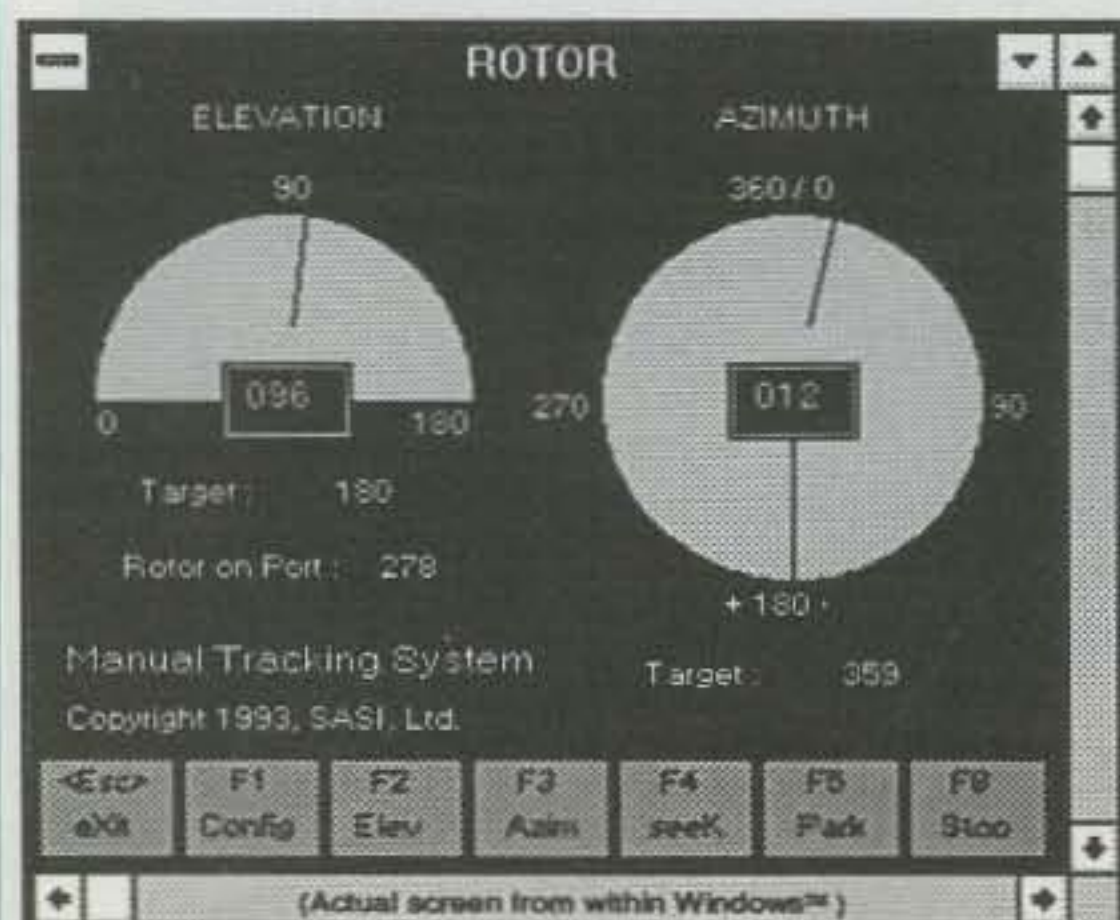
place we were startled to find that every time one of the Alpha amplifiers was keyed, we would lose power for the entire top floor of the hotel! NZ7E and 9G1RQ soon discovered that we were putting significant RF currents into the hotel's GFI system. After the maintenance staff had reset the GFI breakers for the third time, the hotel management informed us that we had better find a solution, or they would shut us down. An electrical engineer, 9G1RQ proposed that we use the rooftop lightning protection system as our station ground. A quick check of the 240 volt supply to the operating room showed the same voltage when measured against the lightning protection system as the room ground. A thick grounding wire connecting all the equipment and run up to a hefty 1/4 inch copper cable connecting all the lightning rods immediately solved all our problems.

### Propagation

Prior to our departure, KD7E had run a series of propagation predictions, and we used our time before the contest to confirm and fine-tune this information. The city of Accra was chosen for its proximity to the Gulf of Guinea. Prior experience had taught us that signals are louder in both directions if we locate ourselves next to salt water. As would be expected

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at this point in the sunspot cycle, 20 meters would prove to be most reliable not long after sunset, with 40 meters giving excellent propagation up until just after our sunrise. A tentative contest strategy had been planned prior to departure, concentrating our target areas on the major population centers of Europe, Asia, and North America. It was amazing to see how modern computer programs are able to make these kinds of predictions with great accuracy.

For work on 160 through 40 meters, a gray-line map program on a laptop computer was very helpful. With this operating aid, propagation possibilities (and impossibilities) become obvious at just a glance. As the 1994 CQ WW DX Contest occurred near the minimum in this sunspot cycle, we had more than the usual interest in operating the low bands. Although still several months away from the peak season for 80 and 160 meters, late October still had some pleasant surprises. Immediately prior to our local sunrise, it was curious to note that 80 meter signals from North America would quickly increase by several S-units, only to fade just as quickly back down into the noise. This 10 to 15 minute window each day both during and after the contest was the time in which we were able to work our top-band European contacts. The main disadvantage to being less than five degrees above the Equator was the terrible

mid-day absorption on HF and a high noise level on the low bands. Contacts with North America on 160 meters were impossible.

### The Contest

The CQ WW DX SSB Contest began at 0000 hours local time (Accra is on GMT) with K5VT starting out by running Europeans on 20 meters. North American signals would build in strength on 40 meters until just past sunrise. NZ7E was positioned at the multiplier station looking for 40 meter multipliers, with WA7LNW at the spotting receiver in search of the odd 80 and 160 meter African or European. Initial activity was almost frantic, with pile-ups so deep as to be almost unmanageable. We figured that the new 9G5 prefix was good for at least a 20 dB advantage!

Each of us operated for 6 hour periods, rotating in 2 hour shifts between the spotting, multiplier, and run stations. Band-pass filters were installed between stations to reduce interference. These were very effective, with the exception the unavoidable QRM produced by the run station on 40 meters when the multiplier station was listening on 20 meters. Given the fact that in certain positions the elements of one tribander and the 40 meter Yagi were separated from each other by only a few feet, it's surprising that inter-station QRM wasn't much worse.

Propagation to North America seemed to be best after sunset, with 20 meters most reliable near midnight and 40 meters excellent thereafter. At this low point in the sunspot cycle it was a pleasant surprise to find 10 and 15 meters a source of more than 30 zones each. Contacts on 160 and 80 meters were a struggle, in spite of NZ7E's outstanding  $\frac{1}{4} \lambda$  slopers for both bands. From our location, it was probably too early in the low-band season to be effective on these frequencies.

Far beyond our original expectations, we worked all but two zones, lacking only zone 1 and zone 40. By the contest's end, a total of 5,380 contacts were in the log for 139 zones and 500 countries. Our score of 10,094,922 was almost 3 million points above the best African multi-single score for 1993.

### Outside The Contest

In the few days after the contest we worked approximately 1,000 contacts on CW, 800 on RTTY, and more than 2,000 on SSB. We found no lack of RTTY enthusiasts available and ready pile-ups were instantly produced. Having never before operated from "the other side" of an RTTY pile-up, I was quickly overwhelmed by how difficult this is for the uninitiated. WA7LNW and K5VT seemed to be right at home in the midst of chaos so profound that everything seemed to blur into one

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ARD6/6B	26.5"	2m:2.6/70cm:4.9	100w
ARD10/10B	34.4"	2m:3.0/70cm:5.5	120w
ARD11/11B	41.5"	2m:3.7/70cm:6.1	120w
ARD12/12B	48.2"	2m:4.3/70cm:6.8	150w
ARD16/16B	64.8"	2m:5.0/70cm:7.7	150w

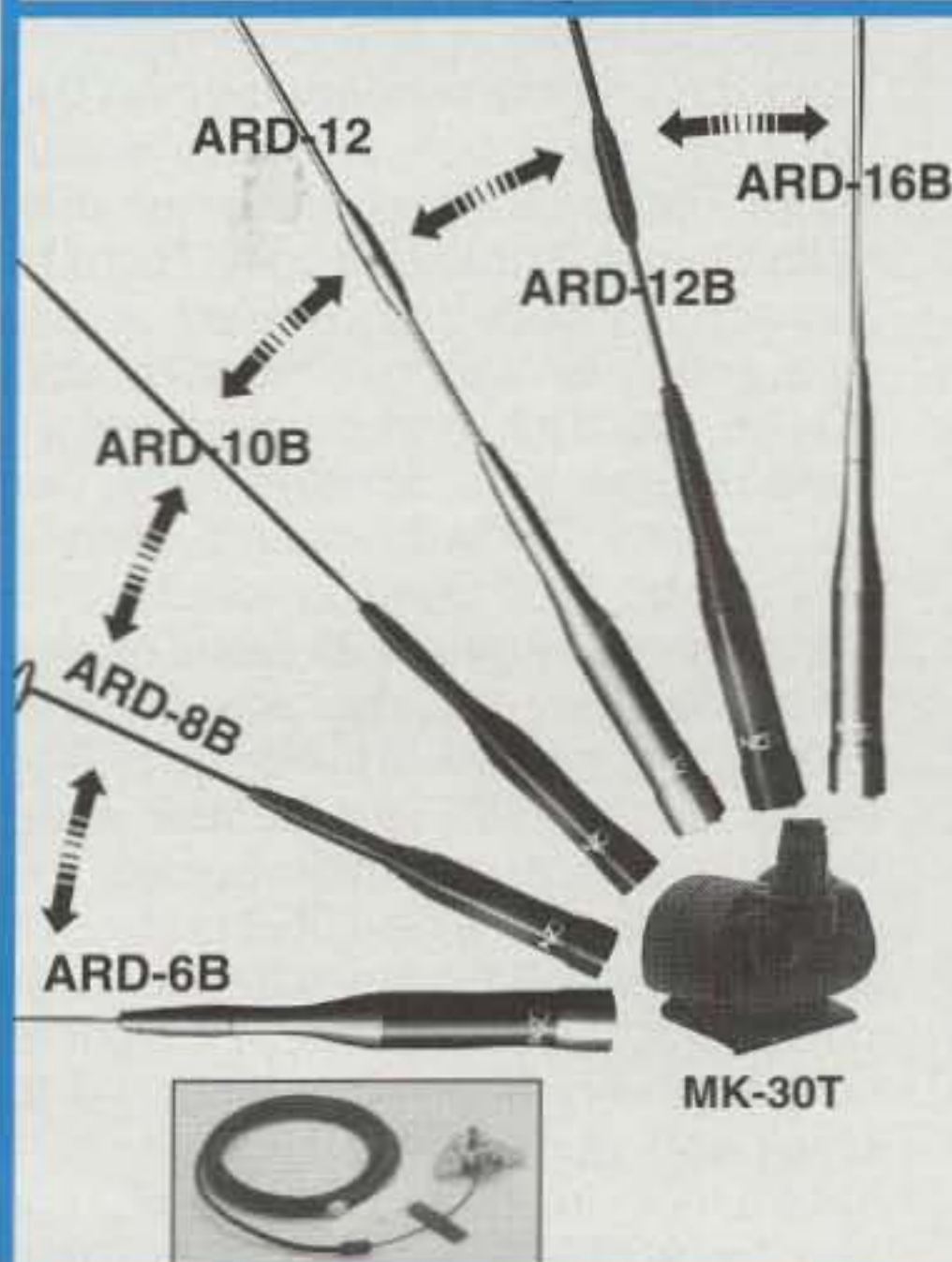
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loud wobbling tone. In spite of this, Jack and Vince had no trouble handing out one contact right after another. After a short while I decided to return to CW, which now seemed easy by comparison!

On SSB Millie, WY7K, was hard to miss. Being an XYL with a distinctive Arkansas accent made her the object of interest on every band. Many now have 9G on SSB thanks to Millie working hundreds of stations every night well into the late hours.

We had anticipated that there would be a great deal of interest on CW and we were not disappointed. An effort was made to concentrate on the new bands, as the 9G1AA operation had done such an outstanding job on 160 through 10 meters more than a year before us. As a result, in the span of just two years VP2ML reports that Ghana dropped from #12 on the 1992 "Most Wanted Countries Survey" to the number #100 position on the same survey by the end of 1994.

In spite of the tens of thousands of CW contacts previously handed out by the 9G1XA and 9G1AA DXpeditions, huge CW pile-ups were produced every time we appeared. Thirty meters offered some of the most outstanding and reliable propagation to Europe and North America. More than once K5VT, AA7NO, and I found ourselves deep in CW pile-ups so vast that they sometimes had to be managed in a definitive manner at our end simply by turning off the radio!

### Banned Activity

For eleven years (1982 to 1993) amateur radio was a "banned activity" in Ghana. This unhappy period began on February 1, 1982 with an announcement on the 6 o'clock evening news that "all amateur radio operators must immediately hand over their transmitting equipment to the nearest police station." Stunned, everyone quickly complied. Interestingly, the majority of the police did not know what to do with the equipment once it was given to them.

After sitting at police headquarters for more than a decade, it was no surprise that much of the equipment was inoperable when returned, with most of the radios suffering from deteriorating insulation and bad capacitors. Obtaining shop manuals for 1970s vintage radios and the process of restoration and repair has been slow and difficult. The present import duty on electronic equipment makes replacing older radios with more current ones prohibitively expensive.

During the ban, only listening on the amateur bands was allowed. This period effectively killed the interest of the entire radio amateur community and had the effect of cutting off communication between them. For a short time the Ghana



The 9G5TL contest team along with several of the local Accra 9G ops.

Amateur Radio Society still met, but enthusiasm waned and regular meetings eventually stopped. After the ban was lifted in March 1993, interest resumed and regular meetings of the Ghana Amateur Radio Society began again in May 1994.

### Ghana Amateur Radio Society

At present, anyone who has experience in telecommunications can automatically apply for and receive an amateur radio license. In the future, the Ghana Amateur Radio Society hopes that it may be able to work with the Frequency Registration and Control Board in the development of standardized amateur radio examinations covering electronics theory and proficiency in CW.

There are presently 26 members in the Ghana Amateur Radio Society, with 13 active and on the air. Of the radio amateurs we met, 9G1NS, 9G1RQ, 9G1AJ, 9G1BS, 9G1BJ, and 9G1RL appear most frequently on SSB. 9G1SB, who recently retired from the ITU, is the only resident currently active on CW. 9G1BS has become very adept at managing the huge RTTY pile-ups that form whenever he appears. There presently are no stations operating satellite.

Monday evening after the contest a reception by the Ghana Amateur Radio Society and members of the Ghana Frequency Registration and Control Board was held for our contest team at the home of Mr. Kofi Jackson, 9G1AJ. It was a happy coincidence that not only is 9G1AJ president of the Ghana Amateur Radio Society, but he is also the immediate past secretary of the Ghana Frequency Registration and Control Board. Amateur

radio in Ghana has a good friend within the governmental regulatory community.

At this reception 9G1AJ, 9G1NS, and 9G1PB were made honorary members of the Central Arizona DX Association. On behalf of the Ghana Amateur Radio Association, Mr. Jackson presented all of the members of our team with "Ghana Fellowship Awards" as a remembrance of our visit. This was a wonderful opportunity for us to meet the Accra amateur radio community.

### 9G0—A New Prefix

Three days before our departure AA7NO, WA7LNU, and I were invited to visit the Accra Technical Training Center in the Kokomlemle district of Accra. There Mr. Jackson introduced us to the school principal and a plan was formulated by which 9G1NS, 9G1RQ, and I would install a three-element Yagi, donated by the Central Arizona DX Association, atop an existing 50 foot tower erected by the Canadian government 28 years earlier.

The next day the Yagi was installed, and Mr. Philip Brock of the office of Frequency Registration and Control issued the Ghana Amateur Radio Society their club callsign with a new 9G0 prefix. With amateur radio still unknown to an entire generation of students, interest in our activity was very high, with almost all the tower work done by the students.

To a room full of students, the first contact for 9G0ARS was made by Ralph Quist, 9G1RQ, with T91ELD, in Lipnica, Bosnia-Herzegovina. Within minutes a tremendous pile-up formed. After seeing the reaction of these students to the many contacts that followed, there is little doubt

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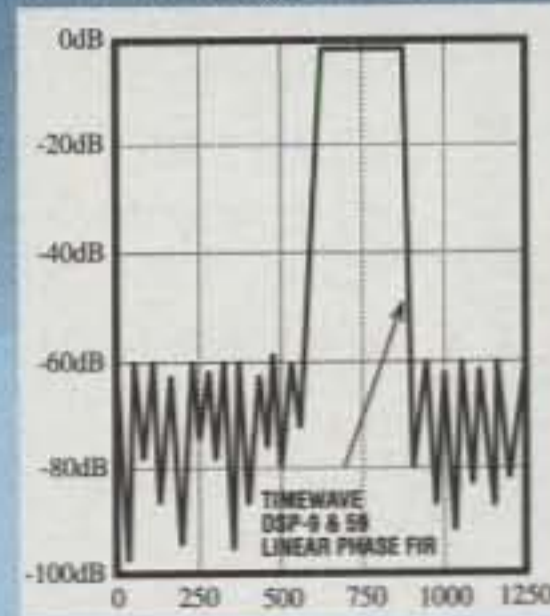
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Band	Contacts	Zones	Countries
160	7	3	5
80	81	15	26
40	378	22	67
20	2,227	36	140
15	1,672	32	139
10	1,015	31	123
All	5,380	139	500
<b>Total Points = 10,094,922</b>			

Table V—9G5TL QSOs, zones, and countries worked by band.

that this soon may become the most popular room at the school.

In the future this will be the permanent location of the Ghana Amateur Radio Society club station, allowing members without stations of their own to effectively operate. Students at the Accra Technical Training Centre will be encouraged to operate. Perhaps this may be the site of future contest operations?

There is currently a plan to have a similar club station set up at the Kumasi University of Science and Technology, in the Ashanti region. There are also hopes for the establishment of regional amateur radio societies in all of the ten districts of Ghana. Expect to hear many more 9G's in the years to come!

Thanks to the efforts of 9G1NS, 9G1AJ,

and 9G1RQ, Ghana may never again appear on anyone's "Most Wanted" list.

### Final Observations

Less than two years ago it would have been inconceivable for six foreign operators to come to Ghana and receive permission to participate in a major DX contest. In this short time, everything seems to have changed.

Ghana is presently a good choice for a DXpedition. Inactive for many years, interest still remains high, especially on RTTY and the new bands. In the future, anyone who wishes to do satellite from 9G will find themselves in the enviable position of being the first to offer this mode. Until 9G becomes more commonplace, running an efficient contest operation from this location may be paradoxically difficult. We found the interest to be so intense that it had the unexpected effect of slowing our rate as we attempted to manage the huge pile-ups that always seemed to form.

Predictably, with several recent DXpeditions to Ghana, its place on the most wanted list will continue to fall as others travel to this location. In spite of several excellent operations before ours, the number of stations waiting patiently to work us seemed endless. Outside the contest it was particularly gratifying for

our team to work hundreds of RTTY contacts. More than once on CW the pile-ups were a bottomless abyss.

With amateur radio now legal once again, the Ghana Amateur Radio Society is doing much to build its membership and increase their activity. Having been off the air for so many years, they are understandably excited about their re-immersion into the world community of amateur radio. It was gratifying to witness their enthusiasm for a hobby that has become such an important part of our lives.

### Special Thanks

We would like to extend special thanks to our generous hosts Samir Nassar, 9G1NS; Kofi Jackson, 9G1AJ; Ralph Quist, 9G1RQ; and the entire membership of the Ghana Amateur Radio Society. Invaluable assistance was also provided by the following: Philip Brock, 9G1PB; Randy Martin, KØEU/9G1XA; Henk van Oosterhout, PA3AWW/9G1AA; Arie Nugteren, PA3DDU; the North American Operations staff of Air Afrique; American Airlines; Magali Souyris of the Accra Novotel; and Eunice Rawlings of Born Free Safaris. The gracious and unhesitating support of these many individuals made all the difference for us.



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	Gray	Black				
SL-11A	•	•	7	11	2 $\frac{5}{8}$ x 7 $\frac{5}{8}$ x 9 $\frac{3}{4}$	12
SL-11R	•	•	7	11	2 $\frac{5}{8}$ x 7 x 9 $\frac{3}{4}$	12
SL-11S	•	•	7	11	2 $\frac{5}{8}$ x 7 $\frac{5}{8}$ x 9 $\frac{3}{4}$	12
SL-11R-RA		•	7	11	4 $\frac{3}{4}$ x 7 x 9 $\frac{3}{4}$	13

### RS-L SERIES



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

### RM SERIES



MODEL RM-35M

#### • 19" RACK MOUNT POWER SUPPLIES

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
RM-12A	9	12	5 $\frac{1}{4}$ x 19 x 8 $\frac{1}{4}$	16
RM-35A	25	35	5 $\frac{1}{4}$ x 19 x 12 $\frac{1}{2}$	38
RM-50A	37	50	5 $\frac{1}{4}$ x 19 x 12 $\frac{1}{2}$	50
RM-60A	50	55	7 x 19 x 12 $\frac{1}{2}$	60
• Separate Volt and Amp Meters				
RM-12M	9	12	5 $\frac{1}{4}$ x 19 x 8 $\frac{1}{4}$	16
RM-35M	25	35	5 $\frac{1}{4}$ x 19 x 12 $\frac{1}{2}$	38
RM-50M	37	50	5 $\frac{1}{4}$ x 19 x 12 $\frac{1}{2}$	50
RM-60M	50	55	7 x 19 x 12 $\frac{1}{2}$	60

### RS-A SERIES



MODEL RS-7A

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

### VS-M AND VRM-M SERIES



MODEL VS-35M

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

MODEL	Continuous Duty (Amps)			ICS* (Amps) @13.8V	Size (IN) H x W x D	Shipping Wt. (lbs.)
	@13.8VDC	@10VDC	@5VDC			
VS-12M	9	5	2	12	4 $\frac{1}{2}$ x 8 x 9	13
VS-20M	16	9	4	20	5 x 9 x 10 $\frac{1}{2}$	20
VS-35M	25	15	7	35	5 x 11 x 11	29
VS-50M	37	22	10	50	6 x 13 $\frac{3}{4}$ x 11	46
• Variable rack mount power supplies						
VRM-35M	25	15	7	35	5 $\frac{1}{4}$ x 19 x 12 $\frac{1}{2}$	38
VRM-50M	37	22	10	50	5 $\frac{1}{4}$ x 19 x 12 $\frac{1}{2}$	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 $\frac{1}{2}$ x 10 $\frac{3}{4}$	10
RS-10S	•	•	7.5	10	4 x 7 $\frac{1}{2}$ x 10 $\frac{3}{4}$	12
RS-12S	•	•	9	12	4 $\frac{1}{2}$ x 8 x 9	13
RS-20S	•	•	16	20	5 x 9 x 10 $\frac{1}{2}$	18
SL-11S	•	•	7	11	2 $\frac{3}{4}$ x 7 $\frac{5}{8}$ x 9 $\frac{3}{4}$	12

# CQ REVIEWS:

## The Kurt Fritzel FB-DX 506 Poly Beam System

BY PAUL CARR\*, N4PC

I was delighted when I was asked to test the Kurt Fritzel Poly Beam System. The FB-DX 506 is very interesting from both a design and performance point of view. Here are the results of my evaluation.

I was told by my mathematics professors many years ago that "poly" is a prefix meaning "many." Therefore, a Poly Beam System must mean many antennas. This is an antenna system that can grow with your requirements. For example, you can start with a simple triband rotary dipole. As need and financial conditions allow, you can add a second element, and you have a two-element triband beam. Later, if you desire, you can add a third element, and you have a three-element, triband beam. The system can expand until you have a five-element, six-band antenna system. The key element is that nothing is discarded along the way. There is zero waste.

The antenna, when it is fully developed, covers 30, 20, 17, 15, 12, and 10 meters. The antenna is actually two multiband trapped systems that are interlaced on a single boom. As a result, two coaxial feed lines are required. Both driven elements are of the split variety, and the manufacturer recommends feeding the driven elements through a balun (not supplied). I used the tried-and-true technique of several turns of coax fashioned into a coil about 8 inches in diameter, and I had no trouble.

I feel that the gain and front-to-back specifications supplied by the manufacturer are accurate. I do not have a calibrated antenna range, so I had to depend on A/B on-the-air comparisons for evaluation. The signal reports that I received convinced me that the gain and front-to-back figures are accurate.

The published gain figures are as follows: 7.7 dBi forward gain and 18 dB F/B on 20 meters. (The dBi is gain with respect to an isotropic source.) On 15 meters these figures are 8.2 dBi forward gain and 15 dB F/B. On 10 meters these figures are 9.2 dBi forward gain and 14 dB F/B. All of these gain figures are the result of three active elements on these bands.

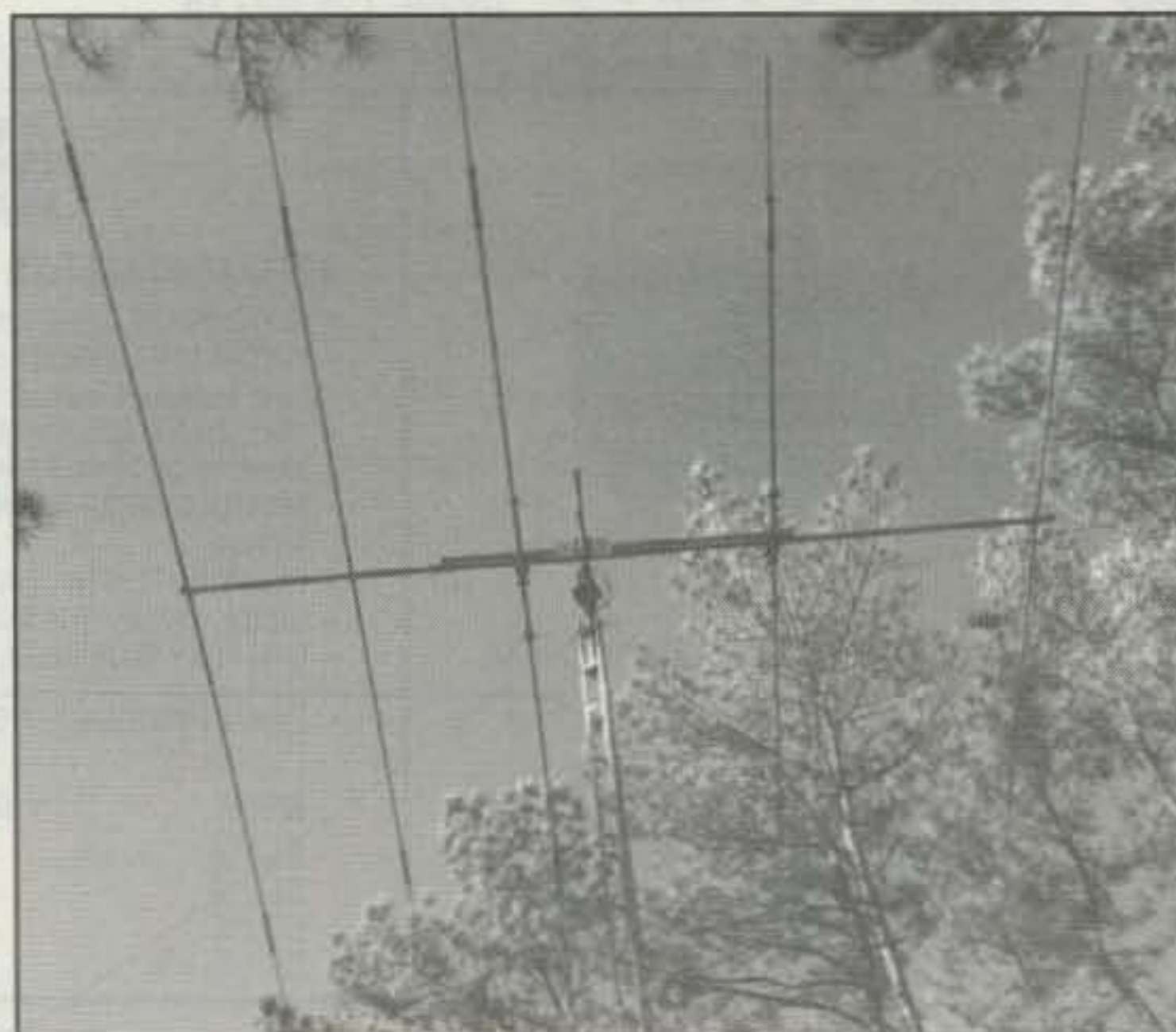
On the remaining three bands there are two active elements. As you would expect, the gain figures are lower on these bands. On 30 meters the forward gain is 7 dBi and a F/B of 11 dB. On 17 meters the figures are 6.8 dBi forward gain and a F/B of 9 dB, and finally, on 12 meters the forward gain is 6.4 dBi and a F/B of 8 dB. After numerous on-the-air tests I found no case where I would disagree with these published figures.

Now let's take a look at the mechanical specifications. The boom is made of heavy-gauge 50 mm (2 inch) material. The boom is in three pieces. The end sections are single pieces of tubing, and the center section is made from two pieces of 50 mm tubing that are held in place with welded straps. The longest element is 10.8 meters (35.43 feet). The total boom length is 6.26 meters (about 20 feet 6 inches). The turning radius is 6.1 meters (a bit over 20 feet). The mounting hardware will match a mast diameter of 50 mm (2 inches). The net weight of the antenna system is 31 kg (68.2 pounds). I would classify all materials as very high quality. The elements are made from heavy-gauge aluminum, and the tolerance of the tubing is  $\pm 0.1$  mm. All mounting hardware is high-quality stainless steel.

Each element is contained in its own plastic package. This means that if you are having an "antenna party," each participant will have all the materials necessary for element assembly along with an instruction sheet contained in a single package. After construction is complete, the individual instruction sheets can be bound in the master instruction manual.

I think that you should allow about an hour for the assembly of each element. This is more time than will be required, but you will have the comfort of knowing that all measurements are accurate when you finish each element.

\*97 West Point Road, Jacksonville, AL 36265



*This is what the completed beam looks like atop the author's tower. While it can be a one-man installation, it is always advisable to have at least one other person there for safety reasons.*

I chose the concrete pad in front of my garage as the construction site. If you choose to work over a grassy area, be sure to put down a ground cover so that if you drop a screw or a nut, the grass will not "eat" the item. You will need an area about 40 feet by 5 feet for the actual assembly site. Work slowly and check your work carefully as you go.

The boom is constructed in the same manner as the elements. I supported the boom sections on two supports so that I could put a slight amount of downward bow in the structure. This is to compensate for the weight of the elements when the entire structure is in the air.

There is only one set of adjustments for the antenna system, and that is on the 20/15/10 driven element. I chose the setting that would cover the CW and low phone portion of 20 meters, and this resulted in full band coverage on all bands. The SWR measurements that I made were better than those specified by the manufacturer. One convenient thing about tuning the antenna is that the measurement for the element tips given are with reference to the length of the tip as measured from the trap. This is nice, since the measurement can easily be made by one person. Before the final assembly, check all measurements once more.

I have a 40 foot crank-down/tilt-over tower, so it was easy for me to check the antenna in phases. First, I placed the 20/15/10 driven element and evaluated it as a three-band rotary dipole. It performed nicely, and the SWR was entirely acceptable on all three bands. Next I placed the 20/15/10 reflector on a boom at a spacing of 10 feet. I was pleased to find that this arrangement made a nice two-element triband beam. The SWR was acceptable on all three bands.

Having gained experience, I was ready to begin the final antenna placement. After placing the boom, I first installed the two driven elements. The key is to keep the structure balanced by placing elements on each side in an alternating pattern. Do not allow the center of gravity of the structure to get too far away from the mast. Next connect the feedlines and check all mounting hardware for proper torque.

The only elements that require a bit of forethought are the two driven elements. Each of these elements has two "U" bolts to secure them to the boom. I had help in installing them initially, but it can be done by one person alone.

Two days after the antenna was installed, the rotor indicator stopped working. I had a second rotor, but this necessitated complete disassembly of the system. The antenna was lowered, removed from the mast, and the faulty rotor was replaced. Now it was time to reinstall the antenna. This was a solo venture. I needed some way to hold the first "U" bolt in place until I could get a couple of nuts started. The solution was simple. I took a large rubber band and placed it around the boom and the "U bolt saddle," and I was able to get the two nuts started. The remainder of the installation was no problem at all. If you are able to work on the ground, the installation can be accomplished by one worker.

How good is the antenna? In a word, it is "great." I think the strong suit of this installation will be its durability. All materials are of very high

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**FT-7400H Mobile** (left) • 440MHz (35w) • 31 memories • alpha display • track tuning • CTCSS encode • backlit DTMF microphone • 6 1/2" w x 1 1/4" h x 7" d, 3.3 lbs.

**FT-2500M 2m Mobile** (top) • 50w • 31 memories • CTCSS encode • scan • backlit DTMF mic • 6" w x 1 1/4" h x 7" d, 1 1/2 lbs.

**FT-912RH Mobile** (right) • 1.2GHz



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**DR-600TB 2m/440MHz Twin Band Mobile** 45W (2m)/35W 440 MHz • receives 118-174 (including AM and 410-470 MHz • 40 memories • scan • full duplex cross band operation • remotes from any DTMF capable 2m or 70cm unit • separate VHF/UHF outputs • separate controls for each band • CTCSS and DTMF encode • 5½" w x 2" h x 7" d, 3¼ lbs.



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DJ-180T DJ-580T DJ-F1T DJ-G1T

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**DJ-180TH** • Same as DJ-180T, 5W standard.

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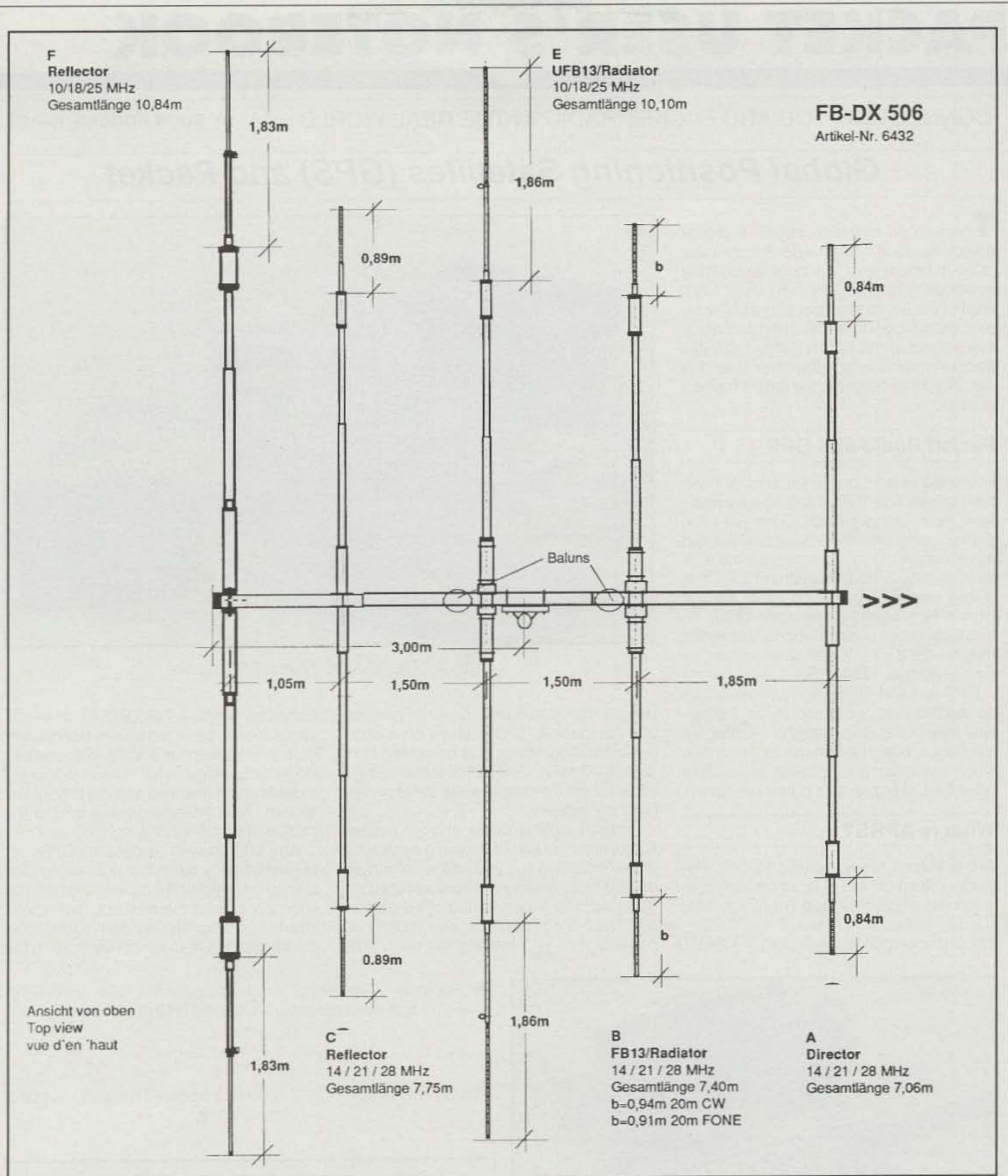


Fig. 1- Overall drawing of the FB-DX 506 Poly Beam System.

quality, and the mechanical engineering is outstanding. I am sure that this system will give many years of satisfactory service.

I have one minor criticism. Remember that I mentioned the elements are constructed from heavy-gauge aluminum tubing? Well, the individual sections are held in place with self-tapping sheet-metal screws. These screws are of the "pan head" type, which requires a flat-blade screwdriver for installation. The screwdriver can slip during installation

and cause injury. Be careful! I feel a better choice for these screws would be the hex-head type which could be installed with a nut driver. There would be less danger during construction.

The Poly Beam System is manufactured by The Kurt Fritzel Company. It is priced at \$1299.95 and is distributed in the United States by Electronic Switch Company, 4343 Shallowford Road, Suite E-6, Marietta, Georgia 30062 (404-518-7376).

# PACKET USER'S NOTEBOOK

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BY BUCK ROGERS, K4ABT

## Global Positioning Satellites (GPS) and Packet

**T**here is no question about it: digital communications has made the amateur radio hobby one of the most fascinating hobbies in which anyone can be involved. Best of all, it's easy to get into packet radio, and it's easy to understand and enjoy this aspect of the hobby. After the initial packet station is put together (see the January 1995 column), the rest is a piece of cake.

### Packet Radio and GPS

Following is an update on Global Positioning Satellites (GPS) and how we interface them using packet. Sure we have packet communications via satellites, but even more exciting, we now have the ability to use the Global Positioning Satellites with a packet application (see "Packet User's Notebook" December 1993). In that December column we discussed the much talked about software written by Bob Bruninga, WB4APR.

GPS is a fact of life, and soon it will be as much a part of our society as the cellular telephone. As a matter of interest, we may soon see this feature as an option when purchasing a car, just as we now have the CD player as a purchase option.

### What Is APRS?

APRS stands for Automatic Packet Reporting System. APRS is a software program developed by Bob Bruninga. This

211 Luenburg Drive, Evinston, VA 24550



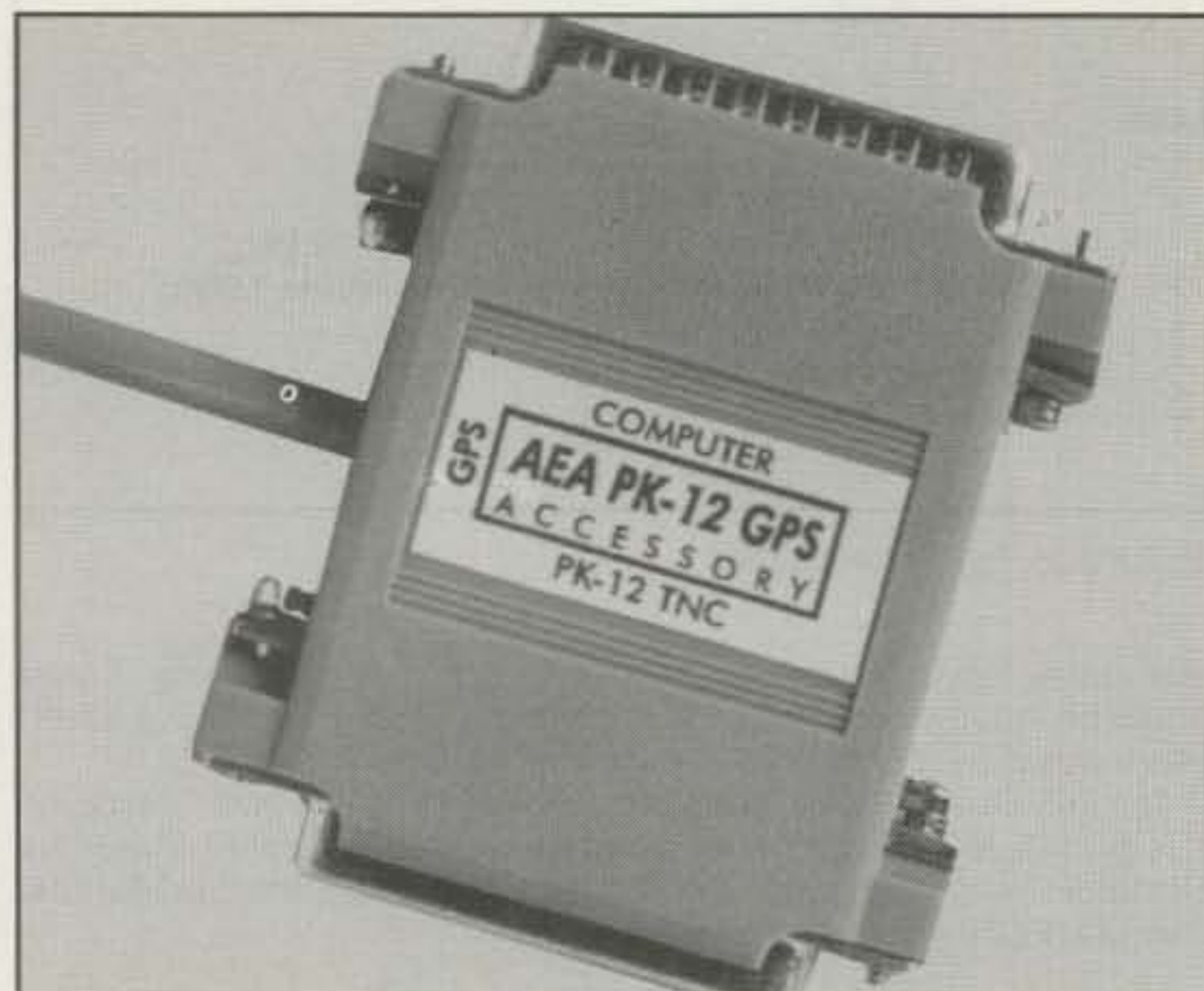
Photo A— The AEA PK-12 in a GPS system.

program allows users to map the position of other packet GPS stations on a computerized map which can be scaled from .5 to 2000 miles. The APRS software also allows short messages to be sent to other GPS packeteers.

Imagine sitting down at your packet station and instead of seeing a screen full of text scrolling by, you see a color map of your local area with all packet stations geographically positioned. The bottom few lines show conventional monitored packets, but you are alerted each time

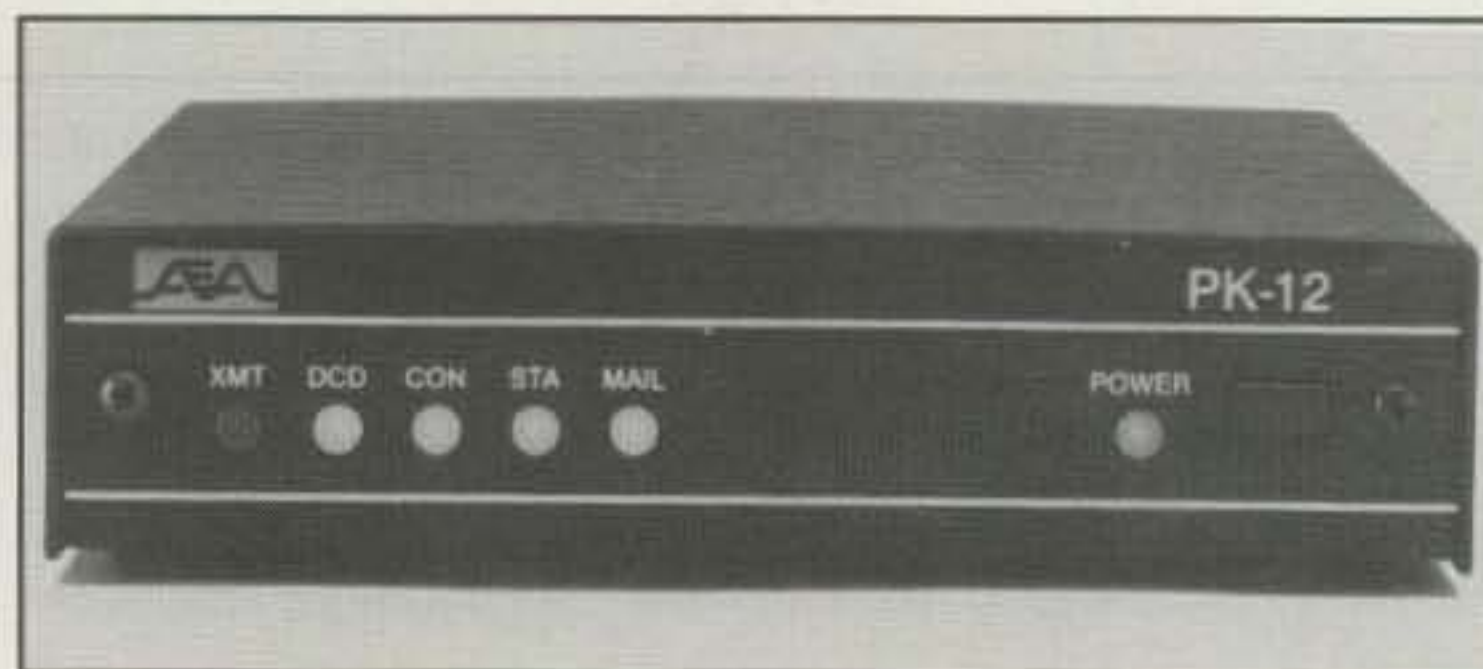
someone sends a new BTEXT or sends you a message. If you have been away from your screen for a while, with one key stroke you will get a full screen display of all beacons monitored and the time of last receipt. Now imagine seeing one of the packet stations moving on the map!

Any station with access to GPS, or LORAN, or any other low-cost navigation device can report its moving position as often as it likes! Even without automatic interfaces, any station can update the position on the map simply by moving the



← Photo B— The APRS Adapter cable for use with APRS software (saves a COM port on the computer).

Photo C— The AEA PK-12 1200 bps packet TNC with new GPS firmware. ↓



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May 1995 • CQ • 59

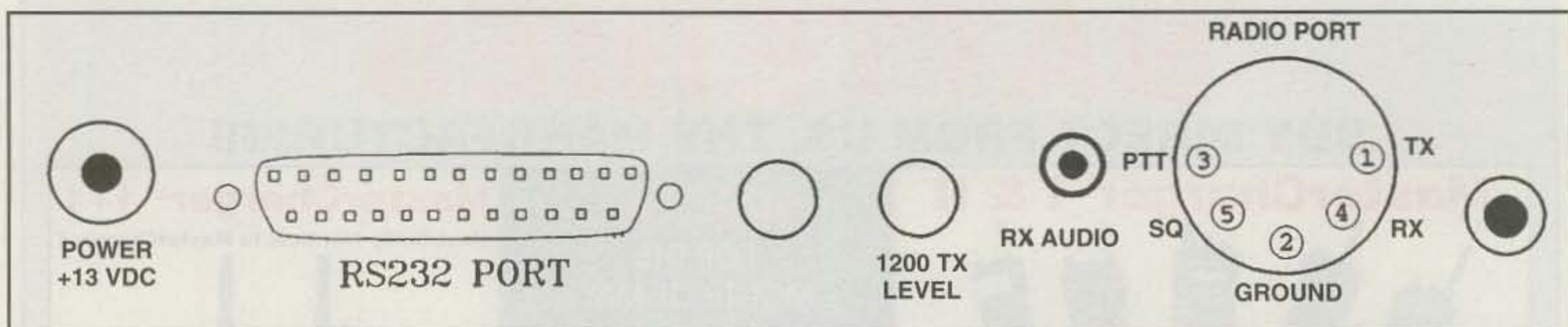


Fig. 1—Rear view of the PK-12.

cursor. All other stations will see the same movement!

### Introducing The "Star" Performer and Friends

The equipment we will use to make our APRS station fully operational for APRS is as follows: a GPS receiver, a transceiver, a computer running APRS software, a PK-12, and an AEA APRS Adapter Cable.

So just what do I need to do GPS? (See photo A.) This question is very vague, but here is a basic answer. If you want to see where other people are, you need a computer running APRS, a radio, and an AEA PK-12. If you want to see where other people are and have them see where you are, you need a computer running APRS, a GPS receiver, a radio, a PK-12, and the AEA APRS Adapter Cable (see photo B).

If you want other people to track your vehicle, you need a PK-12, a GPS receiver, and a radio.

Here are a few of the new features found in the AEA PK-12 (photo C) GPS firmware. GPS firmware allows the PK-12 to act as a stand-alone tracking device when used with a GPS receiver and a radio. Users can transmit position information over the amateur bands (at VHF, usually 145.790 MHz) so others can track their location (see photo D). When used with the optional AEA APRS Adapter Cable, the PK-12 can operate in Hardware Single Port mode, where only one computer COM port is used on a system using APRS software for mapping and tracking.

### What Is A Stand-Alone Tracking Device?

A stand-alone tracking device is a term used for a packet GPS system capable of being tracked without a computer running APRS. APRS software usually interprets the National Marine Electronics Association (NMEA) strings coming from the GPS receiver. The GPS firmware in the PK-12 interprets these NMEA strings also. Because of this, a PK-12 can take NMEA strings from the GPS receiver and trans-

mit them in packet through a radio over the amateur bands. Users can put a GPS receiver, a PK-12, and a radio in a car and be tracked by other users running APRS on a computer. This is useful for public-service events, emergency situations, and other activities—ha! Ha is right. Read on, as this is where I had a bit of "fun."

On the weekends I can rely on my wife, Jean Ann, WB4EDZ, to do a lot of mall hopping and shopping around the Lynchburg and Roanoke area. On a recent Saturday I placed a GPS receiver, the AEA PK-12, and the 2 meter transceiver into a small carton in the trunk of Jean Ann's car. The power was taken from the trunk-lid light before the trunk-open-activate switch. The antenna was a simple magnetic-mount VHF type.

I turned on the system and set the transceiver to 145.790. By the time Jean Ann was ready to leave for the malls, I had the system beaconing the location of the Ford Taurus every five minutes.

I set up one of the seven packet stations in my lab with the APRS software and an APRS map of the area. As she left, I watched the screen as she moved along highway 460. Later the beacon would display the location of the Taurus at positions in the city.

The fun was even more pronounced

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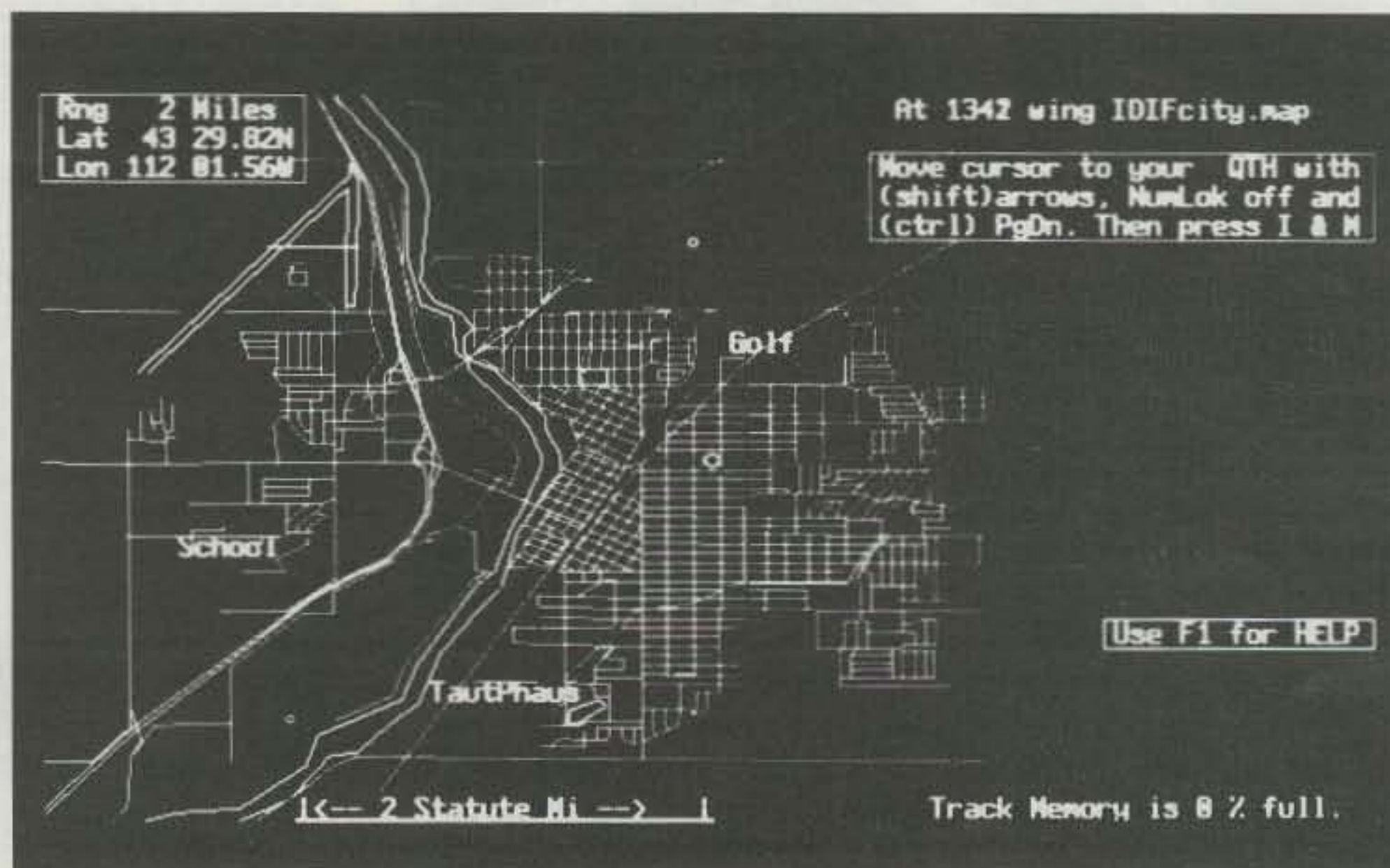
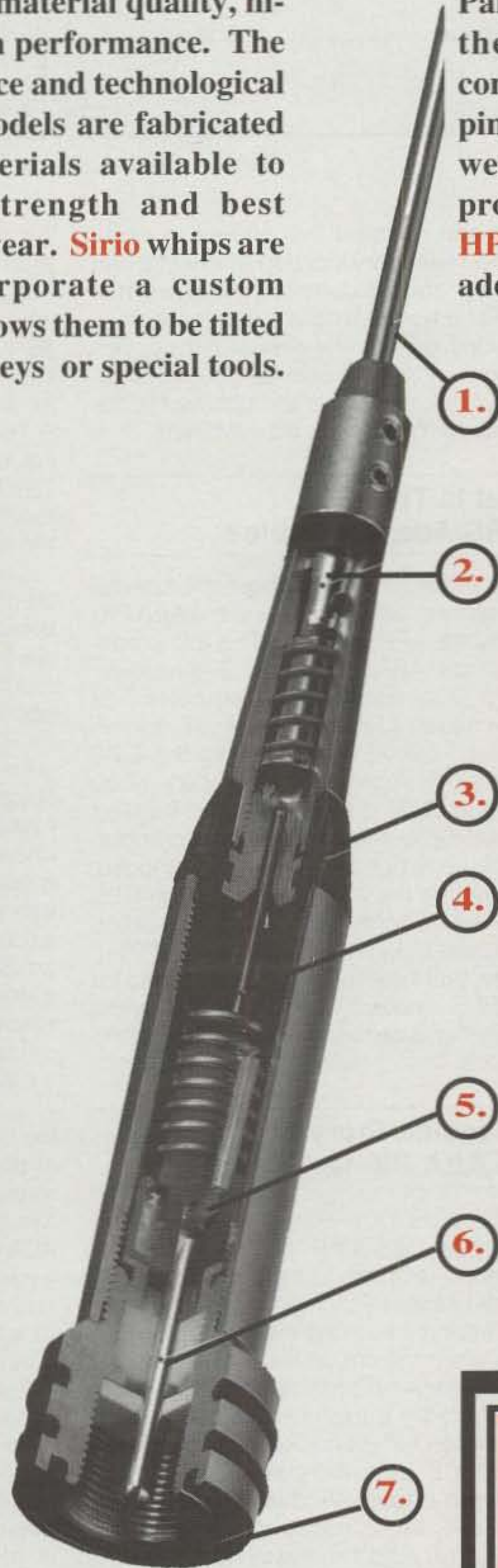
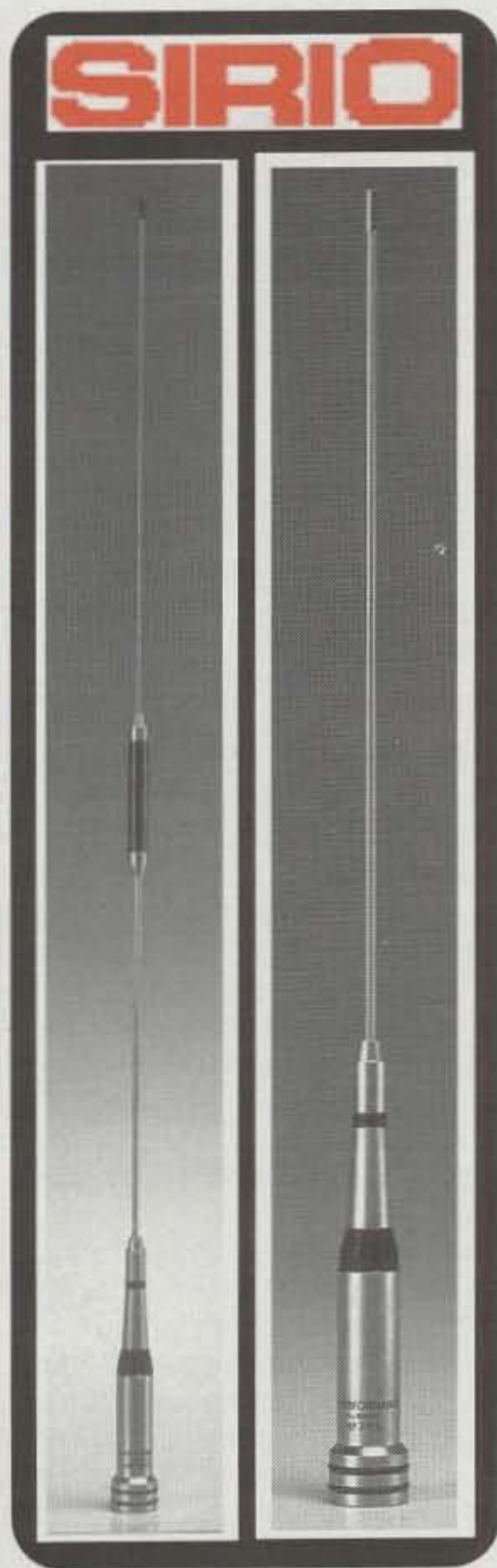


Photo D—A shot of the APS software map included in the PK-96 and PK-12.

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LMR 400 DBL SHLD IIA JACKET 2.7dB @ 450MHz	52FT	50FT
LMR 600 DBL SHLD IIA JACKET 1.72dB @ 450MHz	1.47FT	1.45FT
LMR 900 DBL SHLD IIA JACKET 1.10dB @ 450MHz	4.05FT	4.00FT
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RG MINI BX 95% BRD BLK SILVER, or CLEAR UV RES JKT	16FT	16FT
RG214/U (2) SILVER BRAID SHIELDS MIL-SPEC	1.50FT	1.35FT
RG393/U DBL SILVER SHLD "TEFLON" 25,000 WATTS, @ 10MHz	4.00FT	3.75FT
RG142/U DBL SILVER SHLD "TEFLON"	1.10FT	1.00FT
RG58/U 95% BRAID	15FT	13FT
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18GA TINNED COPPER 4/C GRAY PVC JACKET	20FT	18FT
18GA TINNED COPPER 5/C GRAY PVC JACKET	22FT	20FT
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### Input/Output connections

Radio interface:  
Terminal interface:  
Terminal data rates:

5-pin DIN connector  
RS-232C DB-25 connector  
Autobaud settings at 300, 600, 1200, 2400, 4800, and 9600 bps

### Physical

Dimensions:

5.78"W x 5.28"D x 1.35"H  
(147mm W x 134mm D x 34mm H)  
11.9 oz. (0.34 kg)

Weight:

Table I—Specifications for the PK-12.

when she returned that afternoon, and I showed her every location where she had traveled, and the duration (within five minutes) she had stayed at each location.

I won't go into the rest of the conversation we had, but after 39 years of marriage, I have become accustomed to her bouncing frying pans off my head!

## What Is The AEA APRS Adapter Cable?

I almost forgot to talk about the special cable that enables the use of the AEA PK-12 and the APRS system. This cable connects your AEA PK-12 and GPS receiver to one COM port on your computer. The cable allows APRS to periodically switch between the AEA PK-12 and the GPS receiver. The cable is necessary when only one COM port is available, such as with laptop computers or with a computer that uses one COM port for a mouse. Connecting the AEA PK-12 and the GPS receiver to one COM port is called Hardware Single Port operation (HSP).

Now that I've whetted your appetite for an APRS station, I need to provide some background about the host of our APRS cosmos.

## The Inside Story of The AEA PK-12

The PK-12 is a low-cost, energy-efficient, 1200 bps, VHF/UHF packet controller designed for those just getting into packet radio as well as for serious packeteers who want a small unit they can take with them when they're on the road.

To make an affordable TNC that would withstand the punishment of being used for mobile (APRS) packeting, AEA made the PK-12 software-based instead of hardware-based. All other AEA TNCs use hardware, actual chips, for processing data, so why did they switch to a software design for the PK-12? The reason is simple: 1200 bps packet is far less demand-

ing than other modes. Because of low processor demands for 1200 bps packet, software is the right implementation, which is why we replaced the popular PK-88 with the PK-12. Add to this the easy interfacing of the PK-12, and you're on the air in no time (see fig. 1).

The PK-12, like most TNCs on the market, uses the AX.25 protocol. With the PK-12's full implementation of the AX.25 protocol, the TNC will send out a poll that tells the receiving station to send back data.

The PK-12, with full AX.25 implementation, produces better overall data throughput. It also includes gateway firmware which supports local acknowledgement (ACKs) of packets like a full-service node does. Users can digipeat with the PK-12 if they wish, but gateway offers a superior alternative to digipeating—node hopping. Digipeating is not efficient; it makes numerous retries common, it clogs channels, and it doesn't allow users to transfer data very far. A gateway lets users transfer all data to another user, who in turn transfers it all to another. In addition, there is no limit to the amount of gateways your file can go through to reach its destination, unlike digipeating.

Three users could be using a PK-12 as a gateway. You could be communicating with another station, someone could be leaving you a message in your MailDrop, and other users could be digipeating through your TNC—all at once. With all this action going on through the PK-12, AEA engineers decided there should be a measure of control. There are CFROM and DFROM commands which allow you to selectively choose who may or may not connect to your TNC.

Full-featured mail facilities are included in the PK-12. When the PK-12 is active, other stations can connect to you and exchange personal messages, traffic, or bulletins. The MailDrop has all of the commands people have come to appreciate in AEA products. The MailDrop allows users to automatically receive and reverse forward messages and control



third-party traffic. When turned off, the PK-12's internal lithium battery holds the MailDrop contents. The PK-12 comes standard with 15K of battery-backed Mailbox (32K RAM) and is easily expandable to a 100K Mailbox (128K RAM) for those expecting many messages.

Global Positioning System firmware is included with every PK-12, which enables it to connect to GPS receiver with a NMEA-0183 interface. Unlike other TNCs, the AEA PK-12 itself passes GPS data, so no computer is needed. The new firmware lets the PK-12 be used as a stand-alone tracking device. This means a PK-12 can obtain position information from a GPS receiver and beacon it in packet over the amateur bands through a transceiver without using APRS software. Vehicles equipped with the PK-12, a GPS receiver, and a radio can beacon their location and be seen on a computerized map by APRS users.

AEA also offers an optional APRS Adapter Cable (photo B) for the PK-12 for Hardware Single Port (HSP) mode operation. This cable lets users running APRS software devote only one computer COM port for the GPS receiver and the PK-12. This is a great feature, since most computers only have two COM ports with one used by a mouse. Laptop users only have one COM port, so AEA's APRS Adapter Cable is a must.

Integrating GPS with the PK-12 results in a powerful tool for tracking vehicles and people during public-service events, seeing where emergency vehicles are during disasters, and for mapping DX spots (an eyeball QSO with every spot!), send messages to other APRS users, or just keep track of mobile units with packet and communicate with voice.

All these features are packed into a small case measuring 6.1"W x 7.4"D x 1.3"H. It weighs under 12 ounces, and it uses less than 80 ma. These physical qualities, plus the powerful features, make the PK-12 perfect for going mobile—which is what GPS is all about.

The enhanced MHEARD lets users see the last 18 stations heard. AEA HOST mode allows the computer to fully control the TNC. It can differentiate between commands from the TNC and adjust to regular data streams. The HOST mode is the same in all of our TNCs, making software programming very easy. The HOST mode allows users the freedom to run the TNC with just about any program on the market.

### Whether You Are An "EXPERT" or A Beginner . . .


The PK-12 itself has unique features which make it user friendly. It is equipped with an EXPERT disable function which

limits the command set to the most often used commands for beginners. Newcomers can get on the air in no time with this function, and as they become more familiar with packet, they can switch the command off and use the full command set. Even experienced packet users get into trouble now and then, which is why we included the REINIT command. This command is a cross between RESTART and RESET. REINIT re-initializes most of the

commands to their default settings, then does a RESTART, but the contents of the MailDrop and the NAVTEX message history buffers are preserved.

For more information about the AEA PK-12, contact Advanced Electronics Applications, Inc., P.O. Box C2160, Lynnwood, WA 98036 (206-774-5554; FAX 206-775-2340).

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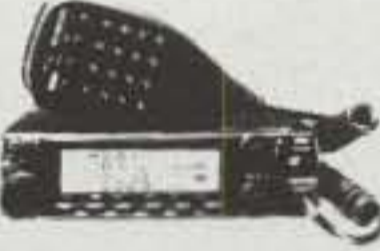

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## ALL ABOUT THE WORLD ABOVE HF

### Students Chase Balloon, Talk to Astronaut

In two separate incidents this past reporting period students have been involved in activities related to the VHF+ frequencies. In the first, taking place on 18 February, a group of students participated in a balloon launch from the grounds of Perryton, Texas, High School. In the second, taking place on 13 March, a group of students got to speak with Astronaut Steve Oswald, KB5YSR, the mission commander of the Shuttle *Endeavor* during the STS-67 mission. What follows are the tales of both events.

**Students Chase Balloon:** It was a balmy Saturday morning late winter in the panhandle of Texas. A group of students, members of Bobette Doerrie, N5UDJ's physics class and others, along with some of their parents and curious amateurs, were awaiting the launch of two weather balloons. Tethered to these balloons was a payload that carried three transmitters, a 2 meter beacon set to send modulated CW on 146.82 MHz, a wireless mic set to broadcast on the low end of the commercial FM band, and a 10 meter radio set to transmit on 28.322 MHz.

In the weeks prior to the launch Jerome Doerrie, K5IS, husband of Bobette, had been assembling and testing the payload. Jerome advised your editor that the 10 meter beacon, running only 50 mw, would be powered by a lithium battery, thereby hopefully giving out a signal for upwards to two weeks after the balloon landed. When asked why he chose 146.82 MHz, an active repeater frequency, he said that it was the only crystal he had left in his parts drawers.

About 9:00 AM the students and adults started arriving at the school. Among them were eight chase teams ready to track the balloon's eastward progress.

Assembling in the physics lab room, the crew members set about making final tests on the payload and other equipment. Around 10 o'clock everyone moved to the adjacent practice field, where the crew began filling the balloons. When the weight of both of the balloons was determined to be right, the payload and the aluminum-foil radar reflector were attached to the balloons and the reflector was stretched out across the practice field.

After powering up the payload, checks were made on the receivers to make sure everything was ready for launch. Scheduled for launch at 10 o'clock, the balloons were released at 10:30. Because of the strong cross winds, the balloons failed to achieve sufficient initial lift. In the process the reflector caught on a fence and tore off.

Relieved of some of its weight, the balloon started rising a bit more rapidly, but not yet enough to clear the pine tree behind the school building. The wind blew the balloon in the direction of the pine tree, snagging the payload on one of its branches. The collision with

#### VHF-PLUS CALENDAR

April 28-30	Dayton HamVention
May 1	Very poor EME conditions.
May 3	Moon Apogee. 432 MHz Sprint, 1900-2300 local time.
May 5-7	West Coast VHF Conference. (See text for details.)
May 5	<i>Eta Aquarids</i> meteor shower.
May 7	First quarter Moon. Good EME conditions.
May 13	ARRL 902, 1296, and 2304 MHz Sprints, 0600-1300 local time.
May 14	Full Moon. Moderate EME conditions.
May 16	Moon Perigee. Lowest declination of the Moon.
May 20-21	ARRL 50 MHz Sprint, 2300 to 0300 UTC.
May 21	Last quarter Moon. Moderate EME conditions.
May 28	Poor EME conditions.
May 29	New Moon.
May 30	Highest declination of the Moon.

*EME conditions days provided by W5LUU.*

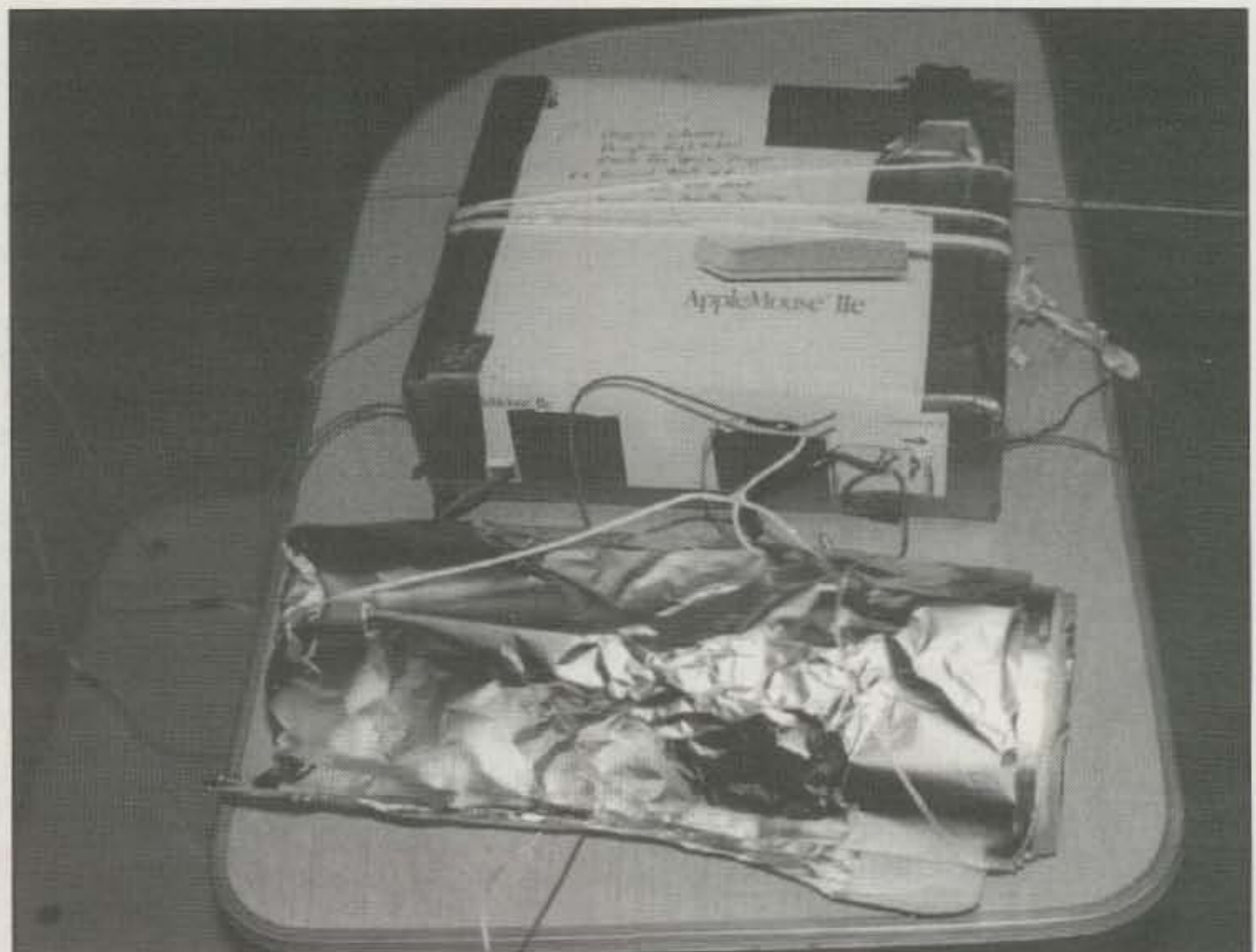
the branch apparently knocked out the FM transmitter, since no signal was heard from it afterward.

A minute or so later another gust of wind freed the payload from the branch and the balloons started rising again. This time the altitude was just barely enough to clear the high-voltage power lines.

The launch now underway, the chase teams gave pursuit. Your editor took Jennifer Doerrie,

KA5WMJ, the daughter of Jerome, because of her knowledge of the back roads of the panhandles of Oklahoma and Texas, and Carol King, K5CPZ. Together we headed across Perryton, keeping the balloons in sight as long as we could.

After losing visual observation of the balloons, we began tracking it on the FT-726. Using a Maldol 2 meter/70 cm Yagi, we started charting its progress across the panhan-



The payload and the aluminum-foil radar reflector await attachment to the balloon prior to its launch at Perryton, Texas, High School.

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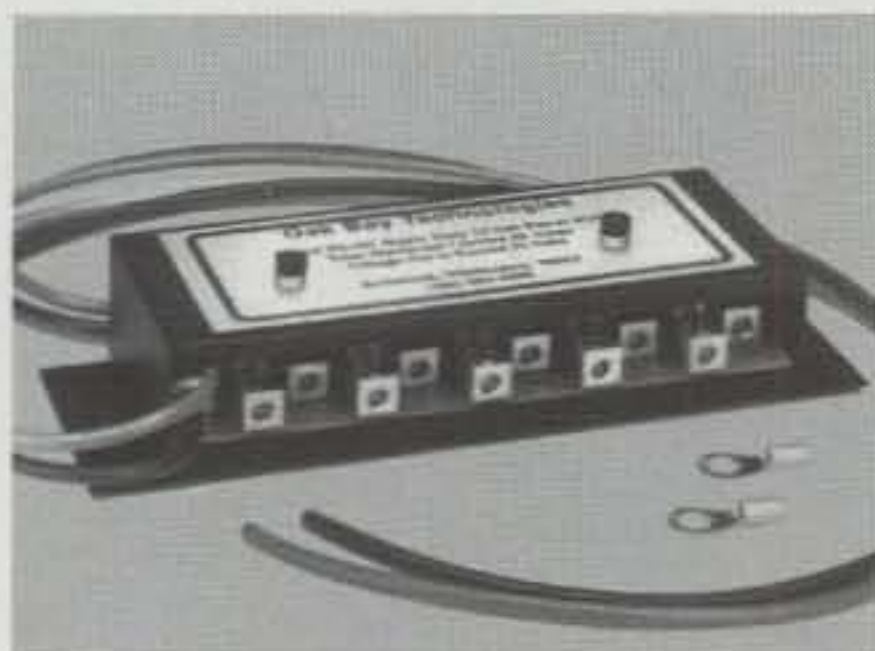
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Just prior to the balloon launch, the Perryton, Texas, High School team stretched out the payload and aluminum-foil radar reflector.

dies. Every 3 to 4 miles we stopped and took a bearing, often finding that the wind had blown them north of, or south of, each of our stops.

About two hours into the chase we notice that while we are still traveling in the same direction as the balloons, the signal was getting weaker. (We found out later that a dryline gust front came across our paths, giving the balloons an extra push ahead of us.) After another hour of chasing, we determine that we could not catch the balloon. We stopped for something to drink and cheese crackers and then headed back to Perryton.

Upon returning to the gathering point of some of the team members (a local restaurant), we compared notes with the rest of the teams. We determined that the balloon went down somewhere east of Fort Supply, which is about 20 miles east of the Oklahoma panhandle. Estimates from the temperature beacon on 10 meters indicated that the balloon never rose above 14,000 feet. At one time, the 2 meter beacon was heard in Hoxie, Kansas, some 200 air miles from Follett, Texas (which is in the northeast corner of the Texas panhandle).

During their short lives, the balloons probably traveled no more than 50 or so air miles, albeit in a very zig-zag direction. Nevertheless, the adventure gave this VHF rover more fun than I have had in quite some time. I found that I had to use my rover skills in reverse, finding the best location to *hear* the beacon, rather than to transmit from it.

More important, however, I realized that the hands-on experience attained by the students was the most valuable experience from this adventure. It is one thing to talk about weather, signal propagation, lift, and other physics concepts in the classroom. It is quite another to actually experience these phenomena in real-life settings.

**Students Talk to Astronaut:** It was last June that I described how the students of Anthony, Kansas, Elementary School talked with Astronaut Linda Godwin, N5RAX, on a Sunday afternoon that previous April. You may also recall my writing about how I talked myself out of driving up to Anthony to witness the event and how I vowed not to miss out again. Well, I got my second chance on 13 March, a rainy Monday evening, in Bethany, Oklahoma.

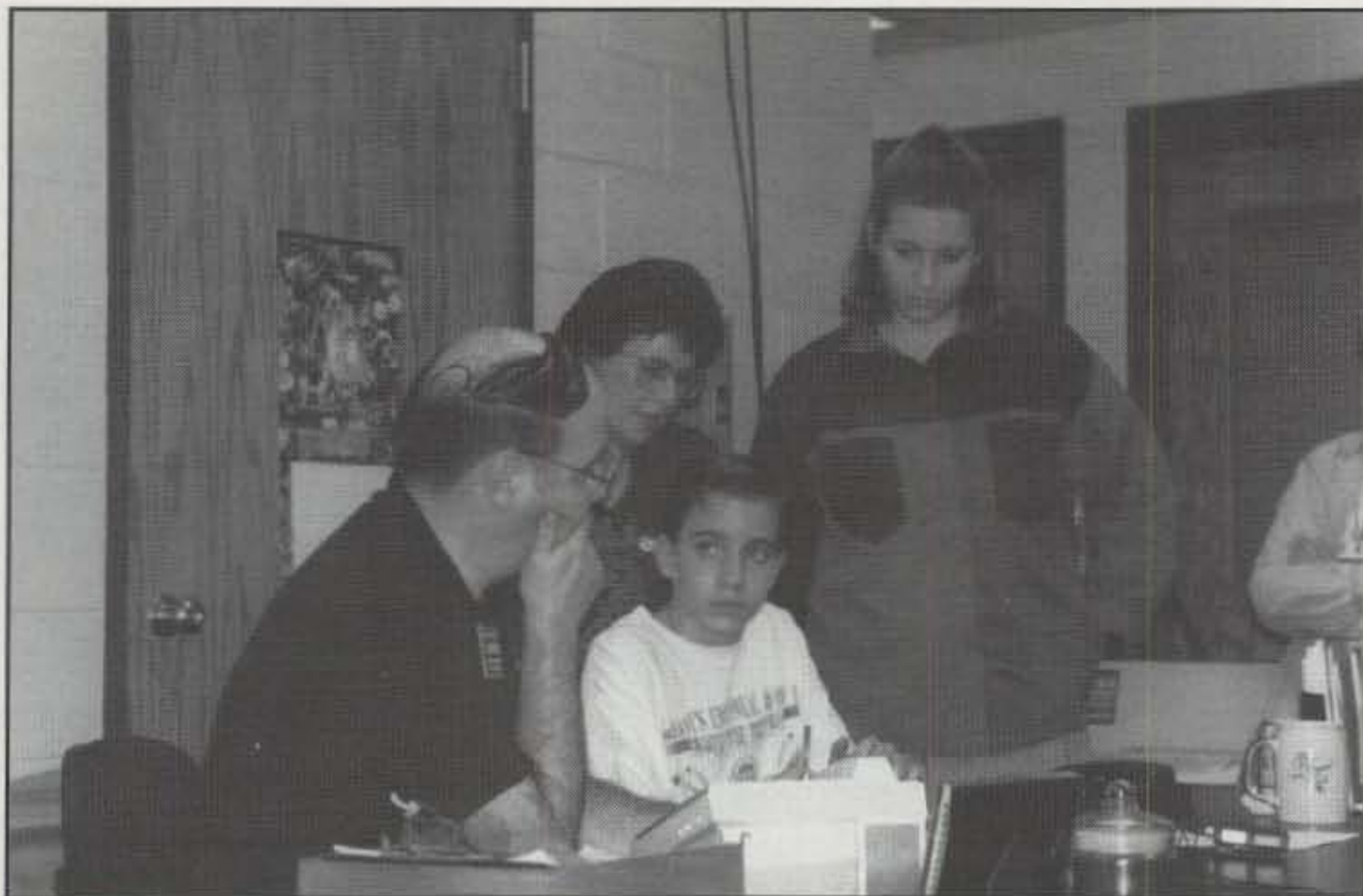
Kathleen Stearns, KB5KIJ, the faculty advi-

sor for an amateur radio club at Bethany Middle School, had called me the day before to tell me of the possible space contact. Upon arriving at the school that Monday, I found over 60 students and parents assembled awaiting the arrival of the Shuttle's footprint. Also present were two of the three local television stations (one with a remote truck) and a reporter from the city's daily newspaper.

This hookup with the Shuttle was to be via a telephone patch through the Texas A&M University Amateur Radio Club (W5ZD). As is sometimes the case when an opportunity to hook up a school is placed on a 24 hour stand-by notice, a fixed station is used to make the contact and a telephone link is made with the school. Nevertheless, the lack of an amateur



Stripped of the aluminum foil because of the low take-off, the balloon, with the payload just a few feet off the ground, was headed for the pine tree to the left edge of the picture. There the payload became momentarily tangled before a gust of wind freed it.



Bethany, Oklahoma, Middle School student Jared Cox was advised by AMSAT Liaison Officer Tom Webb, WA9AFM, and Faculty Advisor Kathleen Stearns, KB5KIJ, on how to ask his question of Astronaut Steve Oswald, KB5YSR, during the STS-67 mission of the Shuttle Endeavor. Awaiting her turn to speak to Steve was fellow student Susan Curry.

radio station at Bethany Middle School did not dampen the students' enthusiasm.

At 6:22 PM a call was made by Bob Diersing, N5AHD, the operator at W5ZD, to Steve Oswald, KB5YSR, the shuttle commander. Immediately, Steve returned the call, and for the next eight minutes (until LOS) students queued up

to ask him questions pertaining to his and his fellow astronauts space flight. Questions such as "What do you do about down time?" and "Are you taking calcium supplements?" were answered quickly so as to get on with the next question. In the meantime Channel 5 was airing a live shot during its 6 o'clock news broad-

cast, with audio from one of Steve's responses clearly being heard in the background.

After it was over, some of the students were interviewed by some of the media representatives. One of the students reported to Kathleen that his parents saw him on the news.

Again, your editor reflected on the fun that was had by all in this adventure in our hobby. Additionally, I again thought about the hands-on experiences that these students had in talking to an astronaut as they watched the computer programmed tracking of the Shuttle across the earth.

Thinking about these two experiences, I wondered about the positive impact that our hobby was having upon the students. I also wondered if it were possible to do more to interest young people in our hobby. I didn't have to think much about that one. Do you?

## Rover Ruckus Roams On

From my reading the continuing comments on the rover reflector on the Internet and from my mail I have made a few summarizations, determinations, and observations.

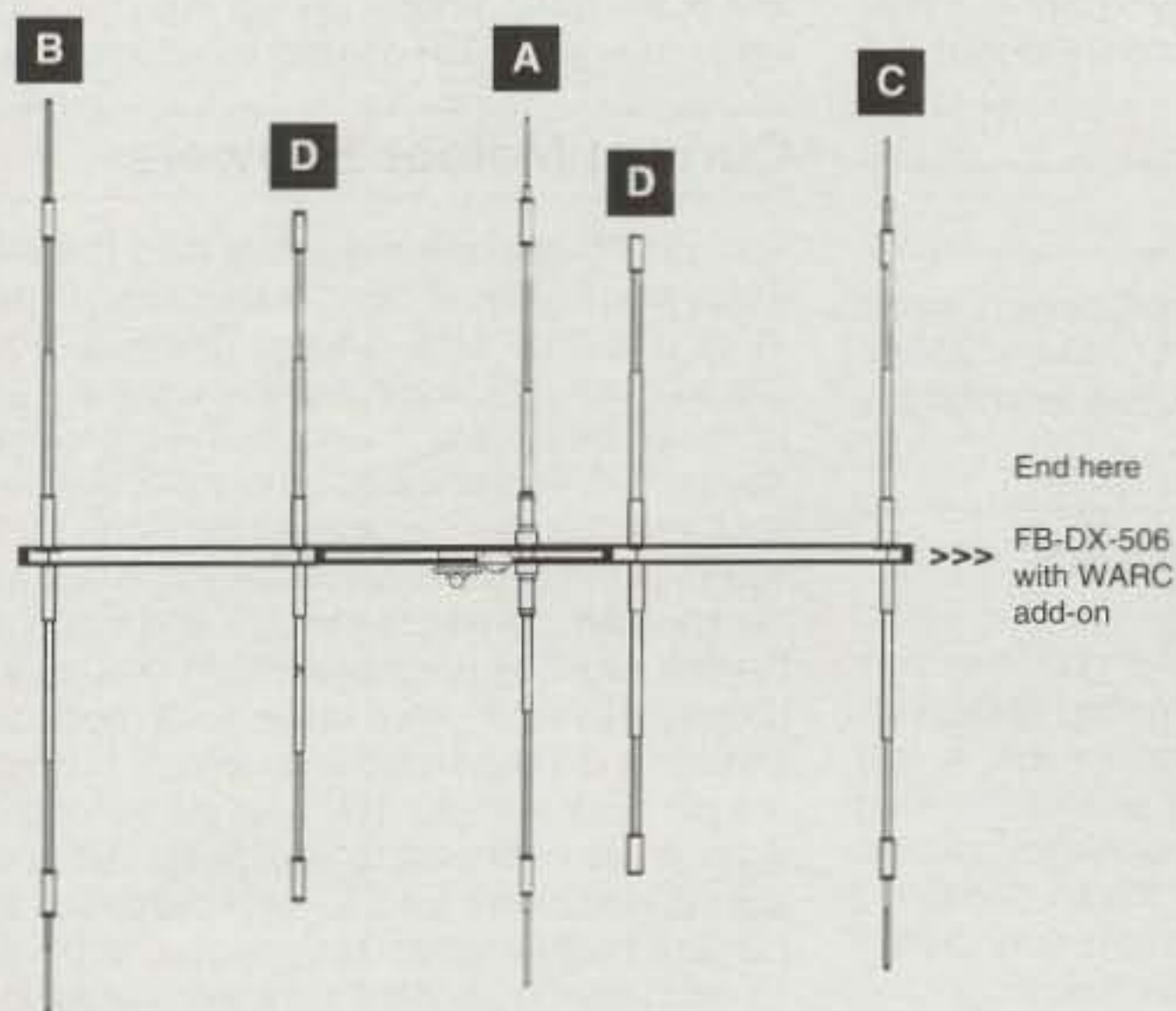
1. The ARRL will not be changing the rover rules back for their June VHF QSO Party. Any hopes of them doing so by June were overly optimistic at best, and any hope of them ever changing the rules back is misplaced, because among other things, background conversations with certain sources indicate that fixed stations' objections to rovers having higher scores than them will keep the pressure on to keep rover scores lower than those of fixed stations.

2. Based upon the number of surveys re-

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<b>D</b>	Makes a 5-element beam	FB-53	9.2/9.2/8.7
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turned to me (less than a dozen), the issue seems to concern a minority within the VHF+ community. Nevertheless, as one pointed out, this minority represents many dozens of contacts to fixed stations. For example, Larry Lambert, NØLL, pointed out that he made less than 60 QSOs with rovers during the January 1995 VHF Sweepstakes. Contrasting this number with his count of more than 160 QSOs a year ago, one can see the impact rovers have on fixed stations' scores.

3. A few rovers have indicated a boycott of ARRL contests, with some opting to favor CQ's contest instead. While I appreciate the interest in CQ's contest, I don't relish it at the expense of another's contest. It is my opinion that a boycott not only hurts the persons intended, but also hurts others.

4. In an effort to counteract a boycott, certain newsletters are planning to sponsor awards based on the old rules. While it is commendable, it still doesn't give the national recognition to the rover that the original sponsor is capable of doing. Those rovers who have indicated an interest in participating under the old rules are planning to sign /RC on CW or /Rover Classic on voice.

5. As with any category in any contest, there are three ways of approaching it: (a) You can play to have fun. (b) You can go all out to win. (c) You can have fun trying to win.

I am wondering what difference it makes what the rules are if you're having fun. By contrast, if you aren't having fun, all the rules in the world won't make it a fun event.

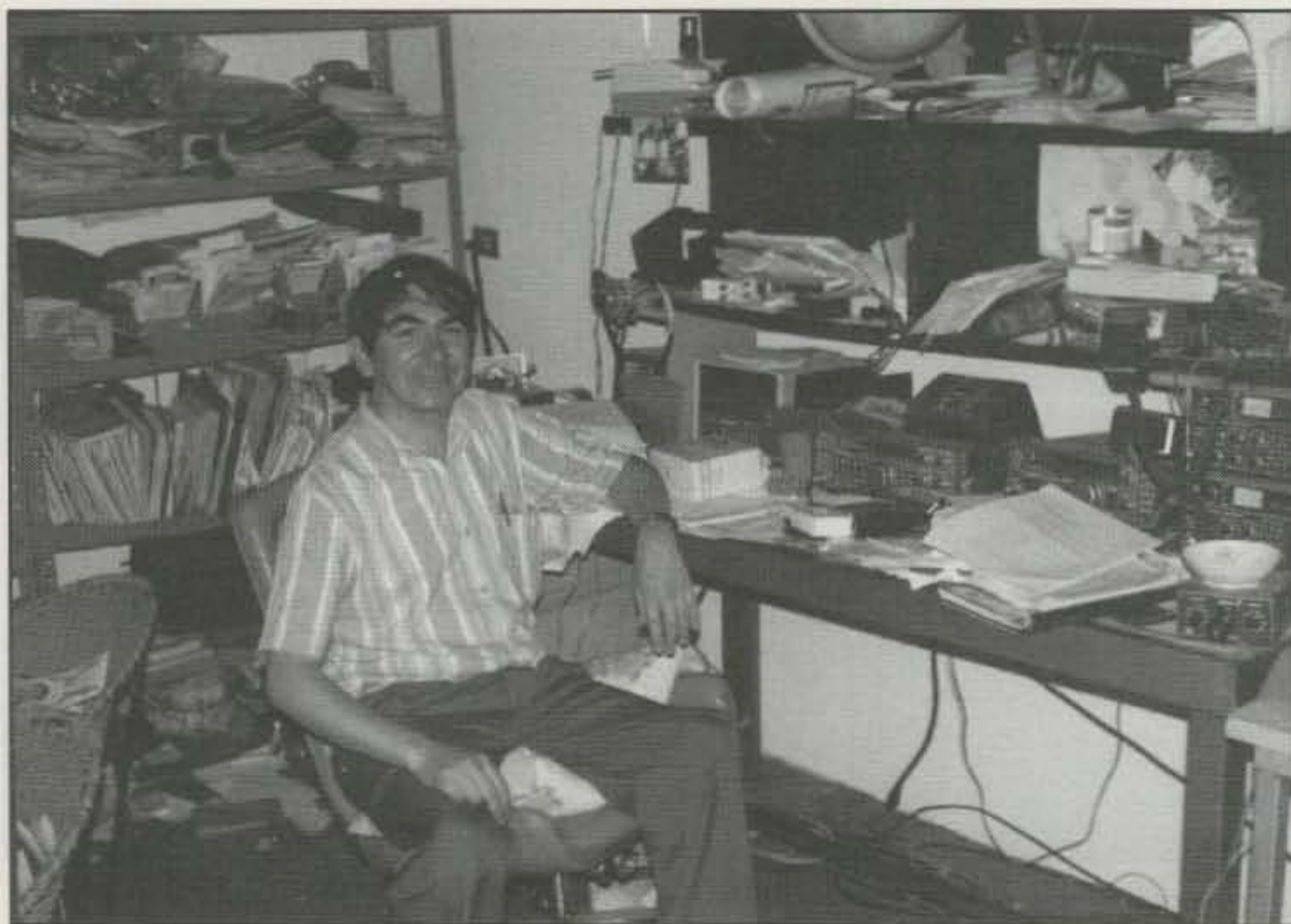
## Current Conferences

The **West Coast VHF Conference** will again be sponsored by the Southern California Six Meter Club. This is the 40th anniversary of this conference and will occur over 5-7 May. About a dozen speakers have been lined up to conduct seminars. To date they include: Gordon West, WB6NOA; Gary Frye, W6XJ; Tim Marek, NC7K; David Laag, WA6OWD; Kerry Banke, N6IZW; Steve Katz, WB2WIK; Joe Moell, KØOV; Scott Bovitz, N6MI; Emil Pocock, W3EP; Gene Swiech, WB9COY; Fred Hein, WA6WZO; and Art Goddard, W6XD.

In addition there will be an ARRL forum, exhibits, and noise-figure measurement tests on Saturday. On Sunday there will be a swap-meet followed by a T-hunt starting at around 1 PM. The organizers have asked your editor to be the banquet speaker and I expect to show a slide presentation on my recent trips to Cuba.

As with last year, this year's conference will be held at the Cerritos Sheraton Hotel, 12725 Center Court Dr., Cerritos, California (phone 310-809-1500 or 800-325-3535; FAX 310-403-2080). Special room rates of \$62 per night will be given to conference attendees, but you must mention that you are attending the conference at the time of your registration. If you are driving in, take the 105 Freeway east to I-605, then south on 605 to Highway 91, then east on 91 to Shoemaker. Take Shoemaker to Center Court Drive and the hotel is on the left.

For more information, contact Gracie Hastings, KK6CG, at 714-990-9203, or FAX her at 714-990-1340. Conference fees are as follows: Registration \$15, banquet \$25, breakfast \$12, and a copy of the *Proceedings* \$10. Send your conference registration to the Southern California Six Meter Club, P. O. Box 10441, Fullerton, CA 92635.



Beni Santos, HC1BI, posed in his typically messy hamshack.

The **Spring EME Conference**, sponsored by Bob Taylor, WB5LBT, will be held 26-28 May 1995 at the Holiday Inn, 9940 Airline Hwy (adjacent to I-12), Baton Rouge, Louisiana (504-9240-7021, 800-HOLIDAY). There are no registration fees. However, Bob says that if they have to rent slide projectors, etc., he will pass the hat. Scheduled speakers include Jimmy Treybig, W6JKV, Derwin King, W5LUU, Ray Rector, WA4NJP, Tommy Henderson, WD5AGO, and possibly Lionel Edwards, VE7BQH.

If you plan to attend, let Bob know by way of the Internet (WB5LBT@AOL.COM), FAX (504-275-7704), voice (504-275-6556), or mail (10715 Waverland Dr., Baton Rouge, LA 70815-5056).

## Current Contests

The 70 cm, microwave bands, and 6 meter ARRL Sprints are scheduled for 3 May, 13 May, and 20-21 May, respectively. See last month's column for more information.

## Major Rules Changes for CQ's VHF Contest

After reprinting Tom Richmond, WB2IEY's opinion of the limited multi-op rules in last month's column, I did some serious thinking about our contest, what has been known as the CQ VHF WPX Contest. The major decision I have made is that our contest will not follow the League's lead. Therefore, the following rules changes have been made, effective with this year's contest:

1. There will be no change in the rover rules.
2. The multi-op categories will now be based on the number of transmitters on the air at any given moment. The Multi-Op Class I category will authorize an unlimited number of transmitters on the air at any given time. The Multi-Op Class II category will limit the number of trans-

mitters on the air at any given time to four. As I explained in my column last month, this is similar to Field Day type rules. And, as with Field Day, you are on your honor to indicate how many transmitters are on the air at any given moment.

3. The WPX multiplier has been eliminated. Again this past year I found that the scoring problem was acute. I attribute it to the continuing confusion over the rules. Therefore, I decided that it wasn't worth the trouble to maintain that category. Accordingly, the contest is renamed the "CQ VHF Contest."

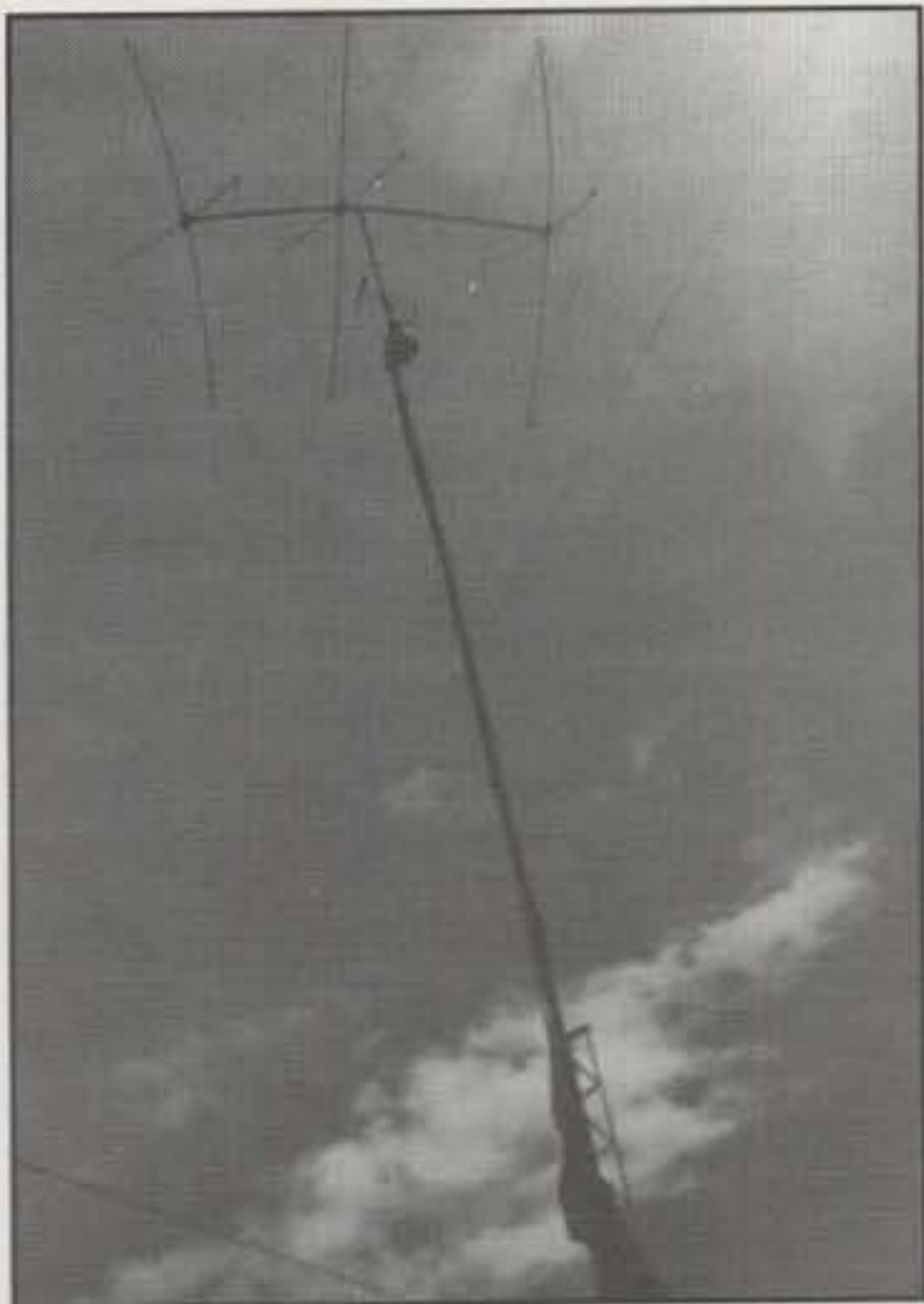
Elsewhere in this issue you will find the full text of the rules. I hope to hear you participating in this, your VHF contest this coming July.

## Current Meteor Showers

The *Eta Aquarids*, a three-day long (between 4 May and 6 May) shower, is predicted to peak at around 1632 UTC 5 May. This is a broad-based peak, and several sub-peaks are possible. It is best to stay alert over the entire three-day period. This shower is more popular in the southern latitudes because of the low ( $-1^\circ$ ) elevation of the radiant. Nevertheless, stations in the southern portion of the U.S. and stations in Central America can benefit from propagation caused by this shower. While not a productive shower, it did produce in excess of 110 meteors per hour in 1980. The best paths for propagation are northeast to southwest and southeast to northwest. East to west propagation is fair and north to south propagation is poor.

Additional potential for meteor scatter contacts may exist at the end of the month as the first signs of the *Arietids* begin to appear. Additionally, the minor showers of *Herculids* (19 May to 14 June, peak 3 June) may have an effect on elevating the number of meteors available.

The *Scorpiids* (29 May to 20 June, peak 5 June) is another southern latitude shower. Stations in the southern hemisphere may ben-



So you don't think you can work DX? When this quad only had two elements, Beni Santos, HC1BI, using only 8 watts, worked over 80 countries on 6 meters!

efit from the slightly elevated (ten per hour) number of meteors entering the atmosphere.

## Notes on Publications

Last month I mentioned the 50 MHz VUCC Record Book produced by Harry Schools. Hot on its heels is another Harry Schools publication called the North American VUCC Record Book. Covering the 2 meter to 23 cm bands, this book contains all the record sheets one needs for paper logging each new grid locator QSO and for filing your application once you reach the requirements of each award. It sells for \$25.00. You can send for yours by writing to Harry at 1606 South Newkirk Street, Philadelphia, PA 19145. Harry prefers postal money orders as the method of payment.

The North American VHF Directory is now available. Containing over 5400 entries, this 56-page book is invaluable for things such as establishing meteor skeds, or finding out who is on from a rare grid. For your copy, send \$10 to Tim Marek, NC7K, 360 Prestige Ct., Reno, NV 89506.

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I used a PorTable during the January VHF Sweepstakes. I actually used two. I mounted my 215 WB on one and one half of my Hy-Gain 70 cm long boom on another. As a rover, I find these poles extremely attractive for quickly raising and lowering antennas at each new location. While snow caused me to operate from only one location during that contest, I

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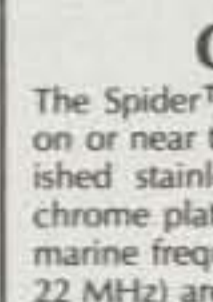
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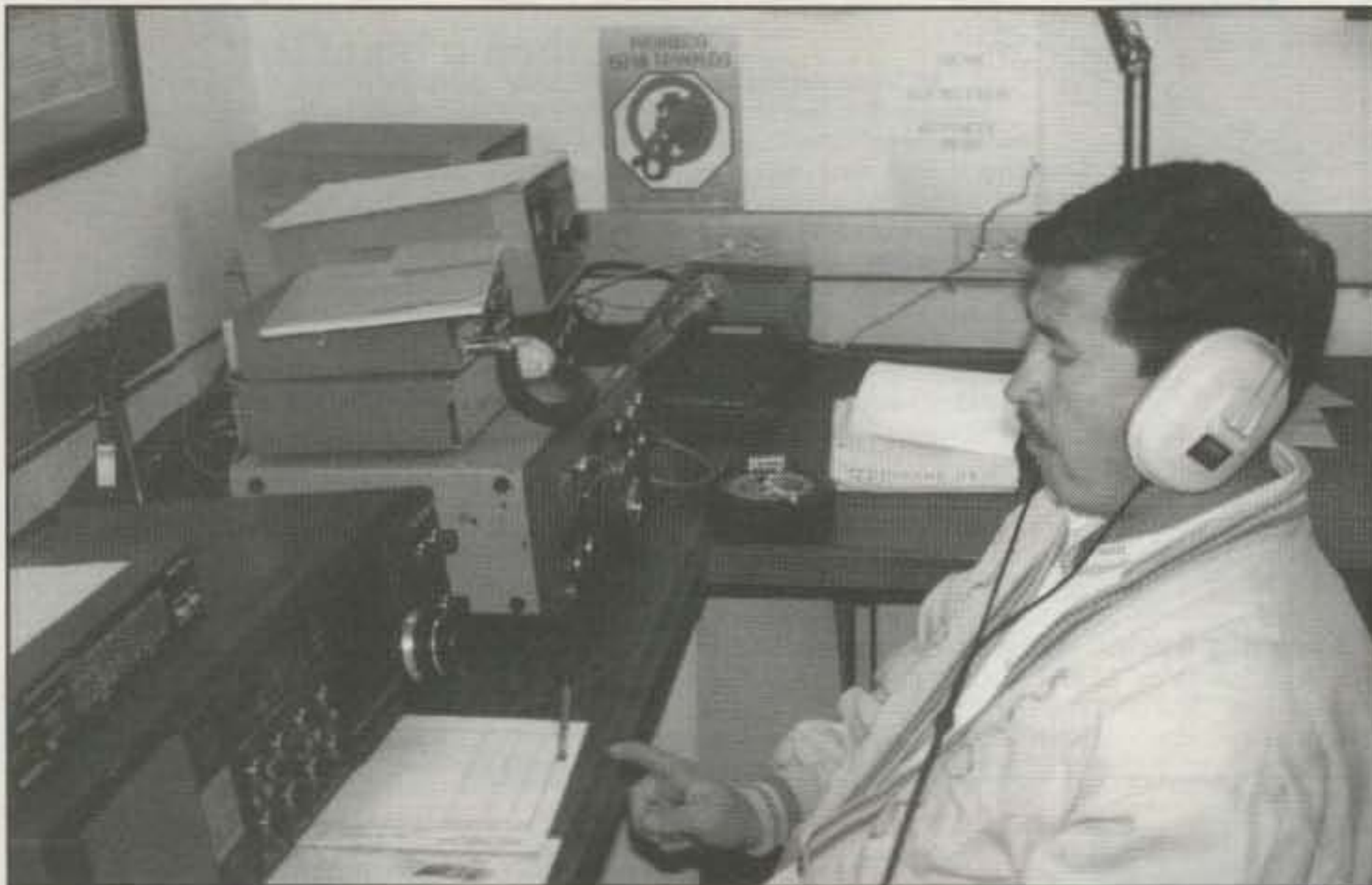
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One of the station operators at the Quito, Ecuador Radio Club poses in front of one of several operating positions at the radio club's station. This award-winning station took second place in its category in the 1993 CQ WW DX Contest.

was quickly able to drop my antennas and QRT at the first sign of the snowflakes.

The PorTapes come in several sizes. The smallest is called the Traveler. Its collapsed size is 47 inches and its extended height is 12 feet. It weighs 4½ lbs and sells for \$99.95. The next largest is called the Adventurer. Its collapsed size is 59 inches and its extended height is 19 feet. It weighs 5½ lbs. and sells for \$124.95.

The next largest size is called, appropriately enough, the Rover. Its collapsed size is 71 inches and its extended height is 26 feet. Its weight is 6½ lbs. and it sells for \$149.95. The next size up is the Expeditioner, with a collapsed size of 83 inches and an extended height of 33 feet. It weighs 10½ lbs. and sells for \$174.95.

The largest size is called the Explorer, with a collapsed size of 95 inches and an extended height of 40 feet. It weighs 12½ lbs. and sells for \$199.95.

Each of the PorTapes comes with a 1¼ inch guy ring, and the two largest sizes come with a 1½ inch guy ring. For an additional \$5.00 you can have a locking sleeve installed at the top of the mast. This sleeve is easily removed and can be used for your antenna mount, thereby eliminating the need to loosen and tighten those "U" bolts every time you take down the antenna.

You might notice that the two longest PorTapes are capable of being extended to the length of a 40 meter quarter-wave vertical. Should you desire to use these masts as antennas, with the optional insulated base and guy kit, they work great.

What about mounting the poles? Randy supplies a mount that you drive over and park on. Called a Bigfoot, this handy mount contains a shaft that will accommodate the bottom section of any of the poles.

Randy not only sells snap-together masts, but antennas as well. Perfected from his rover operations, Randy has made available a 6/10 meter snap-apart beam that can easily be

attached to one of the PorTapes for remote operations.

Incidentally, Randy's PorTapes have been used for non-ham things such as trimming tall trees, painting tall buildings, scraping newspapers off roofs, etc. For more information on these and other products that Randy produces, contact him at 9147 Radcliff Dr., Littleton, CO 80123, or you can call him at 303-761-1458.

### Tom Rutland, K3IPW, SK

Tom Rutland, K3IPW, the owner of Rutland Arrays, became a Silent Key on 26 February. Tom had been ill for awhile and had been looking for a buyer for his business, which included manufacturing the K1FO and his own design antenna arrays. However, his sudden passing at home early Sunday morning came as quite a shock to all of us in the weak signal VHF community.

A retired school teacher, Tom devoted much of his spare time to manufacturing the antennas. He was fairly active in the VHF+ circles when his time permitted.

We join his family in mourning the loss of Tom to our community. Condolences may be sent to his wife, Marie, at 1703 Warren St., New Cumberland, PA 17070.

### Beni Santos, HC1BI

Among the most active 6 meter VHFers from Ecuador is Beni Santos, HC1BI. During my recent trip to Ecuador I was able to visit Beni, first at the Quito Amateur Radio Club headquarters and later at his QTH in Conocoto.

Beni holds the first 6 meter DXCC from Ecuador. He has worked more than enough stations to qualify for VUCC a few times over. He only lacks Alaska for WAS. On HF, Beni holds 5BDXCC, among other awards.

Some of us complain about not having enough power or the right antenna. Beni start-

ed out on 6 meters in 1968. He really started DXing in the late '70s, using just 8 watts and a 2-element quad. Using that setup he amassed over 80 countries before adding an additional element to the quad and raising his power. He now has over 120 countries to his credit.

Beni is not the only HC holder of DXCC. Two others also have achieved that goal, and Beni points out that among the three of them, they have worked over 200 countries.

Upon hearing of my forthcoming trip to Ecuador, I was asked to see if Beni was still active. He reports that while he is still on the air, there has been little propagation to the States. Nevertheless, he is still monitoring and reports much activity in Argentina with several new stations on the air with homebrew equipment.

Beni also is still active on the satellites, as well as 160 meters. One observation that he made which sticks in my mind is that he often finds the same operators on the satellites and 160 meters as he does on 6 meters. Beni feels, as many of us do in the weak signal fraternity, that we are members of a special family within the amateur radio fraternity.

Beni's work and family (a growing teenage daughter) keep him quite busy during his spare time. Nevertheless, he reports that he is still monitoring 6 meters and is anxiously awaiting the rise in the next sunspot cycle. Aren't we all, Beni.

### Radio Club of Quito

While I was awaiting Beni's arrival at the Radio Club of Quito's headquarters, I was given a tour of the club's facilities by President Pablo Davila, HC1DP. Their facility is a beautiful two-story building that includes an operating station, offices, a dining room, and a meeting hall, as well as a miniature basketball court. Their station consists of state-of-the-art equipment and monoband beams on 40, 20, 15, and 10 meters. No wonder they placed second worldwide in their class in the 1993 CQ WW contest.

On VHF they have two 2 meter repeaters on the northern peak, a mountain range known as Pichincha. This installation gives their members excellent coverage to the north of the city. When I visited them, they were in the process of installing another repeater on the southern peak that would give them coverage all the way to Guayaquil in the south. Pablo explains that they eventually will link the two repeaters together (on a 222 MHz link) so that amateur radio operators in Guayaquil will be able to talk to the northern parts of the country.

During my conversation with Pablo, I discovered a latent interest in EME operation. He disclosed to me that he likes to design and build antennas and asked me how many antennas it would take to make EME contacts. I advised him that a moderate station could get by with as little as four stacked arrays and 500 watts. Pablo definitely seemed interested. Who knows? Maybe in the next year or so Ecuador may be active on the moon!

### First NA to Europe 5760 MHz Contact Reported

Dana Shtun, VE3DSS, VHF editor for *The Canadian Amateur*, reports that Barry Malowan-chuk, VE4MA, made contact with OE9PMJ, on 11 December at 2240 UTC, for the first ever



NA-EU QSO on that band. Signal reports were 549/339, respectively. Barry was using a 3.7 meter (approximately 12 foot) dish. He fed the dish with 16 meters (approximately 52 feet) of elliptical and flexible waveguide and 20 watts.

## Inquiring Minds Wanted to Know

Following my reprint of Randy Simon, NØLRJ's story in the January column, I received the following note from Fred Bonavita, W5QJM: "There's a burning, unanswered question in your column. The saga of the NØLRJ-NØUVA race for the record rover score was gripping reading. But whatever happened to the record rattler that almost routed their run? Did it slither away? Did they run over it? What? Inquiring minds want to know."

Well, Fred, and anyone else who is curious, Randy advised me that there is no dirt to dig up on this slithering story. He stated emphatically that they did not run over the snake. He related that after exchanging hisses with it, the pair drove on, leaving the snake still rattling on the road.

## And Finally

One final observation on my first trip to South America: There is a growing interest in satellite operation and weak signal operation among the amateur operators in these countries. As technology has evolved, both of these operations are becoming increasingly within reach of more amateurs. Additionally, the decline in the sunspot cycle is causing amateurs in many of these countries to look to new challenges to

replace the loss of propagation on HF. Finally, these amateurs are also discovering that these operations on the VHF+ frequencies are free of the increasing hassles of HF operations.

It is very interesting to me that the more I travel—whether it is to a communist country, such as Cuba, or to prosperous democracies, such as Ecuador—amateurs are amateurs everywhere. Many of us got into the hobby because of the camaraderie and the technical challenge. And we continue in the hobby finding new ways to meet both of these facets. I have seen amateurs in Cuba make a station out of nothing and rise to the challenge of this lack of materials. I have seen amateurs in other countries dedicate themselves to discovering the uniqueness of propagation within their country as a tool for making new and exciting contacts where seemingly no contacts were possible.

Looking through Beni's DXCC cards caused me to wonder about his dedication to the hobby as he pursued each new country. He had to discover propagation paths and modes that previously were unheard of in order to make these contacts. And, as I mentioned above, he did so for so many of these contacts with only 8 watts and a 2-element quad!

The challenges were not limited to his side of the QSO. One of the stateside cards I examined was from Stan, W3TFA. On his card to Beni he wrote, "Thanks for my first HC contact." In the block listing his equipment he wrote "5 watts output."

In concluding my observations I note that we in the weak signal community have several responsibilities that go with our challenges. We have the responsibility of maintaining the high degree of integrity that is attracting new people to our specialty. We also have the re-

sponsibility of encouraging entry into this specialty as a means for our brethren to set new goals and meet these challenges.

We also have the responsibility of protecting our frequencies from encroachments that threaten to take them away and deprive us and our new friends from learning from the challenges presented to us by these frequencies.

Finally, we have the responsibility of being students of the knowledge acquired by our new friends. This last point was driven home to me time and again while I was in Cuba during the June VHF QSO Party last year. My Cuban friends taught me much about operating on the VHF+ frequencies from within their country. I am looking forward to many years of newly acquired knowledge by our new friends in the weak signal segment of our fraternity.

Should you recently have discovered something noteworthy or discovered the fun of the VHF+ frequencies, please let me know. You can send me a note to the address at the beginning of this column, You can FAX me a note at 405-528-0746. You can send me e-mail over the Internet to 72124.2734@compuserve.com. You can also call me at 405-528-6625. However you get in touch with me, I am looking forward to reporting on your activities in this, your VHF column.

*One final note:* My thanks go to so many of you who have sent me words of encouragement concerning my brother and his illness. I have forward many of them on to my family via my sister's FAX machine. I cannot thank you enough for them because they have meant so much to all of us Lynches. It just reminds me all the more how much we in the fraternity are "family." Thanks again for your kindness.

Until next month . . . 73 de Joe Lynch, N6CL



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# CQ World-Wide WPX CW Contest All-Time Records

The contest is held each year on the last full weekend of May. The All-Time Records will be updated and published annually. Data following the calls: year of operation, total score, and number of prefix multipliers.

## WORLD RECORD HOLDERS

### Single Operator

1.8	LY3BU('94)	132,112	184
3.5	YX3A('89)	1,004,060	305
7.0	VP2VCW('86)	4,641,120	586
14	YW1A('91)	4,617,456	732
21	ZD8LII('91)	5,118,527	743
28	ZS6BCR('91)	3,621,173	617
AB	P4ØW('94)	14,168,115	845

### Multi-Operator Single Transmitter

YM5KA('90)	13,098,790	839
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### Multi-Operator Multi-Transmitter

HG73DX('93)	16,543,420	1060
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## U.S.A. RECORD HOLDERS

### Single Operator

1.8	K5UR('85)	13,668	102
3.5	K1ZM('93)	406,080	288
7.0	N5RZ('85)	1,754,664	452
14	K2VV('86)	2,525,880	582
21	K6LL/7('88)	2,163,388	557
28	N5RZ('89)	162,134	259
AB	KM1H('92)	5,313,160	760

### Multi-Operator Single Transmitter

N4WW('88)	5,593,772	698
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### Multi-Operator Multi-Transmitter

NSØZ('88)	10,870,380	922
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## CLUB RECORD

Northern California Contest Club ('92)	97,527,906
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## QRPp RECORD

VP2MU('91)	1,554,735
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## WPX (Prefix) RECORD

HG73DX('91)	1120
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## CONTINENTAL RECORD HOLDERS

### AFRICA

1.8	ZS6BCR('85)	20	5
3.5	EA8RL('84)	453,456	201
7.0	AM9TY('92)	2,007,990	404
14	ZD8LII('93)	2,687,580	567
21	ZD8LII('91)	5,118,527	743
28	ZS6BCR('91)	3,621,173	617
AB	EA8EA('93)	10,693,146	762

### ASIA

1.8	UP3BP/UF('85)	125,240	101
3.5	UP2NK/UF('85)	701,012	221
7.0	9K2ZZ('94)	3,383,676	487
14	4Z6DX('91)	4,614,030	743
21	7L1GVE('91)	2,811,478	601
28	4X4UH('81)	1,081,262	338
AB	P31A('92)	10,293,858	762

### EUROPE

1.8	LY3BU('94)	132,112	184
3.5	OK1DXS('94)	916,456	388
7.0	S5ØA('94)	3,293,004	606
14	LZ5W('92)	4,222,665	837
21	4N4A('88)	2,585,460	615
28	9H1EL('88)	805,552	398
AB	CR7M('93)	5,645,267	751

### NORTH AMERICA

1.8	VE3BMV('86)	43,428	77
3.5	XL7CC('94)	709,730	241
7.0	VP2VCW('86)	4,641,120	586
14	WC4E/KP4('86)	3,613,248	656
21	FS5T('89)	4,552,470	702
28	HI8JKA('89)	891,242	374
AB	V27T('89)	9,408,672	819

### OCEANIA

1.8	KX6DC('88)	12,240	45
3.5	KX6DC('89)	258,258	143

7.0	V7A('93)	2,205,922	373
14	ZL3GQ('89)	2,775,744	576
21	N7DF/WH2('89)	3,243,450	525
28	KG6DX('81)	1,238,806	334
AB	NH6J/NHØ('88)	4,484,760	532

### SOUTH AMERICA

1.8	YV1ØB('86)	11,550	35
3.5	YX3A('89)	1,004,060	305
7.0	AZ4F('94)	4,496,980	590
14	YW1A('91)	4,617,456	732
21	LTØA('91)	4,290,988	686
28	CE3DNP('89)	2,857,038	582
AB	P4ØW('94)	14,168,115	845

### MULTI-OP SINGLE TRANSMITTER

AF	ZD8ØV('91)	10,938,352	848
AS	YM5KA('90)	13,098,790	839
EU	R6L('93)	9,194,688	939
NA	KP2A('89)	12,843,135	835
OC	AG9A/AH2('91)	9,005,641	787
SA	ZXØF('94)	12,280,162	811

### MULTI-OP MULTI-TRANSMITTER

AF	EA9CE('84)	4,383,308	482
AS	JE2YRD('91)	8,388,942	866
EU	HG73DX('93)	16,543,420	1060
NA	WL7E('88)	12,826,296	952
OC	KH6XX('85)	8,551,399	647
SA	LQ5A('89)	8,290,016	784

### QRPp

AF	5Y4FO('92)	649,057	311
AS	4X4UH('82)	1,028,904	344
EU	LZ2BE('91)	1,137,488	506
NA	VP2MU('91)	1,554,735	469
OC	FO8JP('86)	572,131	259
SA	OABV('81)	444,768	246

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**TS-450S/690S** •160m to 10m amateur band operation, 500kHz to 30MHz general coverage receiver •6m amateur band and 50-54MHz general coverage receive (TS-690S) •DDS (Direct Digital Synthesizer) & digital PLL system •AIP system •IF shift function tuning •AF notch filter



**TS-140S** •160m to 10m amateur band operation, 500kHz to 30MHz general coverage receiver •IF shift circuit •31 memory channels with multi-scan functions •Dual-mode noise blanker •Speech processor with audio compression amplifier

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**TM-742A/642A/942A** •Multi-band operation (TM-742A: 144/440MHz; TM-642A: 144/220MHz; TM-942A: 144/440/1200MHz) •Optional FM band units for TM-742A/642A (TM-742A: 28/50/220/1200MHz; TM-642A: 28/50/440/1200MHz) •Dual/triple receive capability •101 memory channels per band •Detachable display & control panels (option)



**TM-733A** •144MHz/440MHz dual-band operation •Dual receive on same band (VHF +VHF or UHF +UHF) •"6-in-1" programmable memory •72 memory channels •DTSS selective calling with page •1200/9600bps packet terminal •AIP system •Cross-band repeater function



**TM-241A/331A/441A** •Single-band operation (TM-241A: 144MHz; TM-331A: 220MHz; TM-441A: 440MHz) •20 multi-function memory channels plus call channel •Multi-scan capability •Selectable CTCSS tone encoder •Multi-function microphone supplied



**TM-251A/451A** •Single-band operation (TM-251A: 144MHz; TM-451A: 440MHz) •41 memory channels (optionally expandable to 200) •Dual-band receive •Digital recording system •DTSS selective calling with page •1200/9600bps packet terminal

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**TH-22AT/42AT** •Single-band operation (TH-22A: 144MHz; TH-42A: 440MHz) •MOS FET power module •Built-in DTMF keypad •40 memory channels in E-PROM (plus 1 call channel) •Multiple scan functions •Dual scan stop modes (CO & TO) •Channel Display function

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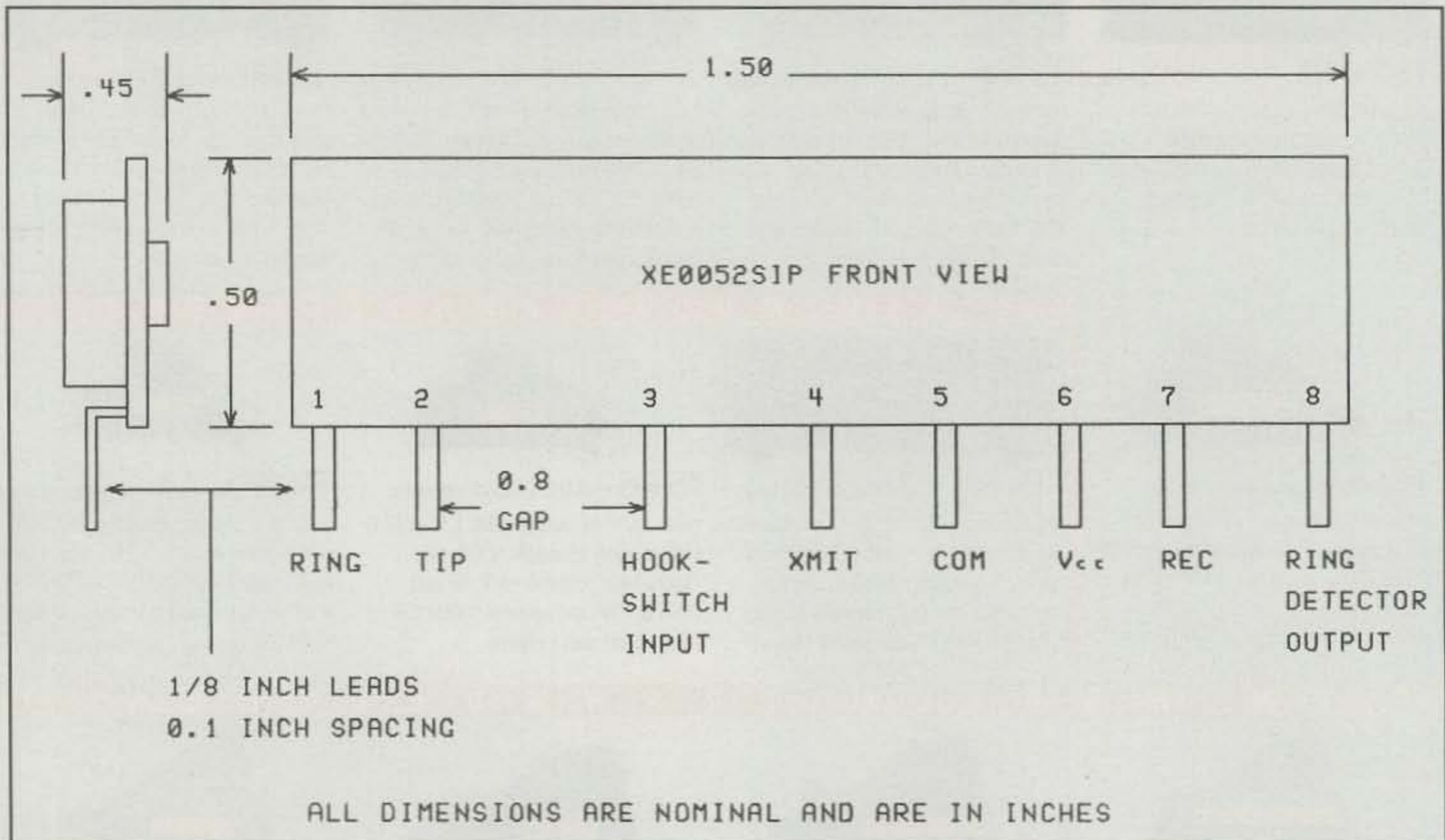


Fig. 1- Pin connections for XE0052SIP chip.

Many experimenters who build equipment that will ultimately connect to the standard U.S. telephone line usually do not take as much care as they should with the portion of their circuitry that actually will connect to the line. Often the line interface is a trade-off that works marginally instead of in full compliance with FCC regulations (as is legally required) and can potentially cause problems with the public switching network. The integrated circuit to be described this month can change all of that.

Fig. 2 is a block diagram of the XECOM XE0052SIP, a complete FCC Part 68 compliant telephone line interface. The chip has an internal 2-wire to 4-wire converter to separate transmit and receive signals, an on/off-hook-switch control input to

easily connect and disconnect the telephone line, a ring detector to sense an incoming call, and an internal surge/protective network. The chip meets all standard telephone audio bandwidth requirements and operates from a single 5 volt power supply at a current drain of only 15 ma (maximum). The operating temperature range is from 0 to 70 degrees C and the chip comes in a standard SIP package as shown in fig. 1.

To implement a complete telephone line interface, the circuit of fig. 3 is recommended. Audio input to the transmit port should be limited to 100 millivolts or so to prevent telephone line overloading, and recovered audio output from the receive port will be at about the same level. A 2 to 3 volt input (TTL logic 1) applied to the hook-switch pin will connect the circuit to the telephone line, while a 0

to 0.5 volt level (TTL logic 0) will disconnect it. Incoming ring signals are also indicated by a TTL signal—low for ring present and high for no ring.

Although the XE0052SIP fully complies with current FCC regulations, to be legally correct, equipment using this chip should be certified by an independent testing laboratory, particularly if you plan to market it. The fact that the chip already complies should make this a simple, relatively inexpensive process. If for some reason you do not seek certification, at least you will not be in a position to "blow out" the line with your creation.

Further information and a comprehensive data sheet can be obtained from XECOM Incorporated, 374 Turquoise Street, Milpitas, California 95035 (408-945-6640).

73, Irwin, WA2NDM

c/o CQ magazine

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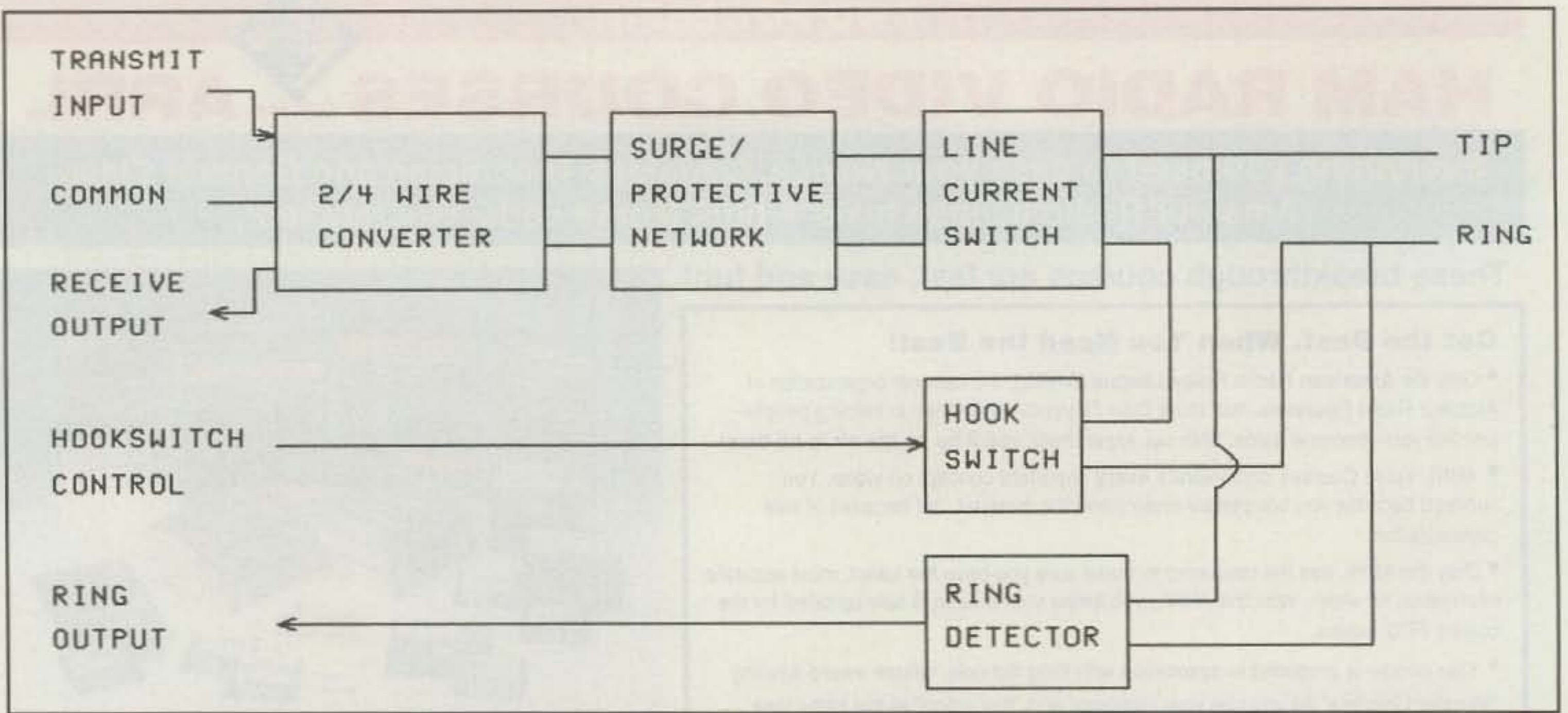


Fig. 2- Block diagram of XE0052SIP telephone-line interface.

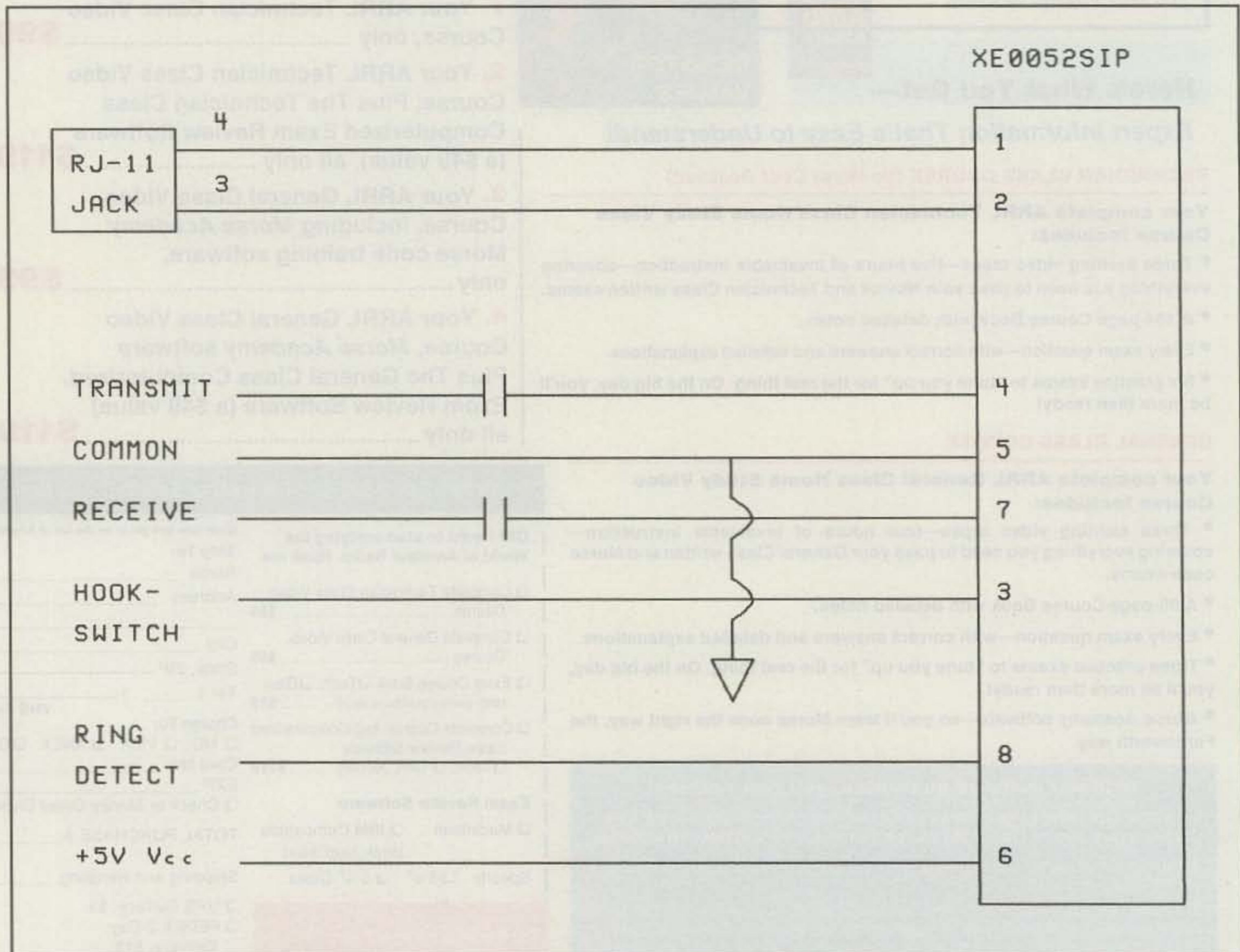


Fig. 3- XE0052SIP telephone-line interface circuit.

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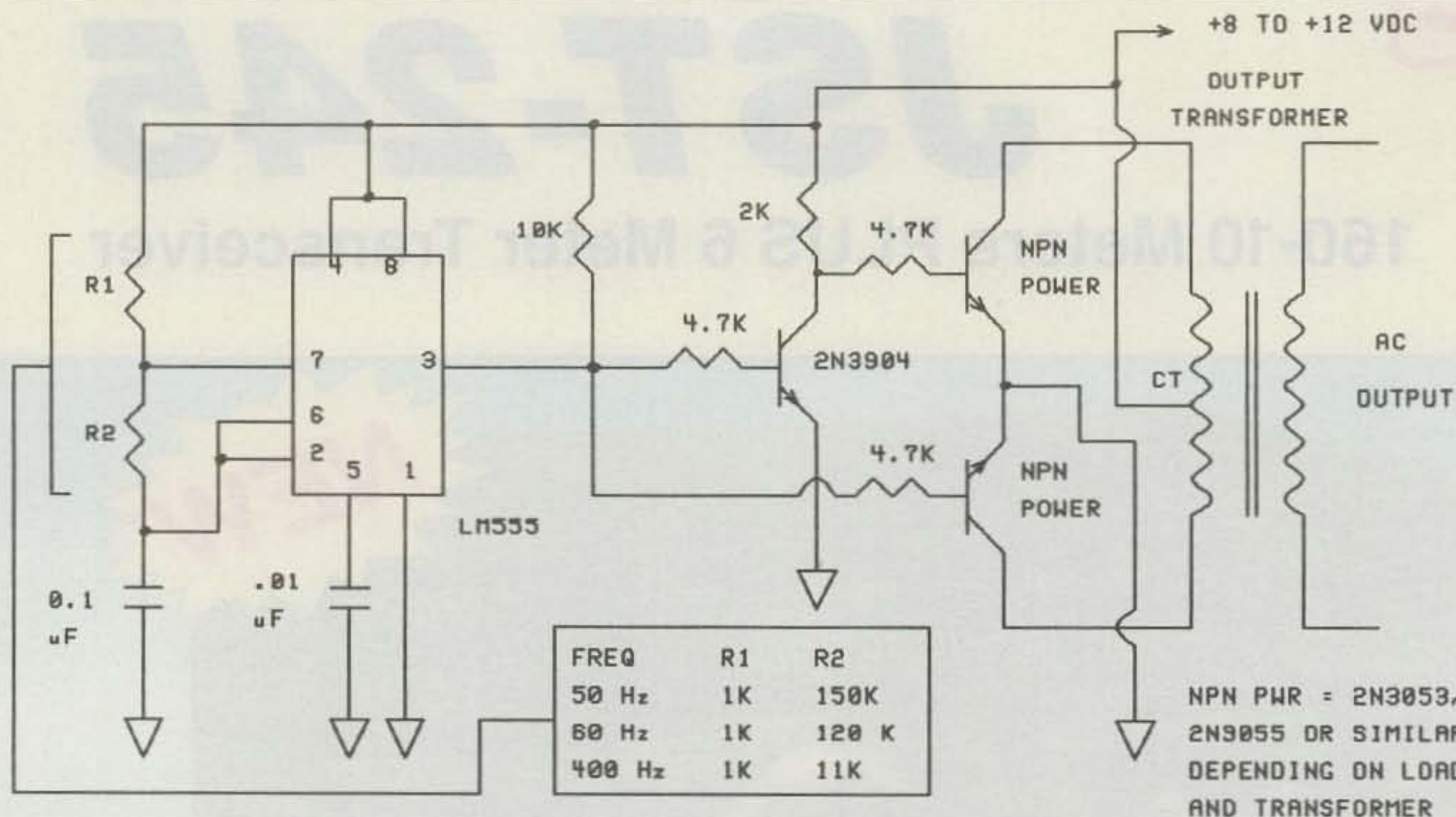


Fig. 1— Revised schematic diagram of variable frequency power supply.

### February Column Correction

I would like to thank all of those readers who noticed the error in fig. 1 of the February column. The corrected schematic diagram is shown here. To those

who have built it, don't forget to heat-sink the two NPN power transistors, especially if you are drawing high currents. I apologize to those who have been inconvenienced by the error, but

these things do happen. Remember we all are "amateurs" in one sense or another, so consider this a test of your expertise (although I assure you it wasn't done on purpose).

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Local Hotel	Marina
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Playland	Playland
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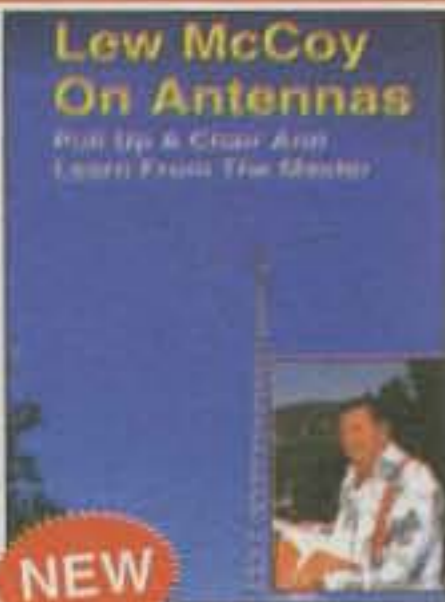
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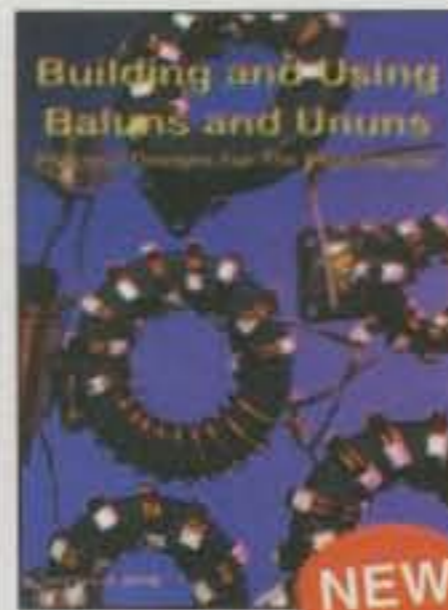
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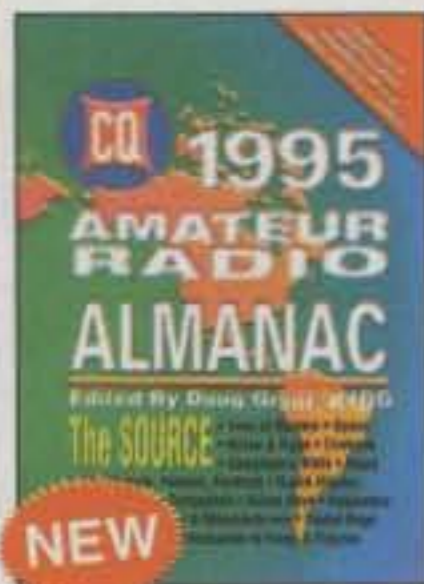


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# ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

BY KARL T. THURBER, JR., W8FX

## Random Reflections—Part III

**T**his time we'll again reflect on and update many of the "Antennas and Accessories" topics we covered in earlier columns; we'll also cover new territory. Let's begin with antennas.

### Antenna Notes

**Roadrunner Resonator.** It's not so easy to put out a big HF signal when you're mobile. The constraints on achieving good performance are many, and so a number of technical approaches have been taken to improve this performance. In the past few years there has been a proliferation of relatively efficient, heavy-duty mobile antennas that stress high performance, multiband operation, and remote tuning. We have covered several.

Now there's another entrant in the mobile antenna derby—the Roadrunner Resonator. The Model RR80-10 covers 80-10 meters, including popular amateur, CAP, government, marine, and MARS frequencies. The hi-Q antenna is remotely tuned for quick frequency changes and includes a "Z-matcher" to help achieve broadband operation. Claimed nominal SWR is 1.5:1 over the entire frequency range. The antenna handles 600 watts PEP.

Mechanically sturdy and precision machined, the antenna presents a stylish appearance and is equipped with a weathertight cover to protect it from ultraviolet (UV) damage. The resonator receptacle and coil drive are steel; the resonator coil uses beryllium copper finger stock for positive contact. A standard mobile ball mount is used, with no antenna supports being required; a heavy, low-loss spring and whip quick-disconnect are included. You supply the whip (60 to 102 inches, the latter length being recommended), coaxial cable, and PL-259 connectors.

The antenna sells for \$299.95 under a 30-day satisfaction-guaranteed or money-back basis; an accessory trailer-hitch ball-mount plate is \$34.95. For more information, contact K. Jim O'Connor at Roadrunner Resonator,

289 Poplar Drive, Millbrook, AL 36054-1674

1850 Swanson, #A20, Lake Havasu, AZ 86403 (602-453-7211).

**Phillystran PLP Big Grip Dead-Ends.** Do you use metallic guys on your non-self-supporting tower? As you know, you should break up metallic guy-wire resonances (which may distort or degrade performance) with strain insulators.

Increasingly, sturdy nonconductive materials such as Kevlar and Kevlar-based Phillystran® are used as tower guys. Their advantage lies in the isolation of the guys from the antenna field. These guys are "electrically transparent," and so they improve antenna directional pattern by eliminating distortion from signal reradiation; there's no need to use insulators to break up guy-wire resonances. The guys also tend to reduce maintenance needs and present neater tower appearance.

One of the more popular nonconductive guying materials is Phillystran® from United Ropeworks (U.S.A.), which has been available since 1973. These guys provide an alternative to troublesome steel guys. Phillystran often is preferred over wire materials because of its high strength, light weight, electrical transparency, dielectric properties, noncorrosive nature, and ease of installation. It's jacketed with a material selected for its abrasion-resistant and weather-resistant qualities.

The longstanding requirement for potted end fittings for these otherwise desirable, insulator-free guys was inconvenient and messy. However, a material known as HPTG I, which has excellent dielectric characteristics, has been available for several years. Three types of HPTG I guys are available in sizes equivalent to "extra high strength steel" diameters of 1/8 to 1/4 inch; a smaller 3/32 inch rope is available for boom supports.

Even newer are the Phillystran® PLP® Big Grip dead-ends for terminating the guys (see fig. 1). The Big Grips match the rope twist direction. They're of galvanized steel construction and color coded for easy identification. They come in three sizes to correspond with the three different HPTG I tower guys. There are

some special hardware requirements that should be followed to effect a proper installation; seven example hardware articulations using Big Grips are shown in fig. 2.

For a specification sheet and price list, contact United Ropeworks (U.S.A.) Inc., 151 Commerce Drive, Montgomeryville, PA 18936-9628 (215-368-6611).

**New from FLYTECRAFT™.** In November 1993 we mentioned that Steve Flyte, K7SF, offers several monoband HF vertical and wideband VHF/UHF antennas. Recently, these have been given minor design tweakings and price adjustments.

As we noted, Steve offers the Model SFX Monoband HF Vertical Antennas. An internal helix provides full quarter-wave electrical equivalency, and shortened radials allow use almost anywhere. Eight models cover the 80, 40, 30, 20, 17, 15, 12, and 10 meter bands. They are rated at 1500 watts and are priced from \$79.95 to \$99.95. Steve also offers the Model CFN Wideband VHF/UHF Antenna. A Discone, it covers 50 through 1300 MHz for receiving and has transmit capability from 144 to 1300 MHz; it's \$89.95.

What's completely new is the FLYTECRAFT Model KFN Wideband VHF/UHF Antenna. It's a heavy-duty, full-size Discone with continuous transmit coverage over 50 to 1300 MHz with an average SWR below 1.7:1 over the entire range. Having a large capture area, the KFN also is quite rugged and able to withstand 90 MPH winds. The antenna has lightweight steel upper elements, a styrene plastic feed assembly, and an aluminum lower element. Power-handling capability is 1 KW. It is priced at \$149.95.

Also new is the Model SFZ Indoor Multiband HF Transmitting and Receiving Antenna. It's an end-fed, center-loaded Hertz that's designed for situations where antenna restrictions may prevent you from operating. The antenna offers continuous coverage between 40 and 10 meters when used with an antenna tuner. It's adjustable in height between 7 and 12 ft. for use between floor and ceiling. It includes a 34

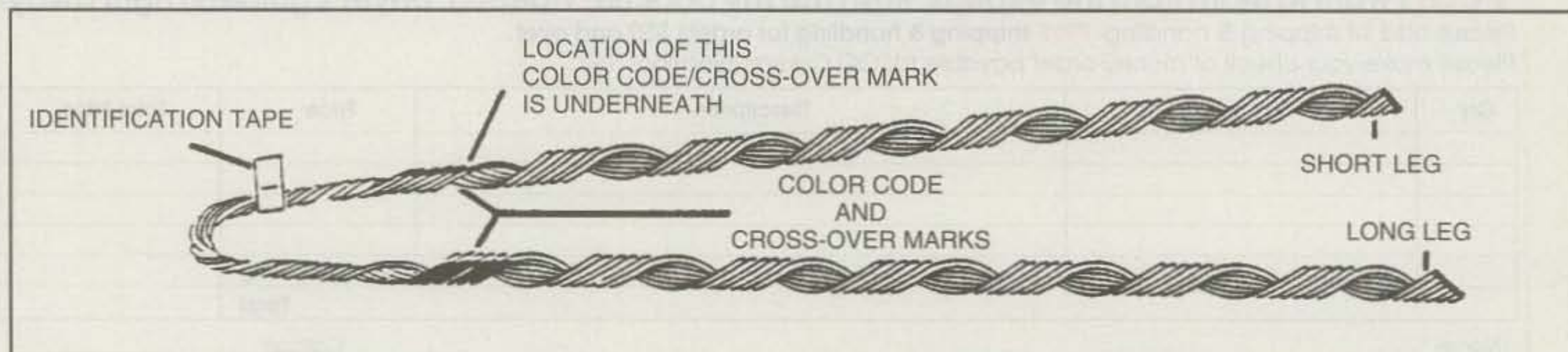


Fig. 1— What's new in nonmetallic tower guy hardware are the PLP® Big Grip dead-ends for Phillystran guys. The Big Grips are of galvanized steel construction and color coded for ease of identification. They're available in three different sizes to correspond with the three different size HPTG I tower guys. (Source: United Ropeworks Phillystran product literature)

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Don't be deceived by the size of the C568A. It may be small, but there is nothing left out. STANDARD has designed a full size keypad with buttons that are easy to read and use. Also, note STANDARD'S optional output power of 5 watts, with the 12 volt battery or adapter, EL power for 1.2 GHz.

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## ARTICULATED HARDWARE RECOMMENDED FOR USE WITH BIG-GRIP DEAD-ENDS

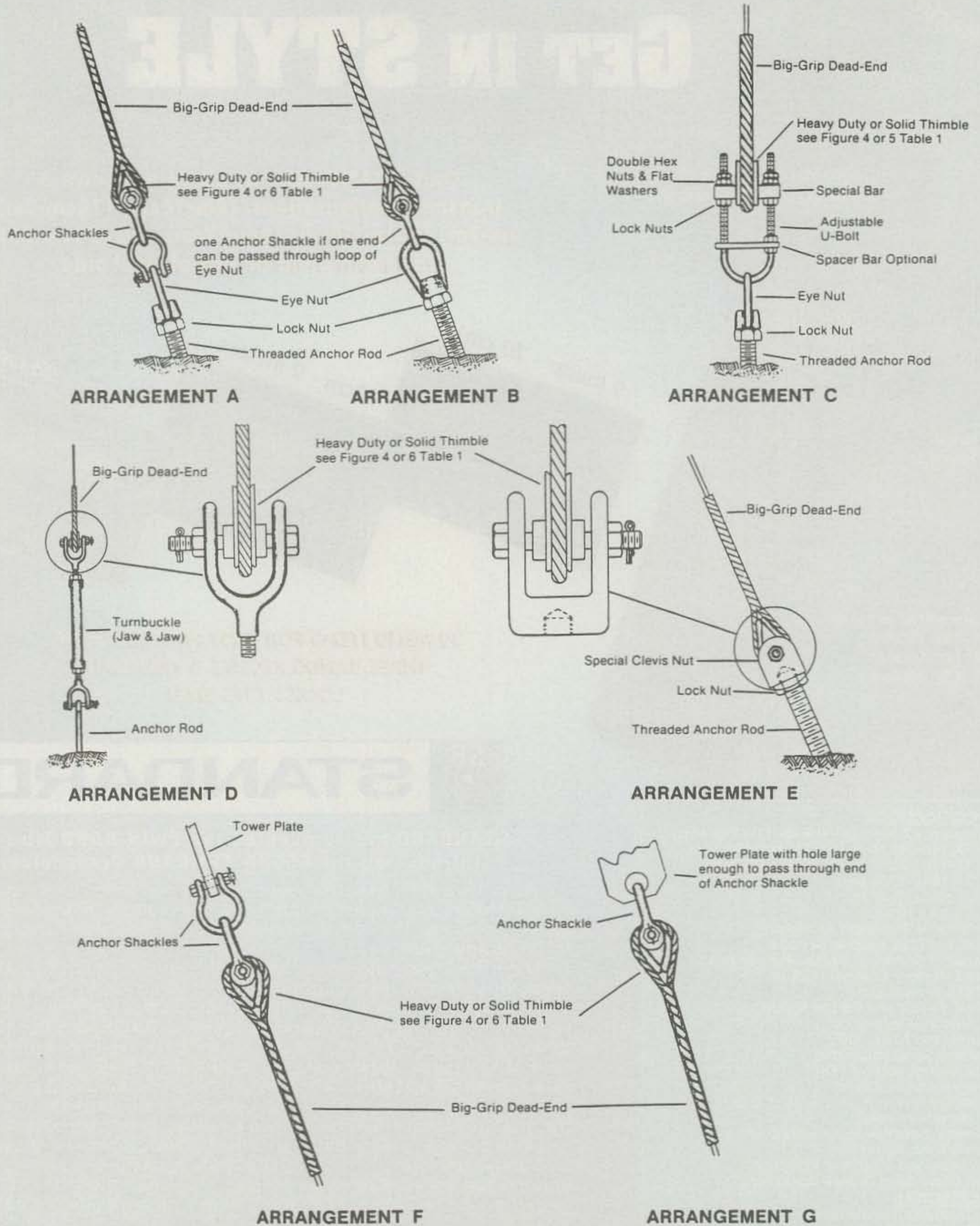


Fig. 2- The Phillystran PLP Big Grip guy-wire dead-ends are precision devices you should handle carefully. They should be articulated with hardware with smooth contours and ample groove clearances. The dead-ends must be used only with the size rope for which they are designed; three different sizes are available. (Source: United Ropeworks Phillystran product literature)

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Gain & Wave: 146MHz 4.5dBi 6/8 wave • 446MHz 7.2dBi 5/8 wave x 3 •  
Max Pwr: 200W • Length: 5'11" • Weight: 2lbs. 9ozs. •  
Conn: Gold-plated SO-239 • Construction: Single-piece fiberglass

**GP-6** • Dual-band 146/446MHz Base Repeater Antenna  
Gain & Wave: 146MHz 6.5dBi 5/8 wave x 2 • 446MHz 9.0dBi 5/8 wave x 5 •  
Max Pwr: 200W • Length: 10'2" • Weight: 3lbs. 8ozs. • Conn: Gold-plated SO-239 •  
Construction: Fiberglass, 2 Sections

**GP-9/GP-9N** • Dual-band 146/446MHz Base Repeater Antenna • BEST SELLER!  
Gain & Wave: 146MHz 8.5dBi 5/8 wave x 3 • 446MHz 11.9dBi 5/8 wave x 8 •  
Max Pwr: 200W • Length: 17'8" • Weight: 5lbs. 11ozs. • Conn: GP-9 Gold-plated  
SO-239 • GP-9N Gold-plated N-type female • Construction: Fiberglass, 3 Sections

**CA-62DB** • Mono-band 6 Meter Vertical  
Gain & Wave: 52MHz 6.5dBi 5/8 wave x 2 • Max Pwr: 500W • Length: 21'8" •  
Weight: 5lbs. 11 ozs. • Conn: SO-239 • 2MHz band-width after tuning (6M) •  
Construction: Thick-wall aluminum, 5 sections

**CX-333** • Tri-band 146/220/446MHz Base Repeater Antenna  
Gain & Wave: 146MHz 6.5dBi 5/8 wave • 220MHz 7.8dBi 5/8 wave x 3 •  
446MHz 9.0dBi 5/8 wave x 5 • Max Pwr: 120W • Length: 10'2" • Weight: 3lbs. 1oz. •  
Conn: Gold-plated SO-239 • Construction: Fiberglass, 2 Sections

**GP-15** • Tri-band 52/146/446MHz Base Repeater Antenna  
Gain & Wave: 52MHz 3.0dBi 5/8 wave • 146MHz 6.2dBi 5/8 wave x 2 •  
446MHz 8.6dBi 5/8 wave x 4 • Max Pwr: 300W • Length: 5'11" • Weight: 3lbs. 1oz.  
• Conn: Gold-plated SO-239 • Construction: Single-piece fiberglass

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ft. counterpoise you place on the floor, either stretched out or coiled up. Power-handling capability is 500 watts, but for indoor use maximum recommended power is 100 watts. It's \$179.95.

For further information, contact FLYTE-CRAFT, P.O. Box 3141, Simi Valley, CA 93093 (1-800-456-1273).

**Universal Towers.** This Michigan firm offers a variety of free-standing (unguyed and self-supporting), lightweight aluminum towers. The towers range from 30 to 100 ft.; heavy-duty towers are available to handle wind loads up to 35 sq. ft.

The firm's catalog provides a good education in determining tower requirements; a short tutorial offers guidance on selecting the right tower. The catalog includes a matrix table that shows the proper tower for various antenna wind-loading and tower-height parameters. Also included is a wind-loading chart of the United States, along with a to-the-point procedure for properly preparing the base and installing the tower.

As the catalog indicates, the first thing to do in selecting a tower is to determine the area of the antenna that you intend to mount on it; usually, this information is in the antenna manufacturer's tech data. Small VHF and UHF antennas may be but two to five sq. ft. in area. On the other hand, large 20 and 40 meter beams or multiple HF arrays may be 35 sq. ft.

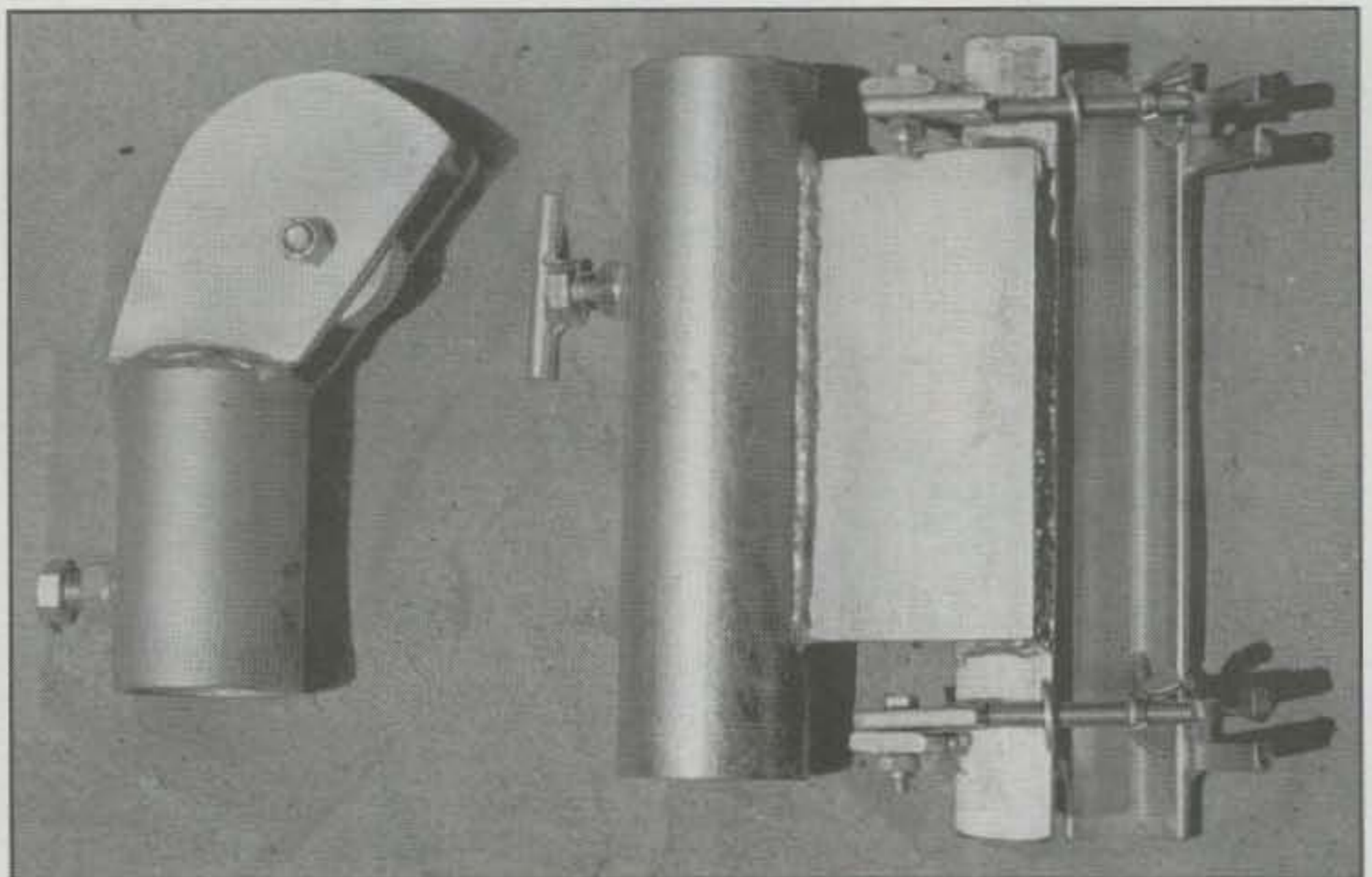
The catalog points out that when using a rotator, a rule of thumb is to add one sq. ft., plus an additional one sq. ft. for the mast, to whatever size antenna you plan to use. You also should avoid going six ft. above the top of the tower with any antenna system. You select the tower height next, with 10 ft. sections the norm; this increment gives you many possible sizes and the ability to add sections later.

Incidentally, large towers generally require a concrete base; the base may be extensive for free-standing towers. The torque exerted on the base of a tall, self-supporting tower with a large rotor and antenna is considerable in high winds. Since the base provides the strength for an unguyed tower, the base must be built right. Universal Towers recommends that you not place aluminum tower sections directly in concrete, since the corrosive effects of cement can destroy aluminum tower sections. Instead, bolt special base sections to the bottom tower section.

For a tower catalog, contact Universal Manufacturing Co., 43900 Groesbeck Hwy., Clinton Twp., MI 48036 (810-463-2560).

**Synthetic Textiles Rope Update.** You use antenna support lines to connect wire antenna ends to their supports. One-half inch diameter manila hemp rope is commonly used; avoid any material with a low working tension rating, such as plastic clothesline and sash cord. Today, Dacron® polyester rope often is preferred by many antenna buffs.

Man-made fiber rope is strong and much more durable than natural fiber rope; synthetic rope isn't affected by mildew, rot, and most chemicals. As an antenna support line, Dacron has far better characteristics than nylon, which can be difficult to knot, although it isn't quite as strong. Dacron isn't as elastic as nylon and so doesn't stretch nearly as much. Dacron also has much better resistance to UV degradation from sunlight than does nylon. Chemicals and fungus inhibitors typically are added to Dacron to improve its resistance to degradation.



*The IIX Equipment gin pole (clamp and pulley detail). The gin pole is a mechanical device for safely and conveniently working with masts and towers. The gin pole consists of three components. These are the pulley assembly, which provides a mechanical advantage; a clamp assembly, to attach everything to the tower; and a pole (not shown in this photo), to gain the height needed for the lift. (Photo courtesy IIX Equipment, Ltd.)*

About six years ago, we brought to readers' attention Synthetic Textiles' black Dacron polyester double-braided antenna rope in  $\frac{3}{32}$ ,  $\frac{3}{16}$ , and  $\frac{5}{16}$  inch diameters. According to the firm's Debbie Livingston, the rope originally was made by the company at the constant urging of a local amateur.

In this specially braided line, DuPont's color-sealed black Dacron polyester yarn is used in connection with the braided jacket for added UV protection and resistance to aging and abrasion. The line ties and unties easily even after years of use, and it also cuts neatly, the ends being sealed with the firm's inexpensive "electric hot knife."

The  $\frac{3}{32}$  inch rope has a strength of 260-plus lbs.; the  $\frac{3}{16}$  inch rope handles 770-plus lbs.; and the  $\frac{5}{16}$  inch rope, 1790-plus lbs. These strengths are guidelines only and are not necessarily exact, being computed using the McGraw-Hill Man-Made Textile Fiber Chart. Prices range from about \$40 per 1000 ft. spool up to \$120 per 1000 ft. length, depending on diameter. The 110 volt electric hot knife is \$25.

More details are available from Synthetic Textiles, Inc., 1145 North Grove St., Anaheim, CA 92806 (714-630-2134).

Incidentally, another source, The Radio Works (P.O. Box 6159, Portsmouth, VA 23703; 804-484-0140), offers Dacron line that's effectively made to military specifications. The Radio Works has a working agreement with one of the original "mil spec" textile mills to continue producing the original olive drab line with essentially the same characteristics as the military stuff.

**More on the Gin Pole.** In the January 1993 column, we highlighted the gin pole. To review, the gin pole is a mechanical device for safely and conveniently working with masts and towers. Two people using a gin pole can make tower and antenna assembly and disassembly simple, fast, and safe.

The gin pole is made up of three components (see photo). These are the pulley assembly, which provides a mechanical advantage while lifting; a clamp assembly, to attach everything to the tower; and a pole, to gain the height needed for the lift. Usually, the person on the ground does the heavy lifting; the tower person has the freedom necessary to guide in and fasten together the tower and various antenna components.

Proper usage of a gin pole offers a controllable and safe method of erecting a tower and antenna assembly. The device is designed to lift loads using human power only and thus shouldn't be used with motorized or any other type of power. You typically use the gin pole by clamping it to a tower leg to assist in the assembly of the tower sections and installation of the mast. A rope or other support line is routed through the tubing and over the pulley at the top of the pole.

IIX Equipment Ltd. offers three steel gin-pole kits. These are for stamped open-leg towers, towers using legs of tubing, and towers with close-spaced "W"-bracing. The pulley-and-clamp kits range from \$180 to \$200. The IIX catalog has a good description and photos of the gin pole with details showing how it is used.

The firm's catalog also is replete with lots of antenna and tower hardware. Included are heavy-duty goodies such as building mounts, standoff brackets, bolt-on mast climbing steps, rotor mounts, rotating antenna mounts, roof "quad pods," multiple tower antenna mounts, mast adapters, beam mount and boom-mast plates, and a variety of mobile equipment mounts.

For more information, contact IIX Equipment, Ltd., P.O. Box 9, Oak Lawn, IL 60454 (708-423-0605). (Note that gin poles also are available from other sources, including Antenna Mart, P.O. Box 699, #8 Shiloh Drive, Loganville, GA 30249; 404-466-4353. The



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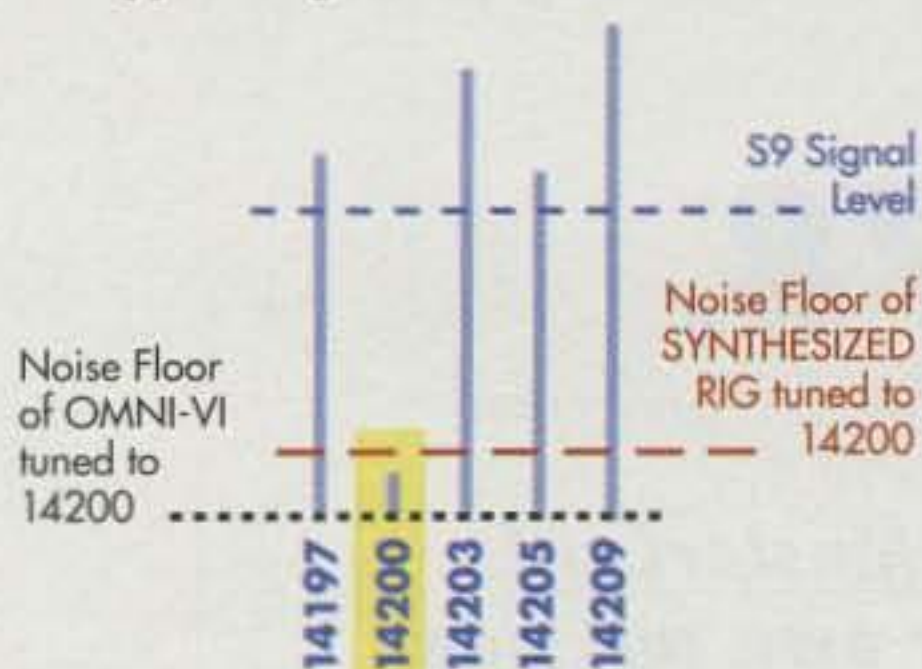
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Noise floor increased in presence of nearby strong signals. Can't even hear weak signal at 14200.

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Phoenix Technologies offers The Phoenix Ultimate Multimedia Suite, a five-program combo of popular multimedia software. Included in the package are the TIME Almanac™, Critical Path™, Business Library™, Video Hound™, and CD Essentials™. Details are in this month's column. The package is \$99. (Photo courtesy Phoenix Technologies, Ltd.)

Antenna Mart gin poles, rated at 200 lbs. maximum lifting load, are \$177.50 and up; they were described in the October 1994 column.)

## Computer and Software Notes

**ILOG.** Steve Iveges, VA3ARS, offers ILOG (for the IBM PC), which is a highly flexible relational database logbook program. It's for both serious DXers and ragchewers who want log-based information presented in the format they want with a keypress. The program Steve offers is simple and fast to operate.

Some of the program's major features include the ability to let you build a search file for almost any award for which you know the criteria; select several different entry modes to suit DXers and ragchewers alike; view or browse the log and prefix data in many different ways; automatically update all statistics; and instantly sort and search upon keystroke command.

There are almost countless possibilities for the most complex sorting, searching, and printing of logbook data. The program also offers user maintenance of DXCC country and prefix data; automatic creation and printing of several styles of QSO and address labels; utilities and setups for custom configurations; and more. The author notes, however, that the program is not intended for tabulating contest results; the supplied documentation is mostly in the form of on-screen help.

Although the ILOG databases are relational, you still can edit and delete records. For convenience, ILOG manipulates its logbook data using standard database file formats.

ILOG is \$59.95 U.S. funds, plus \$5 shipping, from Steve Iveges, VA3ARS, 33 Isabella St., #1105, Toronto, Ontario, Canada M4Y 2P7 (416-923-3026).

**YT-1 Yaesu Control Program.** Steven Stuntz, NØBF, offers the Electrosoft YT-1 Yaesu

FT-990 Control Program. The software is designed to fully control the FT-990 transceiver, and it works on any IBM or compatible PC that's equipped with a serial port. It also requires the Yaesu FIF-232c interface.

The program reads the frequency, bandwidth, and mode for both transceiver VFOs and for 90 memory channels, storing the data in a computer file. The number of channels you can store is unlimited. The program can read any previously saved file and put the frequencies, bandwidths, and modes back into the radio. You could, for example, create separate files to store frequencies by categories such as amateur nets, shortwave broadcasting stations, operating schedules, and favorite scanning channels. Scanning settings are stored separately for each VFO and memory.

Everything you need to operate the FT-990 is found on one screen display. This display has two status lines, three VFO windows, a memory name window, and a function menu window. The program is quite user-friendly in that the bottom status line depicts the command keys used to edit the highlighted fields in the three VFO windows and in the memory name window.

For more details and current pricing, contact Electrosoft, P.O. Box 1462, Loveland, CO 80539.

**New from Phoenix Technologies.** Phoenix Technologies is well regarded for its IBM compatible BIOS (basic input/output system) chips. Recently, Phoenix also has become a major player in software through its End User Applications Division. (Pet peeve: I guess we're all "end users," although I don't like to be referred to as one any more than I like to be called a "consumer.")

In July 1994 we described a promising Phoenix product, the Windows-based Eclipse FIND(TM). It gives you a remarkably fast way to locate, retrieve, and manage your word processing, database, E-mail, FAX, and other files. It lets you instantly search, locate, retrieve, view, organize, print, launch, and archive files from any Windows application. It also lets you view documents in dozens of different formats, copy text, organize and manage files, and archive to save disk space.

Later, in November 1994, we profiled CD Essentials™, a Windows utility for CD-ROMs that's designed to make installing and using them fast and automatic. The program effectively learns how you use your discs and automates the steps needed to access, control, play, and manage them. The program constantly scans your CD-ROM drive and senses when you insert a disc.

Now the firm offers The Phoenix Ultimate Multimedia Suite, a five-program package of multimedia software. While referring to it as "the ultimate" may be overblown, the package does let you expand your multimedia software library at minimal cost. Included are the TIME Almanac™, which gives you full text articles appearing in TIME over the past five years; Critical Path™, a lifelike 3-D motion video game; Business Library™, a business guide with over 60 interactive videos; Video Hound™, which covers 52,000 videos, including over 20,000 movies; and CD Essentials, which we described. The complete package is \$99.

Recently, the firm also updated its award-winning Eclipse FAX program to Version 6.0; it now features new "FAX Assistant"™ technology to give you better control over your FAX cor-

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Feed Point Impedance: ....50 Ohm (+/-5)

SWR: ..... 1.5:1

Recommended Feed Line: ..... RG213/U

Ground Rod: ..... 4' Minimum

Number of Radials: ..... 6

Radial Length: ..... 34'

Height: ..... 31' 1"

Mast: ..... Telescoping

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Area

Wind Surface Area: ..... Approx. 9 Sq. Ft.

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For more details, contact Phoenix Technologies, Ltd., 846 University Ave., Norwood, MA 02062-3950 (1-800-452-0120).

**Pow-R-Bar™.** An interesting computer hardware add-on is available from IMEG, the International Micro Electronics Group, Ltd. It's the Pow-R-Bar, a solid-state, computer-controlled, six-outlet power strip that offers AC power distribution, surge and spike protection, and automation in one unit.

The device manages multiple AC outlets. With Pow-R-Bar connected to your PC, you can control each AC outlet from the computer's serial port using the RS-232 protocol. You have control of each outlet, turning it on or off from the computer, by typing in a simple command using a standard serial communications package or through custom programming.

With this system you have considerable AC control from your PC's keyboard; in fact, practically all of the AC devices in your home or other building can be managed with the system. This makes it an excellent choice for automating your home or office, programming your PC to turn AC devices on or off at times you define, and controlling security systems. Up to 26 of the devices can be daisy chained together via serial cables. The Pow-R-Bars come with DOS and Windows control software and are \$159.

For more information, contact IMEG, P.O. Box 25007, Lexington, KY 40524-5007 (1-800-274-8699).

### Short Bursts

**An Editorial: Some Random Thoughts on Computer Software.** When we think of computers, we generally think of hardware. But we would be remiss if we didn't consider *software*—the "enabler" the importance of which surely will increase. If computer software isn't presently tail wagging the PC hardware dog, it will be in the future. While many companies can make a computer, what makes the computer work as a tool are operating systems, programming languages, and application programs—all forms of software.

When it comes to software, the truly indispensable kind is that which controls the computer, the operating system. Although today people tend to buy application programs more than they buy operating systems, many of the hottest, highest-stakes battles in personal computing center on which operating system will be dominant. Today's arguments about MS-DOS vs. Microsoft Windows, one DOS vs. another DOS, Windows NT vs. OS/2, and the like, are really arguments about operating systems, their capabilities and their limitations.

Times have changed a great deal in the computer world. In the mid-1970s, when interest in PCs developed, there were no operating systems to speak of; they had to wait for the availability of floppy (and later, hard) disks. Instead, you literally pulled your computer up by its bootstraps, or "booted" it—sort of like cranking the engine on an early automobile.

You got your programs into the computer first by setting the front panel switches to re-



Phoenix Technologies has updated its award-winning Eclipse FAX software to Version 6.0. The new version maintains the consistency of its user interface and stays within a single application for FAX viewing, markup, and management. The publisher also has reduced the suggested retail price to entice users. (Photo courtesy Phoenix Technologies, Ltd.)

resent machine code words to initialize the I/O board. Once you did that, you manually entered your bootstrap loader program from a tape reader or audiocassette tape. You could then enter the "monitor program," a sort of quasi-operating system. Still you weren't done.

Only then could you load the high-level BASIC (or Beginners' All-Purpose Symbolic Instruction Code) programming language that almost everyone used to actually *do something* with the computer—provided, of course, that you had already written a BASIC program to do just that. What you actually did often was limited to playing an elementary game or adding and subtracting columns of numbers—great fun at the time, but primitive today.

BASIC helped make the fledgling PC useful. In 1975, 19-year-old software entrepreneur Bill Gates and his friend Paul Allen made a momentous decision. They licensed their version of BASIC to a small Albuquerque company, MITS, for use in its fledgling Altair micro-computer, arguably the first "home computer." Gates and Allen subsequently formed a partnership, originally called "Micro-Soft." His company's humble beginnings as a BASIC supplier soon paled beside an incredibly lucky DOS deal with IBM, which we will cover in a moment.

As PCs developed in the 1970s, the cumbersome switch-setting and bootstrap loader procedures became tedious. Various alternative techniques were used to allow true operating systems to be loaded from the floppy diskettes that were then becoming popular. It was up to a young computer scientist, Dr. Gary Kildall, to develop an operating system that could be used across the board. He first came up with the high-level Programming Language for Microcomputers (PL/M) for the 8008 CPU chip to meet this specific need.

When PCs and floppies came into vogue in the mid- to late-1970s, Kildall wrote a compre-

hensive set of programs that would coordinate the disk drive(s) with the microprocessor, originally for the IMSAI computer. He called it Control Program for Microcomputers (CP/M), and he sold it to hobbyists for about \$75.

CP/M, truly the first popular disk operating system for PCs, was ported to many other PC systems. It was relatively easy to do this, since CP/M was fairly generic, and it depended on the special ROM (read-only-memory) BIOS (basic input/output system) chip that linked the generic operating system to a specific computer's hardware. CP/M rapidly became the de facto operating system in the fledgling 8-bit PC industry. Still later, Kildall offered new and improved versions of CP/M as well as MP/M, the Multi-Programming monitor control program for Microcomputers, which was the multi-user version of CP/M.

An adapted, 16-bit CP/M, which Kildall already was working on in the form of CP/M-86, easily could have become the operating system for the 1981 IBM PC. The computing world as we know it would be quite different today if this had happened. As the legendary industry story has it, Kildall was approached by IBM to do just that, but snubbed IBM officials at a crucial meeting. He reportedly chose to fly his new airplane when their reps came calling, looking for a viable operating system for their soon-to-be PC—and CP/M certainly was viable. Frustrated, IBM turned to Bill Gates of then-tiny Microsoft. But at the time, Microsoft was a company that specialized in computer languages (such as BASIC) rather than operating systems, which it mostly left to Kildall's Digital Research.

Gates found he could indeed supply the operating system for the IBM PC. But to do this he would have to obtain the rights to an obscure 16-bit, amazingly CP/M-like operating system called QDOS ("Quick and Dirty Operating System") from a small Seattle firm. He did just that, obtaining DOS lock, stock, and barrel for a reported \$75,000—surely the software deal of the century.

IBM eventually offered its PCs with both PC-DOS (the name that IBM gave to QDOS) and a version of CP/M, but CP/M cost more; this cemented Microsoft's DOS as the industry standard. Kildall's Digital Research lost out, never quite recovering from its missed opportunity. Ultimately his company was sold to Novell in an \$80 million stock swap. Both a great hero and a great loser in the industry, the 52-year-old Kildall succumbed to a head injury on July 11, 1994, closing the books on a software industry era.

## Looking Back Five

**Five Years Ago in Antennas and Accessories.** So now you know what the column looks like in May 1995. But what did it feature in May 1990? "From the Notebook—Part IV" was May's title.

In that month we examined the LTA Championship Monobanders and Slack Systems wire antennas; discussed K4EGZ's use of a legal "flagpole" to avoid a no-antennas prohibition at his condo; and presented some ideas on restricted-space antennas from WA4BNO, attic antennas from K7JNE, and

stacked monobanders from W5QJM. We also responded to an inquiry from KE7U on terminating resistors for the unusual T2FD antenna described in a previous column.

Soft-wise, we eyeballed QQSL, MufMap II, and LOGic. We also updated our discussion of the pioneering radio contributions of Reginald Aubrey Fessenden. We described C-SAT Satellite Radio and the C-SAT/NWAF ("Not Without a Fight") BBS and perused a new radio operator's world atlas by WØCP, *The Concise EARTHBOOK World Atlas*. We also profiled a microfiche version of the reference guide *From Beverages Through OSCAR—A Bibliography 1909–1988* (which now is updated and also is available on computer disk), from K2RR's Didah Publishing.

If you find a topic we covered in a previous column to be of interest, obtain the back issue directly from CQ's New York offices, rather than requesting the article from us. Most back issues are available from CQ for \$3.50 post-paid. (CQ also offers various "back issues specials" to complete your collection. Check their ad, or call them at 1-800-853-9797 to order back issues.)

## Wrap-Up

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

*Overheard:* Nothing important can be done in *one* trip.

73, Karl, W8FX

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October 17, 1994

Tad Danley, NZ3I  
1355 Peachtree Street  
Atlanta, GA 30309

Electronic Switch Company, Inc.  
4343 Shallowford Road, Suite E-6  
Marietta, GA 30062

Dear Sirs:

I recently purchased a Fritzel FD4 Windom type wire antenna to replace my G5RV, and would like to let you know how it is performing. My G5RV worked well for me on 75/80, 40 and 20, but did not seem to work very well at 17 or above.

Three days ago I put the FD4 up in place of the G5RV, about 25 feet above the ground strung between two pine trees. The physical construction of the antenna is excellent. I am very impressed - and pleasantly surprised! It seems to work better than the G5RV on the lower bands, and much better than the G5RV on the higher bands. I thought you should also know that it works very well on 15 meters too, even though the literature supplied with the antenna states that the impedance at the feed-point on 15 meters is too high to allow operation on that band.

In fact, in the last three days I have worked 8R, 4N7, DK, F, I, CE, KP2, 5W, PY, JA, NH and V7 - all on 15 meters with 100 watts and an antenna 25 feet off the ground that is not supposed to work on 15! I have enclosed a copy of my log as proof.

One last thing: Does Fritzel make yagis? I plan on having a tower up by the end of the year. If your yagis are anything like the FD4, I want one!

Thanks and 73,

*Tad*, NZ3I

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A LOOK AT THE WORLD AROUND US

## Morse Mania: The Romance of Keys Continues—Part II

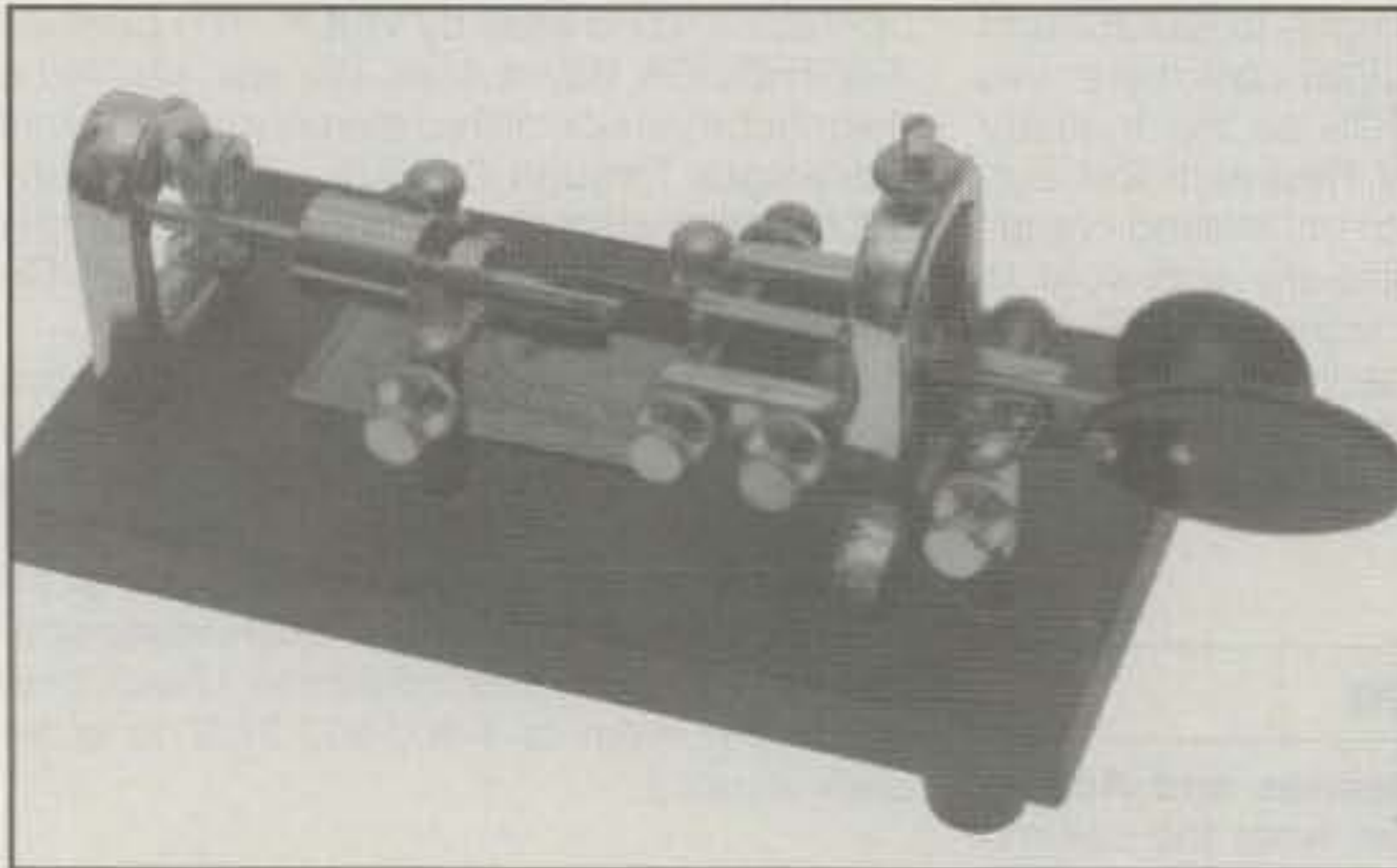


Photo 1—Roaring back out of the pages of amateur radio history is Vibroplex's new 1995 black-based "Original" model bug. Item is made to more precise standards, has deeper gloss chrome on upper parts, and works great.

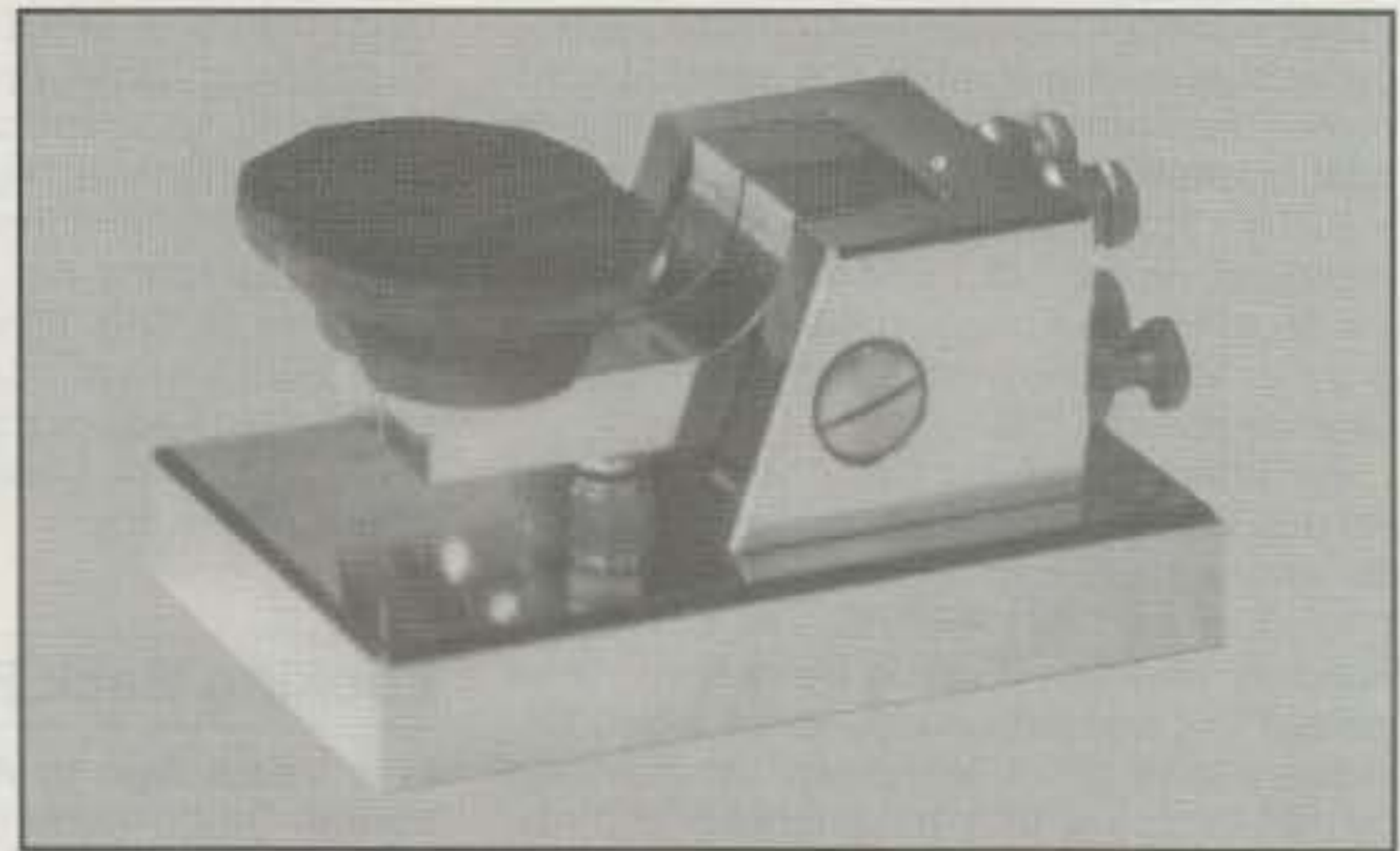


Photo 2—This novel item is a miniature twin-lever paddle based on the "cricket" concept (two-finger operation). It is called "Twinky," it has a pump key twin (Minky), and both are presently being made by DK1WE.

If you thought last month's "keys special" was exciting, check out the treats and delights in this month's column. We have photos and descriptions of new bugs, vertical pendulum bugs, side-swiping bugs, neat hand keys, a new cricket paddle, and more. This promises to be one of our best keys columns yet, so settle back and get ready for a CW overload as we spotlight more terrific keys!

As you have probably heard or noticed in recent ads, the oldest and most famous-name key company in amateur radio (Vibroplex) has a new owner—Mitch Mitchell, Jr., WA4OSR. Mitch holds an Extra Class license, loves CW, and is the first amateur to spearhead Vibroplex. Needless to say, some fascinating expansions and product perfections are already in the works. Vibroplex's machining facilities have been moved back to Georgia (the old home of Vibroplex), and production equipment has been refurbished or replaced to re-establish the precise standards and tolerances that made Vibroplex number one worldwide. It is truly a new day, and Vibroplex is shining brighter than ever before!

Now let's thank this month's contributors—Gil Schlehman, W9WDY; Bill Holly, K1BH; and Bernard Breedlove—and focus on key views!

### Vibroplex's New "Original" Model Bug

Shown in photo 1 is Vibroplex's new 1995-style "Original" model bug, and the first item reflecting new owner improvements. It has a more accurately machined mechanism and base for smoother operation, triple-chromed upper parts for more flair and glamour, and get this—a classic-style black base with rounded edges. Yes, Mitch is bringing back black bases, and they look great, especially against the new deep-luster chrome upper parts. These new bugs (and paddles, too, as they also get the fancy chrome treatment) look and handle like a million dollars! If you are still using an overworked bug with worn

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(scratchy!) contacts and loose pivot points, now is the perfect time to move it into your specialty collection and upgrade to a new super-sounding bug. You'll love the improvement!

### DK1WE's "Twinky"

What is this in photo 2? A miniature hand key with dual arms and a split knob? Actually, it is a dual-lever paddle designed to use the famous cricket concept described in last month's column. That is, you send code by vertical movements of two fin-

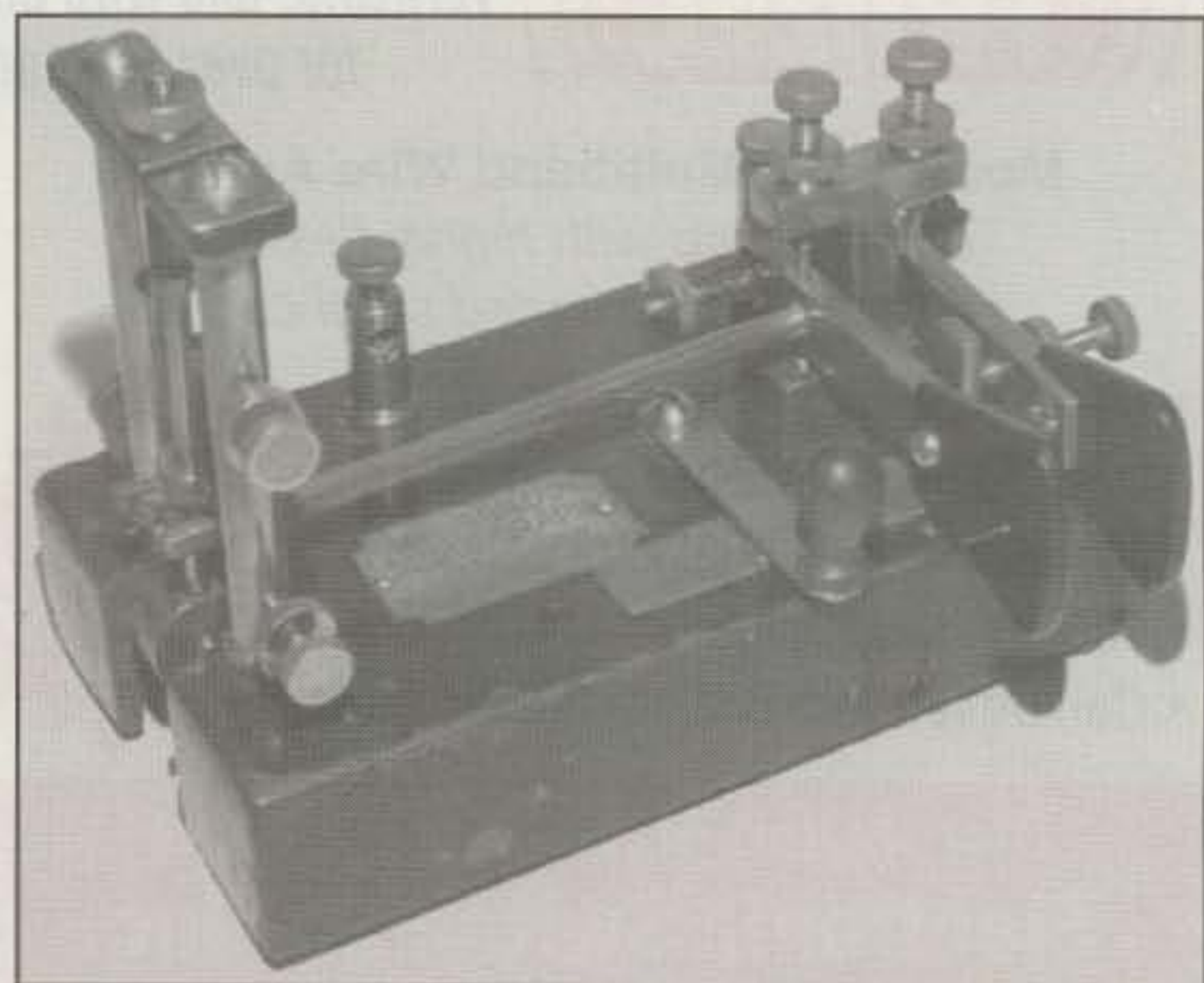


Photo 3—The exceptionally rare and magnificent McDonald Pendograph. This '30s-model vertical bug was made in Australia and features separate dot/dash levers with no iambic action. (Photo courtesy W9WDY)

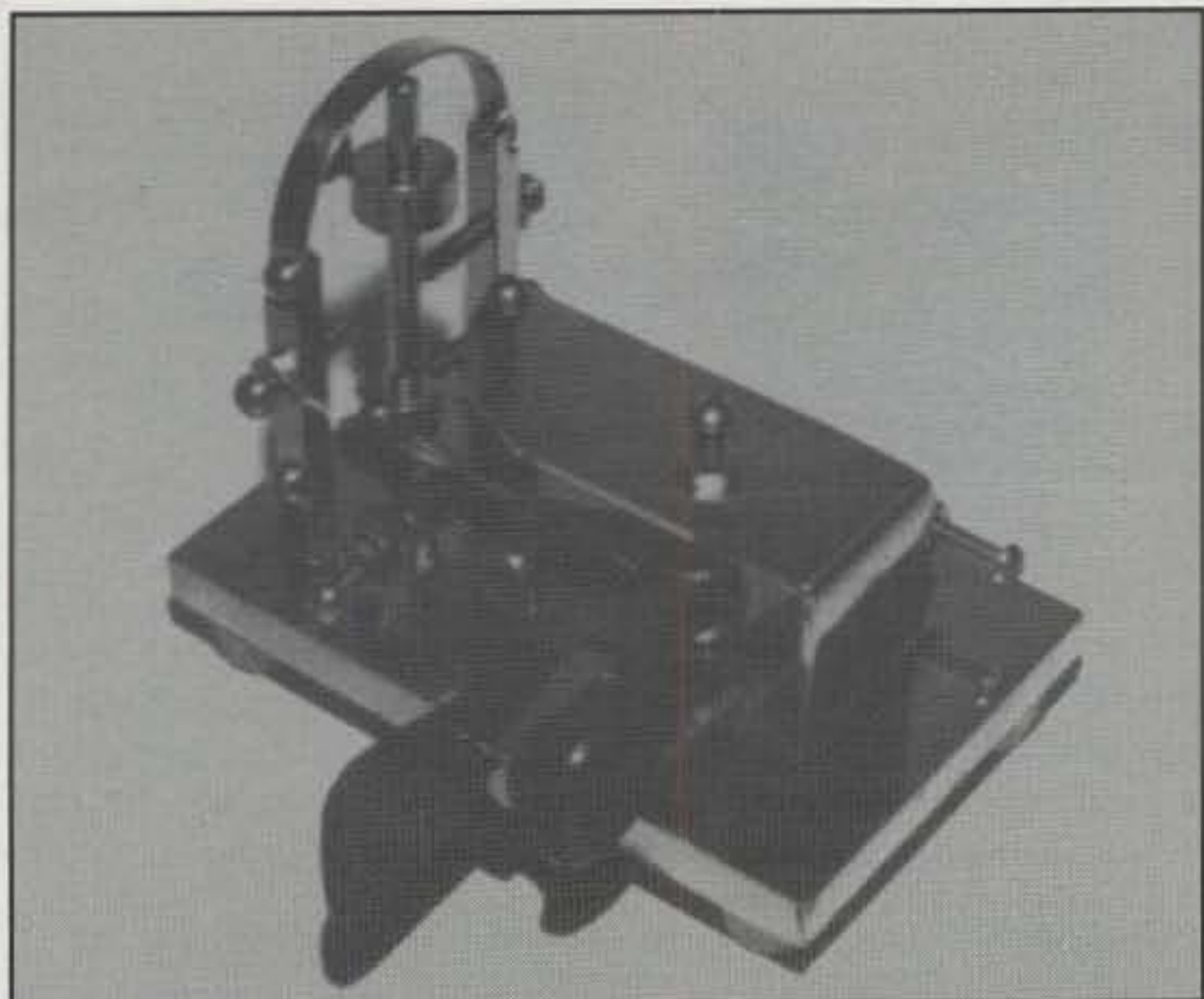


Photo 4— This is an even more rare and glamorous right-angle vertical bug, also from Australia. Item sports enclosed mechanism, all-chrome works, and single fingerpiece. (Photo courtesy W9WDY)

gers (index and middle finger or index and thumb, whichever is best for you). The paddle is called a "Twinky" (pronounced "Twin-Key"), and it is being made by Engmar Wenk, DK1WE (Hubenring 4, 88048, Friedrichshaven, Germany). The little tyke measures only 2.5 inches long by 1.5 inches wide, has precision bearings and separate gap and tension adjustments, and also has a single lever/pumper twin called the "Minky."

Why use the cricket technique for paddling? It is a fun change of pace for one reason, and vertically-moving arms may be less prone to sliding or skidding when mobilizing or operating curled up in an easy chair (confining hamming to the shack is so formal!). Recently I have been cricketing with the Twinky, and it is a blast! I have not mastered right-hand use, but I can turn the key backwards and upside down in my left hand and send good code while standing! CW is fun from any angle!

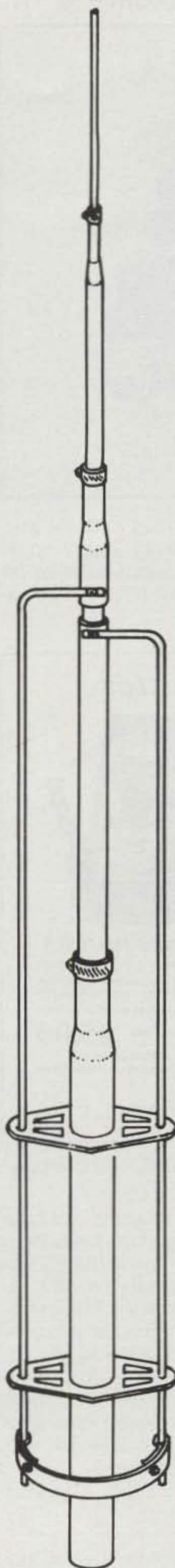
### McDonald Pendograph

Moving into the "far out and fascinating to study" category, our spotlight swings onto the 1936 vintage McDonald Pendograph shown in photo 3. This Australian-made delight sports dual and completely independent operating levers. Its right one is used for manually producing dashes, and its left one is indirectly used to produce automatic dots. Notice the long rod attached to the left lever; it releases "stay put" pressure on the top pivoting/swinging pendulum, which in turn has a dot contactor spring that taps against the pendulum mount's bottom adjusting screw to make dots. The contactor spring is almost hidden behind the pendulum's front-facing support tube (one with two adjusting screws facing camera), but it is there. The support tube (and its dot contact screw) are insulated from the base by rubber washers and screw feedthrough grommets. The pendulum's speed-adjusting weight is barely visible in the base's cutout area.

This key is both challenging to use (there is no iambic action on the dual levers) and intriguing to watch in action. There is a slim chance of experiencing either, however, as these bugs are scarce as hens teeth. Thanks to Gil Schlehman, W9WDY, for sharing photos of the key.

### Right-Angle Australian Bug

The item in photo 4 is an interesting variation of McDonald's



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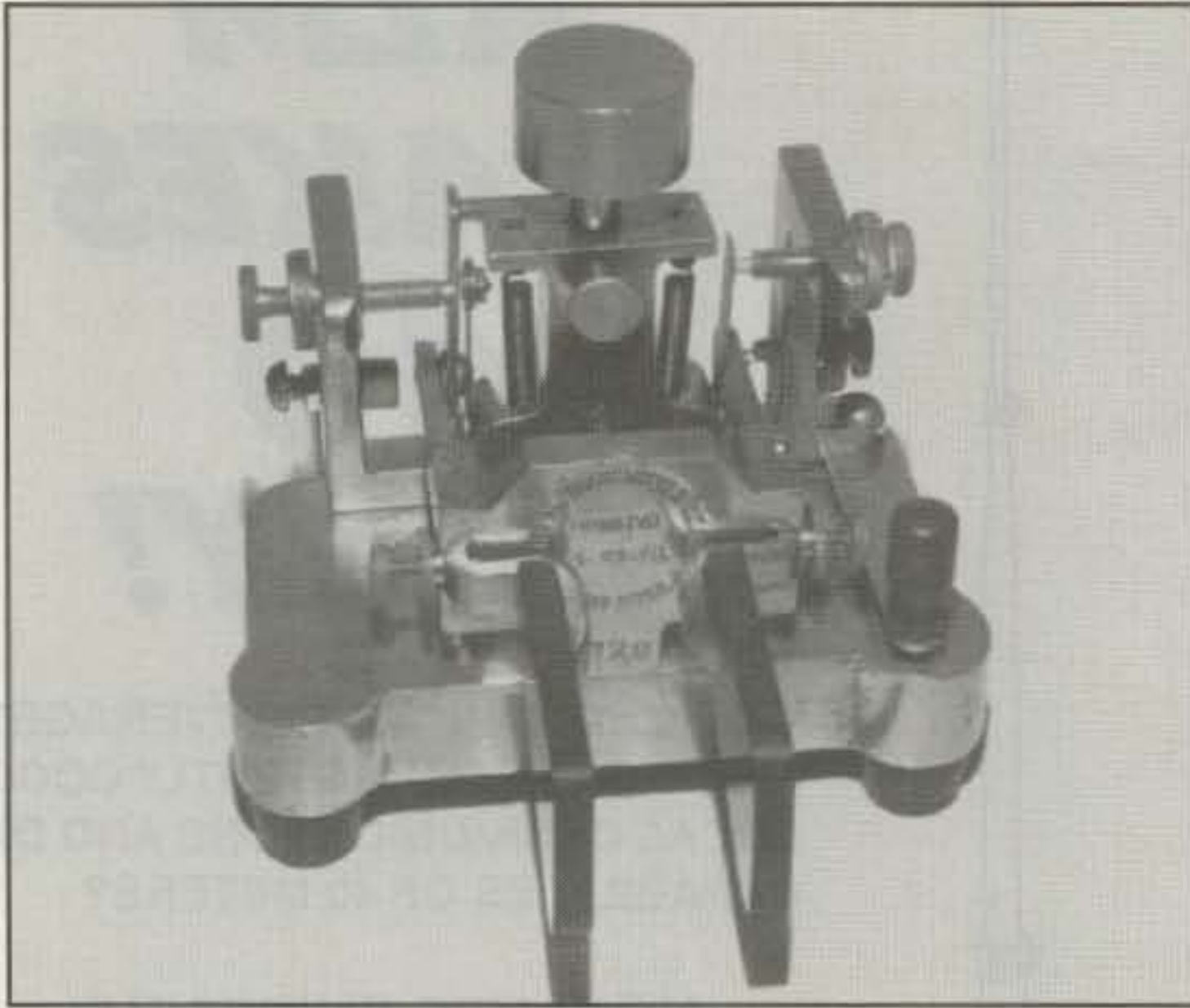
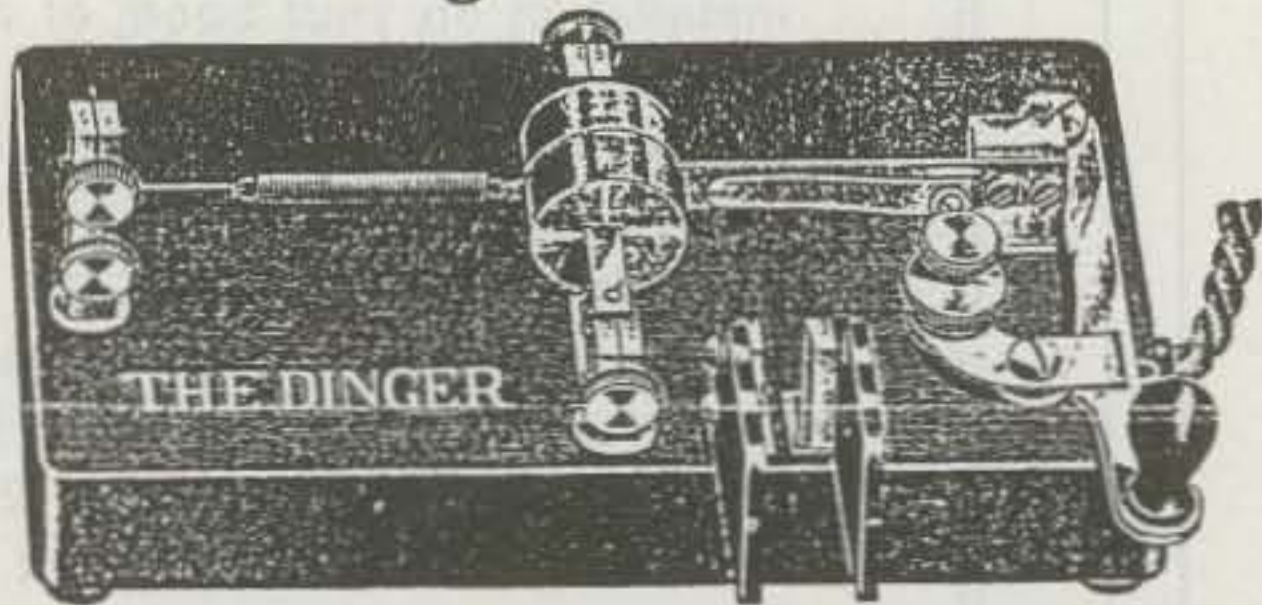


Photo 5— Compact bugs are always fascinating to study, and this one really warrants study. It was made by The National Transmitter Company of New Jersey, and has a cropped-off back end with a vertical pendulum assembly. (Photo courtesy W9WDY)

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Photo 6— Early 1900 advertisement for the D & K Dinger bug.

Pendograph, and another right-angle bug made in Australia during eras past. Notice this pendulum swings from the bottom rather than from the top, and its dot contactor spring (barely visible due to shadow) points upward to mate with the left support's upper screw. The right support's adjustment screw apparently serves as a damper for the pendulum. Rubber washers and screw feedthroughs are again used on this model to insulate the pendulum assembly from the base. Finally, this flashy deluxe style bug is chrome plated and uses a single lever, which makes it much easier to operate. It is truly a dream key capable of escalating one's interest in CW at least 200 percent! Thanks again to Gil, W9WDY for sharing photo views.

### National Dual-Lever Bug

The stubby little bug shown in photo 5 was made by The National Transmitter Company of New Jersey during the roaring twen-

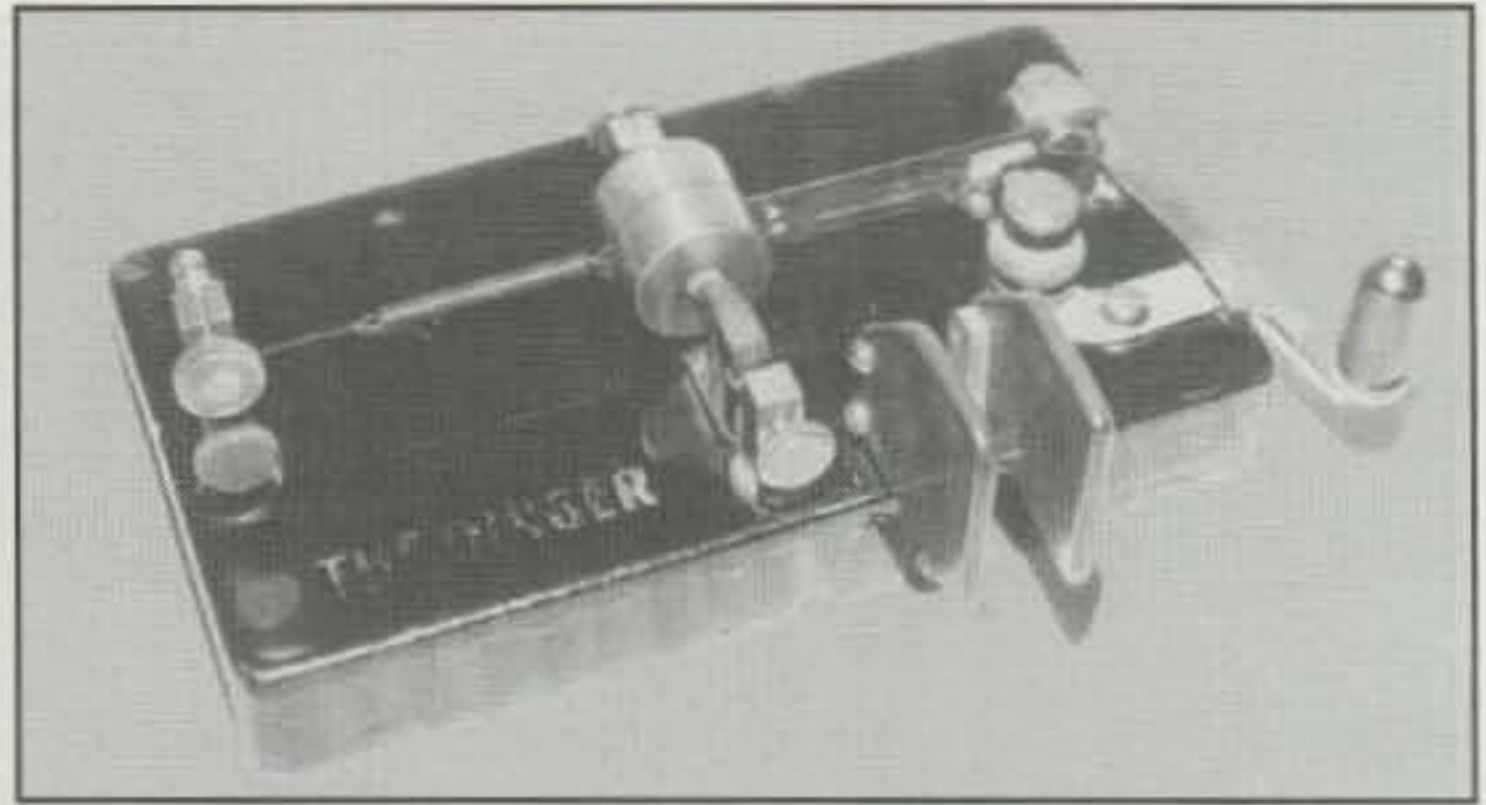


Photo 7— D & K's "Dinger" looks like a combination of relay parts, springs, and string that could not really work, but it does. (Photo of this heart-throb provided by W9WDY)

ties, and some of its cousins may still be "floating around" for sale today. I say that because someone sent me a dim photo of one which they purchased for a fair price a year or two ago. I lost the chap's name after replying to his questions, but I sure would like to hear from him again today (are you still reading the column, old boy?).

The National is another independently operating, dual-lever bug requiring good wrist action for use, but what the heck: it looks like a real entertaining and fun item! Notice the pendulum swings from the bottom, and springs on each side help to evenly balancing the mechanism. The large weight atop the pendulum's framework can be moved up or down to change dot speed. A knurled-end screw below the weight locks it in a selected position. Finally, adjustment screws on each of the upright rear brackets set (left and right) arm travel and contact pressure. Now this is one neat little bug! Thanks again to master collector Gil, W9WDY, for sharing the view.

### The Dinger

During the early 1900s the D & K Manufacturing Company of Cleveland, Ohio produced an unusual broadside bug known as The Dinger, shown in photos 6 and 7. This gem has a leaf-spring-type pendulum (similar to a relay arm), and its end is sandwiched between two round weights. A regular spring is attached to the pendulum's tip end. A piece of string is tied to the spring's opposite end, then wound around an adjustment screw on the bug's left side to set dot speed. Tightening the string causes the leaf-pendulum to produce faster dots. When making those dots, the pendulum taps against a parallel-mounted flexible arm with an end-mounted contact. When making dashes, the right fingerpiece pushes the flexible arm against

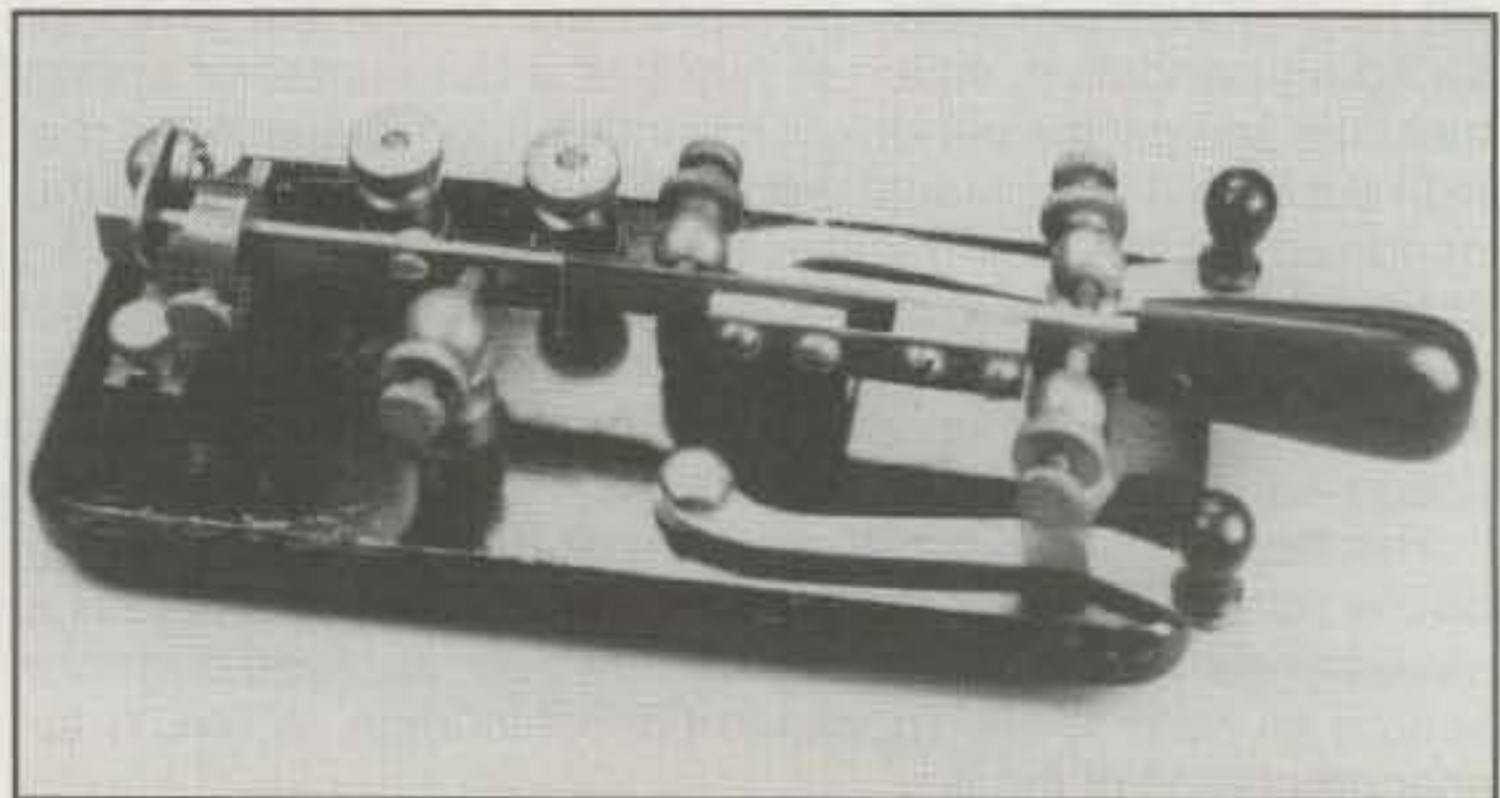


Photo 8— Signal Electric's "Semantic" is a combination side-swiper and bug. Note unlocked pendulum lever for semi-automatic operation. (Photo courtesy K1BH)



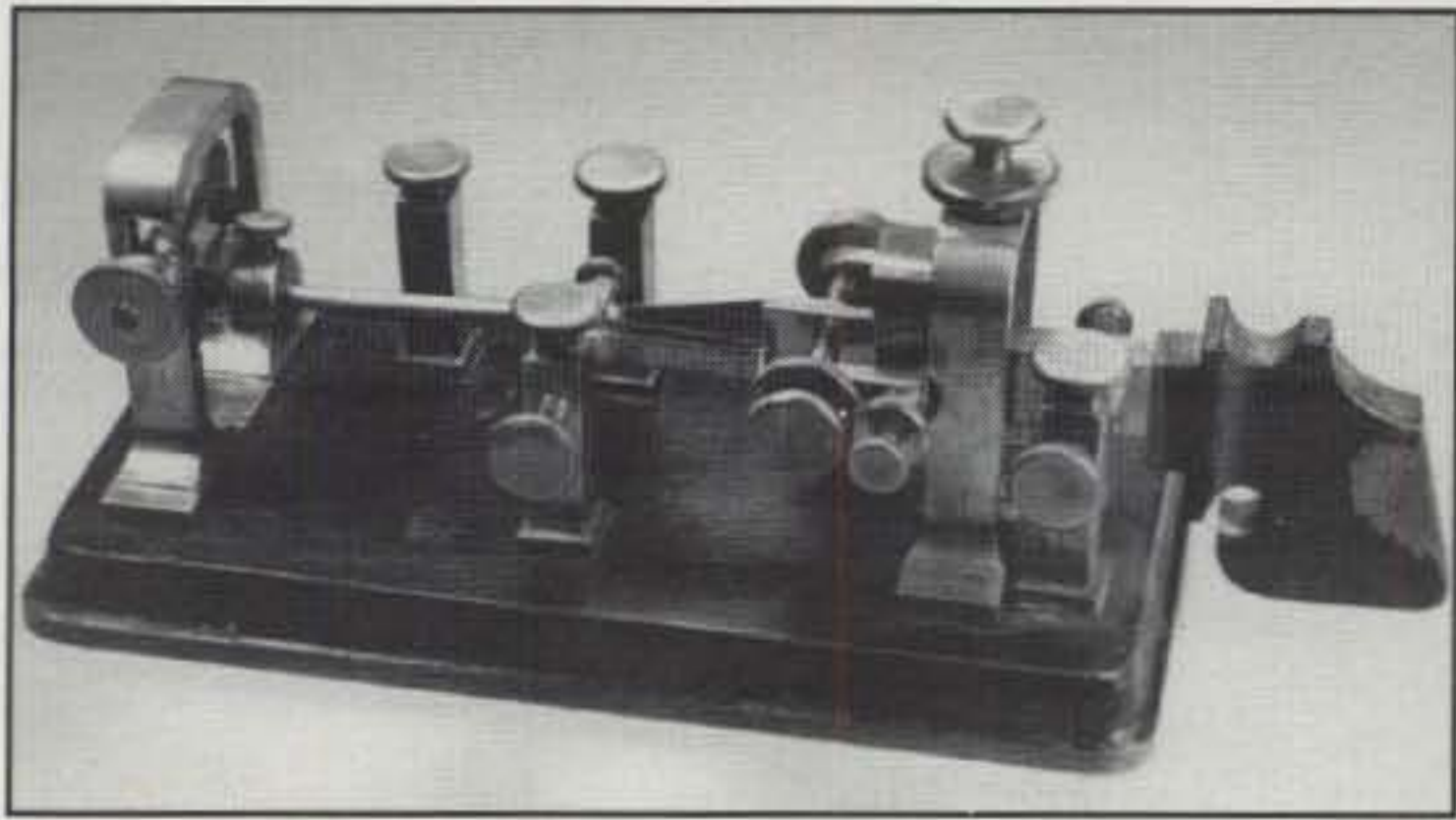


Photo 9- This unusual bug has no nameplate or identifying marks, but must have been made commercially. Check out that fingerpiece! (Photo via K1BH)

the (non-vibrating) pendulum. Proud owner W9WDY says, "The Dinger looks like it could not possibly work, but it is actually a good bug with smooth action." What a heartthrob! Do any of our readers remember this key?

### Signal Electric's Semantic

Our next delight, shown in photo 8, is dedicated to "cootie key" lovers everywhere. It is Signal Electric's rare Semantic, and it is a combination sideswiper and bug featuring quick and easy "facechanging." A sideswiper, as you may recall, has a horizontally moving arm but no vibrating pendulum, so its operator makes both dots and dashes manually. Learning to use a sideswiper is rough, but that is where the Semantic shines. If an operator cannot toggle the fingerpiece from left to right fast enough to make a neat string of dots, he or she can open the

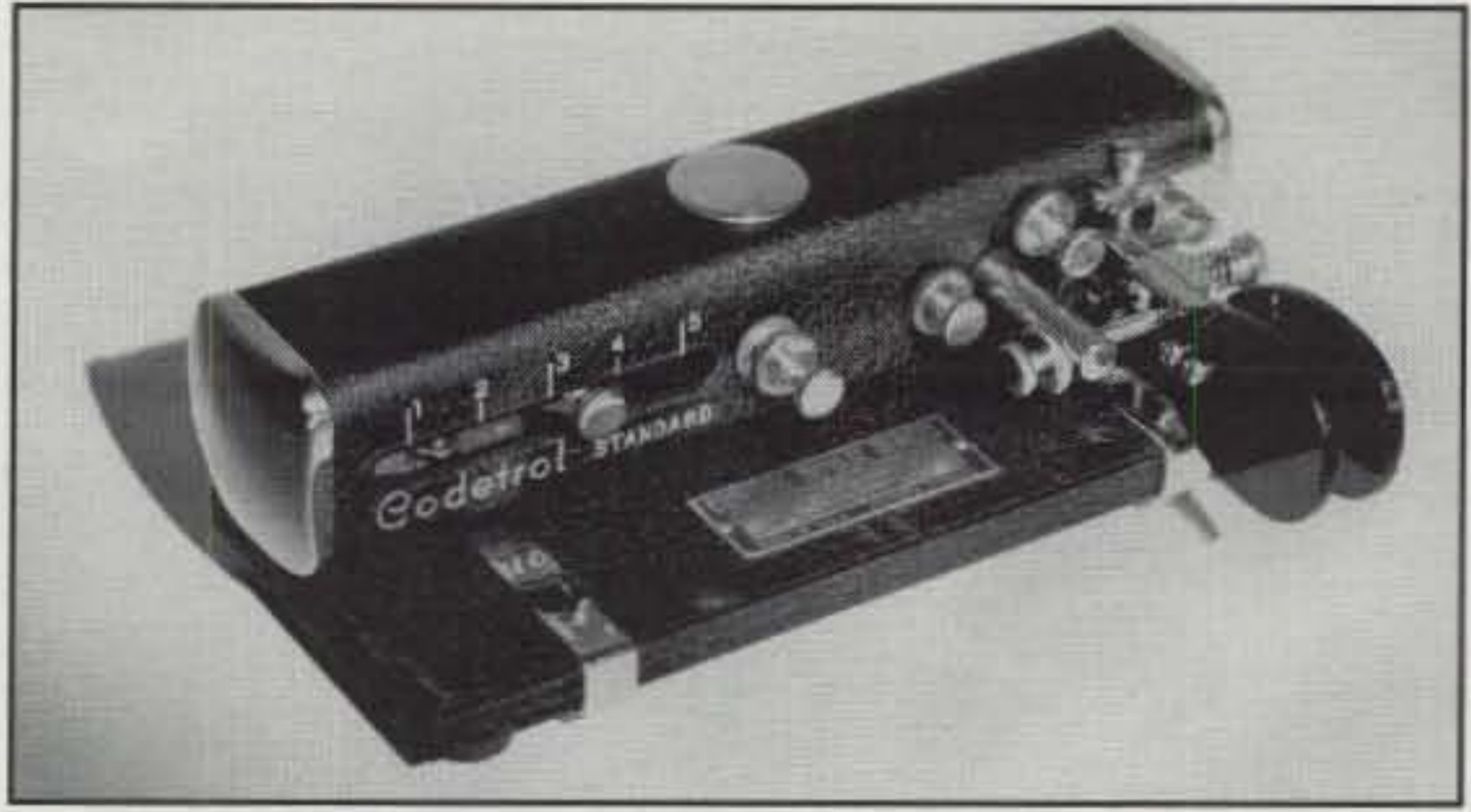


Photo 10- The marvelous Codetrol made by Bernard H. Breedlove during the mid '50s. Item produced quite distinctive and delightful-to-copy code. (Photo courtesy B. H. Breedlove)

right side's circuit closing lever and unlock the pendulum to get bug action (notice raised hook in photo). When ready to try 'swiping again, the operator just relocks the pendulum and circuit lever. Spring-steel straps are used for arm flexibility, and the flat pendulum is fitted with a round (rather than square) weight—two unusual designs that serve their purpose. Our thanks to owner Bill Holly, K1BH, for sharing his photo of the Semantic.

### K1BH's Mystery Bug

This bug (photo 9) is another item in Bill Holly's collection, and it really piques one's curiosity. There are no manufacturer-related marks or nameplates on it. It has a molded-on and strange sculpted fingerpiece, a triangular-shaped mainspring, and an interesting rear damper assembly. A horseshoe-shaped spring strap rather than a conventional spiral-type spring is used for

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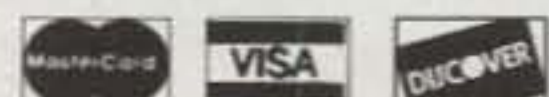




Photo 11— What is better than finding a classic Mac key in like-new condition? Finding one still in its original box, naturally! Keep on hunting. There are more of them still out there!

tensioning the arm's "dot side," and locking screws atop mounting posts are used on dot and dash contacts. The base is fitted with a full-length bottom pad rather than rubber feet. In some ways, this bug's mechanics seem British or German. Might someone have more information on this key?

### The Codetrol

This right-angled Codetrol (photo 10) was briefly discussed in a keys column several years ago, but we now have "updated information" begging to be shared. First, I recently talked with inventor Bernard Breedlove (who is now enjoying retirement on an island near South Carolina), and he said overall production of the Codetrols totalled around 200 units. Most were sold on the European and African markets. Breedlove no longer has any beautiful Codetrols (not even enough parts to assemble one) but maybe some overseas CW buffs still have their Codetrols packed away in an attic or closet. I can only say do not throw one away regardless of the condition. It's a classic!

Bernard told me the special touch in his Codetrols was a perfectly gauged and tempered mainspring plus a heat-treated dot contactor spring. The combination resulted in greater-than-usual dot weighting, which made Codetrol-generated code sound slower than it was and made copying easier than usual. If you missed our past description of this delight, incidentally, it uses a single-lever design with a covered (right angle) mechanism and pendulum. The speed-controlling weight's locknut extends through the cover's cutout, which is calibrated 1 to 5 for easy setting/resetting. A photo cannot fully capture a Codetrol's glamour: it looks even better than it works!

### Mac Steamkey

Several of our friends are trying to find a good Mac key to round out their collection, but few are reporting success. I do not have any quick solutions here, so I decided to throw a little humorous salt in the wound with this view (photo 11) of one like new and stored in its original box. If I really wanted to be a tease, I might even say it is up for mail-in bids and the winning bidder will be notified in December (whoever dreamed up that crazy scheme should be hung by his coax!). Seriously, however, the Mac shown here is not for sale, and its owner remains anonymous to avoid enticing offers.

Most amateurs refer to this little treat as a "Teardrop Mac" (nicknamed according to base shape), but its box lid tells all: it is a Mac Streamkey made by World Champion Radio

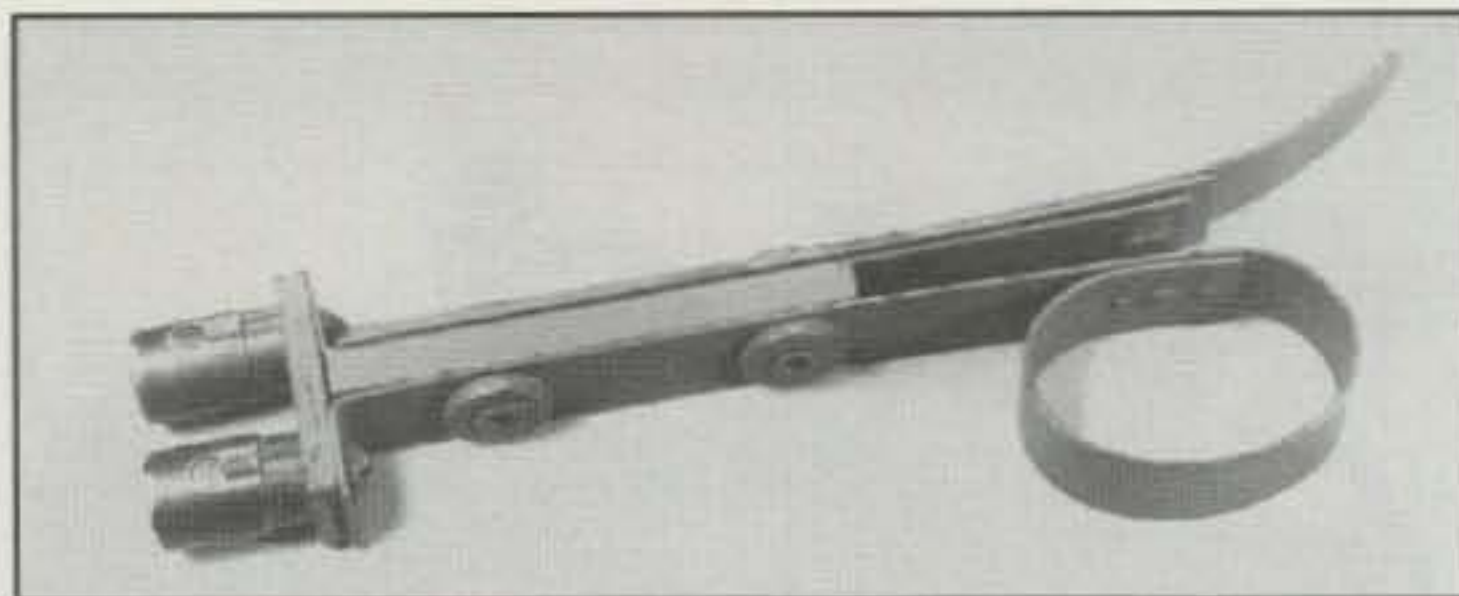


Photo 12— A Model J-51 "finger key" made for in-field use by U.S. Army during WW II. Far out, eh? (Photo courtesy K1BH)



Photo 13— Two popular styles of Russian hand keys used a couple of decades ago. Items are designed to "take a licking and keep on ticking."

Telegrapher Ted R. McElroy in Boston, Massachusetts during the 1940s. Beautiful, isn't it?

### U.S. Army J-51 "Finger Key"

Dave is not the only one with a sense of humor in keys; Uncle Sam is also a mite jovial. Check out, for example, this genuine J-51 "finger key" made for U.S. Army field use during World War II (photo 12). The key is strictly basic in design, as it has a simple spring-steel mechanism, wood center insulator, and only a top coat of military green paint for shock protection during use. You operate the key by holding it so the connecting posts point toward your little finger, slip your thumb through the loop, rest your index finger on the curved strip, then squeeze the two strips together. Does it work? You bet, but I would not want to try a paint-scratched J-51 with an old-style tube rig! Thanks to K1BH for sharing this key view.

### Russian Keys

The two prizes shown in photo 13 were acquired in a "good old boy" exchange with an Eskimo running dog sleds across the North Pole in summer. I sent him some Confederate Rebel flags,

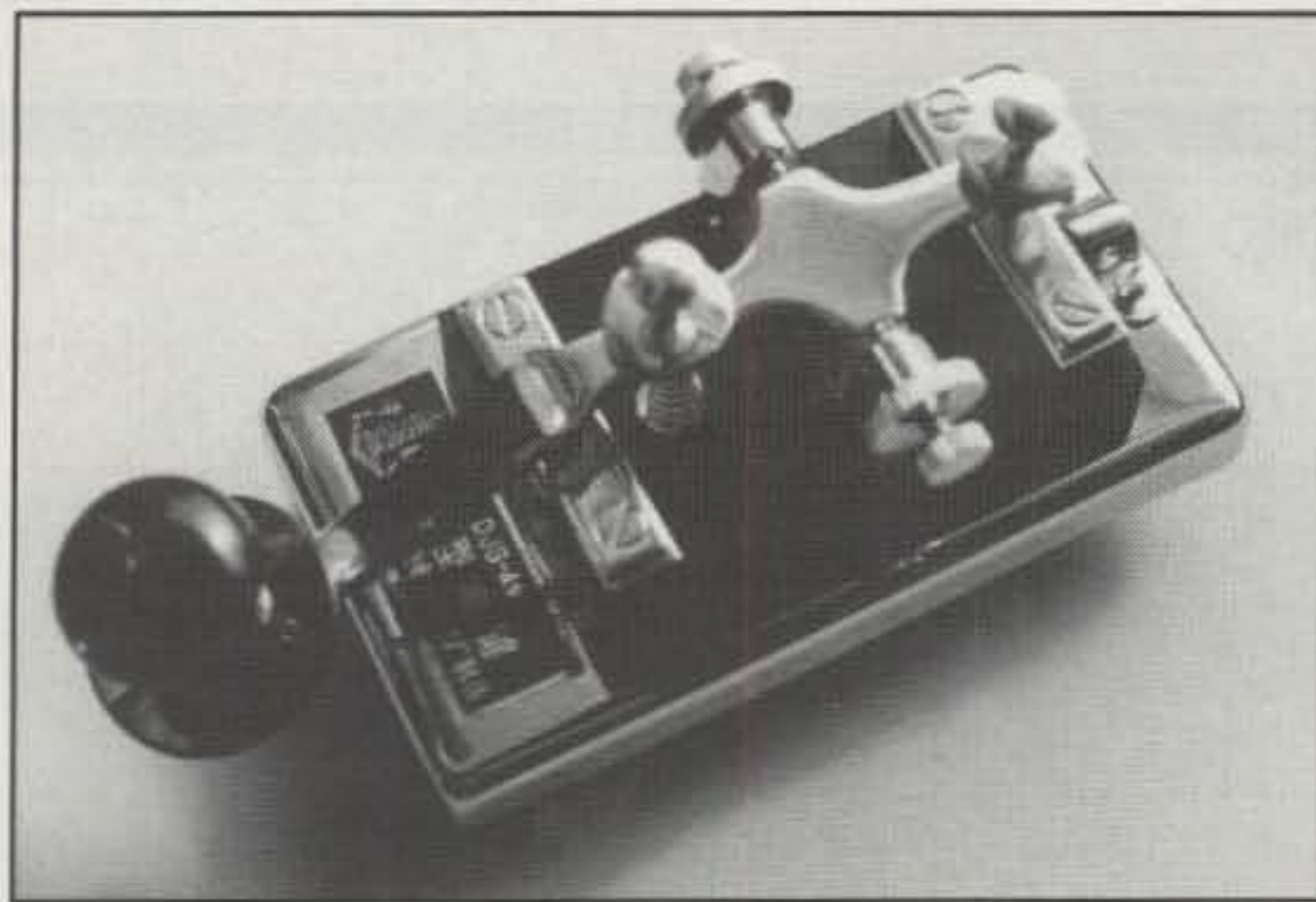


Photo 14—Brand-new Chinese hand key. Item was rescued from a sinking cargo ship, removed from its sealed-waterproof bag, and photographed for this column.

Dixie beer cans, and a gun rack for a pickup truck, and he sent me a pair of Russian pump keys. Yes, and they are delightful.

The upper key measures 4"H x 3.5"W x 7"D, and has an all-aluminum mechanism under its military green cover. The knob sits 2.5 inches above a table, which calls for a slightly raised arm position and flexible wrist action to use (a good training key!). The lower key seems to be as popular in Russia as a J-38 is in the United States. It has a plastic base, plastic inner frame, and a swing-open cover with a strange symbol on the top. It also has both key-down and key-up contacts, indicating it must have been used in both radio and landline services. Both Russian keys have larger-than-normal knobs and have a good "feel" during use.

### Chinese Key

The key of photo 14 was made in China and rescued from an ill-fated cargo ship that sank off the coast of Africa a couple of years ago. Gordon Crowhurst, G4ZPY, acquired the key, and I acquired it from him. The key was still in its hermetically-sealed bag when I received it; I cut open the bag and removed the key for photographing. I then discovered the little pumper was factory-preset for a surprisingly wide gap, and its tension spring (which was set to minimum) made the arm too stiff for comfortable use for more than a few minutes. Our "BY" friends must really have to work for CW QSOs! The key is an attention grabber, however, bearing a Chinese-inscribed nameplate and very high gloss chrome finish. Nice!

### Tips For Today

Whoa! We are out of space, and I still want to share some tips on adjusting and using bugs on the air today. First, old bugs with worn contacts produce scratchy and choppy dots. Get them refinished. Alternately, buff them with steel wool or emery cloth (harsh, but necessary). Want a great-sounding bug? Set it for liberal arm travel, then run in the dot contact screw for heavy-weighted dots (eight to ten before going into a solid dash). This step increases dot speed, so add a "finishing touch" of resetting the weight(s) for slower dots. Perform the previous steps using the exact rig with which you use the bug; transmit into a dummy load and listen on an auxiliary receiver while adjusting. Finally, critique your "bug fist"; if it is difficult to read on a CW-interfaced computer, switch over to a fancy paddle and restrict bug use to in-shack demos. Now get busy perfecting your CW skills, and let's QSO on 30 meters some evening soon (0230-0300Z).  
73, Dave, K4TWJ

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CONSTRUCTION PROJECTS, TECHNIQUES, AND THEORYs

## Getting To Know RF Filters

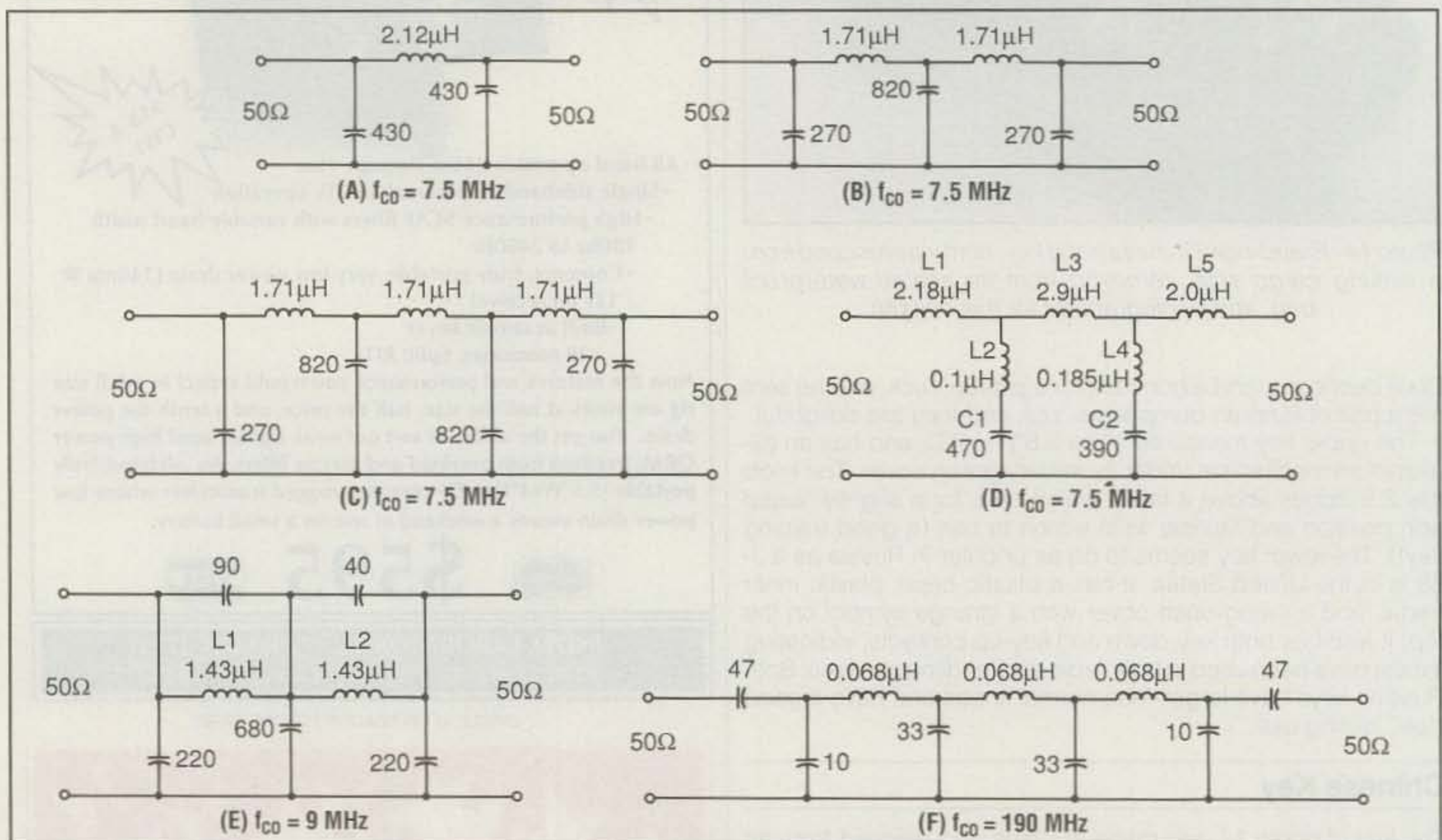


Fig. 1- Various low-pass filter arrangements that are discussed in the text.

Complying with FCC regulations that address the purity of a transmitter output waveform (spurious energy, inclusive of harmonics) should be as important to the builder of homemade gear as is the audible quality of the signal. A good target for the amateur builder is the reduction of spurious energy, referenced to peak output power, by at least 30 dB. Commercial manufacturers are held to such rigid standards in order to sell their products. A caring amateur constructor abides by the same rules.

Unfortunately, many solid-state transmitter designs are published without regard to acceptable attenuation of spurious RF energy. This oversight in design occurs frequently with regard to QRP transmitters. The builder tries to save money and simplify his or her circuit by using a single pi-section output filter, and more often than not there is a serious impedance mismatch between the collector of the PA and the input of the filter. It is not unusual to see, for example, a simple 50 ohm filter connected to a 24 ohm collector. A filter does not function effectively when a mismatch exists, and high SWR reduces the available output power

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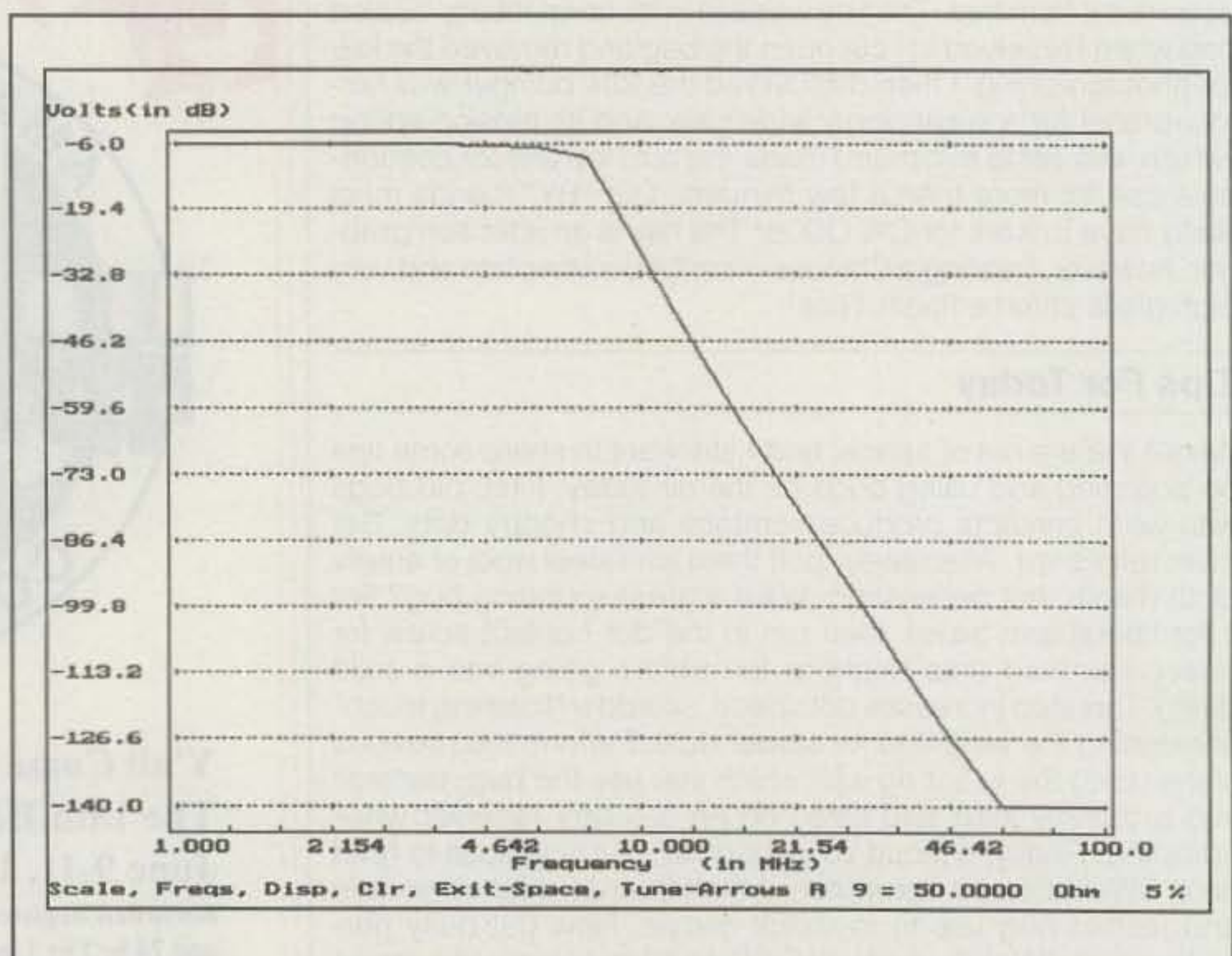


Fig. 2- Computer plot of the fig. 1(C) low-pass filter, based on NOVA software.

because maximum power transfer can only occur when unlike impedances are matched. Other types of harmonic filters are similarly placed in the wrong environment. This article treats the use of effective filters and compares the performance of simple and advanced low-pass networks.

## How Many Filter Elements To Use?

The greater the number of filter elements, the better the harmonic attenuation. However, as the number of poles is increased, the insertion loss of the filter rises. In other words, some output power must be traded for increased spurious energy attenuation.

Fig. 1(A) shows a single pi type of low-pass filter designed for use at 40 meters. The second harmonic is down only 13 dB from peak power, per computer analysis with NOVA software. The third harmonic is attenuated by 27 dB. Neither figure complies with the FCC regulations. The filter performance worsens as the mismatch between it and the PA collector increases. The mismatch can be resolved easily by using a broadband matching transformer between the PA and the filter (standard design procedure).

Fig. 1(B) shows a 40 meter half-wave type of low-pass filter that is often seen in low-power, solid-state, homebrew transmitters. It also falls short of the mark in attenuating spurious energy. Analysis shows that the second harmonic is down by 22 dB, while

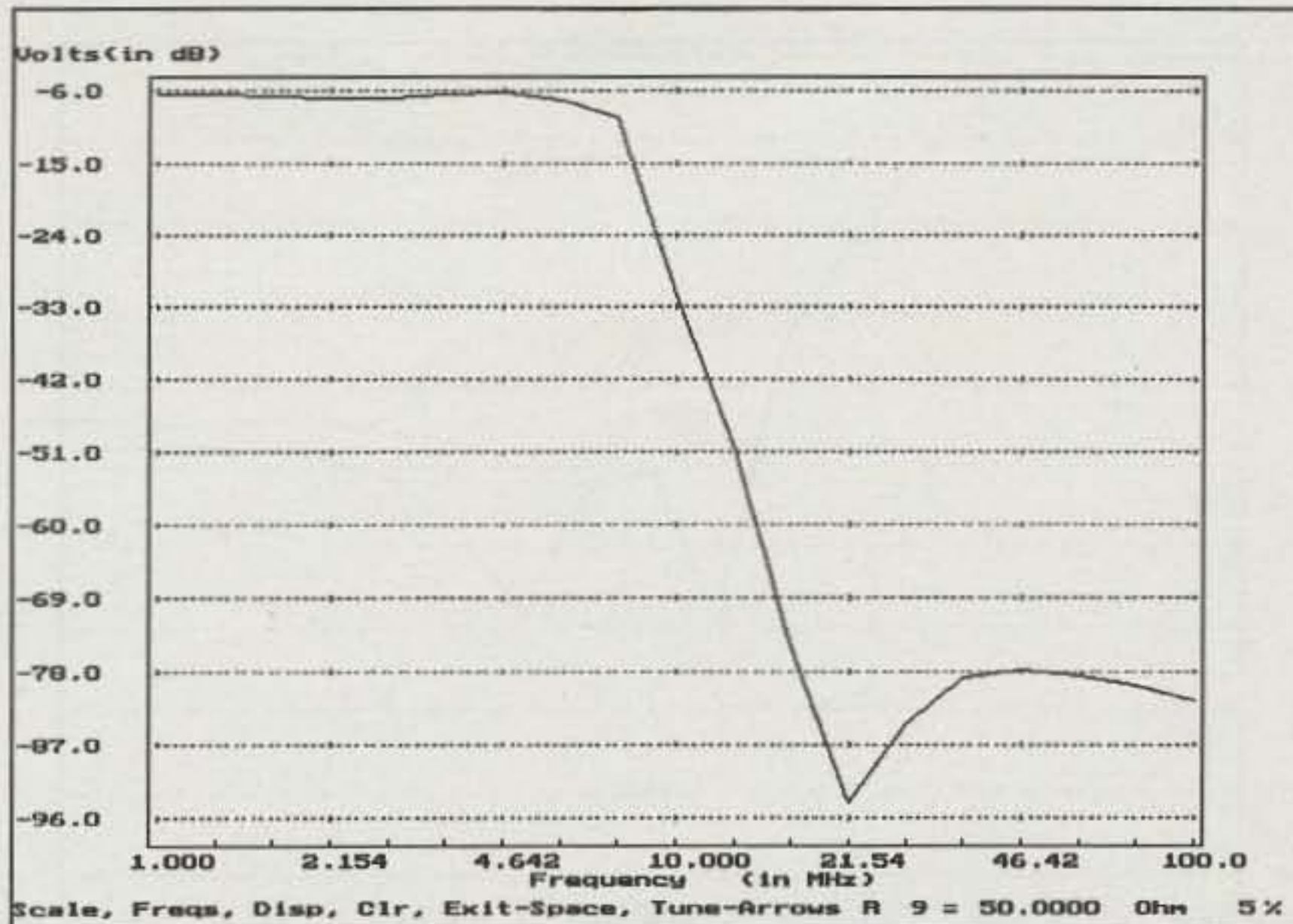


Fig. 3— Filter response for the elliptic filter in fig. 1(D) showing the improved harmonic attenuation compared to no-elliptic filters.

the third harmonic is 45.6 dB below peak output power. Using the 13 dB second-harmonic value for the fig. 1(A) filter, we find that for a transmitter output power of 10 watts, the second-harmonic energy is a healthy 0.5 watt, and this can be heard for hundreds of miles. Even a 1/10 watt signal can be heard hundreds of miles away under good condi-

tions if the antenna will accept the harmonic energy.

High levels of harmonic energy can cause still another problem: This unwanted energy is not accepted by most antennas and shows up as SWR. This is why some amateurs can't obtain an SWR of 1:1 no matter how carefully they adjust their antennas.

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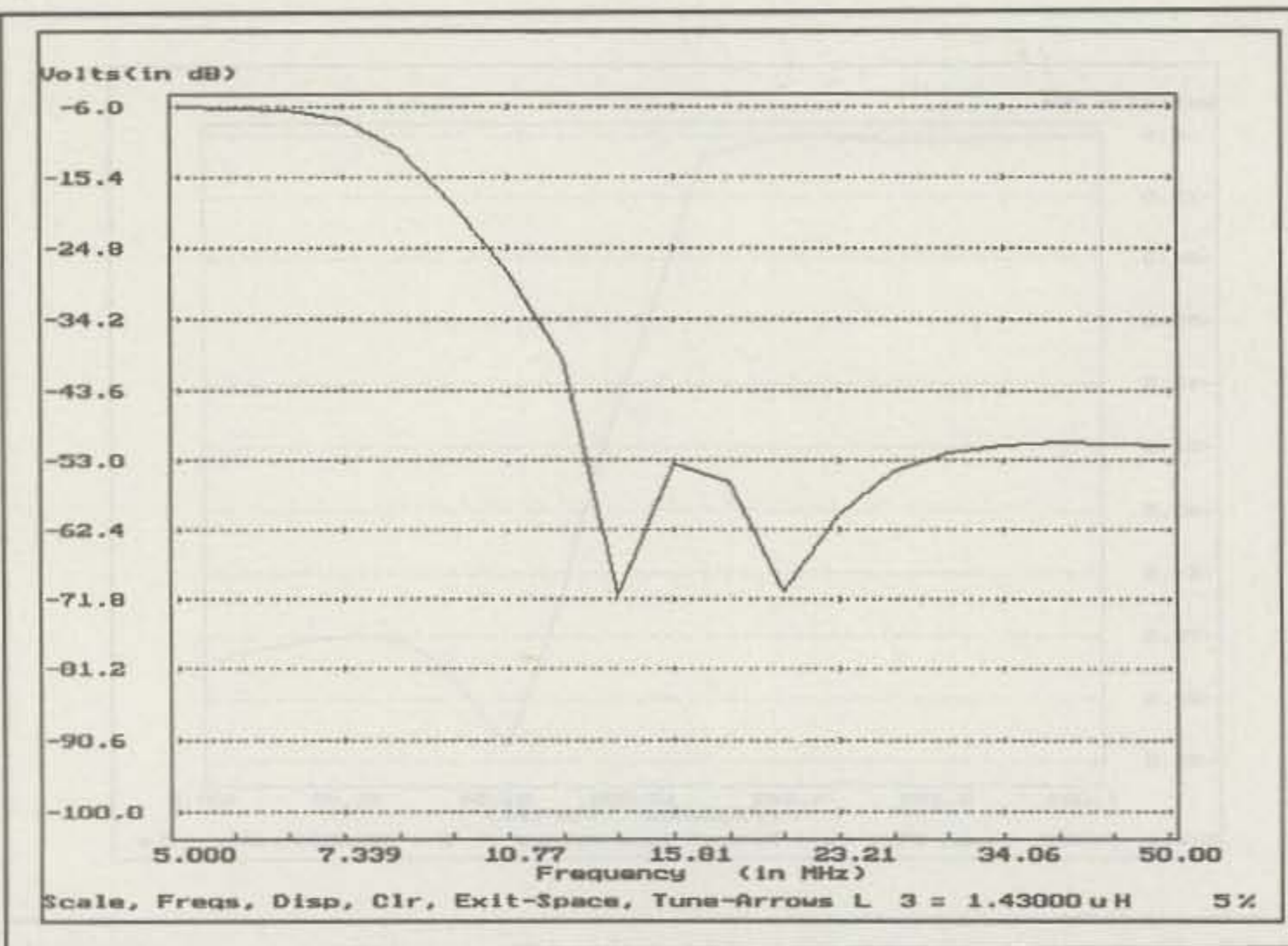


Fig. 4—The response curve for the elliptic filter model in fig. 1(E). The frequency at the bottom scale has been compressed to more clearly define the two notch frequencies.

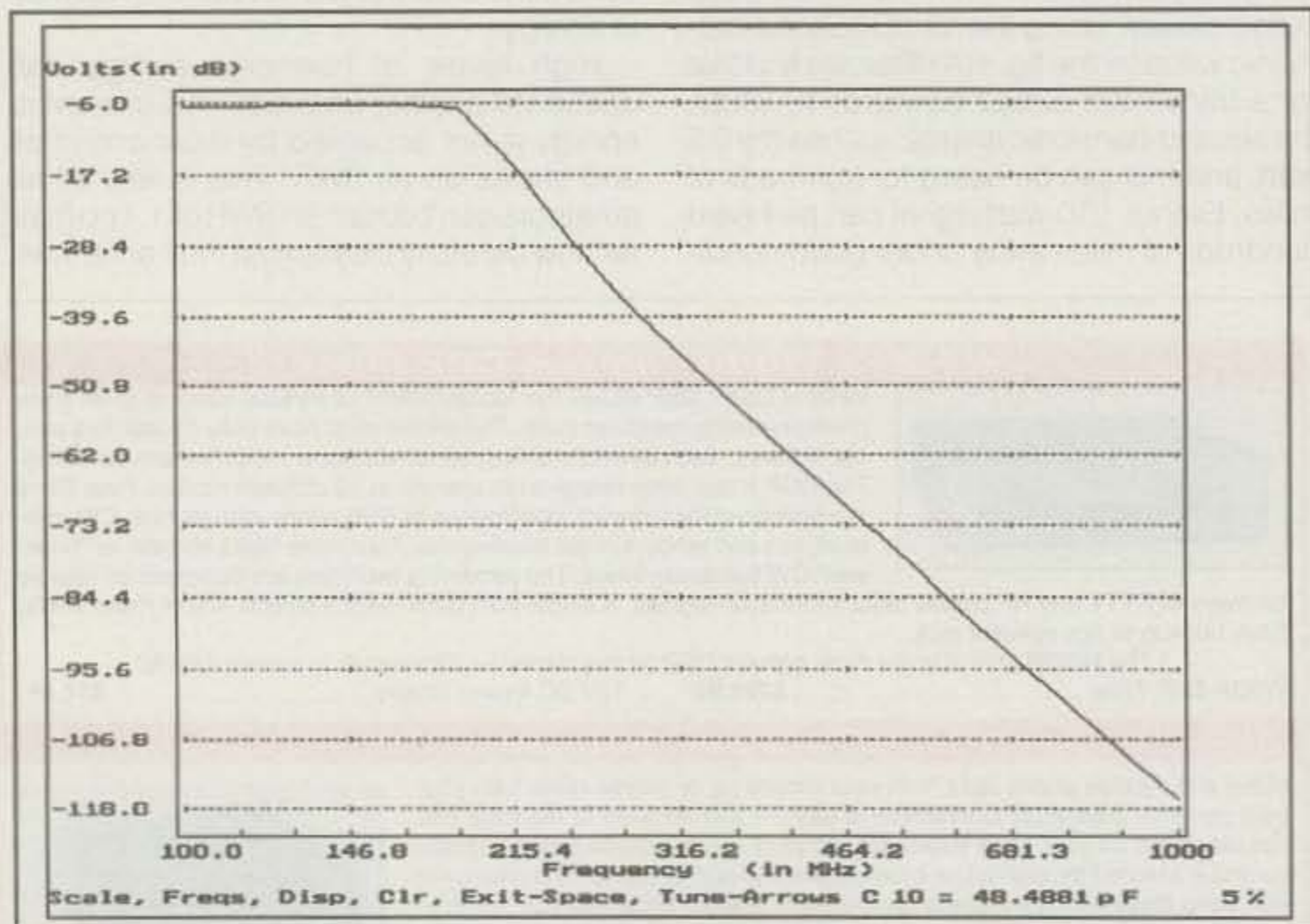


Fig. 5—Computer plot for the 9-element, 2 meter low-pass filter.

The harmonic energy prevents the reflected-power reading from dropping to zero.

### A Better Filter

The circuit in fig. 1(C) is my choice for run-of-the-mill transmitter output filters. It is easy to build and not expensive. I designed it for 40 meters with standard-value capacitors. The inductors are wound on Amidon T50-6 toroids (19 turns of No. 22 enamel wire). Polystyrene or dipped silver mica capacitors are best in filters. The T50 cores will accommodate power levels up to 50 watts at low SWR. T68-6 cores (or larger) are recommended for power levels up to 120 watts.

The fig. 1(C) filter attenuates the second harmonic by 32 dB. The third harmonic is down by 37.5 dB. A curve for this Butterworth filter is provided in fig. 2. Filters for other amateur bands can be designed by using the filter tables in *The ARRL Handbook* or with software such as RF CAD or other filter programs.

### Elliptic Filters

Fig. 1(D) shows the circuit for an effective elliptic low-pass filter. The series-resonant elements—C1, C2, L2, and L4—are tuned to the second and third harmonics of 7 MHz in this example. Trimmers in parallel with

reduced-value fixed capacitors would permit peaking the series elements exactly at the harmonic frequencies, such as 14.2 and 21.3 MHz for 7.1 MHz operation. The trimmers can be tuned for harmonic-signal nulls while observing the S-meter of a receiver.

Harmonic suppression for the fig. 1(D) filter is 51 dB (second) and 88 dB (third), which greatly exceeds the performance of the fig. 1(C) circuit. Fig. 3 shows the response curve for the elliptic filter.

Another method is suitable for obtaining elliptical-filter performance. An example is given in fig. 1(E). The circuit is similar to that of fig. 1(B), except for the two capacitors that have been added across L1 and L2. These capacitors tune the two inductors to the second and third harmonics of the fundamental signal. Again, trimmers across the coils will permit on-the-nose frequency adjustment. Attenuation of the second harmonic is 66 dB, and the third harmonic is down 64 dB. Fig. 4 illustrates where the two notches appear on the response curve.

### A 2 Meter Low-Pass Filter

VHF harmonics cause all manner of problems to commercial VHF and UHF services, especially where repeaters are involved. An effective low-pass filter is often helpful when used at the output of a 2 meter transmitter. Fig. 1(F) provides a circuit for a filter that attenuates the second harmonic by 36 dB and the third harmonic by 62 dB. It is designed around standard-value capacitors. L1, L2, and L3 have an ID of 1/4 inch and a length of 1/2 inch. Use 5 turns of No. 18 bus wire for each coil. The two 47 pF capacitors at the filter ports are necessary in order to ensure a 50 ohm bilateral impedance. Best performance will result when each filter section is contained in a separate shield compartment (prevents input-output leakage). The plot for this filter is presented in fig. 5.

### Summary Remarks

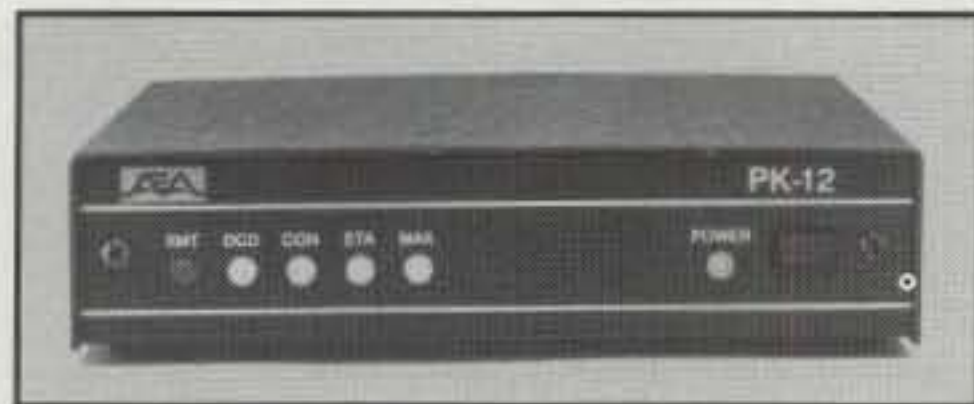
The purpose of this article is to acquaint the less technical amateur with the workings of harmonic filters and to point out the advantages of using filters that are capable of effectively "laundering" the transmitter output signal.

Those who are interested in the NOVA software may wish to contact the firm listed in footnote 1. NOVA permits designing with transistors, op amps, transformers, and L, C, and R elements. Although the program is designed for use with a dot-matrix printer or a pen plotter, it can be used with a laser printer such as my Panasonic KX-P4410 (or HP laser printers) by invoking WordPerfect for use in combination with NOVA. The resultant laser printout will look like it was processed with a dot-matrix printer.

### Footnote

1. RF Engineering, RD 1, Box 587, Chango Lake Rd., Norwich, NY 13815.  
73, Doug, W1FB

# CQ Showcase



## AEA PK-12 w/GPS Firmware & Optional APRS Adapter

AEA's PK-12 packet controller now includes firmware which enables it to connect to GPS receivers with a NMEA-0183 interface. AEA's optional APRS Adapter Cable for the PK-12 was designed for Hardware Single Port Mode operation. The cable lets users running APRS (Automatic Packet Reporting System) software to devote only one COM port for the GPS receiver and the PK-12. The new firmware built into the PK-12 is GPS and Loran compatible.

Suggested retail price of the PK-12 is \$129; the APRS Adapter Cable \$30. Early PK-12's can be upgraded to GPS capability for \$10. For more information, contact Advanced Electronic Applications, Inc., P.O. Box C2160, Lynnwood, WA 98036 (206-774-5554; FAX 206-775-2340), or circle number 107 on the reader service card.

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## JPS Communications' ANC-4 Antenna Noise Canceller

The ANC-4 Antenna Noise Canceller is an RF device designed to remove locally generated noise from signals received by a primary antenna. The unit is installed at the antenna connector of the receiver/transceiver to cancel locally generated noises such as power-line noise, computer/TV noise, electrical noise from local machinery or equipment, etc., before they get into the receiver and affect the receiver's AGC circuits.

The unit may be used with any receiver or transceiver with RF power output of 150 watts PEP or less. An RF detector built into the unit automatically bypasses the network whenever transmit RF is detected. The unit is *not* designed to be used at the output of a high-



power linear power amplifier, but must be installed at the lower RF level of the transceiver, if transmitting is anticipated. The unit connects between the main station antenna and the receiver antenna connector. A short wire antenna and a short collapsible whip are supplied with each unit to act as the noise pick-up antenna. If no main antenna is available, the ANC-4 may be used as an active antenna by plugging the noise antenna (or a longer wire antenna) into the noise antenna jack and using the noise gain control to increase the antenna output. The unit requires 12 VDC at 300 ma. Adapters are available from JPS.

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For more information or for a catalog, contact Antenna Mart Quads, P.O. Box 699, Loganville, GA 30249 (404-466-4353; FAX 404-466-3095), or circle number 102 on the reader service card.

## Connect Systems Decoder

Connect Systems has announced their new communications decoder which decodes and displays 50 CTCSS codes, 104 DCS codes, and all 16 DTMF digits. Designated as Model CD-2, this unit can be used in conjunction with communications receivers, scanners, and service monitors to decode on-the-air communications codes. In addition to the display of data on the LED panel, all decoded data is available on the RS-232 serial port. An optional PC compatible software applications program (CD-2P) allows the user to view all decoded data on the computer and also acquire time, date, and hits per CTCSS or DCS code plus usage



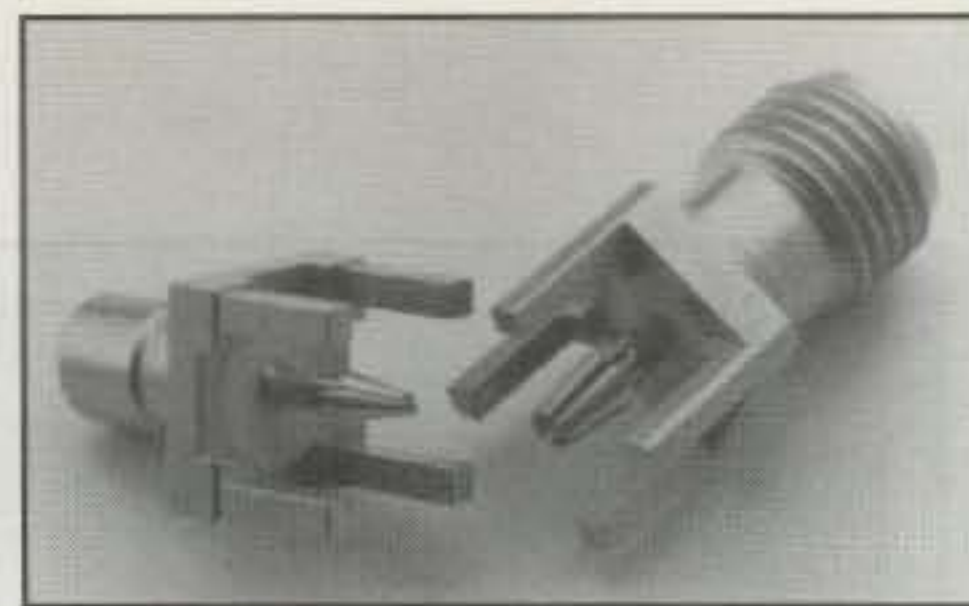
graphs. DTMF characters are decoded in strings up to 128 characters in length.

For more information, contact Connect Systems, Inc., 2259 Portola Road, Ventura, CA 93003, or circle number 103 on the reader service card.

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For more information, contact Amphenol RF/



Microwave Operations, One Kennedy Ave., Danbury, CT 06810 (203-743-9272, or toll free 1-800-627-7100), or circle number 104 on the reader service card.

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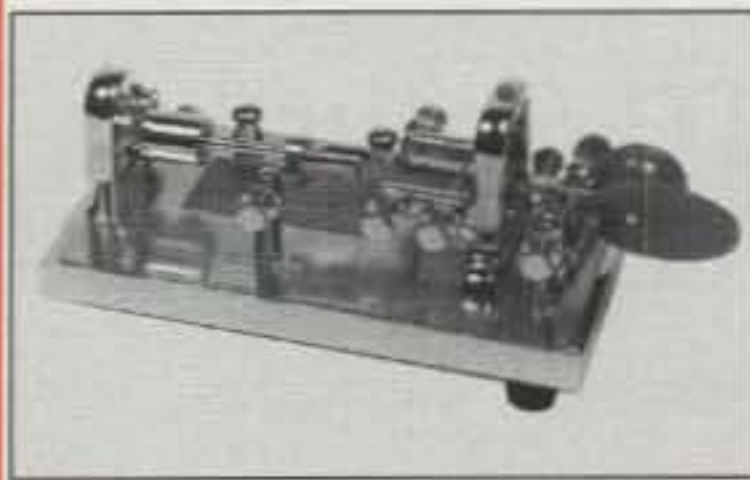
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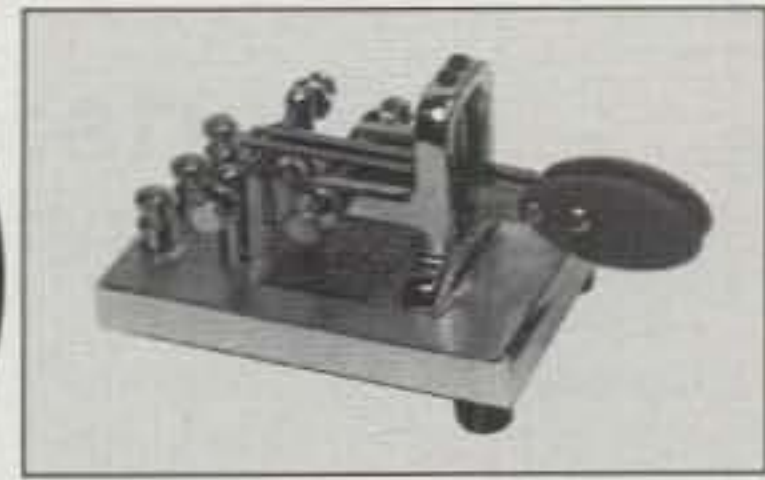
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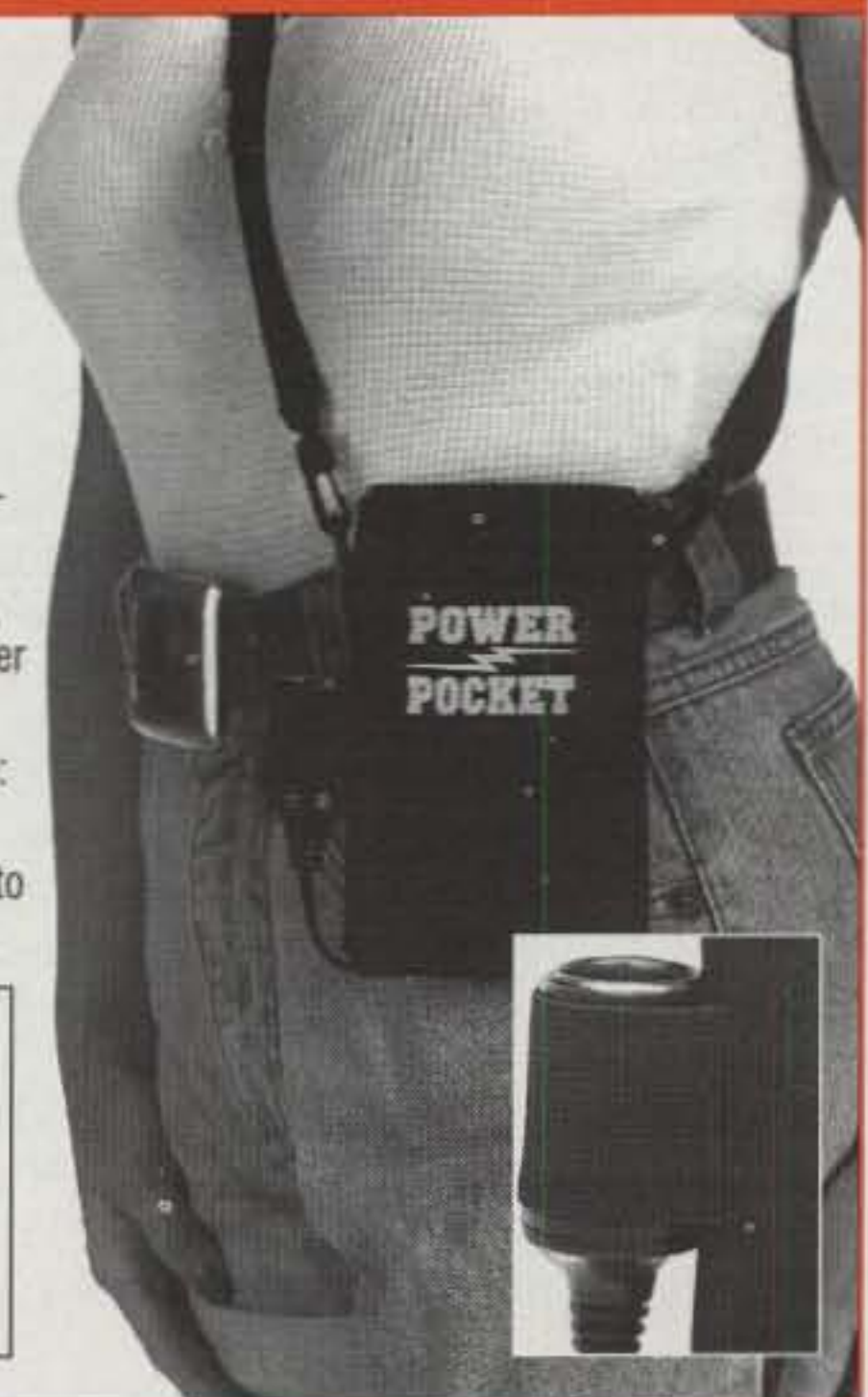
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**II. Objectives:** The objectives of this contest are for amateurs around the world to contact as many amateurs as possible in the allotted 27-hour period, to promote VHF and above activity, to allow VHF and above operators the opportunity to experience the enhanced propagation available at this time of year, and for interested amateurs to collect VHF and above Maidenhead grid locators for awards credits.

**III. Bands:** All authorized amateur radio bands above 50 MHz may be used, as authorized by local law and license class.

**IV. Class of Competition:** (1) Single op fixed station. (2) Multi-op class I fixed station. (3) Multi-op class II fixed station. A *fixed station* is defined as one that is a regular home station location. You may operate from your home station or you may be a "hired gun" at another home station to qualify for a fixed station category. A multi-op class I station is one that operates five or more transmitters simultaneously on all authorized amateur frequencies above 50 MHz. A multi-op class II station is one that operates four or less transmitters simultaneously on all amateur frequencies above 50 MHz. (4) Single op portable station. (5) Multi-op class I portable station. (6) Multi-op class II portable station. A *portable station* is defined as one you set up away from a regular home station location. (7) Rover station. A rover station is one that is manned by no more than two operators, must travel to more than one grid locator, and must sign "rover" or /R. The spirit of this class is to encourage operation from rare grid locators by persons who are inclined to do so. It is not the intent of this class to encourage one operator to move from one super station to another super station in another grid locator in order to compete in this category. (8) QRP station. Anyone operating a station running 25 watts output, or less, is eligible to enter this category. There are no location restrictions. You can operate from your home QTH or from the highest mountain you can find. However, you cannot run more than 25 watts output on any band.

**V. Exchange:** Callsign and Maidenhead locator grid locator (4 digits—e.g., EM15). Signal reports are optional and need not be included in the log entry.

**VI. Multipliers:** The multiplier is the number of different different grid locators worked per band. A "Grid Locator" is counted once per band. *Exception:* The rover who moves into a new grid locator can count the same grid locator more than once per band as long as the rover is himself or herself in a new grid locator location. Such change in location must be clearly indicated in the rover's log. It is required that rover category operators maintain separate logs for each grid locator location.

A. The rover who changes location during the course of the contest is free to contact as many other stations as he or she wishes. The rover becomes a new QSO to the stations working him or her when that rover changes grid locator.

B. The grid locator is the Maidenhead grid locator to four digits (FM13).

**VII. Scoring:** One point per QSO on 50, 70, and 144 MHz; 2 points per QSO on 222 and 432 MHz; 4 points per QSO on 903 and 1296 MHz; 6 points per QSO on 2.3 GHz and above. Work stations once per band, regardless of mode. Multiply total QSO points times total number of grid locators (GL) worked. Contest entrants may not transmit on 146.52 MHz, or your country's national 2 meter FM simplex calling frequencies, or commonly recognized repeater frequencies for the purpose of making or requesting contacts. Contacts made within your own country, in the DX window of 50.100–50.125 MHz, are discouraged. Contacts made on the SSB calling frequencies of 50.110 MHz, 50.125 MHz, and 144.200 MHz are discouraged. Contest participants are required to use UTC as the logging time.

**Incentive scoring:** Operators completing two-way CW or MCW contacts may add one point to the QSO value for each contact. Example: W1XX works stations as follows:

37 QSOs, with 3 QSOs on CW ( $34 \times 1 = 34$ ;  $3 \times 2 = 6$ ;  $34 + 6 = 40$ ) and 10 GL's (10 multipliers) on 50 MHz

45 QSOs ( $45 \times 1 = 45$ ) and 8 GL's (8 multipliers) on 144 MHz

26 QSOs ( $26 \times 2 = 52$ ) and 4 GL's (4 multipliers) on 222 MHz

38 QSOs ( $38 \times 2 = 76$ ) and 5 GL's (5 multipliers) on 432 MHz

2 QSOs ( $2 \times 4 = 8$ ) and 2 GL's (2 multipliers) on 903 MHz

6 QSOs ( $6 \times 4 = 24$ ) and 2 GL's (2 multipliers) on 1296 MHz

*Summary:*

W1XX therefore has 245 QSO points ( $40 + 45 + 52 + 76 + 8 + 24 = 245$ )  $\times$  21 multipliers ( $8 + 4 + 5 + 2 + 3 = 21$ ) = 5,145 total points.

**VIII. Awards:** Engraved plaques will be awarded to the top-scoring stations in each category in the world (for a total of eight plaques). Parchment certificates suitable for framing will awarded to the top-scoring stations in each category in each continent. Certificates may also be awarded to other top-scoring stations who show outstanding contest effort. Certificates will be awarded to top-scoring stations in each category in geographic areas where warranted. Geographic areas include states (U.S.), call areas (Japan), provinces (Canada), and countries, and may also be extended to include other subdivisions as justified by competitive entries.

**IX. Miscellaneous:** An operator can sign only one callsign during the contest. This means that an operator cannot generate QSOs by first signing his callsign, then signing his daughter's callsign, even though both callsigns are assigned to the same location. All contacts above 300 GHz must use coherent radiation on transmissions and employ at least one stage of electronic detection on receive. A station located exactly on a dividing line of a grid locator must choose only one grid locator from which to operate for exchange purposes. A different multiplier cannot be given out without moving the complete station at least one hundred meters.

**X. Log Submissions:** This is a new contest with new log sheets. Therefore, old log sheets are no longer usable. You must request new log sheets from: **CQ VHF Contest, CQ Magazine, 76 North Broadway, Hicksville, NY 11801**. Please include an SASE with sufficient postage to cover your request.

Completed logs must be postmarked no later than August 31, 1995 to be eligible for awards. All logs should be mailed to: Joe Lynch, N6CL, VHF Contest Chairman, P.O. Box 73, Oklahoma City, OK 73101. Logs may be submitted on disk, provided that a hard copy of the log is sent with the disk and the data is in an ASCII format compatible with an IBM-PC type computer.

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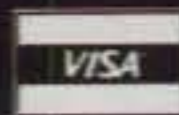
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# OUR READERS SAY

## Azden Review Correction

The review of the Azden AZ-21A handheld in the February issue of *CQ* listed the incorrect information regarding the manufacturer and marketer of the unit. The unit is manufactured by Azden Corporation and is marketed in the U.S. by the Communications Division of Azden Corporation.

## The Missing Pieces Filled In

Editor, *CQ*:

Thanks to you and your staff for the terrific job you all did with the January "Col-

lector's Edition." I earned my Novice Class license in 1957 at 14 and upgraded to General Class a few months later. For all the reasons which you and your readers are very aware, ham radio was a wonderful hobby for a kid back in the 1950s. For a youngster back then (and even now) earning a General Class ticket was an important accomplishment.

In 1962 I went off to college and became a ham radio dropout. The years passed with career changes, marriage changes, and all the other changes we all go through. I didn't give ham radio much thought after 1962

except to periodically renew my license. I guess I always figured I might want to go back to it some day, so I kept my option open but did nothing else.

I won't bore you with my life's story except for some some recent events. A couple of years ago I made friends with a ham who had been active on the HF and VHF bands since the mid '70s. He rekindled my interest, and about a year ago gave me a '60s vintage 2 meter mobile unit. That did it. I was hooked for the second time in my life. I subscribed to *CQ* and *QST*, acquired several books, and quickly came to understand the hobby as it exists today. I discovered my General Class license privileges had been watered down, there were some new bands available, new operating modes, and new dimensions to the hobby that couldn't have been foreseen by the average ham in the late '50s and early '60s.

Having renewed enthusiasm, I upgraded to Advanced and then Extra Class. I got some HF equipment and put up a combination dipole and started to make some SSB contacts on 40 and 80 meters (my first-ever SSB activity, as I operated only on CW and AM as a kid). But there was something still missing!

I remember ham radio as it was, and I was becoming more and more knowledgeable about ham radio as it is today. It was all those years in between that I didn't have a clue about. How did ham radio evolve between then and now? Thanks to your very excellent "Collector's Edition" the missing years have been filled in; I now feel I never really left ham radio at all.

Kudos to all who made this issue what it is, and thank you for filling in the missing years.

Mike Jones, K6KZD  
Lone Pine, CA

The single most comprehensive source of information on HF propagation is now available from *CQ*!

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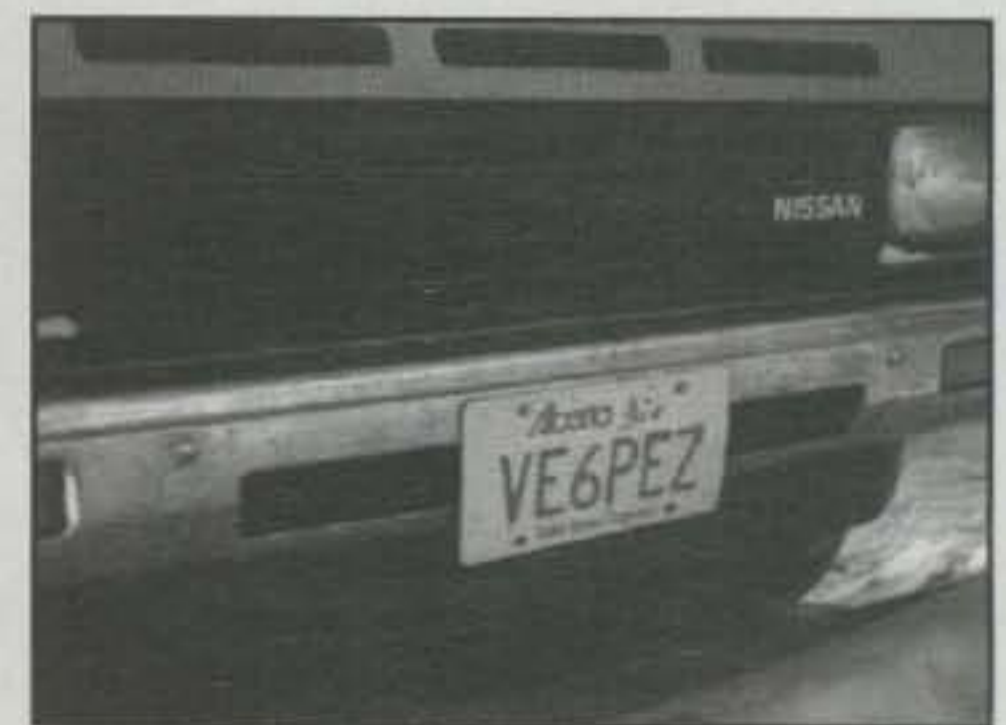
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## Free Plates!

Editor, *CQ*:

Here is a picture of the license plate of my friend Lance Leggo, VE6PEZ, of Edmonton, Alberta, Canada. Get this: The plates are free if you are a ham operator! All Alberta ham callsigns start with VE6.

Trevor Fletcher  
Edmonton, Alberta, Canada

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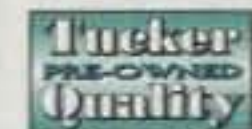
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You'll appreciate the versatility of 5 channels and 12 traces, plus its portability and very bright, clear display. The front-panel is laid out in a fresh, user-friendly fashion so you don't have to learn a "new scope" all over. It will trigger four ways: off of channels 1, 2, 3, or "ALT." A patented "trigger lock" allows for stable, automatic triggering even on complex signals such as TV waveforms. Another unusual feature is its ability to display several patterns at once. For example, this Kikusui COS6100M can show you X-Y displays of channel 3 vs. channel 1, and vs. 2, 4, and 5. Bandwidth of 100 MHz, sensitivities are CH1 and CH2: 5 mV-5 V; CH3, CH4, CH5: 0.1 V and 1 V. The sweep speeds are 20 nS-0.5 S (A and B). This is a great deal on a powerful oscilloscope!

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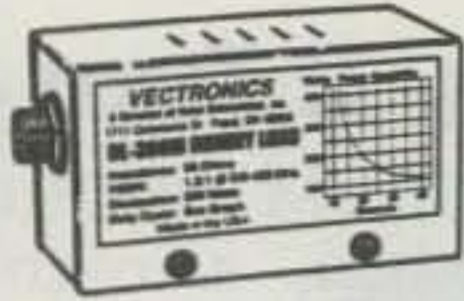
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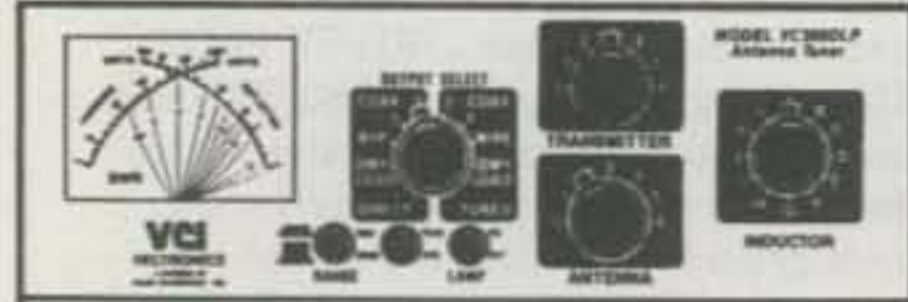
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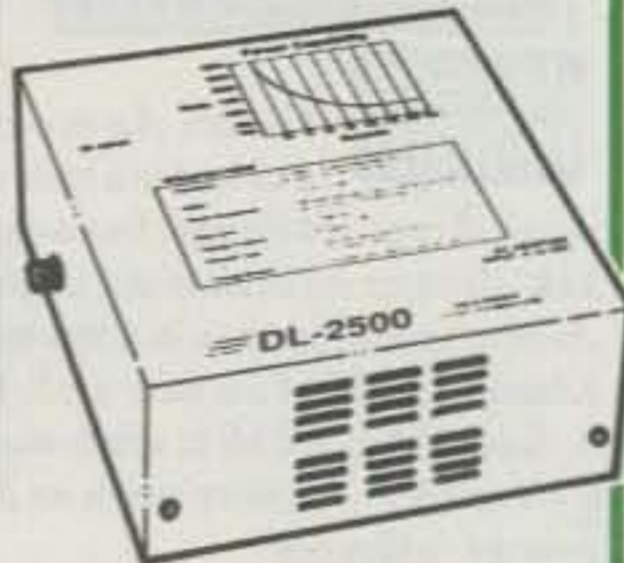


**DL300M**  
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Dummy Load

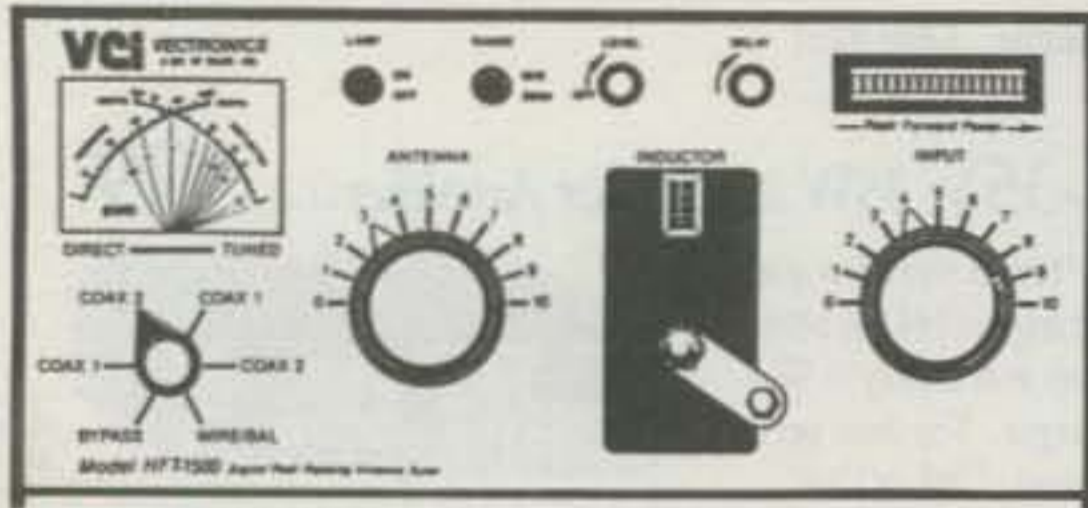


**VC300DLP** 300W Antenna Tuner

**DL2500**  
2500 Watt, 150 MHz,  
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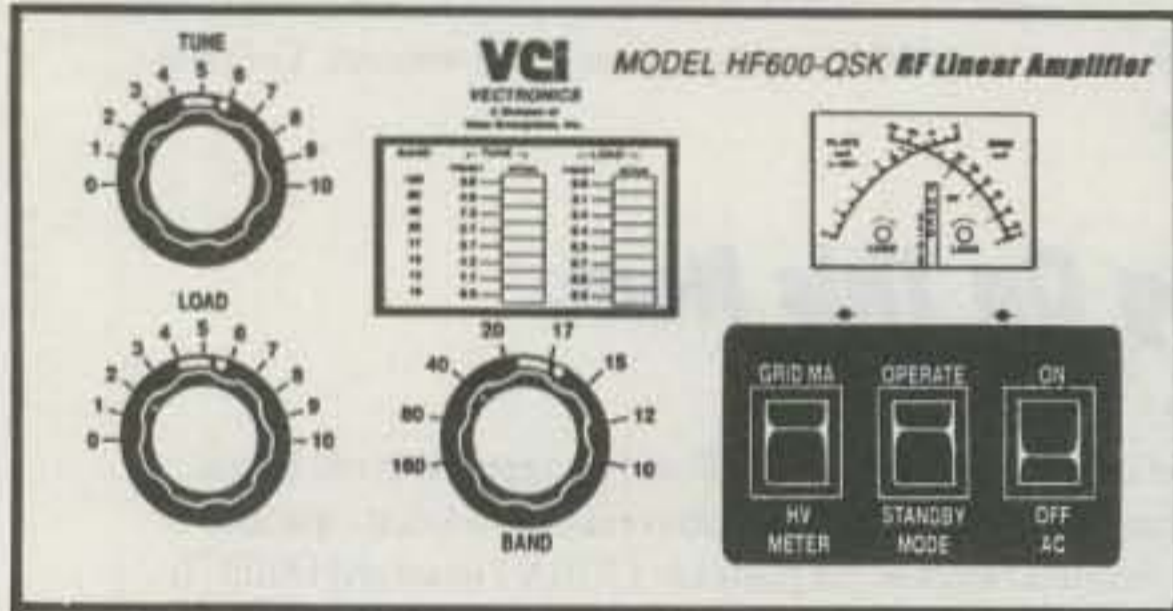
**VC300D** 300W Digital Antenna Tuner



**HFT1500** 1500W Antenna Tuner



**DL650M**  
1500 Watt,  
650 MHz, Dry  
Dummy Load



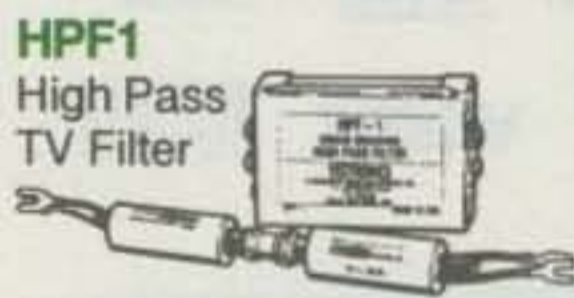
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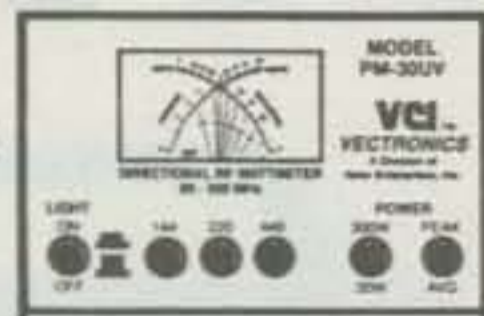
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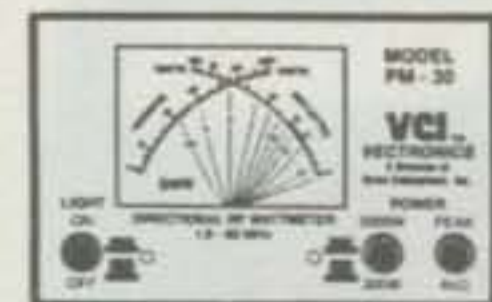
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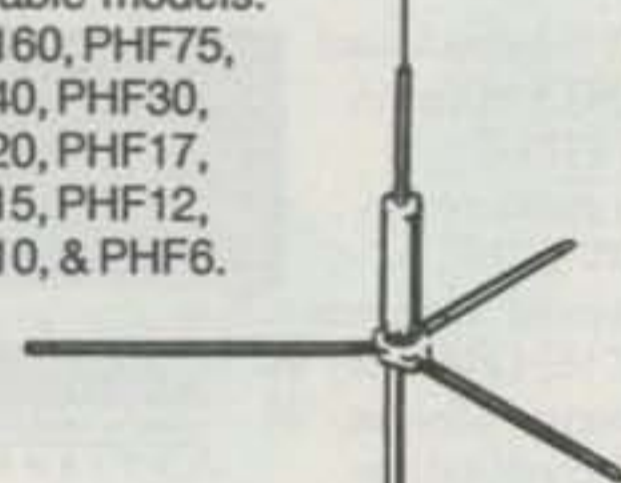
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## Equipment and Accessories—Part III, Conclusion

The first part of this three-part article covers older accessories and modern equipment. The second part covers modern accessories, antennas, headphones/loudspeakers, lighting, clocks, electric power, and telegraph apparatus.

### Older Gear

Now that I have given it my best effort to convince you to hock your spouse and kids to buy sophisticated new gear, let's come back to the real world. If your financial situation is like mine, it may be a long time before you can afford to purchase new gear. That does not mean you cannot enjoy operating in the meantime; simply get lower priced older equipment and get on the air, but please do not buy junk.

An advantage related to starting with older (used) equipment is that you get a low-cost opportunity to try the various bands and modes. There is plenty of old gear available that can satisfactorily meet the initial communication needs of new amateurs. There is no way to know what type of operation will appeal to you. You may find 1.25 meters to your liking, or 23 centimeters (1270–1295 MHz) may entrance you with facsimile or TV operation. You may find you prefer radioteletype, packet radio, radiotelegraph (code), or radiotelephone (voice) operation on one of the HF (3–30 MHz) bands. I hope you will try all the bands and all the modes.

### Related Previous "Novice" And "Basics" Columns

Several past "Novice" and "Bill's Basics" columns have been devoted to equipment and accessories. Such articles are referenced herein by month and year of the *CQ* issue in which they appeared. If you have access to prior issues of *CQ*, you should have no difficulty locating the referenced articles; simply look in the table of contents for the "Novice"/"Basics" column in which you are interested. Most past issues of *CQ* can be purchased for \$3.50 each from *CQ*, 76 North Broadway, Hicksville, NY 11801. Also, I have sets of printed aids which I distribute to students in licensing courses I conduct. Your SASE and request will bring a data sheet re-



The Ameritron ALS500M solid-state, no tune mobile amplifier.

garding the scope and availability of these printed aids.

The price shown with each of the following items includes reproduction and mailing costs:

"Amateur Radio Station Grounding" (\$2) 9–78.

"Amateur Radio Station Installation Tips" (\$3.50) 11–77 through 3–78. This article provides a lot of information about old equipment, including vacuum tube gear.

"Antennas" (\$1.50) 7/8–89. This one provides an easily understood introduction to a variety of antennas.

"Dipole Antennas" (\$2.50) 5/7–83. This article tells everything one should know to build and erect dipoles.

"Electrical Power For Fixed Stations" (\$1) 2–85.

"Electric Shock" (\$1) 4–83.

"Getting Started" (\$3.50) 2/9–87. This one gives new amateurs an overview of the choices that must be made when getting started on the air.

"Headsets" (\$1) 3–89. Details the reasons why a headset should be used.

"Military Equipment Designations" (\$1) 11–87. Enables one to identify military surplus equipment and accessories for possible use in amateur radio stations.

"Military Radio Frequency Transmission Lines" (\$2.50) 8–83. Helps amateurs identify suitable feedlines.

"Random and Long Wire Antennas" (\$2.50) 4/5–88. This article supplies information regarding what one should (and should not) do when erecting an end-fed wire antenna.

The preceding alphabetical listing of

articles clearly indicates the wide range of material that has been printed to help prospective and new amateurs become familiar with amateur radio station accessories and equipment.

Amateur radio magazines are filled with advertisements about new accessories and equipment. The "for sale" sections of these publications list used items for sale.

There are several good sources of amateur radio items. Here is a list of some of the most useful distributor's catalogs one can request. Some are not free.

Amateur Electronic Supply, Inc., 5710 West Good Hope Road, Milwaukee, WI 53223.

Amateur Radio Trader, P.O. Box 3729, Crossville, TN 38557 (superb source of used items).

AntennasWest, P.O. Box 50062, Provo, UT 84605 (wire antennas).

Electronic Equipment Bank, 323 Mill Street N.E., Vienna, VA 22180.

Eur-Am Electronics, P.O. Box 990, Meredith, NH 03253-0990.

Fair Radio Sales Company, P.O. Box 1105, Lima, OH 45802 (military surplus).

Grove Enterprises, Inc., P.O. Box 98, Brasstown, NC 28902-0098.

Ham Radio Outlet, 933 North Euclid Street, Anaheim, CA 92801.

The Radio Works, P.O. Box 6159, Portsmouth, VA 23703 (wire antennas).

Tucker Electronics, P.O. Box 551419, Dallas, TX 75355-1419.

Universal Radio, Inc., 6830 Americana Pky., Reynoldsburg, OH 43068-4113.

In addition to the preceding list of distributor's catalogs, you can request catalogs and flyers from manufacturers ad-

45527 Third Street East, Lancaster, CA 93535-1802



The Ameritron ALS600 FET amplifier.



The Ameritron ALS600PS 50 volt power supply for the ALS600 amplifier.

vertising their products in issues of CQ.

### Equipment Reviews And Introductions

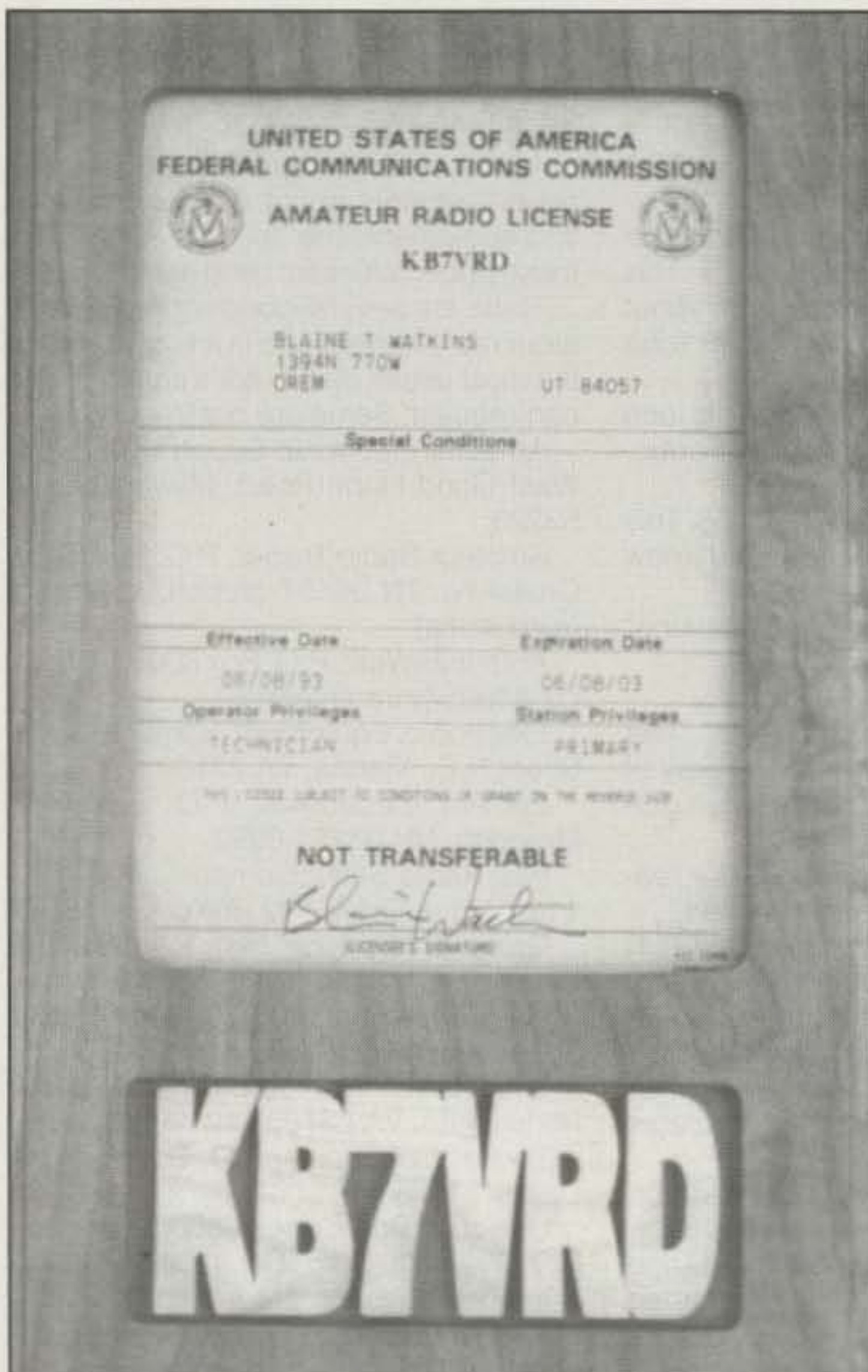
Amateur radio magazines frequently contain in-depth reviews of new accessories and equipment. If you want detailed infor-

mation about something you are interested in buying, these reviews can help you learn about it. Accessory and equipment introductions are also helpful. Several of these introductions are included herein to provide readers with descriptions of typical new items. The Ameritron address is 921 Willow Road, Starkville, MS 39759.

The address of MFJ Enterprises is P.O. Box 494, Mississippi State, MS 39762.

### Ameritron ALS500M Solid-State Mobile Amplifier

This 3.5" x 9" x 15" quiet amplifier provides a 500 watt (400 watts on code) PEP out-



◀ The amateur radio license wall plaque available from Shack Attack.

▼ Walt Palmer, KB3BCZ, operates from the hay loft of his barn in Gouldsboro, Pennsylvania. He was an Army radio operator from 1949 to 1952 and an Air Force radio operator from 1953 until he retired in 1970. His station includes an IC-736 transceiver with multiband vertical and G5RV antennas. Walt has contacted amateurs in almost all states and more than 20 countries. We know he is active on the air because I was working him on the 15 meter band while my wife (Marie, W6JEP) was typing the caption for this picture!





# Weather Stations/Scanners/CB

**COMMUNICATIONS ELECTRONICS INC.**  
Emergency Operations Center

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Now readers of *CQ Amateur Radio* magazine may purchase weather forecasting and communications equipment directly from Communications Electronics Inc. Order today and save.

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Now you can be your own weather reporter with the Davis Weather Monitor II. Our top-of-the-line weather station combines the most advanced weather monitoring technologies available into one incredible package. Glance at the display, and see wind direction and wind speed on the compass rose. Check the barometric trend arrow to see if the pressure is rising or falling. Push a button, and read indoor and outdoor temperature, wind chill, humidity and barometric pressure. Our package deal includes the new ultra high resolution 1/100 inch rain collector part #7852-K, and the external temperature/humidity sensor, part #7859-K. The package deal is order #DAV1-K for \$479.95 plus \$15.00 shipping. If you have a personal computer, when you order the optional Weatherlink computer software for \$139.95, you'll have a powerful computerized weather station at an incredible price. For the IBM PC or equivalent order part #7862-K. Apple Mac Plus or higher including PowerBook, order part number 7866-K.

The Weather Monitor II (7440-K) comes complete with anemometer with 40 feet of cable, external temperature sensor with 25 feet of cable, junction box with 8 feet of cable, AC power adapter, detailed instruction booklet and one year limited factory warranty.



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Davis Weather Wizard III 7425-K	\$154.95
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Davis Rain Collector II 0.01" 7852-K	\$59.95
Davis Rain Collector II 0.2 mm 7852M-K	\$59.95
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Weatherlink Software for Apple-Version 3.0 7866-K	\$139.95
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6-Conductor 40' (12.2 m) extension cable 7878-K	\$21.95
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8-Conductor 50' (15.2 m) junction box cable 7881-K	\$24.95
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2400 baud modem for Weatherlink MEXT-K	\$39.95
Talking weather station - Call 313-994-9000 for demo ITPRO2-K	\$3,999.95
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Thermometer with transparent calendar & clock display by OSI TC188-K	\$19.95
Thermometer with AM/FM dock radio by Oregon Scientific CR388-K	\$39.95
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Bearcat 2500XLT-K1 SPECIAL	\$299.95
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Bearcat 860XLT-K1 base	\$159.95
Bearcat 760XLT-K base/mobile	\$198.95
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Bearcat 560XLA-K base/mobile	\$83.95
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Sportcat 150-K handheld w/800 MHz	\$159.95
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**Bearcat® 9000XLT-K Radio Scanner**  
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**Frequency Coverage:**  
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The new Bearcat 9000XLT gives you pure scanning satisfaction with amazing features like TurboSearch™ to search VHF channels at 300 steps per second. This base and mobile scanner is ideal for surveillance professionals because it has a selectable attenuator to help eliminate annoying intermodulation from adjacent frequencies in highly populated areas and selectable AM, Wide FM and Narrow FM modes that allow you to change the default receiving mode of the BC9000XLT. Other features include **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. **Hi-Cut filter** to help eliminate unwanted static noise. 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. 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; **BC005** CTCSS Tone Board \$54.95; **EX711** External speaker with mounting bracket & 10 feet of cable with plug attached \$19.95. The BC9000XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited warranty from Uniden.

## CB/GMRS Radios

The new Maxon GMRS 210+3 transceiver is a PLL synthesized 10 channel radio on General Mobile Radio Service frequencies. Two channels are dealer programmable and one channel is set aside for emergency and safety communications. The seven remaining channels are non-programmable for frequency—they are set on interstitial frequencies for all-purpose GMRS radio use. 2 watts of RF power for exceptional transmitting range. Up to 5 watts when used with the supplied 12 volt vehicular DC power cord. CTCSS built-in. Includes 450mAh Ni-cad rechargeable battery pack, AC/DC wall battery charger, owner's manual, FCC license application, belt clip, antenna. Order today from CEI. Maxon GMRS210+3-K GMRS transceiver \$199.95  
Cobra 29LTDWX-K CB/Weather Alert ... \$129.95  
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Ranger RCI2970-K 100 watt 10 meter. . \$369.95  
Ranger RCI2950-K 25 watt 10 meter .... \$239.95  
Uniden GMR100-K GMRS Handheld ..... \$144.95  
Uniden WASHINGTON-K SSB CB Base ... \$189.95  
Uniden GRANTXL-K SSB CB Mobile ..... \$139.95  
Uniden PRO538W-K CB & Weather ..... \$59.95



## Talking Weather

Now your weather station can talk to callers. Call 313-994-9000 for a demonstration. The Talking Weather Station (TWS) from Innovative Tech Works, lets anyone phone your Davis Weather Monitor II and hear the weather. Here's how it works. You setup the TWS with most IBM PC 80286 or faster compatible computers with a 40 MB hard disk. Requires MS-DOS version 5.0 or later with 1 MB of RAM. Add phone lines and your own personal messages or promotional advertising. Callers are automatically greeted with your voice giving them the weather and your messages. Several times a minute, the TWS software will poll the Weatherlink and will update the voice library files to make your spoken report. A single line card, order # IT1-K is only \$489.95. A two line card is order # IT2-K for \$939.95. A complete turnkey system for commercial use is available, order #ITPRO2-K starting at \$3,999.95.

## VHF Transceiver

**RELM® WHS150-K Transceiver**  
Mfg. suggested list price \$481.67/CE price \$339.95

Severe weather spotters depend on the RELM WHS150 transceiver for direct two-way communications with their police or fire department, civil defense agency or ham radio repeater. The WHS150 is our most popular programmable five watt, 16 channel handheld transceiver that has built-in CTCSS, which may be programmed for any 39 standard EIA tones. Frequency range 148.000 to 174.000 MHz. Will also work 144.000-148.000 with slightly reduced performance. The full function, DTMF compatible keypad also allows for DTMF Encode/Decode and programmable ANI. Weighting only 15.5 oz., it features dealer programmable synthesized frequencies either simplex or half duplex in both 5.0 and 6.25 KHz increments. Other features include scan list, priority channel, selectable scan delay, selectable 5 watt/1 watt power levels, liquid crystal display, time-out timer and much more. When you order the WHS150 from the Weather Bureau, you'll get a complete package deal including antenna, battery, belt clip and user operating instructions. Other accessories are available. A leather carrying case with swivel belt loop part #LCWHS is \$49.95; rapid charge battery charger, part #BCWHS is \$69.95; speaker/microphone, part #SMWHS is \$54.95; extra Ni-cad battery pack, part #BP007 is \$59.95. The radio technician maintaining your radio system must order programming instructions part #PI150 for \$18.00 to activate this radio. FCC license required for United States operation.

## Other neat stuff

Grundig Satellit 700-K1 portable shortwave receiver with 512 memory & AG adapter	\$364.95
Grundig Yacht Boy 400-K1 digital portable shortwave receiver - 40 memory presets	\$189.95
Grundig Yacht Boy 230-K1 portable shortwave receiver	\$109.95
Sangean AT5800-K portable 20 memory shortwave receiver	\$69.95
Sangean AT5803A-K1 portable shortwave w/AC adapter - 9 memory presets	\$139.95
Sangean AT5806-K portable 45 memory shortwave receiver	\$159.95
Sangean AT5818CS-K portable shortwave receiver with cassette recorder	\$209.95
Uniden EXP9200-K 900 MHz, 2 line cordless phone	\$289.95
Uniden EXP9100-K 900 MHz, 1 line cordless phone	\$269.95
Cobra CP912-K 900 MHz, spread spectrum cordless phone	\$249.95
Bogen PR2000-K Digital two-line advanced voice mail system & answering machine	\$279.95
Bogen PR0018-K memory expansion module, doubles recording time to 36 minutes	\$79.95
FANS P161P-K 60 name/number caller ID, unwanted call blocker, automatic paging	\$149.95
SNI ID200-K Bouncer name/number caller ID, call reject, forward to machine	\$89.95
ICOM GP21-K1 handheld global positioning system (GPS)	\$494.95
WR200-K weather radio with National Weather Service storm alert	\$39.95
RELM WHS150-K VHF handheld 5 watt, 16 channel transceiver	\$339.95
RELM RH250NB-K VHF 25 watt, 16 channel synthesized transceiver	\$289.95
Ranger RCI2950-K 25 watt 10 meter ham radio transceiver	\$239.95
Ranger RCI2970-K 100 watt 10 meter ham radio transceiver	\$369.95
Uniden LED99005W-K Super Wideband Laser/Radar Detector	\$139.95
ME2-K Map Expert CD Rom for IBM PC by DeLoorme Mapping	\$299.95
HGPC-K HamCall CD Rom for IBM PC by Buckmaster Publishing	\$39.95
ANTX-K VHF scanner/VHF transmitting antenna PL259 connector	\$29.95
ANTMMBNC-K magnet mount scanner antenna w/ BNC connector	\$29.95
ANTMMOT-K magnet mount scan antenna w/Motorola plug	\$29.95
ANTMMPL-K magnet mount scan antenna with PL259 connector	\$29.95
ANTSGBNC-K glass mount scanner antenna with BNC connector	\$29.95
ANTSGMOT-K glass mount scanner antenna with Motorola jack	\$29.95

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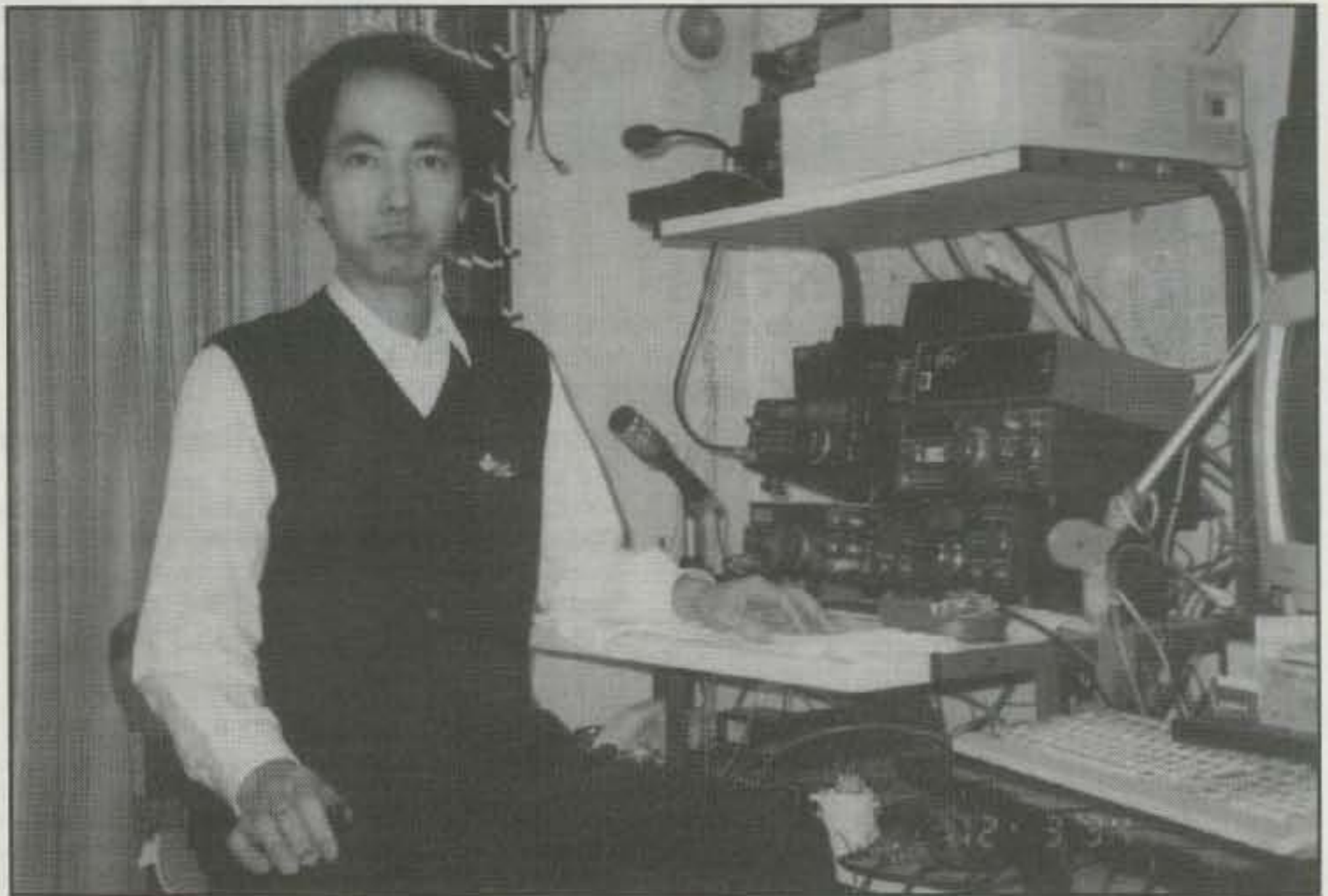
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put between 1.5 and 22 MHz. An easily installed 10/12 meter conversion kit is available at \$29.95 above the \$799 amplifier price. The amplifier features load fault protection, thermal overload protection, instant bandswitching, SWR protection, no tuning, excellent harmonic suppression, and no warm-up requirement.

### No-Tune Solid-State FET Amplifier

MFJ Enterprises has announced the availability of the Ameritron ALS600 Linear Amplifier priced at \$1299. An optional 10/12 meter kit is \$29.95. It covers 1.5 to 22 MHz and includes a matching AC power supply. It features instant bandswitching, full SWR protection, over-power protection, and no warm-up time requirement. This amplifier weighs 12.5 pounds and it is 6" x 9.5" x 12". The illuminated cross-needle combination SWR and power meter enables users to simultaneously read the SWR, forward peak power, and reflected peak power. The front-panel ALC control provides adjustments of the output power. The matching ALS600PS 120 VAC Power Supply includes inrush current protection. An illuminated cross-needle meter shows voltage and current of the nominal 50 VDC power supply output.



Toshikazu (Kazu) Koseki, JO1TWT, helps keep Tokyo, Japan available to amateurs using the 15 meter Novice band. Kazu said he looks forward to contacting many American amateurs.

### License Wall Plaque

Shack Attack is marketing an alder wood plaque that is designed to display one's large amateur radio license in a 5" x 7" window cutout. The plaque's dimensions

are 7.5" x 12". An included plexiglass cover prevents laser printed license text from sticking. All required mounting hardware is supplied with the plaque. The price per plaque is \$23.45, which includes shipping and handling fees. The

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Shack Attack address is 1394 N. 770 West, Dept. 81, Orem, UT 84057-5903. The telephone number for President Blaine Watkins, KB7VRD, is 801-222-9430 and his toll-free order number is 800-573-7388.

### Headset

I have used a Telex ProCom 250 Headset for many years. It is an excellent headset. I did not think I would ever find an equal or better one, but I believe the Heil Pro-Set Headset meets that criteria. The very comfortable headband is fully padded and it has detent stops on both sides. Vinyl earpads can be snapped on and off each earphone, making it easy to clean or replace them. The microphone boom can be set to almost any position, and it can be moved up out of the way when it is not in use. Three types of microphones are available with this headset. The HC-4 is the DX dream machine mic, the HC-5 is a full range mic, and the HC-6 is a full range broadcast quality mic. This superb headset is sold by Heil Sound Limited, Heil Drive, Marissa, IL 62257. Their voice and FAX phone numbers are 618-295-3000 and 618-295-3030, respectively.

### Summary

Choose your equipment and accessories very carefully. Get the best items possible. Experienced amateurs can do well with relatively poor gear, but new amateurs need good gear to do well on the air. Get on the air a lot with whatever station you assemble. Be an operator, not just a license holder. Amateur radio has too many people who seldom (if ever) operate. I hope to contact you on the air!

### For Technician-Plus Licensees

It appears obvious that we have three types of Technician licenses. Originally, the Technician applicant had to pass FCC element 1-A (5 wpm code test), element 2 (Novice written test), and element 3 (Technician/General written test). These licensees should only have to pass an element 1-B (13 wpm code test) to upgrade to upgrade to General licenses. If you are in this group, you had better bring your original ticket with you when you try to upgrade, or you may be asked to take the element 3-B (General) written test again.

Next, we have Technician-Plus amateurs who did not take the element 3 Technician/General written test. They are only required to pass elements 1-A (5 wpm), 2 (Novice written), and 3-A (Technician) tests. We also have Code-Free Technicians who are only required to pass elements 2 and 3-A. If you hold Technician-Plus operating privileges, you should have a ticket marked "Tech-

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nician-Plus." If your license is marked "Technician," you can request the FCC to issue one marked correctly. This change should automatically initiate action to correct your *Callbook* listing from "T" (Code-Free Technician) to "P" (Technician-Plus). Submit a copy of your present license with such a request. The FCC address is P.O. Box 1020, Gettysburg, PA 17326.

The 1995 *North American Radio Amateur Callbook* shows 244,824 Code-Free Technician licensees, whereas it just lists 5,039 Technician-Plus amateurs. These figures are not close to being correct. If your license just shows "Technician," the *Callbook* shows "T" (Code-Free Technician), even if you are a Technician-Plus amateur.

If you have the FCC correct your license, that should automatically correct your listing in the next *Callbook*. If you want to make sure that your listing will be corrected, you could send a copy of your corrected Technician-Plus license to Ted Misa, Editor of the *North American Radio Amateur Callbook*, 1695 Oak Street, Lakewood, NJ 08701.

## Photographs Wanted

Photographs of new amateurs in their shacks provide introductions to a few of the newer licensees. Photograph size is unimportant, but good definition, contrast, and subject matter are important. Color pictures can be used, but black-and-white photographs are preferred. Operating activities and achievements, plus a self-introduction, are needed with each picture. Send an SASE if a picture must be returned. A free one-year *CQ* subscription (or renewal) is awarded to the one amateur whose picture I select as the winner for the month. If you are a subscriber, please enclose the mailing label (or copy) from your latest *CQ* issue. One award is made each month, no matter how many photographs are printed. DX amateurs, who frequently work the American Novice bands, are also urged to submit photographs.

73, Bill, W6DDB

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## NEWS/VIEWS OF ON-THE-AIR COMPETITION

### Guest Operating—Are There Any Issues?

#### May's Contest Tip

It may seem obvious, but labeling antennas and amplifier settings is a must for contest stations. In the excitement of Friday afternoon it may be more tempting to work guys than take that final step towards efficiency. Paying attention to the details of preparation is what separates successful contest efforts from mediocre ones in the long run.

**A**s you'll read in this month's CQ Profile, many contesters place a high value on operating from their own stations, stations that have been designed, built, and maintained by one person. My experience in this area benefits from seeing both sides of the coin. In the mid-1980s I used to operate all the time from my own station in Billerica, Massachusetts. It was a simple station by today's standards—one tower with monobanders and a few wires hanging off the top. Fortunately, it was also a magic location (in a valley, believe it or not), and I was able to win a few contests from there.

In recent years, and especially since my move to New York, it has not been practical to construct a large contest station. My current scenario is not unlike many other contesters' circumstances. Let's face it: Not all amateurs have five acres in the country on which to build the next contest superstation.

If your goal is to operate competitively, what are you to do? Herein lies the topic for this month's discussion. In talking to many people over the years, I've found there are wide-ranging opinions on this topic. The hardliners feel that you should always operate from your own station and that use of someone else's sweat and toil is inappropriate. There may be some truth to that. You, at the very least, have to ask whether or not it's completely fair for someone to enjoy the same accolades by driving to a "turn-key" amateur station on Friday afternoon, compared to someone who has been climbing towers for five summers in a row in a concerted effort towards personal achievement.

There are other considerations. The most obvious gray area is when the station malfunctions during a single operator contest effort. Is it fair to make the guest operator figure out the design and intricacies of the host's station on little or no sleep? Conversely, is it equitable for the host to busily repair a problem while the guest continues to operate? When you are operating from your own station and a problem develops, there is no one, short of a very cooperative wife, who is going to help.

#### Calendar of Events

Apr.	26-28	DX-NA YLRL SSB Contest
Apr.	29-30	Helvetia (HB9) Contest
Apr.	29-30	SPDX RTTY Contest
May	6-7	ARI "Marconi" Int'l DX Contest
May	6-7	Connecticut QSO Party
May	6-7	MARAC County Hunters CW Contest
May	6-7	Massachusetts QSO Party
May	13-14	Nevada QSO Party
May	13-14	Georgia QSO Party
May	20-21	Michigan QSO Party
May	27-28	<b>CQ WW CW WPX Contest</b>
June	10	Portugal Day Contest
June	10-12	ARRL June VHF QSO Party
June	17-18	All Asian CW DX Contest
June	24-25	ARRL Field Day
July	1	RAC Canada Day Contest
July	8-9	CQ WPX VHF Contest
July	8-9	IARU HF World Championship

And at the very least, you stand to lose unrecoverable operating time. I think the answer is obvious: It's not really fair. Fortunately, over the years I've been very lucky not to have any catastrophic situations occur as described above while I've been guest operating. But this scenario makes you think. What if you lose a contest by 15 QSOs to a "guest operating competitor," and those contacts were lost because you were at 90 feet on a tower Sunday afternoon fixing a sticky relay on your 20 meter stacks?

Even if contest adjudicators (always wanted to use that word) included language in the rules that prevented host operator intervention for station malfunctions, it would be very difficult to enforce. Even more unfair would be a rule preventing someone from operating at another contesters' station. This is a complicated subject indeed. The contest world certainly does not need another operating category. Imagine the burden of figuring out the winner of the Single Operator, CW, QRP, Assisted, 20 Meter Single Band, Guest Operator category?

We can all agree that it's not a perfect world, and the scenarios that can come from this topic should be something to discuss and consider. I personally feel that the fairest solution resides with the operators themselves. It actually begins well before the contest. If practical (and as a host operator, I would expect it), the guest should be involved in the development and maintenance of the station. In other words, the guest should have a vested interest in the performance of the hardware, too! However, it becomes more complicated during the heat of battle. I suggest, as a guideline, that guest operators at the very minimum should have responsibility for fixing problems that are understood and practical. A little common sense applies here. For example, it should be the job of the guest operator to retrieve and

install a replacement amplifier from the trunk of his car rather than the host giving him the luxury of continuous operating time by doing the dirty work. I believe the same applies to outside work—especially if you have been involved in the construction of the station. The sticky relay problem should be solved by the guest, not the host. Put in general terms, host operators are not there to maintain continuous operating time for the guest. They are there to provide an operating venue and a little alternating current for the equipment.

Now I know you're thinking about the many other advantages that come from operating at someone else's station. Who should cook the food? Is it fair for the host to make sure you are awake at 1000Z on Sunday morning? Does the very presence of a "cheerleader" in the shack give you a motivational advantage? The bottom line of this topic is to be extremely cognizant, as a guest operator, of any advantage given to you by the presence of your host. The solution, although not perfect, is to try to operate under the same circumstances that you would encounter at home. Wake-up calls by your wife or a host operator are probably the same thing in my book. A good hot meal cooked by your girlfriend or host is also similar. In contrast, asking your host to climb his tower to manually move the Tailtwister rotator off the south limit switch or drive around the neighborhood looking for line noise is another matter. Do you have opinions on this complex topic? I'd like to hear from you!

#### Final Comments

As you read this (at least in North America) many of you are also packing your bags for the Dayton Hamvention. As always, it is a contesters' dream to be at Dayton, and there has yet to be a year when I haven't had an eyeball with a new person I've talked to for a very long time in years past. It's one of the beauties of amateur radio and contesting—our camaraderie.

That's it for this month. Please remember to send your Contest Calendar submissions to me for the August issue no later than June 1st.  
73, John, K1AR

#### ARI "Marconi" International Contest

2000Z Sat., May 6 to 2000Z Sun., May 7

This is a special edition of the ARI International DX Contest to commemorate the 100th anniversary of Guglielmo Marconi's radio invention in 1895. It is sponsored by the Association Radioamatori Italiani. The ARI DX Contest is managed by veteran contesters I2UIY and should offer a significant amount of activity. This year's edition will have some special one-time only rules, so read the following

c/o CQ magazine  
Internet: p00259@psilink.com  
Compuserve ID: 71301,424

## CQ Profiles: John Crovelli, W2GD

Out of all the active contesters in the world, there are only a privileged few who have won a major contest in their operating career. Even fewer have won something twice. This month I am pleased to profile a perennial winner—John Crovelli, W2GD.

When it comes to winning, John has the formula. However, like most successful contest operators, he certainly didn't start that way. John was first licensed together with his best friend in 1961, at age 11, as WV2UOO. (How many of you remember that prefix?) Growing up in a rural farm community in New Jersey, John became interested in amateur radio through a neighbor and his future Elmer, W2GZJ. By coincidence, W2GZJ was also a TV repairman, thus providing good preparation for a future contest!

John was first exposed to amateur radio at a 1960 ARRL Field Day. It may be a familiar story to you. From those early days, John never looked back as he entered contest after contest. Due to limited hardware John focused mostly on domestic contests such as CD Parties, SS, Field Day and others.

Over the years John gained tremendous experience in building competitive station hardware. John takes pride in operating from stations he has built himself, feeling that operations from your own station add another level of satisfaction when you win—and winning is just what John has done over the years, as he recalls one of his most memorable achievements of attaining first place in the 1978 ARRL Sweepstakes. If that wasn't impressive enough, John did it from the East Coast, and of course from his own station—a feat that has only been accomplished twice in the past 25 years!

As W2GD's operating legacy entered the 1980s, John discovered the fun that can come from operating overseas. John's first "DXpedition" was actually in 1978 from the 9Y4W multi-multi operation in the CQ WW CW Contest, placing second in the world on 20 meters. From that day on, John was hooked, logging thousands of air miles, including an adventurous trip to OJØ, while achieving winning scores as well. Perhaps his most familiar operating position of late is from Aruba, where John has used both P4ØGD and in recent years P4ØW.

Over the past few years John has been getting involved in other aspects of contesting, including QRP. Always looking for new challenges, he has made some impressive efforts in this category as well, with an eye toward operating QRP in some of the larger DX contests.

John's experience has taught him a number of things, but there are a few that he prefers to highlight. Operating ability, according to John, is an acquired talent that only peaks with years of experience. In a world of instant gratification, you simply have to put in your time to be one of the best. Speaking of the best, John tells me that in his opinion OH2MM on CW and N6KT on SSB are the absolute best operators in the world—hands down. I guess the CQ WW records they hold support his opinion, too!

Part of winning for W2GD is to keep the station setup simple. John is a big fan of non-



Here's John Crovelli, W2GD, ready to set a new record from P4ØW.

sophistication when it comes to setting up a competitive station—especially when it comes to operating overseas. He recalls how well some operators, such as K1KI, have done over the years from amazingly simple stations. When more complexity is in order (i.e., a Caribbean multi-multi), planning is paramount in John's book. All of the above, combined with operating skill, are what makes a winner, and you certainly can't refute his results!

John has many of the same concerns that all of us have for the future of amateur radio and contesting in particular. We have to be careful, in his opinion, not to take too much of the human element out of contest operating as technology advances. And, he says, if we're not careful, the lack of youth entering our ranks will be the end of contesting as we know it. John feels strongly that you have to put back into contesting what you've taken from it.

You'll often find W2GD in a pileup on 160 meters, as he likes to operate that band regularly in between contests. One-sixty meters has always been a fascinating band for John, and his interests peaked at a recent series of winning operations from the Coast Guard sta-

tion in Sandy Hook, New Jersey. You can imagine the thrill his operating team experienced while operating right by the water with 200 foot high antennas and being called by Europeans all night. It's just one of the many reasons why W2GD likes to contest so much.

John is very active in his local radio club, the Cherryville Repeater Association, and has been a member of the world-class Frankford Radio Club since 1975. His home station is impressive in its own right with three towers supporting a wide array of antennas for all bands. When John isn't contesting or DXing, he finds some time to read and do other things. But as is often the case, a competitor as committed as John has little time to do anything else.

Married for 20 years, John has a 16-year-old son. Professionally, he is a veteran management consultant and spends a lot of time in airplanes en route to clients around the United States. It's that success and drive in business that has made John Crovelli, W2GD, one of the best operators in the world. When it comes to describing an intense competitor, W2GD has always been at the top of the pack. Keep up the rate, John!

### Winning W2GD Style Some of the Highlights

Contest	Year	Callsign	Position
SS CW	1978	W2GD	1st Place
ARRL DX CW	1984	4U1ITU	1st Place S/O EU
ARRL DX CW	1985	VP2MGD	1st Place S/O World
ARRL DX CW	1987	P4ØGD	1st Place S/O World
ARRL DX CW	1988	P4ØGD	1st Place S/O World
ARRL DX CW	1989	P4ØGD	1st Place S/O World
CQ WW CW	1989	P4ØW	1st Place S/O World
CQ WW CW	1989	P4ØW	1st Place S/O World
CQ WPX CW	1992	W2GD	1st Place S/O World
CQ WPX CW	1993	W2GD	1st Place S/O World
CQ WW SSB	1993	P4ØW	1st Place S/O World
CQ WPX CW	1994	P4ØW	1st Place S/O World
CQ WW SSB	1994	P4ØW	1st Place Assisted S/O World
CQ WW CW	1994	P4ØW	1st Place Assisted S/O World

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closely. Stations are allowed to work each other worldwide.

**Classes:** Single Operator SSB, CW, or RTTY; Single Operator Mixed; Multi-Single Mixed; and SWL Mixed.

**Frequencies:** 160 through 10 meters (no WARC bands) according to the IARU band plans. All stations (including single operator) must adhere to the standard 10-minute rule.

**Exchange:** Italians send RS(T) and province; all others send RS(T) and serial number. Marconi Memorial stations will send RS(T) and the code "GM" (identified with the IY prefix).

**Points:** QSOs within your own country count only for multiplier credit. Count 1 point for QSOs inside your own continent, 3 points for QSOs outside your continent, and 10 points for Italian QSOs. Stations can be worked once per band and mode (e.g., 15 CW, SSB, and RTTY).

**Multiplier:** Italian provinces (103) and DXCC countries (not I or IS0), as well as the special Marconi Memorial stations. Credit multipliers once per band.

**Scoring:** Final score is sum of QSO points times the sum of multipliers.

**Awards:** A plaque will be offered to the highest scoring station in each class. In addition, a certificate will be awarded to the top two to five placing stations as well as the leading scorers in each DXCC country.

**Special Award:** A pocket calculator will be awarded to all stations that work at least 50 Italian stations (outside Europe) or 150 Italian QSOs (inside Europe). A separate list of Italian stations worked is required for this award.

Free logging software is available for the ARI

Contest. You may obtain your copy directly from the contest manager (\$5 or 10 IRCs for expenses). Logs must be mailed 30 days from the end of the contest and addressed to: ARI Contest Manager, I2UIY, P.O. Box 14, 27043 Broni (PV) Italy.

### MARAC County Hunters CW Contest

0000Z Sat. May 6 to 2400Z Sun. May 7

The Mobile Amateur Radio Awards Club is pleased to sponsor the 27th annual County Hunters CW Contest. Mobile and fixed stations from every county in the U.S. are invited to participate. Mobiles may be worked each time they change counties and must identify by signing "M" after their callsign. Mobiles are defined as capable of being in motion at all times while transmitting and receiving with no connections to stationary power sources or antennas.

**Exchange:** RST, county, and state for US (province/DXCC country for others).

**Scoring:** Fixed station QSOs are worth 1 point. Mobiles and DX QSOs are worth 15 points. W/VE to DX QSOs are worth 5 points. Final score is total QSO points times the total number of U.S. counties worked.

**Frequencies:** 3575, 7040, 14050, 21050, and 28050 kHz.

**Awards:** Certificates will be awarded to the winning fixed stations in each state, province, and DXCC country (1000 points minimum). Other certificates are available to the winning

mobile in each state operating from 3 or more counties (10 QSOs/county minimum). Plaques will be awarded to the top two scoring mobile and NA fixed stations, and DX station.

Completed logs, summary sheets, and county lists (required for entries with over 100 counties) must be received by June 6th. Send your logs to: Norm Beavers, W3DYA, 3320 McMillan Drive, Tyler, TX 75701-8239. Include a #10 SASE for contest results.

### Massachusetts QSO Party

1800Z Sat., May 6 to 0400Z Sun., May 7  
1100Z Sun., May 7 to 2100Z Sun., May 7

The Massachusetts QSO Party is sponsored by the Framingham Amateur Radio Association and is open to all amateurs around the world.

**Classes:** Outside MA, MA single-op, multi-op, portable, MA team (5 MA single ops), MA Novice/Technician, MA club.

**Exchange:** RS(T) and QTH (state/province/DXCC country/MA county).

**Scoring:** Credit 1 point for SSB and 2 points for CW/Digital/Video contacts.

**Multipliers:** MA counties (maximum of 14 per band) for non-MA stations, and states, provinces, or DXCC countries for MA participants worked per band. Final score is total QSO points times total multipliers.

**Frequencies:** CW—1810, and 50 kHz up from lower band edge. SSB—1850, 3890, 7290, 14270, 21390, 28390. Novices—3705, 7130, 21130, 28130.

**Awards:** Certificates will be awarded for the

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Logs must be postmarked by June 8th and sent to: FARA, P.O. Box 3005, Framingham, MA 01701.

### Georgia QSO Party

1800Z Sat. to 2000Z Sun., May 13-14

This once popular contest has been revived again. Open to amateurs worldwide, stations may be worked once per mode and band. The object is for non-Georgian stations to work as many Georgian stations as possible during the contest period.

**Classes:** Mobile, fixed, portable, CW and phone, single and multi-single or multi-multi operations are permitted.

**Exchange:** GA stations send county and signal report. All others send signal report and QTH (state, province, or country).

**Scoring:** Credit phone QSOs with 2 points and CW contacts with 4 points. Non-Georgian stations use GA counties as multipliers (159 maximum). GA stations count states, provinces, GA counties, and DXCC countries. Final score is total QSO points times the sum of your multipliers. GA mobiles add 100 bonus points for each county from which you operated and made at least 10 QSOs.

**Frequencies:** CW—3540 kHz, and 40 kHz from the lower CW band edge. SSB—3855, 3975, 7243, 14240, 21330, 28400, 50240 kHz.

All logs must be postmarked no later than July 31st and should be sent with an appropriate summary sheet to: Sandy Walker, III, WB4EVH, 411 Wilson Drive, Centerville, GA 31028. Send an SASE for a copy of the final results.

### Michigan QSO Party

1800Z Sat. May 20 to 0300Z Sun. May 21  
1100Z Sun. May 21 to 0200Z Mon. May 22

This year's Michigan QSO Party will be sponsored by the Oak Park Amateur Radio Club. As usual, stations are allowed to be worked once on each band/mode. Portables and mobiles may be counted as new contacts each time they operate from a new county.

**Exchange:** RS(T), QSO number, QTH (county for Michigan stations state/country for others).

**Scoring:** Michigan stations—1 point/QSO times (States + Countries + Michigan counties). Each CW contact is 2 points per QSO. KL7/KH6 count as states and VE is considered a country. Credit 5 bonus points for each contact with the W8MB club station. Non-Michigan stations use similar scoring except multipliers/QSOs are limited to Michigan counties. Maximum multiplier is 85.

**Frequencies:** CW—1810, 3540, 3725, 7035, 7125, 14035, 21035, 21125, 28035, 28125 kHz. SSB/VHF—1855, 3905, 7280, 14280, 21380, 28580, 50125, 144025, 146520 kHz.

**Awards:** Michigan—plaques are available to the high multi-operator/single-transmitter score, high Michigan (Upper Peninsula), high Michigan, high aggregate club score, high

Michigan mobile, and high VHF entry (100 QSOs minimum). Certificates will be awarded to the high scorer in each Michigan county. Non-Michigan—high out-of-state plaque will be awarded and certificates for the high score in each state and country.

Mailing deadline for logs is July 1, 1995. Send your logs to Mark Shaw, K8ED, 27600 Franklin Road, Apt. 516, Southfield, MI 48034. Members of the Michigan QSO Party committee are not eligible for awards. Include an SASE for a copy of the final results.

### CQ WPX CW Contest

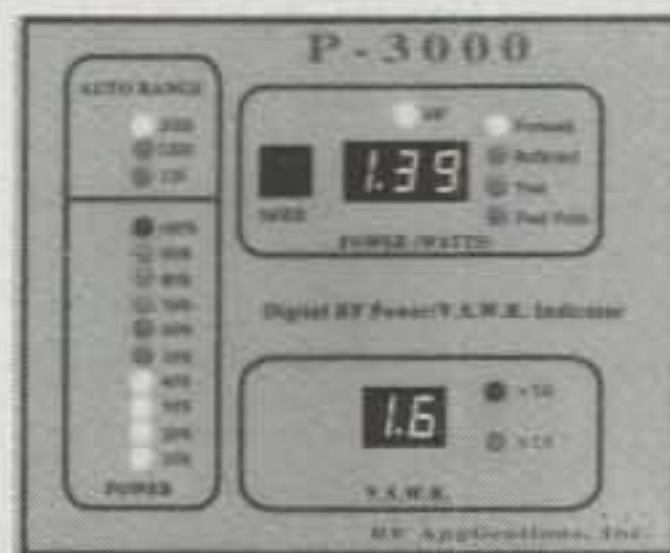
0000Z May 27 to 2400Z May 28

Complete rules were in the January issue of CQ. Rules and summary/log sheets can be obtained from CQ Communications, 76 N. Broadway, Hicksville, NY 11801. Check the current rules for the current trophy list. As with all CQ contests, be sure to indicate the mode of operation on your envelope when you mail your logs. Results of the 1994 contest can be found elsewhere in this issue.

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CIRCLE 58 ON READER SERVICE CARD

## NEWS OF COMMUNICATION AROUND THE WORLD

## The Spratly Islands

If all went as planned, last month there were two separate DXpeditions active from the Spratly Islands, in the South China Sea. **9M0A** was due on at the beginning of April, with a team from Malaysia and Japan. **DU0K** was the callsign of a Philippine operation the second week of the month. This is the first time two DXpeditions operated from the Spratlys in the same year.

The Spratly Islands are one of the most unusual DXCC countries. Both their political and amateur radio histories are involved and confusing. The recent operations reflect rising international interest in this formerly obscure collection of widely scattered rocks and reefs.

The Spratly Islands consist of about 100 small islands, reefs, sandbars, and rocks stretching across more than 500 miles of the South China Sea. To find the Spratly Islands on a map, look for the bulge of Vietnam toward the southeast. The Spratly Islands lie between this bulge and the Philippine island of Palawan, which separates the South China Sea from the Sulu Sea.

The Spratly Islands are presently claimed in all or part by China, Taiwan, Vietnam, the Philippines, and Malaysia. Each country affirms its claims with military garrisons on one or more of the larger islands. (In the case of the Spratlys, large means as much as a mile long.)

The Spratly Islands were first explored and charted by Chinese sailors about 2000 years ago. The scattered rocks held no interest to China. A few fishermen would travel to the shallow water around some of the islands for a few weeks each year, but otherwise travelers to the region avoided the Spratlys because of the numerous shoals and submerged rocks.

The modern history of the Spratly Islands dates back to the late 19th century, when France claimed the Spratlys as part of French Indochina. As part of France's agreement with China in 1887, France relinquished its claim over the islands in favor of China's historic interests. However, China again showed little interest in the islands.

France occupied some of the islands in the 1930s, only to be thrown out by the Japanese in 1940. The Japanese held the islands (and much of the rest of the region) through World War II. At the end of the war, with the withdrawal of Japan-

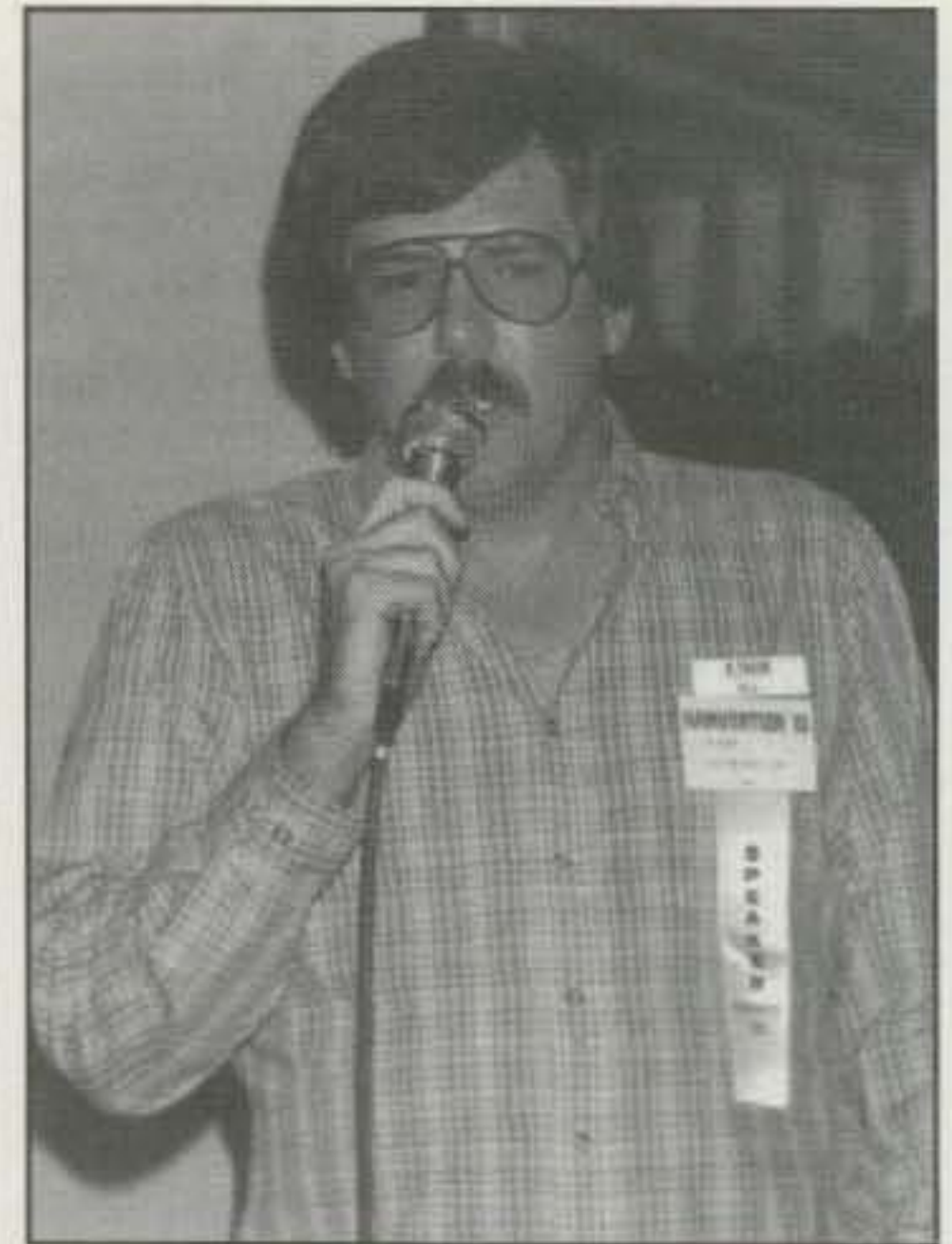
ese troops, China again reaffirmed its claim over the islands.

The Spratly Islands sat largely unnoticed by the rest of the world over the next 30 years. Although the islands lie across some of the most important shipping lanes in the world, no country outside the region seemed to pay much attention to the Spratlys. It was thought that the islands were completely uninhabited. Later research showed this not to be the case.

Increasing interest in maritime claims and possible oil and gas reserves began to draw attention to the Spratly Islands in the 1970s. The bordering countries began to press their own claims over nearby islands, to expand their jurisdiction over greater expanses of the South China Sea for economic reasons, and to stake claims for possible oil and gas drilling.

In 1974 South Vietnam occupied several of the islands nearest to its shores, landing troops and artillery. The Philippines extended the runway on Thitu, the largest of the Spratly Islands, well out into the sea, to beef up their military outposts on those islands just off their coast. Taiwan and Malaysia also occupied several islands.

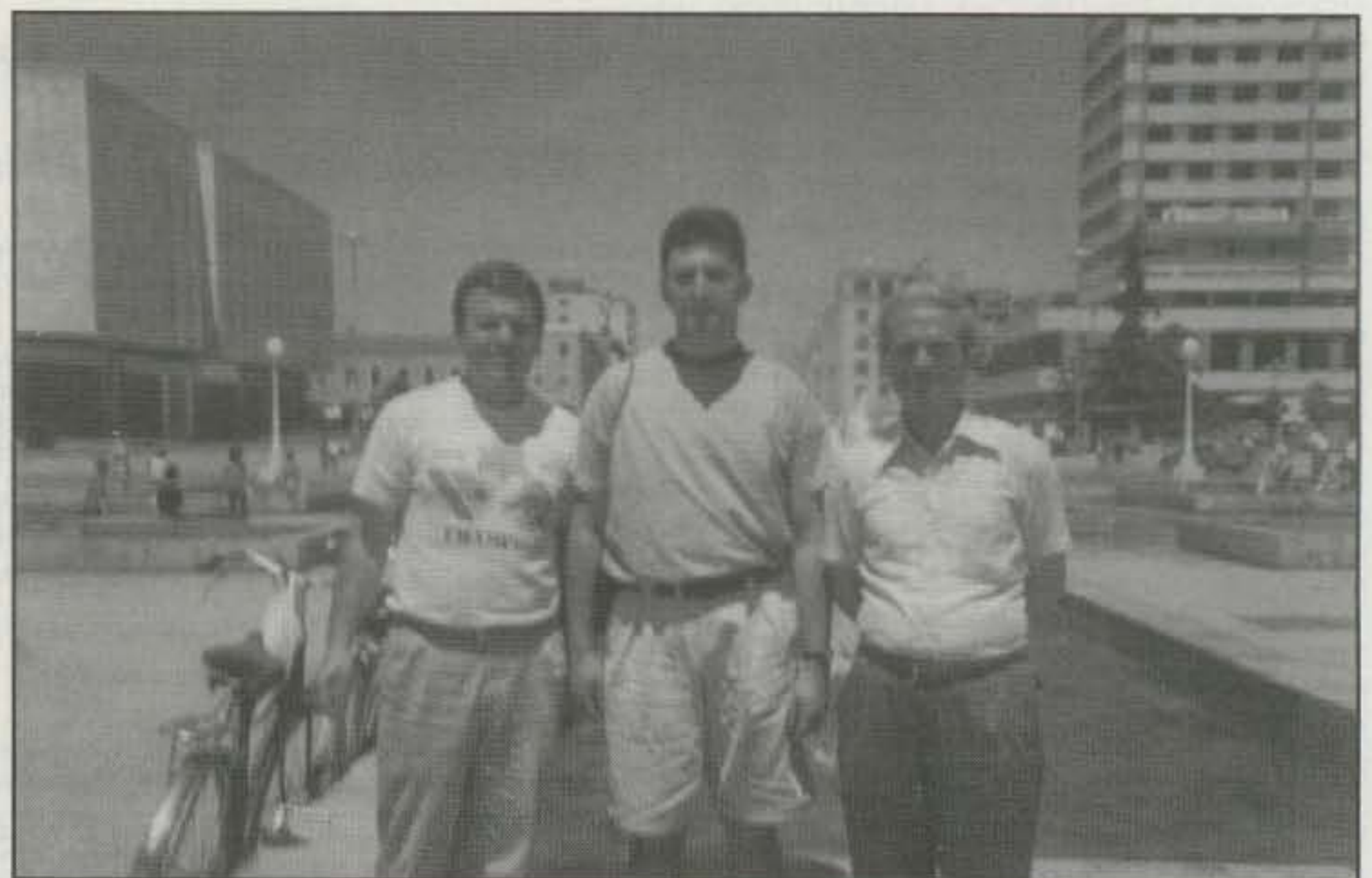
The overlapping claims have resulted in a lot of hot air over the years, with each country pushing its own claims in various venues. The situation heated up dramatically in the late 1980s, when China decided to push its long-held claims by force



Bill, K1MM, was one of the Spratly DXpeditioners who returned to operate after dodging gunfire. (DXers Magazine photo)

of arms. The Chinese Navy attacked several Vietnamese-held islands and drove off the occupying troops. The Chinese sank two Vietnamese Navy ships, and about 80 troops lost their lives in the bloodiest battle over the Spratlys.

There have been many claims and



ZA1B, ZA/Z32KV, and ZA1Z in Tirana, Albania.

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## The WPX Program

### SSB

2496 .....JR9FJY 2499 .....EA1US  
2497 .....K5GJ 2500 .....AA6BB  
2498 .....WA1MKS 2501 .....EA2CMW

### CW

2863 .....JH4MIF 2864 .....EA1AUI

### MIXED

1698 .....WX7M 1699 .....EA3FBD

Mixed: 450 WX7M, 500 WX7M, 550 WX7M, 650 VE6JAV, 700 VE6JAV, IK2MMF, 750 VE6JAV, IK2MMF, 800 IK2MMF, 850 IK2MMF, 1350 KS8Z, 1400 AE5B, 1450 AE5B, 1500 AE5B, 1600 KA5TQF, 1650 KA5TQF, 1700 K9UQN, KA5TQF, 1750 KA5TQF, 1800 KA5TQF, 1850 KA5TQF, 2150 W8UMR, 2200 HA5NK, N4UH, W8UMR, 2250 HA5NK, 3600 W2FXA.

SSB: 350 F-11556, EA1US, AA6BB, EA2CMW, 400 T17DBS, EA1US, AA6BB, EA2CMW, 450 T17DBS, EA1US, AA6BB, 500 EA1US, AA6BB, 550 EA1US, AA6BB, 600 EA1US, AA6BB, 650 DJ9SZ, KE4BM, AA6BB, 700 DJ9SZ, KE4VM, AA6BB, 750 AA6BB, 800 AA6BB, 850 AA6BB, EA8BWW, 900 AA6BB, EA8BWW, 950 AA6BB, 1000 AA6BB, 1050 AA6BB, 1300 KA5TQF, 1350 AE5B, KA5TQF, 1400 AE5B, KA5TQF, 1500 KA5TQF, 1550 KA5TQF, 1850 KF7RU, 2400 EA8AKN, 1450 EA8AKN, 2500 EA8AKN.

CW: 350 JH4MIF, 9A3UF, EA1AUI, EA5FV, 400 JH4MIF, 9A3UF, EA1AUI, EA5FV, 450 JH4MIF, EA1AUI, EA5FV, 500 EA1AUI, EA5FV, 550 EA1AUI, EA5FV, 600 IK2MMF, EA1AUI, EA5FV, HB9CVO, 650 OK1DCE, IK2MMF, EA1AUI, EA5FV, HB9CVO, 700 OK1DCE, IK2MMF, HB9CVO, DF6SW, 750 IK2MMF, HB9CVO, 900 KA5TQF, 950 KA5TQF, 1100 JN3SAC, EA6AA, 1150 JN3SAC, 1200 JN3SAC, 1950 JA9CWJ, 2050 W8UMR.

10 Meters: LW2DFM, IN3SAC, AA6BB, IK2MMF, EA6AA, KA4GYU  
15 Meters: EA1US, AA6BB, IK2MMF, KA4GYU  
20 Meters: AA6BB, IK2MMF, DF6SW  
40 Meters: AA6BB, IK2MMF, EA6AA, KA4GYU, DF6SW  
80 Meters: WX7M, AA6BB, EA6AA, DF6SW  
160 Meters: NK8S, WX7M, AA6WJ

Asia: DJ9SZ, LW2DFM, AA6BB, 9A3SM  
Africa: AA6BB, IK2MMF, KA1CLV

No. Amer.: WX7M, LW2DFM, K5GJ, AA6BB, IK2MM  
Europe: LW2DFM, AA6BB, EA2CMW  
Oceania: AA6BB

**Award of Excellence Plaque Holders:** I8YRK, W4CRW, SM8AJU, K5UR, K6XP, N5TV, K2VV, VE3XN, W6OUL, DL1MD, DJ7CX, DL3RK, WB4SIJ, SM6DHU, N4KE, I2UIY, DL7AA, ON4QX, WA8YTM, YU2DX, OK3EA, I4EAT, OK1MP, N4NO, ZL3GQ, VK9NS, DEØDXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, W4BQY, IØJX, SM6CST, VE1NG, I1JQJ, WA1JMP, PY2DBU, H18LC, KA5W, KØJN, W4VQ, KF2O, K3UA, HA8XX, HA8UB, W8CNL, K7LJ, W1JR, F9RM, W5UR, WB8ZRL, SM3EVR, CT1FL, K2SHZ, UP1BZZ, W8RSW, WA4QMQ, EA7OH, K2POF, DJ4XA, IT9TQH, W8ILC, K2POA, N6JV, W2HG, ONL-4003, VE7DP, K9BG, W5AWT, KØG, HB9CSA, F6BVB, W1BWS, YU7SF, G4BUE, N3ED, DF1SD, K7CU, I1POR, LU3YLW4, NN4Q, KA3A, YBØTK, VE7WJ, VE7IG, K9QRF, YU2NA, N2AC, W4UW, NXØI, W9NUF, N4NX, SMØDJZ, DK5AD, WB4RUA, DK5AD, WD9IC, W3ARK, I6DQE, LA7JO, VK4SS, K6JG, I1EEW, I8RFD, I3CRW, VEFXR, N4MM, KC7EM, ZS6BCR, CT1YH, IV3PVD, KA5RNH, ZP5JCY, F1HWW, KC8PG, NE4F, VE3MS, K9LJN, ZS6EZ, YU2AA, I1WXY, IK2ILH, DEØDAQ, LU1DOW, N1IR, IK4GME, WX3N, KC6X, N6IBP, W5ODD, IØRIZ, I2MQP, I5ZJK, JAØSU, S51NU, K9XR, WØULU, HB9DDZ, F6HMJ, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW.

**Award of Excellence Plaque Holders with 160 Meter Endorsement:** CT1YH, IV3PVE, KA5RNH, ZP5JCY, AB9O, FM5WD, SMØDJZ, DK5AD, SM6CST, I1JQJ, PY2DBU, W3ARK, H18LC, KA5W, UR2QD, VE3XN, K6XP, LA7JO, W4VQ, K6JG, K3UA, HA8UB, W4CRW, N4MM, K7LJ, SM8AJU, KF2O, SM3EVR, K5UR, UP1BZZ, OK1MP, N5TV, K2POF, W8CNL, DJ4XA, IT9TQH, DL9RK, N6JV, ONL-4003, W1JR, W6OUL, W5AWT, KØG, F6BVB, W4BQY, YU7SF, W5UR, N4NO, DF1SD, K7CU, I1POR, W8RSW, N4KE, I2UIY, YBØTK, W8ILC, W1BWS, VE7WJ, K9QRF, NN4Q, W4UW, NXØI, G4BUE, LU3YLW4, I4EAT, WB4RUA, VE7WJ, N4NX, DEØDXM, VE7IG, K9BG, I1EEW, AB9O, CT1YH, IV3PVD, KA5RNH, ZP5JCY, I2MQP, IØRIZ, W5ODD, WX3N, IK4GME, HA8XX, YU1AB, F6HMJ, HB9DDZ, K9XR, KØJN, ZS6EZ, JAØSU, I5ZJK, I2EOW, KS4S, KA1CLV.

Complete rules and application forms may be obtained by sending a business-size self-addressed, stamped envelope (foreign stations send extra postage if airmail desired) to: "CQ WPX Awards," P.O. Box 593, Clovis, NM 88101-9511 USA.

counterclaims in the last few years. China, Taiwan, and Vietnam each claim all the Spratly Islands as their territory. Malaysia and the Philippines claim several islands close to their shores. Both China and Vietnam have contracted with

drilling companies to search for oil and gas reserves in the southwestern part of the region. Each country is defending its own drilling without interfering with the other, but this situation holds the potential for a major conflict, should drilling reveal significant oil and gas reserves.

While the Spratly Islands were once an obscure footnote in the back of political factbooks as one of the very few areas claimed by more than two countries, they have erupted in recent years as one of the hottest and most disputed regions in the world. (Only one other part of the world has as many countries involved in multiple, overlapping claims; see below.)

### Amateur Radio and The Spratlys

The amateur radio history of the Spratly Islands is almost as complex (and explosive!) as its political history. The first amateur radio operation from the Spratly Islands was in October 1965, when infamous DXpeditioner Don Miller, W9WNV, and his DXpeditioning partner Chuck Swain, K7LMU, aired **1S9WNV**, suppos-



Phil, 5W1AU, lost many of his antennas during a hurricane, but he is slowly getting back on the air. (DK7PE photo)

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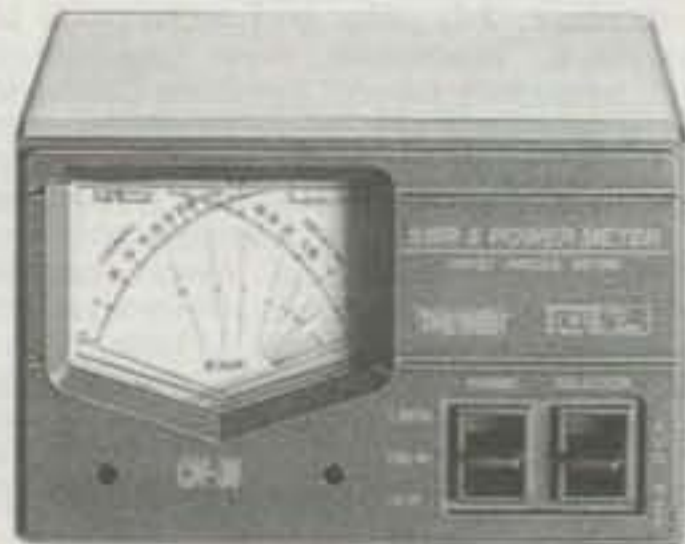
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177.....DK4TA

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43.....KC8PG

#### 160 Meters

77.....W1JZ (34 Zones)

#### All CW

65.....N8ABA 66.....WB4DBB

#### All Band WAZ

#### SSB

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4247.....EA5OL 4253.....KN6DV

4248.....EA7CRL 4254.....TU2QW

4249.....EA5GMB 4255.....N9JVC

4250.....AB4IQ 4256.....CT1AUO

4251.....N5WNG

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7537.....SM0BNK 7543.....WU1F

7538.....SM0BNK (CW) 7544.....KD7E (CW)

7539.....EA3FBO 7545.....KN6DV

7540.....I4JEE (CW) 7546.....WM9X (CW)

7541.....DL1VDL (CW) 7547.....WG9L (CW)

7542.....9A2AJ (CW) 7548.....G3LNS

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and \$1.00 to: WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Road, Sudbury, MA 01776. The processing fee for all CQ awards is \$4.00 for subscribers (please include your most recent CQ mailing label or a copy) and \$10.00 for nonsubscribers. Please make all checks payable to the Award Manager. Applicants sending QSL cards to a CQ checkpoint or the Award Manager must include return postage. Questions regarding the WAZ Award may be sent to K1MEM with an SASE.

## 5 Band WAZ

As of January 31, 1995, 406 stations have attained the 200 Zone level.

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K6YRA, 199 (34)	VE1AST, 199 (18)
AA4KT, 199 (26)	SP3IOE, 199 (24)
K7UR, 199 (34)	SM6AHS, 198 (12, 31)
NA0Y, 199 (26)	UA3AGW, 198 (1, 12)
W0PGI, 199 (26)	KL7Y, 198 (34, 36)
W2YY, 199 (26)	VO1FB, 198 (19, 27)
W9WAQ, 199 (26)	EA5BCK, 198 (27, 39)
W1JR, 199 (23)	KZ4V, 198 (22, 26)
VE7AHA, 199 (34)	K4PI, 198 (23, 26)
W1FZ, 199 (26)	G3KDB, 198 (1, 12)
IK2GNW, 199 (1)	DK2GZ, 198 (1, 24)
W9CH, 199 (26)	UY5XE, 198 (24, 27)
ACBM, 199 (34)	N5FG, 198 (22, 34 on 40)
IK8BQE, 199 (31)	KG9N, 198 (18, 22)
JA2IVK, 199 (34, 40m)	W2UE7, 198 (18, 18on40)
KA5W, 199 (26)	K2ENT, 198 (28, 40 on 20)
K1ST, 199 (26)	KM2P, 198 (22, 26)

The following have qualified for the basic 5 Band WAZ Award:

W1JZ, 193 Zones	KM2P, 198 Zones
PA3BUD, 200 Zones	WW1V, 152 Zones
KN6DV, 156 Zones	AB4IQ, 168 Zones
WB9YXY, 187 Zones	WB4DBB, 194 Zones

Endorsements:

KC8PG, 200 Zones	KJ6HO, 180 Zones
DK4TA, 186 Zones	I1POR, 200 Zones
KB4HU, 195 Zones	K3JGJ, 191 Zones

946 Stations have attained the 150 Zone level as of January 31, 1995.

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edly from the Islands. Or was it the first Spratly operation? The operation was accredited for DXCC, but later investigations revealed that Don Miller in fact did not operate from many of his claimed locations. Given these later findings, some DXers have expressed some doubt as to whether Don actually operated from the Spratlys, or instead from some other nearby location.

Another factor casting doubt on the 1S9WNV operation was that Don Miller pushed for separate DXCC status of Ebon Atoll and Cormoran Reef at the same time he lobbied for separate status from the Spratlys. All three were added to the DXCC countries list based on an announcement in the January 1966 issue of QST. It was soon discovered that the doc-

uments supporting separate DXCC status of Ebon and Cormoran were false, and DXCC status was withdrawn for those two entities. However, the Spratlys remained on the list.

The reason for separate DXCC status for the Spratlys was never clearly explained, but the QST note said that the Islands were claimed by several different countries, but were "in the possession of no one country." As such, the Spratly Islands fell under the catch-all rule of "distinctly separate administration." (This rule was later deleted from the DXCC country criteria.)

The lack of administration over the Spratly Islands meant that amateur operations using "unofficial" prefixes could merit DXCC credit. The International Telecommunication Union (ITU) does not is-

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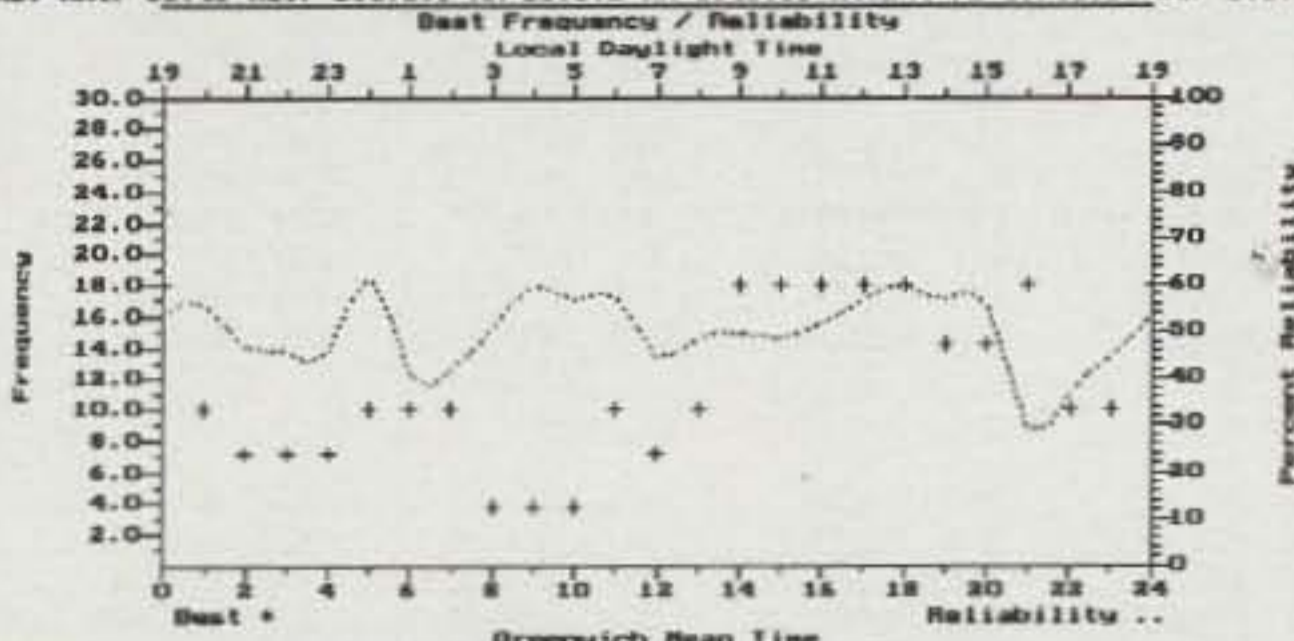
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POWER = .100 MW, 3 MHz NOISE = -148.0 DBM, REQ. SWR = 43.0  
Az: Mxtr 62.43 Rcvr 240.29, M1 1375.1 KH 2546.5, Midant F2 Ir/3a:10.13/ 1.37



Select Parameter by Number, Band by Letter or press (Q) to Quit  
(1) SWR, (2) Reliability, (3) Mxtr take-off angle, (4) Mxtr Ant Gain  
(5) Rcvr Ant Gain, (6) S-Meter, (7) dB > MicroVolt, (8) dBu, (9) Best  
(A) MUF, (B) 2.0 MHz, (C) 3.0 MHz, (D) 7.2 MHz, (E) 10.1 MHz, (F) 14.2 MHz  
(G) 18.1 MHz (H) 21.2 MHz (I) 24.9 MHz (J) 28.5 MHz (K) 29.6 MHz  
Select Output by Function key  
(F1) SEP 37 (F2) OCT 25 (F3) NOV 34 (F4) DEC 33 (F5) JAN 21 (F6) FEB 20  
(F7) MAR 29 (F8) APR 28 (F9) MAY 26 (F10) JUN 25 (F11) JUL 24 (F12) AUG 24

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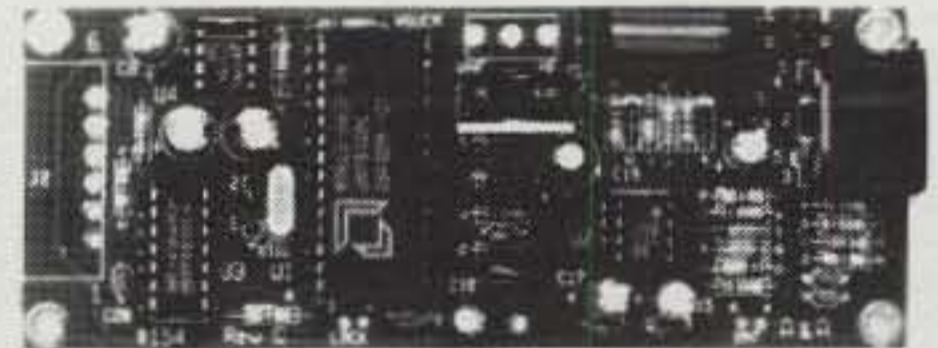
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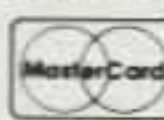
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Shown with optional  
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## CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries for the mode indicated. The ARRL DXCC Countries List is used as the country standard. Honor Roll listing is automatic when submitting application or endorsement for 275 or more countries. Deleted countries do not count and are dropped from listing as they occur. Currently there are 327 countries. To remain on the CQ DX Honor Roll, annual updates are required. Honor Roll updates may be made at any time, in any number. Updates indicating "no change" will be accepted to meet the annual requirement. All updates must be accompanied by an SASE for confirmation. The fee for endorsement involving the issuance of a sticker is \$1.00.

### CW

K2TQC	327	K6LEB	327	N6AR	326	W0HZ	325	DL3DXX	322	N6AV	318	KA7T	310	G2FFO	303	N4OT	296
K1MEM	327	KD8V	327	K8NA	326	I1JQJ	325	W1WAI	322	AA6AA	317	4N7ZZ	310	VE9RJ	303	W7IIT	296
W9DWQ	327	9A2AA	327	WA4IUM	326	N7MC	325	AA5NK	322	KU0S	317	K4CXY	309	WB6OKK	303	K0HOW	294
N4MM	327	N4KG	327	KZ4V	326	W0JLC	325	ON4QX	321	N6CW	316	VE7DX	309	WA4DAN	301	K7JYE	292
K2FL	327	OK1MP	327	K9IW	326	N5FW	325	K9QVB	321	KA5TQF	316	K4JLD	309	HA5NK	301	KB3X	289
DL1PM	327	W0IZ	327	I5XIM	326	W7JLC	324	DJ2PJ	321	W3BBL	315	G3KMQ	309	WG5G/QRPp	301	F6HMJ	284
K3UA	327	PA0XPO	327	KB8DB	326	W0SR	323	W8XD	321	N4AH	315	N5FG	309	WB4DBB	301	K7EHI	280
K9BWQ	327	W2FXA	327	WA8DXA	326	WA4JTI	323	IT9ZGY	320	K2JF	314	I1EEW	309	KA2DIV	300	KF5PE	282
K9MM	327	SM6CST	327	EA2IA	326	AG9S	323	K1HDO	320	AA2X	314	N3DON	306	YU1TR	300	W2LZX	279
K2ENT	327	N4JF	327	F3TH	326	N7RO	323	KB4HU	320	W5OG	313	N1HN	306	W8YTM	299	KE5PO	277
K2OWE	327	W2UE	327	K8LJG	325	W7CNL	323	K4XO	319	K2JLA	312	WB4UBD	305	YU2TW	299	W3HQU	276
K4CEB	327	W9WAQ	327	IT9QDS	325	K4IQJ	323	VE3HO	319	K1VHS	311	I4LCK	305	W6YO	299	WF9K	276
I4EAT	327	AA4KT	327	W6DN	325	NC9T	322	IT9TQH	319	OH3NM	310	N5HB	304	CT1YH	298	G4MVA	276
K6JG	327	YU1HA	327	G4BWP	325	W4OEL	322	WB5MTV	318	IK2ILH	310	OZ5UR	304	HB9DDZ	297	YU7FW	275

### SSB

K4MZU	327	DL6KG	327	VE3GMT	326	AA5NK	325	LU7HJM	322	W6NLG	318	K8CMO	311	W3YEY	302	OK1AWZ	287
K2TQC	327	KZ2P	327	K9BWQ	326	W6BCQ	325	WA3HUP	321	IK8GCS	318	K8NWD	311	N6RJY	302	4X6DK	287
K2FL	327	DL9OH	327	IK8CNT	326	IK1GPG	325	TI2HP	321	W6MFC	318	ZS6BBY	311	WA9BDX	302	KG6LF	287
W9DWQ	327	KS0Z	327	W0YDB	326	I2EOW	325	VE7WJ	321	N5ORT	318	WA9IVU	311	KD5ZD	302	IK2DUW	287
W9SS	327	W6EUF	327	OZ3SK	326	K2JF	324	IBXTX	321	XE1ZLW	318	K3NEE	311	WA8MEM	302	IK8BMW	286
WA4IUM	327	OE3WWB	327	W4EEE	326	WB5TED	324	I8YRK	321	EA8TE	318	IN3ANE	311	KD4YT	302	NM5O	285
DJ9ZB	327	W2FXA	327	A18M	326	WZ4I	324	K4POV	321	K1UO	318	F1OZF	311	CT1AHU	302	N8BJQ	284
WB1DQC	327	SM6CST	327	W4UW	326	W2FGY	324	KS2I	321	KF5AR	318	E16FR	311	RA2YA	301	KJ5LJ	284
XE1AE	327	K6YRA	327	KE4VU	326	W0SR	324	KA9I	321	IBIYW	318	I0SGF	311	W2LZX	301	CT1BWW	284
EA2IA	327	N4KG	327	WB6OKK	326	K8YVI	324	W7ULC	321	VE2GHZ	318	I2MGP	310	XE2DU	301	VE3IMO	283
K2ENT	327	K3UA	327	AG9S	326	NC9T	324	W3AZD	321	KU9I	318	WBAXI	310	VE6PW	301	XE1ILJ	283
OZ5EV	327	OK1MP	327	WA4WTG	326	YV1CLM	324	W0ULU	321	K8YVI	318	KA5RNH	310	NO4J	301	KE6CF	283
KA3HXO	327	W6DN	327	W7OM	326	YV5CWO	324	WB4DBB	321	KF8VW	318	N5HSF	310	AB4NS	301	YC3OSE	282
CX4HS	327	I2QMU	327	WD8PUG	326	W5LLU	324	4N7ZZ	321	WB6PSY	317	W3SOH	309	WP4AFA	300	YV1JV	282
F9RM	327	PA0XPO	327	W2CC	326	I8KCI	324	TI2JP	321	WB3CQN	317	XE1MD	308	WA5SUE	300	VE4MT	282
I4EAT	327	N4JF	327	K2JLA	326	KB7VD	324	I0AMU	320	9H4G	317	W8YTM	308	YU2TW	300	W8QII	281
KB8DB	327	KB4HU	327	VE2PJ	326	KE5PO	324	K4CXY	320	WA6DTG	317	I4CSP	308	WT4T	300	VU2DVP	281
VE3XN	327	KC4MJ	327	VE2WY	326	VE4AT	324	G4ADD	320	PY2DBU	317	N6AV	306	W7KSK	300	LU6FAZ	281
YU1AB	327	OE2EGL	327	I8LEL	326	NJ0C	324	OA4ED	320	XE1XM	316	WD5P	306	VE3FJE	300	KB5MRT	281
VE1YX	327	SV1ADG	327	WB4UBD	326	I1POR	324	I4WZK	320	KV2S	315	TI2TEB	306	AB4UF	300	WN6J	281
N4MM	327	CX1TE	327	IT9TGO	326	K9HQM	323	I4SAT	320	WA9RCQ	315	VE3DLR	306	WB4UHN	300	NX0I	280
N7RO	327	K5OVC	327	AA4KT	326	KC5P	323	I8LEL	320	KB8O	315	W3YEY	306	KB8NTY	300	YU1TR	280
YS1GMV	327	W4UNP	327	K7LAY	326	WD0GML	323	K4JLD	320	N3ARK	315	KF8UN	306	I2ZGC	299	WN5K	279
K9MM	327	TI2CC	327	PY4OY	326	WN5JZ	323	KD5ZM	320	NI5D	315	KF7RU	306	NW5K	299	KK4TR	279
4Z4DX	327	WA4ECA	327	PT2TF	326	W7FP	323	WE2L	320	KA4RAW	315	XE1MDX	305	WB6GFJ	299	KA0ZFX	279
ZL1AGO	327	I0ZV	327	WB3DNA	325	WW1N	323	EA3EQT	320	KE3A	315	VK3JF	305	VE3CKP	299	KQ4WD	279
KF7SH	327	I4LCK	327	KE4VU	326	YV5VB	323	WS9V	319	K2AJY	315	W6SHY	305	KJ9N	298	HA5NK	279
ZS6LW	327	K7EHI	327	KM2P	326	K4SBH	323	VE4AT	319	KX5V	315	4X4JO	305	EA5RJ	296	W0IKD	279
VK4LC	327	IK0IOL	327	K9HDZ	326	K0HOW	323	ON5KL	319	IK7DBB	314	CT1EEB	305	HP1JC	296	VE7HAM	279
YV5AIP	327	AA6BB	326	I1EEW	326	WB2JZK	323	WA4DAN	319	K7TCL	314	DL3DXX	305	HP6AYV	296	N5QDE	279
ZL3NS	327	K5TVC	326	N5FW	326	CE7ZK	323	AA6AA	319	AB7AU	314	EA5OL	305	VE3XO	294	VU2CVP	278
K9IW	327	I8ACB	326	ZL1HY	326	XE1CI	322	KI3L	319	OH5KL	313	WA2FKF	305	KB5WQ	294	EA3CWT	278
K6JG	327	N6AR	326	W0SFU	325	W5XQ	322	VE3HO	319	WD0DMN	313	NU4Y	305	IT9VDQ	293	N6CFQ	278
WA6OET	327	YU1HA	326	IT9ZGY	325	K2ARO	322	XE1MD	319	F6BFI	313	N4KE	304	AA2FN	293	K4BYK	277
WA4JTI	327	WD8MGQ	326	KC8EU	325	VE7DX	322	KB1JU	319	W5GVP	313	K3LUE	304	TI2LTA	292	WN5MBS	277
YV1AJ	327	XE1L	326	N4KEL/M	325	KA5TQF	322	OE7SEL	319	N8PTI	313	WF9K	304	K2EEK	291	VE2DRN	277
YV1KZ	327	K8LJG	326	LA7JO	325	WB4PUD	322	WD0BNC	319	KD9CN	313	G4NXG/M	304	N6ITW	291	KQ4GC	277
N6AHU	327	K8NA	326	K6LEB	325	LZ1HA	322	WA5HWB	319	K1VHS	313	KJ6HO	304	YB1RED	291	G0LRX	277
EA4DO	327	VE3MR	326	K8CSG	325	N5FG	322	K9QVB	318	EA2AOM	313	WB2NQT	303	WA3KKO	290	KC6AWX	276
W9OKL	327	VE3MRS	326	IK8BQE	325	ZS6AOO	322	KB5FU	318	W1LQQ	312	WA1DHM	303	I4UFH	289	WZ3E	276
9A2AA	327	W4NKI	326	W3GG	325	K1HDO	322	AA4AH	318	K4LR	312	K4JDJ	303	EA5GKE	289	NX4Y	275
KD8V	327	KZ4V	326	IT9TQH	325	N2VW	322	G4GED	318	I8INW	312	OA4QV	303	TI5RLI	287	NC3C	275
																F5NDX	275

### RTTY

K2ENT	312	WB4UBD	291	K3UA	267	NI4H	252	W4EEU	250	KE5PO	248
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sue prefix allocations beginning with 1 or 0; all such are unofficial and self-assigned. Thus, DXpeditioners operating from the Spratlys could use whatever call-sign they wished, and they did not need to provide evidence of licensing for DXCC credit. Every such unlicensed operation from the Spratlys has used the 1S prefix.

The second amateur operation from the Spratly Islands was in February 1973. Five Americans stationed in South Vietnam operated as **1S1A** from Spratly Island. The five were K4EVB, WB4UZZ, WB4VBY, W5ZSX, and K7CBZ. The latter was Don Riebhoff, who later held the call-sign K7ZZ, and was very active from many DX locations, including his CT4AT

superstation. This team found Spratly uninhabited.

By the late 1970s the Spratly Islands had worked their way up into the Top Ten of the Most Wanted countries, peaking at the seventh position in 1978. A Top Ten status attracts the notice of many DXpeditioners, and Spratly was no exception. With the added bonus of not requiring any licensing, the Spratlys appeared to be a choice DXpedition destination in 1979. VK2BJL, N2OO, N4WW, K1MM, and K4SMX chartered a boat to sail them to Amboyna Cay in April. However, as they approached the island, they saw heavy fortifications and many troops. The island garrison fired a shot at

their boat, and they turned and sailed away. N2OO and N4WW decided that they had seen enough of Spratly and headed home.

The other three DXpeditioners later operated as **1S1DX** from Barque Canada reef, some distance away. This was a highly successful operation at the peak of the sunspot cycle, and the team made a major dent in the demand for Spratly contacts. Spratly fell right out of the top 50 Most Wanted.

Their being fired upon was the first indication the amateur community had that some of the Spratly Islands were inhabited, and that the occupying troops would not hesitate to fire on unauthorized visi-

## QSL INFORMATION

3A5ØLZ to W3HCW  
 3D2XC to JE1DXC  
 4E9RG to DU9RG  
 4K4POL/A to UAØKCL  
 4LØJA to JP1BJR  
 4N7ZZ to YU7FIJ  
 4U49UN to W8CZV  
 4U50UN to W8CZV  
 5H/9Q5MRC to G3MRC  
 5R8DP to JA1OEM  
 5R8ED to LA1SEA  
 5T5JC to F6FNU  
 5W1MW to VK2BEX  
 5X1XT to WF5T  
 7J1ATX to OH1TX  
 7Q7JL to GØIAS  
 7Q7SB to AB4IQ  
 7S30WG to SM3CVM  
 7Z50Ø to W1AF  
 8P6BE to KU9C  
 8P9CT to K9JJR  
 8P9CU to K9JJR  
 8P9EM to G3VBL  
 8P9HG to DJ3NY  
 8Q7BX to I4ALU  
 9G1MR to IK3HHX  
 9G5MT to WY7K  
 9G5RM to NZ7E  
 9G5VT to K5VT  
 9K2MU to WA4JTK  
 9K2ZC to KC4ELO  
 9Q5BB to EA4BB  
 9Q5FH to EA1DOD  
 9Q5IY to LA1K  
 9Q5MRC to G3MRC  
 9V1YC to AA5BT  
 9X5EE to PA3DLM  
 9Y4SF to WA4JTK  
 A22MN to WA8JOC  
 A35RK to KK6H  
 AA5DX/KP4 to N2AU  
 C53HG to W3HCW  
 C6AHY to WA4WTG  
 C91AI to CT1DGZ  
 CØ2MA to HI3JH  
 CØ2OV/4 to CØ4QH  
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 CW8B to LU8DPM  
 CXØCW to LU8DPM  
 CX8BBH to LU8DPM  
 D2RU to GMØFET  
 D2XX to PA3CXC  
 D3X to CT1EGH  
 D68TA to JA1IDY  
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 EA9AU to EA9IB  
 ER3MM to UØ5OIV  
 ER5AL to YØ4BII  
 EU3FT to W3HCW  
 EW1MM to W3HCW  
 EW1WZ to DL1ØY  
 EX8F to DL8FCU

FG/K5BDX to K5BDX  
 FG5FZ to F6FNU  
 FG5GI to F6GWX  
 FK/7K1WLE to 7K1WLE  
 FK/JM1WBB to 7K1WLE  
 FK/JN1BSH to 7K1WLE  
 FK/JØ1SIT to 7K1WLE  
 FK/JP1IHT to 7K1WLE  
 FKØFU to NA5U  
 FY5GJ to F2YT  
 FY5YE to W5JLU  
 GBØSJA to GWØSGL  
 H44MS to DL2GAC  
 H5ANX/H5ABP to A22RS  
 HA8LLK to HA8LKE  
 HC7SK to SM6DYK  
 HC8A to WV7Y  
 HH2/N3SIY to KB5IPQ  
 HH2LQ to KM6ON  
 HI7V to HI7JM  
 HKØHEU to HKØFBF  
 HL9DC to N7RO  
 HP1X8H to W4YC  
 HQ6DX to HR2JPC  
 HR1LW to JA1LW  
 HSØZAK to N4TMW  
 HSØZAL to N4TMW  
 IC8/N2TGK to IC8WIC  
 J2ØUFT to F5LBM  
 J28DE to F2WS  
 J68AC to WA2USA  
 J68AH to ACØS  
 J68AK to W8QID  
 J68AR to K9BQL  
 J68AS to N9AG  
 J68BT to W8KTQ  
 J68BU to N9NCX  
 J68ER to W9UI  
 J68WX to WX9E  
 J79YL to KQ1F  
 JW5NM to LA5NM  
 KC4AAA to NC6J  
 KC6SS to WV5S  
 KG4JO to WI2T  
 KP4SB to KD8IW  
 L5ØD to LU8DPM  
 LZ4AX to LZ1KBB  
 OA5/IK1EDC to I1ZL  
 OD5PL to HB9CRV  
 OH1KAG/TF to OH3NE  
 OH1NOA/ØD5 to OH1MRR  
 OJØ/NØAFW to WA2FIJ  
 OMØAA to OM3CVN  
 OM7DX to OM3CGP  
 OS4ANT to ON4ANT  
 OS5CD to ON5CD  
 OX3XR to OZ3PZ  
 P4ØJ to WX4G  
 P49I to K4PI  
 PA56XMT to PAØLVB  
 P15ØNWG to PAØLVB  
 P19IRC to PA3E2L  
 PJ9JT to W1AX  
 R1FJC to RW6HS  
 R9WA to W3HCW  
 SP5GRM to SP5ES  
 T2ØXC to JE1DXC

T3ØXC to JE1DXC  
 T32A to JA5EXW  
 T32J to JR5JQA  
 T32X to JA4GXS  
 T5AR to SMØDJZ  
 TI2IDX to WA9BXB  
 TI2PDX to KB9CRY  
 TI4/AA7JM to WA5TUD  
 TI4CF to TI2CF  
 TJ1PD to N5DRV  
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 TMØP to F6BFH  
 TM5T to F6KCE  
 TØØP to F6BFH  
 TU4SR to OH8SR  
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 URØMC to UB2MC  
 V26E to AB2E  
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 V47NF to WB8GEW  
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 V5/NØAFW to WA2FIJ  
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 V51HK to DL6OBS  
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 VP2MEJ to W5ASP  
 VP8CBC to W4FRU  
 VP8CQS to DL1EHH  
 VP8CRB to W4FRU  
 VP8CRC to K5VT  
 VP8SGP to W4FRU  
 VQ9TP to N5TP  
 VQ9ZX to K7ZX  
 VS6WV to KØTLM  
 XE1/JA1QXY to JA1HG  
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 XQ8ABF to LU8DPM  
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 ZF1DX to W8BLA  
 ZF2LS to KJ6HO  
 ZF2NG to K9WYI  
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 ZF2RV/ZF8 to WJ7R  
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 ZL4TT to ZL1HS  
 ZP5XYE to JA7ZF  
 ZZ5AVM to PP5LL

tors. Failure to heed this warning would result in disaster a few years later.

Early in 1983 several members of the Cologne (Germany) DX Club met to discuss possible DXpedition targets. Most of the countries in the top 25 Most Wanted were either out for political reasons or required a major DXpedition, such as Heard Island VKØ. One possibility was St. Peter and St. Paul Rocks PYØ, off the coast of Brazil. However, a November 1982 DXpedition to the Rocks put them out of contention. The DXpeditioners decided on Spratly, especially since there would be no licensing difficulties.

In early April four German DXpeditioners and the crew of the catamaran *Siddhartha* set sail for the Spratly Islands from Singapore. Operators DJ6SI, DK9KX, DJ4EI, and DJ3NG were aiming for Bar-

que Canada reef, the operating site of the 1979 DXpedition. But, as they neared Amboyna Cay, the occupying troops opened fire on their boat. Several rounds hit the ship, igniting the fuel stored on deck for the generators. Diethelm, DJ4EI, was killed and the catamaran sank. The survivors drifted in an open dinghy for the next ten days before being rescued by the freighter *MS Linden* on April 19th. The night before their rescue, Gero, DJ3NG, died. The Spratly Islands had become the second most deadly DXpedition target in amateur radio history. (For more details about this ill-fated DXpedition, see the January 1989 issue of *The DX Magazine*, or DJ6SI's account in German: ISBN 3-9802867-2-X.) The first tragedy occurred on or about January 29, 1966, when Chuck Swain, K7LMU, and Ted Thorpe,

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ZL2AWJ, along with three crew members were lost aboard the 38 foot ketch *Marinero* during a storm. They were returning to American Samoa after their successful FW8ZZ, Wallis Island, DXpedition.

Only a few weeks later DU1CK operated briefly as 1S1CK from a Philippine-occupied island near Thitu. Generator problems and other difficulties limited the success of this operation. The Spratly Islands remained in the Top 20 Most Wanted countries, and actually rose in demand following the 1S1CK operation.

The Spratly Islands moved into the Top Ten Most Wanted in the late 1980s, as no DXpeditioners wanted to risk their lives to put the island group on the air. In late April 1990 Romeo Stepanenko, 3W3RR, led a Soviet team to the Spratlys, operating as 1S1RR and 1S0XV for a few days. This operation did little to reduce demand for the Spratlys, which dropped only to 19th on the Most Wanted list. By 1992 the Spratly Islands were once again in the Top Ten. By this time the various countries that claimed the Spratlys were seeking additional ways to bolster those claims. For example, Malaysia opened a tourist resort, of sorts, on one of the islands it occupied. Veteran DXpeditioner Martti Laine, OH2BH, took advantage of Malaysia's need to cement its Spratly Islands claims by organizing a major DXpedition to Malaysian-occupied Swallow Reef, also known as Layang Layang. In six days of operating as 9M0S, the multi-national team made 37,000 contacts, including more than 3000 with the US East Coast, the most difficult shot from the Spratlys. This operation dropped Spratly out of the top 20 Most Wanted countries for the first time in more than 10 years. Spratly was 30th in the 1994 Most Wanted survey, its lowest ranking since 1981.

Note that both of the planned 1995 Spratly Islands DXpeditions are set to operate from islands claimed and occupied by two of the "weaker" claimants to the Spratlys: the Philippines and Malaysia. Both will point to their issuing an amateur radio license and maintaining jurisdiction over the operation as proof of their claim over at least some of the Spratly Islands.

Whatever the justification for the Spratly Islands DXpeditions, DXers benefit from having two shots at this relatively rare country.

An interesting footnote to the Spratly Islands story was a couple of attempts to have Spratly deleted from the DXCC countries list. The first effort was organized in the spring of 1983, following the disastrous DXpedition attempt discussed above. Nothing came of that effort. Another attempt to delete the Spratlys arose in 1992. DX Advisory Committee member Bill Shipp, KC1AG, argued that the origi-





A world-class collection of DXpeditioners at the Tokyo DX convention: SMØAGD, K5VT, DJ9ZB, KØIR, and VK2BEX.

nal premise under which the Spratly Islands became a DXCC country was incorrect. It was thought at the time that the Spratlys were uninhabited. (See the quote from QST above.) However, later research revealed that at least the Taiwanese had maintained their military garrison on Itu Aba since 1956. Therefore, the island group was not unadministered, and thus didn't meet even the "separate administration" criterion for separate DXCC status.

Most of the other individually occupied islands in the Spratlys are too close to their parent counties to count as separate DXCC entities. Under Shipp's proposal, the Spratly Islands as such would be deleted, and two new DXCC countries formed out of the few islands that are far enough from their parent countries to count: Itu Aba under Taiwanese control and those islands occupied by China. Despite logic behind the proposal, the DXAC declined to go along with the deletion, and the Spratly Islands remain a current, if controversial, country on the DXCC list.

A final note: We mentioned above that there is another country with multiple territorial claims. Actually, there are two additional *amateur radio* countries with such claims: Antarctica and the South Shetland Islands. Both fall under the Antarctic Treaty, which allows many countries access to the region without adding weight to their conflicting claims from before the Treaty. Thus, DXers can work stations licensed by Australia, New Zealand, Great Britain, Argentina, Chile, Poland, France, and many others, and have all such contacts legitimately count for Antarctica or the South Shetlands. The

Spratly Islands are the only other such multi-licensed DXCC entity.

### May DX Activities

A Portuguese team plans to activate the Sabana Islands in Cuba during the second week in May. Sabana, in the CO5-CO6 call areas, probably will be a New One for Islands On The Air. Callsigns and QSL route will be announced prior to the operation.

The Radio Society of Bermuda will operate a special-event station using the callsign **VP9RND** on May 20-21 from 12-2000Z. This station commemorates the 200th anniversary of the Royal Naval Dockyard in Sandys Parish. Operation will be mostly SSB on the HF bands. A special certificate is available to stations contacting VP9RND. With your QSL, include an address label and US\$2 or four IRCs to cover the costs and return mailing. Send your requests to WB2YQH, P.O. Box 73, Spring Brook, NY 14140. (*Your DX editor frequently operated contests from the Society's club station at the Royal Naval Dockyards, 20 years ago.*)

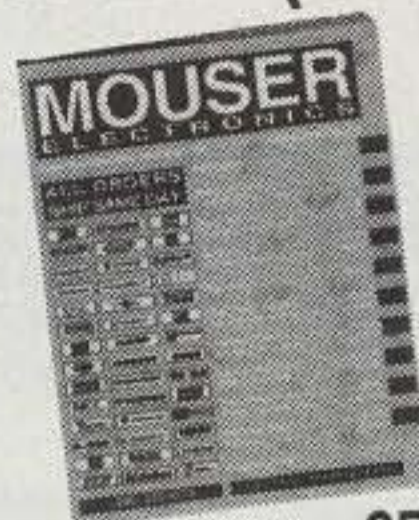
The Vereniging van Radio Zendamateurs, the Dutch amateur radio society, will mark the 50th anniversary end of WW II with a special-event station signing **PA5MEI** May 1-13. Twenty-eight stations will use the special prefix **PI45** during the entire month of May. The Liberation Award is available to stations outside of Europe who work PA5MEI or any two of the PI45 stations. Send your log extract and US\$10 to Ad de Bok, PE1EBJ, P.O. Box 56, 5320 Ab Hedel, The Netherlands.

Finally, there will be an amateur radio convention in Slovakia May 27-28. Com-

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QSL the 1994 CQ WW SSB operation of **V7X** via KH6HH.

73, Chod, VP2ML

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Kenwood, a clasp on a gold bracelet for a YL ham from NJ, a few PL-259s, din plugs and other connectors for new rig owners, a cracked HT case, a pot metal toy gun for a budding cowpoke. One woman fixed a hole in her truck radiator so she could get home. **THIS IS EASY!**

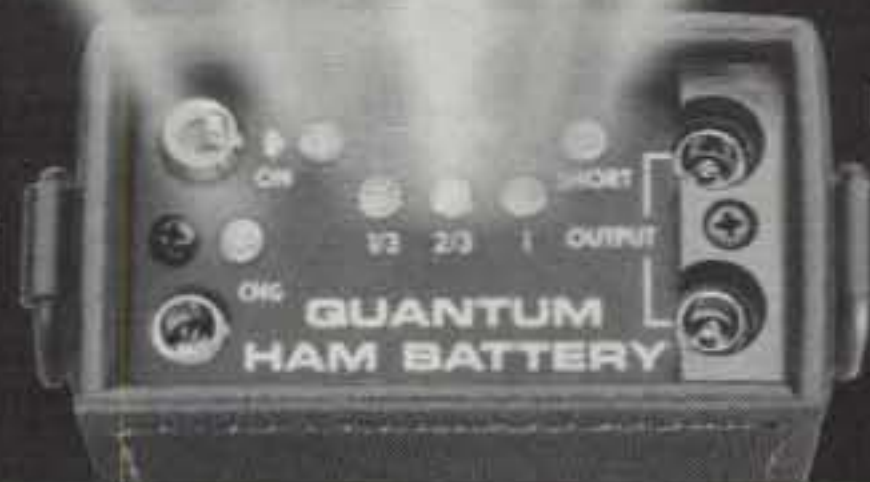
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CIRCLE 82 ON READER SERVICE CARD

## NEWS OF CERTIFICATE AND AWARD COLLECTING

This month we introduce a revision to CQ's USA-CA Award rules and program. In Feb. 1994 Eldon L. Sanders, W5VDW, suggested several revisions and clarifications of the USA-CA rules. After reviewing the rules, monitoring the County Hunters on 14,336, and discussing it with several of the leading County Hunters, I decided that Sonny was correct. At the National Convention further discussion was held with those amateurs attending. Several eyeball discussions were also held with folks who wanted to contribute their thoughts. We are grateful to all the amateurs who participated, and particularly the written comments by W5VDW, W4RKV, W0OWY, and K9DCJ.

### USA-CA Rules and Program

The United States of America Counties Award sponsored by CQ magazine is issued for confirming two-way radio contacts with specified numbers of U.S. counties under rules and conditions hereafter stated (as revised 1995).

All amateur radio awards are dependent on the integrity of the individual amateur radio operator. This is particularly true of the USA-CA Award.

#### A. Awards Classes

CQ issues the USA-CA Award in seven (7) different classes, each a separate achievement as endorsed on the basic certificate by use of special seals for higher classes. Also, special endorsements are issued for all one band or mode operations subject to the rules.

Class	Counties Required	States Required
USA-500	500	any
USA-1000	1000	25
USA-1500	1500	45
USA-2000	2000	50
USA-2500	2500	50
USA-3000	3000	50

#### USA 3076-CA for All Counties Special Honors Plaque \$40.00

#### B. Conditions

1. USA-CA is available to all licensed amateurs everywhere in the world and is issued to them as individuals for all county contacts made, despite calls held, operating QTHs, or dates.

2. Special USA-CAs are also available to SWLs on a heard basis.

Box 76, Pleasant Mount, PA 18453-0076

### HONOR ROLL

500		1500	
SV1AOZ	2825	KB0G	1135
KB0G	2826	K1CLN	1136
KB7JJO	2827	W6ISQ	1137
OD5ZZ	2828	N5BLK	1138
US7MM	2829	WS3F	1139
VE7AAP	2830	2000	
K1CLN	2831	KB0G	1042
W6ISQ	2832	K1CLN	1043
N5BLK	2833	W6ISQ	1044
WS3F	2834	N5BLK	1045
JA7FWR	2835	WS3F	1046
1000		2500	
KB0G	1356	KB0G	964
T1YRL	1357	K1CLN	965
VE7AKM	1358	W6ISQ	966
K1CLN	1359	N5BLK	967
W6ISQ	1360	WS3F	968
N5BLK	1361	3000	
OA4ED	1362	KB0G	883
WS3F	1363	W6ISQ	884
JA7FWR	1364	N5BLK	885
		WS3F	886

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 Award Manager, Box 76, Pleasant Mount, PA 18453-0076 USA. DX stations must include extra postage for airmail reply.

3. All contacts must be confirmed by QSL and such QSLs must be in one's possession for identification by certification officials. Any QSL card altered in any way disqualifies the applicant.

4. QSOs via repeaters, satellites, moon bounce, and phone patches are NOT valid for USA-CA.

5. So-called "team" contacts, in which one person acknowledges a signal report and another returns a signal report, while they log both amateur call signs, are NOT valid for USA-CA. Acceptable contact may be made with only one station at a time.

#### C. County Identity

1. Unless otherwise indicated on QSL cards, the QTH printed on cards will determine county identity.

2. The National Zip Code & Directory of Post Offices will be helpful in some cases in determining identity of counties of contact as ascertained by name of nearest municipality. Publication No. 65 is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 039-

### SPECIAL HONOR ROLL

John G. Troster, W6ISQ  
USA-CA All Counties #859  
February 28, 1995

Gene R. Williams, N5BLK  
USA-CA All Counties #860  
February 28, 1995

Brian Matheny, WS3F  
USA-CA All Counties #861  
February 28, 1995

000-00264-7, shipped only to U.S.A. or Canada.

Also available is the ZIP/County Computer Program by James D. Hardy, K4HAV, P.O. Box 7304, Tifton, GA 31793-7373.

3. For mobile and portable operations the postmark shall identify the county unless information stated on QSL cards makes other positive identity.

4. Effective 1 July 1995 the Mobile station must be within the county boundaries. The rule regarding cities, parks, or reservations not within counties proper is rescinded as of 30 June 1995.

5. A fixed station contact may only be used for a single county.

6. When operating from a county line, the Mobile must be parked with a portion of the vehicle in each county. "On the run" contacts are not valid.

#### D. Administration of USA-CA Program

1. The USA-CA program will be administered by a CQ staff member acting as USA-CA Custodian, and all applications and related correspondence should be sent directly to him at his QTH.

2. Decisions of the Custodian in administering these rules and their interpretation, including future amendments, are final.

#### E. Record Book and Bookkeeping

1. The scope of USA-CA makes it mandatory that special Record Books be used for application. For this purpose, CQ has provided a 64-page Record Book that contains application and certification forms that provide record log space meeting the condition of any class award and/or endorsement requested.

2. A completed USA-CA Record Book is the medium of basic application and becomes the property of CQ for record purposes. On subsequent applications for either higher classes or for special endorsements, applicants may use addi-

tional Record Books to list required data or may even make up their own alphabetical lists conforming to requirements. Computer submissions in ASCII are also acceptable.

3. Record Books are to be obtained directly from CQ Communications, 76 N. Broadway, Hicksville, NY 11801 for \$2.00 each. It is recommended that two be obtained—one for application and one for personal file copy.

#### F. Application

1. Make Record Book entries necessary for county identity and enter other log data necessary to satisfy any special endorsements (band-mode) requested.

2. Have the certification form provided signed by two licensed amateurs (General Class or higher) or an official of a national-level radio organization or affiliated club verifying that QSL cards for all contacts as listed have been seen. The USA-CA Custodian will request specific cards when the USA-CA All Counties level is applied for. You may contact the Custodian for a list of cards and submit these cards at the time of application or the Custodian will request them after he has received the application. The applicant should provide sufficient postage for return of cards.

3. Send ORIGINAL completed Record Book (NOT a copy), certification forms, and handling fee. Fee for subscribers to CQ is \$4.00 U.S. or 10 IRCS; for non-subscribers the fee is \$10.00 or 22 IRCS. (Subscribers please include a recent CQ mailing label.) Send to USA-CA Custodian, Norm Van Raay, WA3RTY, Box 76, Pleasant Mount, PA 18453-0076.

For later applications for higher class seals, send Record Book or self-prepared list (floppy disks in ASCII format are acceptable) per rules and \$1.25, or 6, IRCs handling charge. For application for later special endorsements (Band/Mode) where certificates must be returned for endorsements, send certificate and \$2.50, or 10 IRCs, for handling charges. Note: At the time any USA-CA Award certificate is being processed, there are no charges other than the basic fee regardless of the number of endorsements or seals; likewise, one may skip lower classes of USA-CA and get higher classes without losing any lower awards credits or paying any fee for them.

Also Note: IRCs are NOT accepted from US stations.

#### Awards Issued

We had three qualifiers for CQ magazine's coveted USA-CA All Counties Award:

John G. Troster, W6ISQ, USA-CA #859;  
Gene R. Williams, N5BLK, USA-CA #860;

and Brian Methany, WS3F, USA-CA #861.

Seven folks took their first step and received USA-CA 500 basic certificates:

Manolis Keratzakis, SV1AOZ, #2825; Timothy J. Heber, KBØG, #2826; Gilbert De Guerre, KB7JJO, #2827; Wald Karami, OD5ZZ, #2828; Willy Kostjuk, US7MM, #2829; Janis Cameron, VE7AAP, #2830 (Janis is the wife of VE7AKM, who moved up to USA-CA 1000 #1358); William R. Welch, K1CLN, #2831; and Hiromi Hatazawa, JA7FWR, #2835.

Others progressing on their quest are: Timothy J. Heber, KBØG, USA-CA 1000 #1356, 1500 #1135, 2000 #1042, 2500 #964, 3000 #883.

Luc Glarey, 11YRL, USA-CA 1000 #1357.

Garry Cameron, VE7AKM, USA-CA 1000 #1358.

William R. Welch, K1CLN, USA-CA 1000 #1359, 1500 #1136, 2000 #1043, 2500 #965.

Augusto Morales-Zevallos, OA4ED, USA-CA 1000 #1362.

Hiromi Hatazawa, JA7FWR, USA-CA 1000 #1364.

#### MARAC '95

This year's annual convention will be held at the Holiday Inn in Hamburg, New York, July 5-9. The event is located near Niagara Falls, with many area attractions to add to the fun. Special activities include an afternoon at Naval Park, followed by a Taste of Buffalo dinner and a Triple A/International League Buffalo Bisons baseball game at Pilot Field; a bus trip to old

Fort Niagara; daily bus trips to Niagara Falls and the Outlet stores; a Friday night banquet at Ilio DePaulo's; counting hunting equipment and operating seminars; and much more! We will also be giving away several thousand dollars worth of door prizes.

We have reserved a block of up to 75 rooms at the Holiday Inn in Hamburg, our headquarters hotel. We are guaranteed an excellent rate of only \$66 per night, regardless of the number of family members in your room, even for nights before and after MARAC '95. Call in your room reservations directly at 716-649-0500. Also available are the nearby HoJo Inn (716-648-2000) and the Red Roof Inn (716-648-7222).

For more info, contact a MARAC '95 committee member: Paul, AA2AV, chairman, 908-548-8096; Jim, KZ2P, treasurer, 908-370-8055; Bo, NO2W, 716-534-5161; Paul, WB2ABD, 716-826-7659; Bill, K2NJ, 908-788-4827; Harry, N2CWG, 716-798-3328; or Tom, 908-251-4018.

#### County Hunter in The Peoples Republic of China

Bill Nash, WØOWY, has been keep subscribers to his "Weekly Hunter" up to date on the activities of Linda Stocks, AA6MR (USA-CA 1000 #1179), in the Peoples Republic of China. Linda is teaching English at the Shandong Teacher University. I've written to Linda and hope she will share her experiences with our CQ readers as well.

73, Norm, WA3RTY



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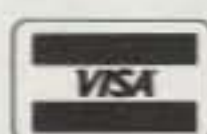
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M1860A 60'	15 sq ft, 85 MPH w/Hazer 7	\$3195.00
M1870A 70'	15 sq ft, 85 MPH w/Hazer 7	\$3485.00

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#### H-5 HAZER

cranked near top of M1330A Martin tower. →



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CIRCLE 64 ON READER SERVICE CARD

# WASHINGTON READOUT

REGULATORY NEWS IN THE WORLD OF AMATEUR RADIO

BY FREDERICK O. MAIA, W5YI

## Is Morse Code Essential?

**B**inary signalling is the earliest form of communication. It is defined simply as the presence or absence of a single element that when used in prearranged combinations conveys intelligence. Signal fires, reflected sunlight, smoke signals, flag waving, and jungle drums are the earliest examples of binary signalling.

The earliest forms of signalling were, of course, audible or visual systems, since electrical transmission had not yet been invented. Indeed, the word *telegraph* is derived from the Greek *tele* (far) and *graphein* (to write). It refers to a system of encoded signs or sounds transmitted to a distant point.

Around 300 BC the Greeks arranged torches on two walls to indicate letters. The semaphore which made its appearance in the 18th century was not much different. Ropes and pulleys were used to arrange movable arms at the top of a post to convey meaning.

Electric-wire telegraph systems arrived in 1835, when Samuel Morse employed a chemical battery and a lever to send currents through a wire circuit. The discovery of the "ground return" circuit meant that only one wire would be needed.

The first American Morse code contained dots, dashes, longer dashes, and spaces. The space appeared in certain letters such as "C"—two dots, a space, and one dot. The Continental code, later called the International Morse code, contained only dots and dashes and was used primarily in Europe.

In 1865 Guglielmo Marconi, an Italian inventor, proved the feasibility of radio communications. In that same year 25 European nations met in Paris and formed the International Telegraph Union (ITU) to facilitate wireline telegraphic communications across international borders.

Marconi spanned the Atlantic Ocean with the wireless telegraph in 1901. The era of the amateur radio operator had begun. In the early years wireless telegraphy remained confined primarily to the sea, and few ships staffed their radio equipment around the clock.

All of this changed quickly on April 15, 1912, when the *Titanic*, ripped open by an iceberg, sank three hours later in the North Atlantic. The *Titanic's* radio operator frantically called for help over the wire-

less. However, the radio operator on the nearest ship, 20 miles away, had gone to bed with no one to take his place. A ship 58 miles away responded and managed to rescue 700 survivors.

Later that same year regulations were enacted to require at least two radio operators on ships and a constant watch, with emergency backup power supplies. The Radio Act of 1912 also provided for government radio licensing.

### Amateur Operators and The Radiotelegraph

In 1927 the International Radiotelegraph Convention made its first frequency allocations. It was at that same conference that the ITU passed a regulation requiring an amateur operator to prove an ability to transmit and receive in Morse.

Although from 1949 on, this regulation has been modified at every conference capable of changing it, there still exists a mandatory Morse requirement for amateur HF operation. This month's column takes a look at international policies on Morse code testing in the Amateur Service. Topics covered include a background to the ITU decision-making process, the recently released summary report of the IARU CW Ad Hoc Committee, and arguments for and against regulatory change.

### The International Regulatory Environment

Internationally, amateur radio is governed by a set of rules and requirements set out in Article 32 of the International Radio Regulations. These guidelines are agreed upon by members (countries) of the International Telecommunication Union (ITU). The old International Telegraph Union was renamed in 1932 and became a specialized agency of the United Nations in 1947.

ITU agreed-upon rules carry the force of law once ratified in each nation. Nationally, each country has a sovereign right to make its own regulations, but the regulations may not be in conflict with international law.

Up until now, the ITU convened regular radio conferences which concerned specific services only. Periodically, a World Administrative Radio Conference (WARC) is held at which all services (including amateur radio) are considered.

Rapid changes in the telecommunica-

tions and radio communications environment, however, highlighted a need for ITU restructuring, thus enabling regulatory change to keep pace with technological change. As a result, ITU World Radio-communication Conferences (WRCs) will now be held at two-year intervals, starting this October/November in Geneva. At these international conferences all radio services can be addressed by adding each as an appropriate agenda item. Therefore, although it has been 16 years since a regulation concerning the Amateur Service was last able to be reviewed, the revised conference process means that there will be many opportunities for future change to international regulations.

### International Amateur Radio Regulations

The Amateur Service is defined in Article 1 (Radio Regulation 53) of the International Radio Regulations as: "A radiocommunications service for the purpose of self-training, intercommunication, and technical investigation carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest."

The international radio regulation that directly influences Morse code testing in the Amateur Service is Radio Regulation 2735 (RR 2735, found in Article 32). The text of RR 2735 is: "Any person seeking a license to operate the apparatus of an amateur station shall prove that he is able to send correctly by hand and to receive correctly by ear texts in Morse code signals. The administrations concerned may, however, waive this requirement in the case of stations making use exclusively of frequencies above 30 MHz."

### Possible Amateur Service Morse Code Change

One of the agenda items at WRC-95 is simplification of the international radio regulations. WRC-95 will be considering whether or not to delete the wording of the Article 34 (RR 2800) requirements that apply to Morse testing for experimental stations. RR 2800 reads: "In experimental stations any person operating radiotelegraph apparatus, either on his own account or for another, shall have proved his ability to transmit by hand and to receive by ear, texts in Morse code sig-

*National Volunteer Examiner Coordinator, P.O. Box 565101, Dallas, TX 75356-5101 (817-461-6443)*

nals." As you can see, the wording of RR 2800 is very similar to RR 2735. A widespread belief is that if RR 2800 is eliminated from the international radio regulations, then RR 2735 should be also. One of the suggestions is to modify RR 2735 to read: "Administrations may take such measures as they judge necessary to verify the proficiency in the use of Morse code of any person wishing to operate the apparatus of an amateur station."

### Report of the IARU CW Ad Hoc Committee

To deal with this matter, the International Amateur Radio Union established a committee to look into all of the issues surrounding retention or deletion of the Morse code as a requirement for an amateur license. The American Radio Relay League more or less controls the IARU. The ARRL serves as its international secretariat, and the current IARU president, Richard L. Baldwin, W1RU, is a previous ARRL general manager. The IARU is comprised of more than 100 amateur radio societies around the world.

The members of the IARU CW Ad Hoc Committee are Fred Johnson, ZL2AMJ, Chairman (ITU Region 3); David Sumner, K1ZZ, IARU Secretariat (Region 2); and John Allaway, G3FKM, Secretary (Region 1). The committee published their final report in December 1994, and it is enti-

tled "The Morse Code and Amateur Radio: A Summary from the Work of the IARU CW Ad Hoc Committee." The report was made available to us by David Sumner. We forwarded a copy to ORACLE, the New Zealand-based lobby organization that opposed retention of the Morse requirement. ORACLE stands for Organization Requesting Alternatives by Codeless License Examinations. Instead their group supports a codeless option when qualifying for any amateur radio operator license.

### Summary of the Report Contents

The points that the Ad Hoc committee looked into are:

- a. What are the issues involved in the various discussions relative to maintaining or deleting a knowledge of the Morse code as a requirement for an amateur license?
- b. What progress in amateur digital communications and in amateur voice communications is likely to affect future use of Morse by amateurs?
- c. Should there be a greater awareness of any possible benefits of a knowledge of Morse code by radio amateurs?
- d. Should Morse code be considered as one of the filters for entrance into amateur radio?
- e. Does the ad hoc committee recommend any changes to the ITU Radio Regulations?

f. Or, does the Ad Hoc committee recommend the status quo for the foreseeable future?

### Findings of the IARU CW Ad Hoc Committee

The Committee says that although future planning for most telecommunication services is based on the assumption that virtually all new systems will be digital rather than analog, some amateurs will still use Morse for reasons little influenced by technological advances (i.e., reasons of personal preference).

A wider understanding of the position of Morse code in amateur radio seems to be needed in training courses for all grades of the amateur radio license. Every entrant into amateur radio should have an appreciation of the thrills and satisfaction that competency in code can bring.

At the present time, Morse code is the only practical means of ensuring that amateur stations possess a capability for intercommunication. Changing the Morse requirement would alter the basic character of the amateur service.

Deregulation (elimination or modification of RR 2735) would allow standards to fall, resulting in possible congestion of the HF bands by technical elite operators incapable of self-controlling their occupancy to achieve the best communicating results.

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The conclusions of the report advise against change. The IARU strongly believes that Morse is still essential for intercommunication. If the IARU is to support change, then this will only be done once there is clear support from all three IARU regions.

## ORACLE Comments on The Report

ORACLE gave us their views on the IARU findings:

"Despite the scope for objective argument provided by the terms of reference,

the report concentrates its efforts on providing 'reasons' for maintaining Morse code as a mandatory requirement. Discussion of arguments for change is noticeable by its absence, especially with respect to terms of reference 'a.' Therefore, appraisal of successive parts of the report has found key parts of the IARU claimed position to be contrived.

"Furthermore, it's evident that there exists, despite explicit denials to the contrary, a 'hidden agenda' that an international regulation on Morse code testing is desirable to control the number of participating amateurs."

These criticisms of the IARU report are

best illustrated by listing excerpts from the IARU report. It is clear from the beginning of the report that the argument for the retention of Morse as a mandatory requirement rests on the intercommunication argument.

**IARU:** The intent is clear: As a condition of access, radio amateurs who share the limited international resource, the HF spectrum, are expected to be able to conduct rudimentary communication among themselves, without regard to language barriers or to limitations of their equipment. . . . At the present time, Morse code is the only practical means of ensuring that amateur stations possess a capability for intercommunication.

**ORACLE:** Intercommunication is not specifically defined in the ITU regulations. When applied to radio, it means to have free passage to each other. In effect, this means that there is no particular method prescribed by regulation and amateur stations can make contact as each chooses, both nationally and internationally.

Given the choice of modes now available, it is clear that Morse is no longer essential for communication between radio amateurs. Therefore, there is no operational or technical justification that Morse should continue to be a mandatory international regulatory requirement for amateur intercommunication purposes or for qualifying for a license.

In putting forward the intercommunication argument, the report specifically denies that the Morse requirement acts as a filter. However, there is ample evidence that controlling numbers is the real objective. Evidence for this "hidden agenda" is contained in the following excerpts from the ad hoc committee report.

**IARU:** The bands available to amateurs are narrow relative to the peak demand for access by increasing numbers of amateurs. The amateur bands are finite and are unlikely to be significantly extended. RR 2735 places a formal restraint on their use with the increasing number of radio amateurs.

Regulation RR 2735 has been accepted by administrations as a very worthy control on the standard and numbers of amateur radio operators in the congested international HF spectrum.

The 30 MHz figure replaced the 144 MHz figure at WARC-79, which in turn had replaced the 1000 MHz figure set at an earlier conference. It had been acknowledged that the 1000 MHz figure was inappropriate considering the limitation of the technology in use at the time and a reduction to 144 MHz would bring more aspirants to amateur radio.

As this report shows, the requirement for RR 2735 and the international scene has changed little in the years since WARC-79 except that with increasing numbers of radio amateurs, the need for

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RR 2735 has become more compelling. Intercommunication is called for in RR 53. This is equally as important as RR 2735 with its call for Morse code to support intercommunication by all amateur radio users of that scarce and congested international resource, the HF radio spectrum.

**ORACLE:** These excerpts show clearly enough that Morse code proficiency is in reality being used as a "filter" to limit the number of participants. This is basically a restrictive practice.

The IARU report has contrived an intercommunication scenario to attempt to justify some "real purpose" but the above excerpts from the same report reveal the that underlying primary intended function is to control the number of participants. Perhaps the IARU should come out in the open and admit this. Few would argue that the numbers should not be controlled in reasonable ways, and it is the manner in which this is achieved that is the issue. It would be of considerable benefit to the future of amateur radio to direct work to this issue rather than struggling to hold a "no change" position on Morse code testing.

The revised system of biennial ITU conferences has led to the emergence of a new argument against change. This is demonstrated in the following excerpt from a packet message placed by Bob Knowles, ZL1BAD, a Coordinator for Administrative Council of IARU, justifying the retention of mandatory Morse testing. The question is answered from the perspective of "protecting the service."

**IARU:** Acting on advice from the highest levels, including officials of the ITU, all three IARU Regional Organizations (which represent all National Societies in each region) and the Administrative Council of IARU are opposed to any attempt to change the regulation that requires the Morse test for a HF license.

"Why," you may ask, "is such a body of opinion against any change to the Regulations?" To get the Regulations changed it would be necessary to have Article 32—of the International Radio Regulations of Geneva—opened for discussion at a competent World Administrative Radio Conference (WARC) of ITU Member Countries, all 168 of them.

Each member country has one vote. A "certain grouping" of countries, that do not have an Amateur Service, or one so insignificant that they do not care about it, can out vote the countries that do support the Amateur Service and this "certain grouping" of countries would dearly love to get the HF spectrum that the Amateur Service currently has.

"We" are advised at the very highest international levels that the Amateur Service would be "extremely unwise" to take any action that opened Article 32 for discussion. "Extremely unwise" is "diplo-

mat" for "stupid"... and "you have been warned."

**ORACLE:** In reply, it is only reasonable to test this statement against what has actually happened at previous international conferences. The international Morse code regulation, which is in Article 32, has been reviewed and modified at every conference since 1947 that was capable of changing it. The waiver frequency was set at 1000 MHz in 1947, at 144 MHz in 1959, and at 30 MHz in 1979.

Regarding frequency allocations, at WARC-79 there were three new bands allocated to the amateur service. At WARC-92 the 40 meter band was discussed for sharing with the broadcast service and possibly extending it below 7.0 MHz.

There is evidence of many changes to international regulations pertaining to amateur radio, and the amateur HF bands were not only retained, but extended. It is not known why the selection of bands at risk is limited to just the HF bands, as VHF/UHF/SHF bands are surely useful as well. If the "certain grouping" of countries actually exists then they are of course free to initiate their own proposals at any conference. There appears to be no evidence of "anti amateur" proposals. Note that as the review of all of the radio regulations is a dynamic process, the "do nothing" approach is a guaranteed formula for falling behind the times.

Rather than focussing on "knocking

opposition suggestions, surely IARU representatives could themselves make a positive contribution to modernization by debating the policy issues that have an influence on the future success of amateur radio. Their apparent adherence to the status quo does not allow amateur radio to keep pace with other radio services.

In the next few years cellphones and similar personal communications by radio will be commonplace among the general public. The failure of amateur radio to take heed of changes in the telecommunications environment will result in it becoming isolated and irrelevant. The current insularity [narrowness] of amateur radio may result in its eventual demise.

### Options For Changing Morse Code Regulations

**ORACLE:** Relaxing or removing the requirement for Morse code testing is considered to be the single biggest challenge that, if achieved, will restore general acceptance that amateur radio has a genuine place in local, national and international events.

Regulatory change does not mean "doing away with CW." Morse testing should continue to be offered as one of the syllabus options for qualifying. CW operators are free to carry on with what they like doing. Newcomers are free to learn and use CW if they choose. All along, the attributes of CW will continue to exist even if the regulations on qualifi-

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cations change. CW can float to its own level of interest group support just as all other parts of amateur radio interests do.

### Modification of The Waiver Frequencies In RR 2735

**ORACLE:** The formulation of RR 2735 is to require Morse code proficiency to access amateur bands below a specified frequency, and to make available a waiver for accessing higher frequencies. In 1979 the waiver frequency was lowered from 144 MHz to 30 MHz. There have previously been proposals to lower the waiver frequency to 28 MHz so that the 10 meter band is available to code-less operators.

Consideration should also be given to bands at the lower frequency end. The 1.8 MHz (160 meter) and 3.5 MHz (80 meter) bands are mostly used for national communications even though they can, of course, be used for international communications. The "core HF bands" that are generally the better performers for DX communication are broadly between 5 and 25 MHz.

Therefore one approach in the evolution of RR 2735 is to further reduce the waiver frequencies to below 5 MHz and above 25 MHz. This would test the theory about band congestion and "untrained" operators on HF. That Morse code training can transform an unacceptable amateur operator into an acceptable one is itself highly debatable.

Referring to *The Text Of The USA 1979 Proposed Modification In 1979* the U.S. proposed the following relatively extensive modification of RR 2735: "It is recommended that any person operating the apparatus of an amateur station should have proved that he is able to send correctly by hand and to receive correctly by ear, texts in Morse code signals."

This has the status of a recommendation rather than a regulation and would give each country a choice in whether or not to (nationally) require Morse proficiency for licensing.

### Conclusion by ORACLE

**ORACLE:** IARU ongoing insistence, without credible justification, that manual telegraphy apprenticeships are required to gain full amateur qualifications is a major factor in potential newcomers not continuing their interest in amateur radio. One would have thought that this was obvious to any amateur radio administrator.

Youngsters these days are more likely to be computer literate and interested in computer-based data communications than they are in becoming a telegrapher. This is not said to discourage those who genuinely want to take up CW, but as reminder the "real ham radio" is not purely a historical matter but involves new modes as well.

73, Fred, W5YI



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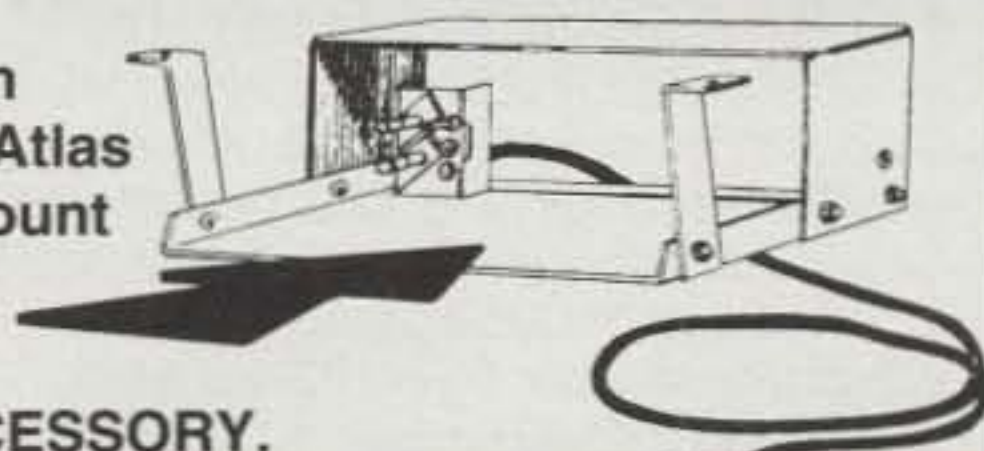
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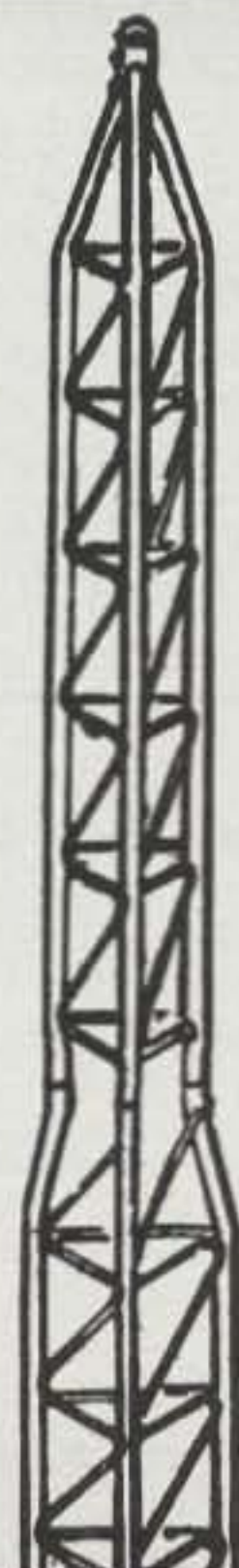


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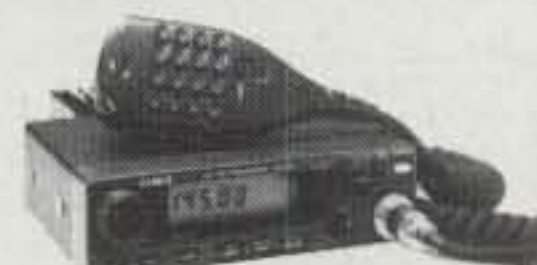
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## THE SCIENCE OF PREDICTING RADIO CONDITIONS

### Low Solar Cycle Period Begins

**S**unspot Cycle 22 has entered its final phase. The low phase of a solar cycle is generally defined as the period of time during which the end of a cycle and the beginning of a new cycle remain under a smoothed sunspot number of 30.

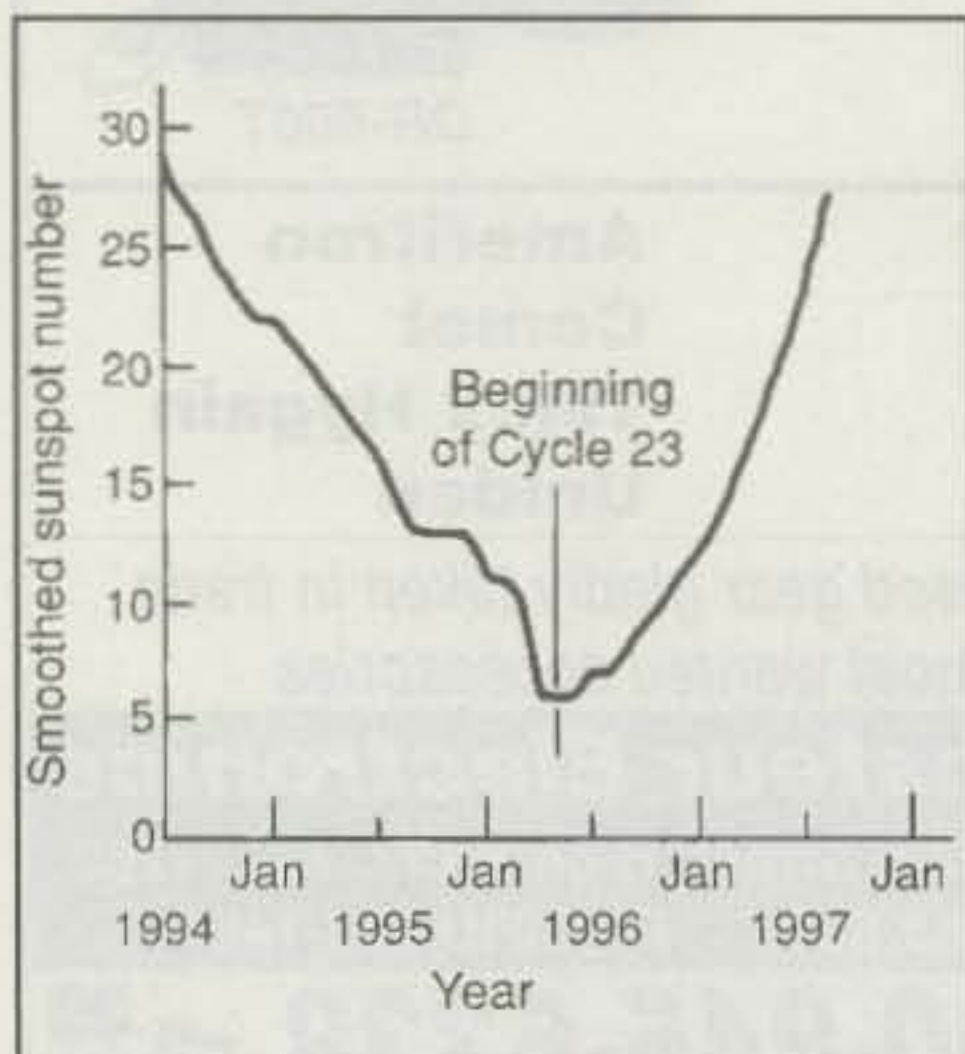
The Royal Observatory of Belgium, the world's official keeper of sunspot records, reports a monthly mean sunspot of 24 for January 1995. This results in a 12-month running smoothed sunspot number of 29 centered on July 1994. The smoothed number is an average of the mean values for the past twelve months, and is the basis for measuring the solar cycle. Now that Cycle 22 has dropped below the 30 mark, this marks the beginning of a period of low solar activity which will continue through the end of Cycle 22 and until the growth of a new cycle, Cycle 23, exceeds a smoothed sunspot number of 30.

How long a period will this be? According to sunspot predictions made by the Space Environment Services Center of the National Oceanic and Atmospheric Administration (NOAA), Cycle 22 is expected to continue to decline slowly, reaching a minimum of 6 in May 1996.

Cycle 23 is predicted to begin during June 1996 and rise slowly, with a level of 30 expected during September 1997. According to these predictions, the present low phase of solar activity will continue from July 1994 through August 1997. The period of low solar activity is depicted graphically in fig. 1.

Propagation conditions on the various amateur HF bands will be significantly dif-

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#### LAST MINUTE FORECAST

Day-to-Day Conditions Expected for May 1995

Propagation Index.....	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 10-12, 15, 23, 28	A	A	B	C
High Normal: 1, 7-8, 13-14, 24, 27	A	B	C	C-D
Low Normal: 2, 5-6, 9, 16-17, 20-22, 25, 29, 31	B	C	D	D-E
Below Normal: 3-4, 18, 26, 30	C	C-D	D-E	E
Disturbed: 19	C	D	E	E

Where expected signal quality is: A—Excellent opening, exceptionally strong, steady signals greater than S9.

B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S9 and S6, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S3, and with considerable fading and noise.

E—No opening expected.

#### HOW TO USE THIS FORECAST

1. Find propagation index associated with particular band opening from Propagation Charts appearing on the following pages.

2. With the propagation index, use the above table to find the expected signal quality associated with the band opening for any date of the month. For example, an opening shown in the charts with a propagation index of 3 will be good (B) on May 1st, fair (C) on the 2nd, fair-to-poor (C-D) on the 3rd and 4th, fair (C) on the 5th and 6th, etc.

ferent during this low period of solar activity when compared to conditions during periods of higher sunspot numbers. Considerably fewer DX openings on the 10, 12, 15, and 17 meter bands can be expected, balanced by an improvement in conditions on the 160, 80, 40, and 30 me-

ter bands. Twenty meters should remain the best of the DX bands, but expect considerably fewer DX openings, and for shorter durations, than during periods of greater solar activity.

A smoothed sunspot number of 19 is forecast for May 1995.

#### Solar Flux Values

The Dominion Radio Astrophysical Observatory of Canada, located at Penticton, B.C., reports an adjusted mean value of 83 for the January 1995 level of 10.7 cm solar flux. This results in a 12-month running smoothed solar flux level of 84 centered on July 1994. A level of approximately 73 is likely for May 1995.

#### May Propagation

The following is an overall picture of HF amateur band conditions expected during this month. For specific times of DX openings refer to the DX Propagation Charts which appeared in last month's Column. This month's column contains Short-Skip Propagation Charts valid for May and June, as well as charts centered on Alaska and Hawaii. The Short-Skip Charts contain propagation forecasts for openings varying in distance between 50 and 2300 miles. For day-to-day propagation conditions expected during May, see the Last Minute Forecast which appears at the beginning of this column.

In May optimum frequencies for DX propagation are lower during most of the daylight hours—but higher during the late afternoon, early evening, and nighttime hours—than were observed during the

Editor's Note: Graph is based upon following values:

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1994							29	27	26	24	23	22
1995	22	21	20	19	18	17	16	14	13	13	13	13
1996	11	11	10	6	6	6	7	7	8	9	10	11
1997	12	13	15	17	19	21	24	27				

Fig. 1—Low sunspot phase (smoothed numbers less than 30) of Cycle 22-23, based upon predictions of the Space Environment Services Center (NOAA) Boulder, Colorado.

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Date UTC  
30/01/95 17:44:20

Azimuth Elevation  
205.5° 24.3°

Range Height  
2672km 1483km

Squint Mode  
N/A N/A


Doppler Phase  
N/A 186

UMD Eclipse  
1.23 Towards

Panel III. Sun angle  
N/A N/A

Latitude Longitude  
23.50°N 5.49°E

Next set in 00:02 hrs



Hubble space tel.

Date UTC  
30/01/95 17:44:20

Azimuth Elevation  
301.6° -38.3°

Range Height  
8829km 599km

Squint Mode  
N/A N/A


Doppler Phase  
N/A 99

UMD Eclipse  
0.80 Away

Panel III. Sun angle  
N/A N/A

Latitude Longitude  
28.28°N 91.35°W

Next rise in 12:32 hrs  
Visible for 00:03 hrs




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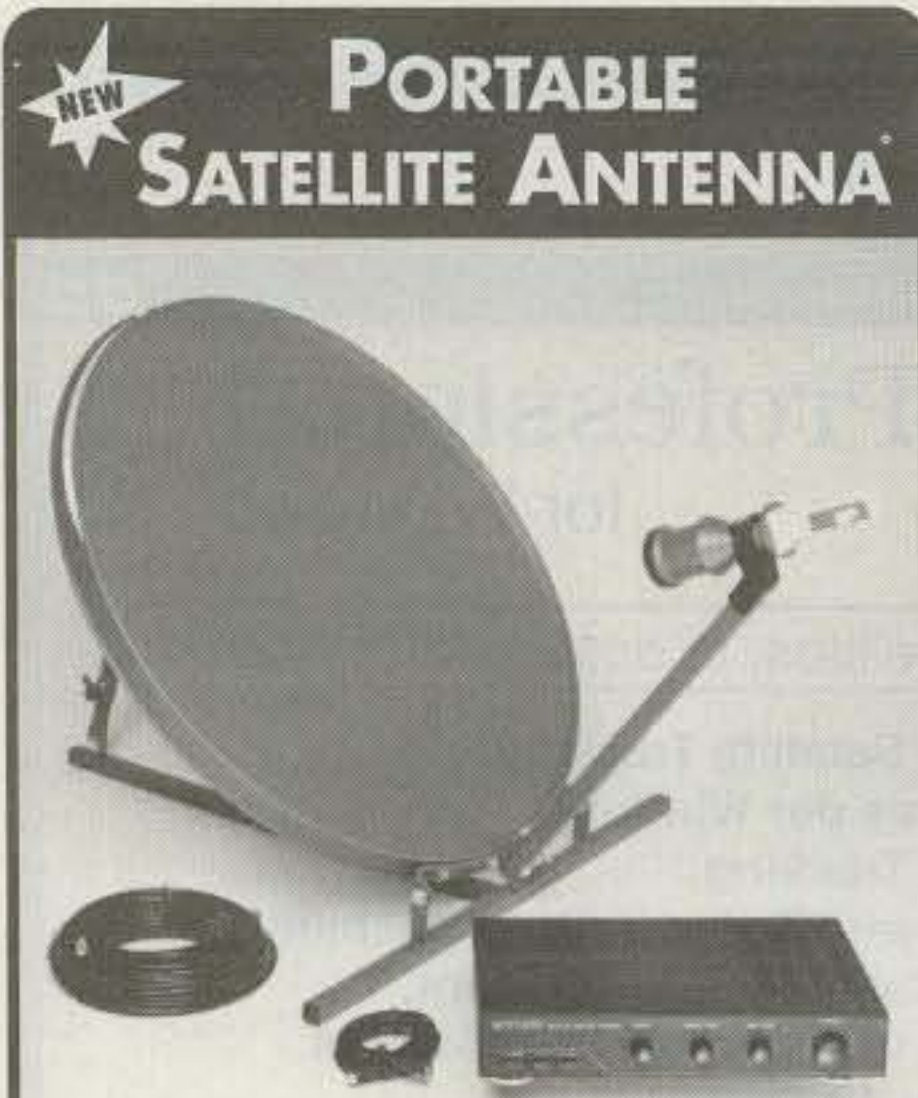
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**HOW TO USE THE SHORT-SKIP CHARTS**

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 160 meter openings. A \*\* indicates possible 10 meter openings.

2. The *propagation index* is the number that appears in ( ) after the time of each predicted opening. In 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 A.M.; 13 is 1 P.M., 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 N.Y. and Texas, the time at the midpoint would be CDT, etc. Times shown in the Hawaii chart are in HST. To convert to daylight time in other USA time zones, add 3 hours in the PDT zone; 4 hours in the MDT zone; 5 hours in the CDT zone, and 6 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 15 or 3 P.M. in Los Angeles; 18 or 6 P.M. 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 7 hours in the PDT zone; 6 hours in the MDT zone; 5 hours in the CDT zone and 4 hours in the EDT zone. For example, at 20 GMT it is 16 or 4 P.M. in N.Y.C.

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**  
**May & June 1995**  
**Local Daylight Savings Time**  
**At Path Midpoint**

Band (Meters)	Distance Between Stations (Miles)			
	50-250	250-750	750-1300	1300-2300
10	Nil	08-09 (0-1) 09-13 (0-2) 13-17 (0-1) 17-21 (0-2) 21-23 (0-1)	08-09 (1) 09-13 (2) 13-17 (1-2) 17-21 (2) 21-23 (1) 23-07 (0-1)	08-09 (1-0) 09-21 (2-0) 21-23 (1-0) 23-07 (1-0)
15	Nil	07-09 (0-1) 09-13 (0-2) 13-17 (0-1) 17-21 (0-2) 21-00 (0-1)	07-09 (1-2) 09-13 (2-3) 13-17 (1-2) 17-19 (2-3) 19-21 (2) 21-00 (1) 00-07 (0-1)	07-09 (2-0) 09-13 (3-1) 13-17 (2-1) 17-19 (3-1) 19-21 (2-0) 21-07 (1-0)
20	Nil	07-09 (0-2) 09-12 (0-3) 12-17 (0-4) 17-19 (0-3) 19-23 (0-2) 23-07 (0-1)	07-08 (2) 08-09 (2-3) 09-12 (3-4) 12-17 (4) 17-19 (3-4) 19-20 (2-4) 20-21 (2-3) 21-23 (2) 23-07 (1)	07-08 (2) 08-09 (3-2) 09-15 (4-2) 15-17 (4-3) 17-20 (4) 20-21 (3) 21-23 (2) 23-07 (1)
40	08-10 (0-2) 10-16 (1-4) 16-18 (2-4) 18-20 (1-3) 20-22 (0-2) 22-08 (0-1)	08-10 (2-4) 10-15 (4-2) 15-16 (4-3) 16-19 (4) 19-20 (3-4) 20-22 (2-3) 22-08 (1-2)	08-09 (4-3) 09-10 (4-2) 10-15 (2-1) 15-16 (3-1) 16-19 (4-2) 19-20 (4) 20-22 (3-4) 22-01 (2-4) 01-03 (2-3) 03-08 (2)	08-09 (3-1) 09-10 (2-1) 10-16 (1-0) 16-19 (2-1) 19-20 (4-3) 20-01 (4) 01-03 (3) 03-06 (2) 06-08 (2-1)
80	08-10 (4) 10-18 (4-3) 18-20 (4) 20-22 (3-4) 22-00 (2-4) 00-06 (2-3) 06-08 (3-4)	08-10 (4-1) 10-16 (3-0) 16-18 (3-1) 18-20 (4-2) 20-00 (4) 00-06 (3-4) 06-08 (4-3)	08-09 (1) 09-10 (1-0) 09-10 (1) 21-23 (1) 23-01 (2-1) 01-04 (3-2) 04-07 (2) 07-08 (1)	08-09 (1-0) 09-18 (0) 18-20 (1-0) 20-22 (3-2) 22-02 (4-3) 02-06 (3-2) 06-08 (2-1)
160	06-09 (4-1) 09-10 (2-0) 10-19 (1-0) 19-21 (3-1) 21-23 (4-2) 23-06 (4-3)	06-09 (1) 09-19 (0) 19-21 (1-0) 21-23 (2-1) 23-01 (3-2) 01-04 (3)	08-09 (1-0) 09-21 (0) 21-23 (1) 23-01 (2-1) 01-04 (3-2) 04-07 (2) 07-08 (1)	08-21 (0) 21-01 (1) 01-04 (2) 04-06 (2-1) 06-07 (1) 07-08 (1-0)

winter months. A considerable increase is expected in sporadic-E ionization during the month, and this should result in more frequent short-skip openings on the HF bands, and on 6 meters as well. A seasonal increase in the static level is also normal for May.

**10 Meters:** Very few DX opportunities are expected on this band during the present period of very low solar activity. An occasional opening may be possible towards South America during the afternoon hours, when conditions are High Normal or better. Frequent short-skip openings between distances of approximately 750 and 1400 miles, however, should be possible on many days.

**12 Meters:** Much the same pattern as on 10 meters is expected. Since this is a lower frequency range, the band can be expected to open a bit more often than will 10 meters and stay open for an hour or so longer.

**15 Meters:** A seasonal decrease in DX openings on this band is normal for May and the summer months, but some fairly good openings to many parts of the world

still should be possible during the hours of daylight. The afternoon hours should be best for DX possibilities. Numerous short-skip openings between approximately 600 and 2300 miles should be possible on many days.

**17 Meters:** The propagation pattern should be similar to 15 meters. With decreasing solar activity and summertime propagation conditions in the northern hemisphere, the somewhat lower frequency range of this band may well prove to be a propagation asset. On many days when conditions will not permit 15 meters to open, check this band for openings. When 15 meters does open, expect the same opening on 17 meters, but the band should remain active up to an hour after 15 meters closes. When compared to 20 meters, daytime openings may be similar, but often signals will be stronger on 17 meters.

**20 Meters:** This is expected to be the best band for DX during May. Opening shortly after sunrise, good DX conditions can be expected to one area of the world or another through most of the daylight

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**ALASKA**  
May & June 1995  
Openings Given in GMT #

To:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	Nil	20-02 (1)	22-00 (1) 00-02 (2) 02-04 (3) 04-05 (2) 05-06 (1) 10-12 (1) 12-14 (2) 14-16 (1)	Nil
Central USA	Nil	21-04 (1)	22-02 (1) 02-03 (2) 03-05 (3) 05-06 (2) 06-07 (1) 12-13 (1) 13-15 (2) 15-16 (1)	08-12 (1)
Western USA	Nil	20-23 (1) 01-03 (1) 03-05 (2) 05-06 (1)	00-02 (2) 02-04 (3) 04-07 (4) 07-08 (3) 08-09 (2) 09-15 (1) 15-18 (2) 18-00 (1)	07-09 (1) 09-14 (2) 14-15 (1) 11-13 (1)*

**HAWAII**  
May & June 1995  
Openings Given in  
Hawaiian Standard Time #

To:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	Nil	12-15 (1) 15-17 (2) 17-19 (1)	13-15 (1) 15-17 (2) 17-19 (3) 20-04 (2) 04-08 (1)	19-20 (1) 20-23 (2) 23-02 (1) 21-23 (1)*
Central USA	Nil	12-15 (1) 15-18 (2) 18-20 (1)	15-16 (2) 16-17 (3) 17-19 (4) 19-20 (3) 20-22 (2) 22-04 (1) 04-05 (2) 05-07 (3) 07-09 (2) 09-15 (1)	19-20 (1) 20-21 (2) 21-01 (3) 01-02 (2) 02-04 (1) 20-21 (1)* 21-00 (2)* 00-03 (1)*
Western USA	13-17 (1)	09-12 (1) 12-15 (2) 15-17 (3) 17-18 (2) 18-20 (1)	06-08 (4) 08-16 (3) 16-19 (4) 19-20 (3) 20-22 (2) 22-05 (1) 05-06 (2)	18-19 (1) 19-20 (2) 20-22 (3) 22-02 (4) 02-04 (3) 04-05 (2) 05-07 (1) 19-20 (1)* 20-22 (2)* 22-02 (3)* 02-04 (2)* 04-05 (1)*

\*Indicates best time to listen for 160 Meter openings.  
\*\*Indicates best time for 10 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.

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.

hours and well into the hours of darkness. Peak conditions are expected during the sunrise period and again during the late afternoon and early evening. Expect excellent short-skip conditions, often with exceptionally strong signal levels, between distances of approximately 350 and 2300 miles. Quite often, particularly during the late afternoon and early evening, optimum

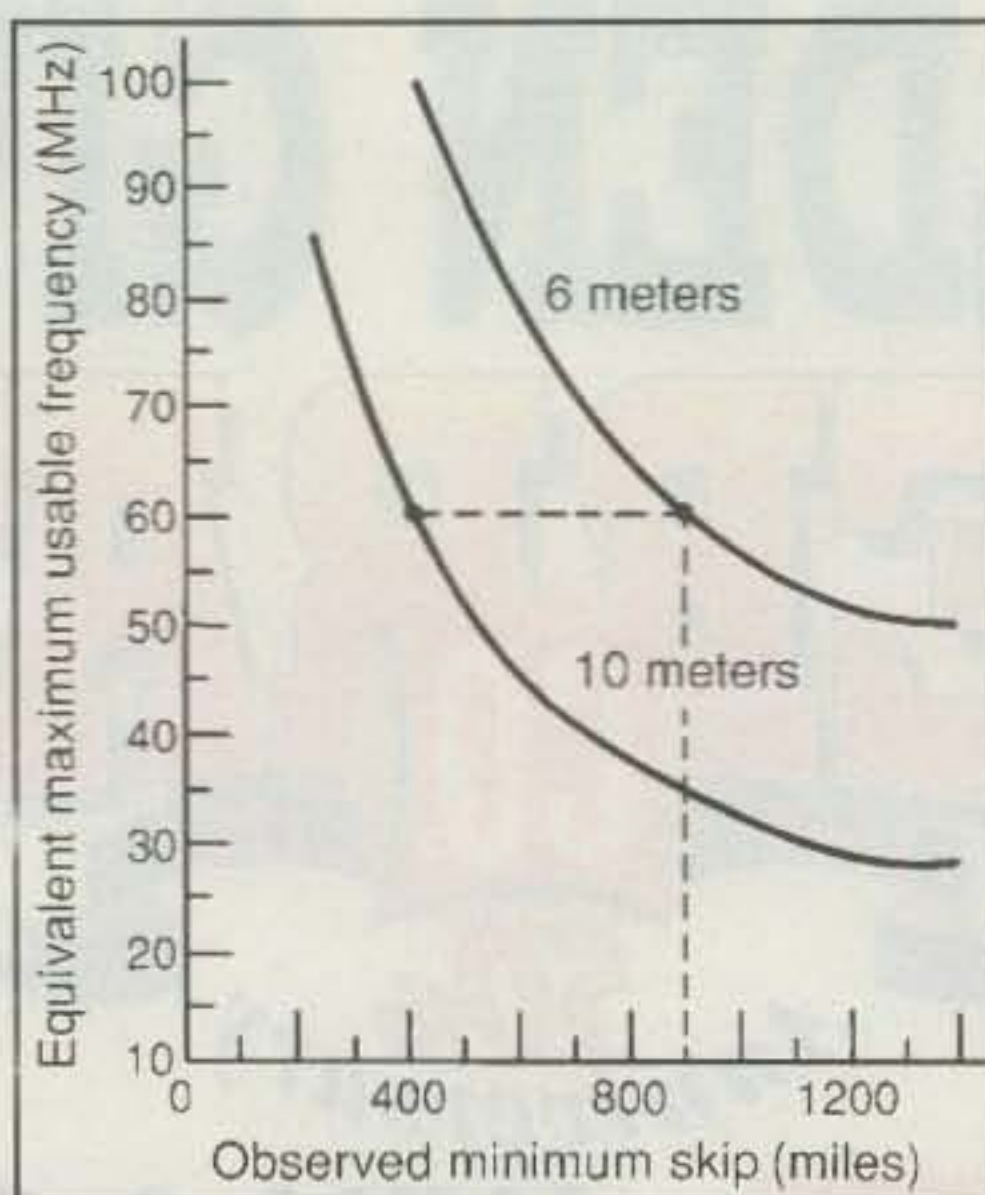


Fig. 2- How to predict 6 meter short-skip openings.

conditions will exist for both short and long skip, and stations a few hundred miles away will be heard at the same time as DX stations several thousand miles away, causing considerable QRM!

**30 Meters:** This can be another propagation asset during the summer months. Peak openings are expected during the nighttime hours, much like 40 meters, but often with higher signal levels and somewhat lower noise levels.

**40 Meters:** Fewer DX openings are expected because of the shorter hours of darkness and the higher levels of static expected in the northern hemisphere during May. However, some good openings to many areas of the world should still be possible during the hours of darkness and the sunset and sunrise periods. Good daytime short-skip openings also should be possible for distances ranging between approximately 150 and 750 miles, with nighttime openings extending up to the one-hop limit of 2300 miles.

**80 Meters:** A considerable decline in DX possibilities is expected during May because of the shorter hours of darkness and seasonal increase in static levels. Some fairly good DX opportunities should continue to occur, however, for openings to many areas of the world during the hours of darkness and the sunrise period. Weak signals will often be masked by high static levels. Excellent short-skip openings should be possible during the daylight hours over distances of approximately 50 to 250 miles. During the hours of darkness short-skip openings should increase up to approximately 2300 miles. Short-skip propagation also may often be marred by high static levels.

**160 Meters:** Propagation conditions on this band have passed their seasonal peak and will be on the decline until early fall. Openings up to distances of at least 1000 miles should still be possible during the

hours of darkness, and over considerably greater distances at times when static levels are low.

**VHF Ionospheric Openings**

Sporadic-E ionization should increase considerably this month, and some fairly good 6 meter openings should be possible between approximately 1000 and 1400 miles. These openings are most likely to occur between 10 AM and 2 PM and between 6 and 10 PM local daylight time, although they can also occur at other times. During periods of intense and widespread sporadic-E ionization, two-hop openings considerably beyond 1400 miles may occasionally occur on 6 meters, and openings between approximately 1200 and 1400 miles may be possible on 2 meters!

Here's a useful tip for predicting 6 meter short-skip openings from observations made on 10 meters. The geometry of propagation is such that as the skip distance decreases on 10 meters, the highest frequency that will be reflected by sporadic-E ionization increases. By observing the minimum skip heard on 10 meters, and using the relationship shown in fig. 2, it should be possible to tell whether or not 6 meters is open and over what distance.

For example, if the minimum skip heard on 10 meters in a south-westerly direction is observed to be 400 miles (it's the distance to the nearest skip station that counts, not others), from fig. 2 the intersection between 400 miles and the 10 meter curve corresponds to an MUF of 60 MHz. This means that there is a very good chance that 6 meters should also open in the same general direction. The minimum skip distance that can be expected on 6 meters can be found from fig. 2 by locating the intersection between 60 MHz and the 6 meter curve. The resulting 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, the chances are very good that 6 meters will also open in the same general direction.

The *Eta Aquarids* meteor shower should intersect the earth's atmosphere between May 4th and 6th. This is a major meteor shower, and it should reach maximum intensity during the afternoon of May 5th, with a predicted hourly meteor count in excess of 20. Chances are excellent for meteor-burst openings during the period of the shower.

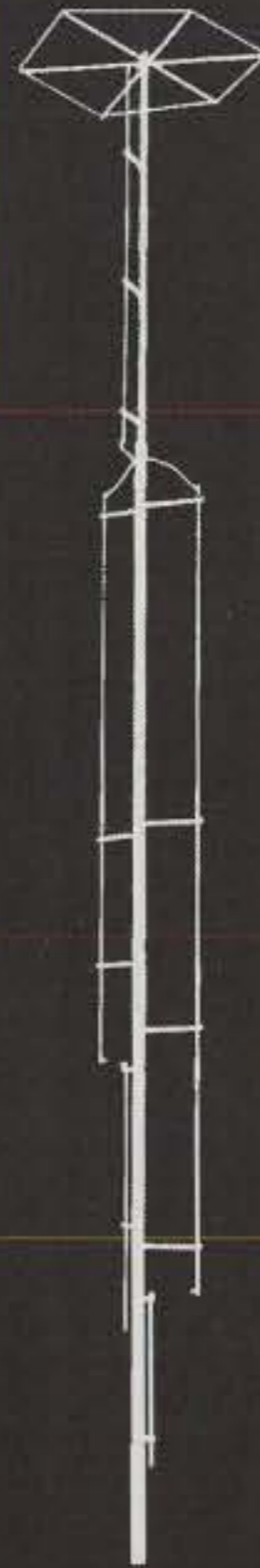
While there is generally little auroral activity during May, some displays could occur during periods of radio storminess. Check the Last Minute Forecast at the beginning of this column for those days that are likely to be Below Normal or Disturbed during May.

73, George, W3ASK



# GAP: THE PERFECT ANTENNA

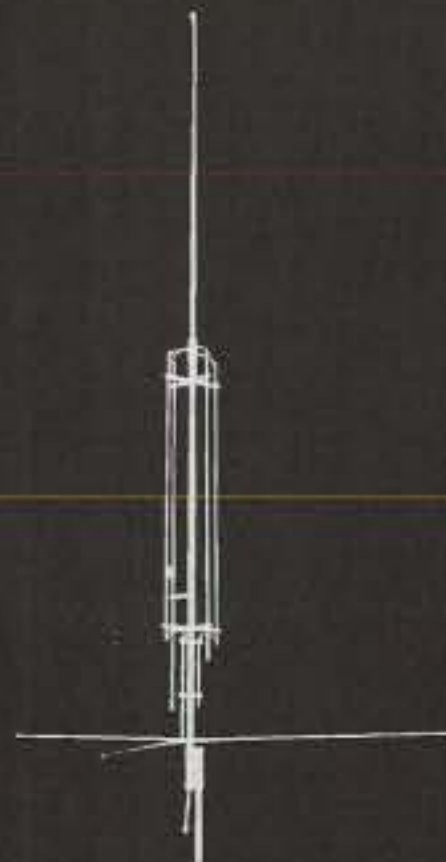
We at GAP realize there isn't a perfect antenna. No singular antenna will scream DX on 80 and be the best for local nets on 10. If anyone tells you there is, beware! The perfect antenna does not exist, but the right one for you may. If you want something to bust the pile on the low bands, then consider the Voyager. Just starting out in ham radio and need a great general coverage antenna, the Challenger is easy to assemble and for little effort will yield superior performance, especially on DX. Maybe you knowingly or unknowingly moved into one of those "restricted areas" where the Eagle's limited visibility, but unlimited ability is desired.



Voyager DX



Challenger DX



Eagle DX

This chart helps you select the right GAP antenna. When comparing GAPs, bandwidth is not a concern. With few exceptions, a GAP yields continuous coverage under 2:1 for the **ENTIRE BAND**.

All antennas utilize a GAP elevated asymmetric feed. A major benefit is the virtual elimination of the earth loss, so more RF radiates into the air instead of the ground. This feed is why a GAP requires **NO RADIALS**. Just as elevating a GAP offers no significant improvement to its performance, adding radials won't either, making set up a breeze.

**A GAP antenna has no traps, coils or transformers.** This is important. The greatest sources of failure in multiband antennas are these devices. Perhaps you heard someone discuss a trap that had melted, arced or became full of water. Improvements to these inherent problems are the focus of the antenna manufacturer, while the basic design of the antenna remains unchanged. **GAP improved the trap by eliminating it!** Removing these devices means they don't have to be tuned and, more importantly, won't be detuned by the first ice or rain. The absence of these devices improves antenna reliability, stability and increases bandwidth.

Another major advantage to a GAP antenna is its **NO TUNE** feature. Screws are simply inserted into predrilled holes with a supplied nutdriver.

The secret is out and people in the know say:

**CQ**—"The GAP consistently outperformed base-fed antennas...and was quieter."

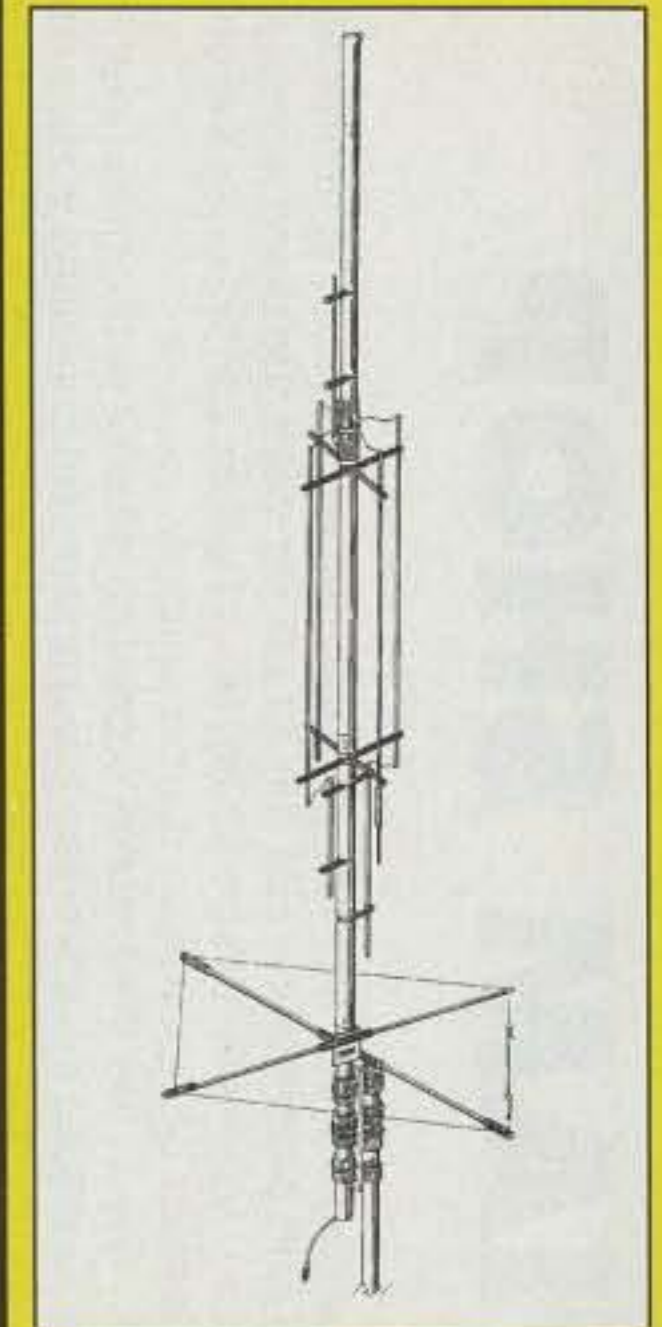
**73**—"This is a real DX antenna, much quieter than other verticals."

**RF**—"To say this antenna is effective would be a real understatement. Switching back and forth on 40m between another multiband HF vertical and the GAP, there was no comparison. Signals were always stronger on the GAP, sometimes by S units, not just DBs."

**Worldradio**—"These guys have solved the problem associated with verticals. That is, an awful lot of RF is wallowing around and dropping into the dirt instead of going outward bound. A half-wave vertical does need radials if it is end fed (at the bottom). But the same half-wave vertical does not (as much, hardly at all) if it is fed in the center."

**IEEE**—"Near field and power density analyses show another advantage of this antenna (asymmetric vertical dipole): it decreases the power density close to the ground, and so avoids power dissipation in the soil below it. The input impedance is very stable and almost independent of ground conductivity. This antenna can operate with high radiation efficiency in the MF AM standard broadcast band, without the classical buried ground plane, so as to yield easier installation and maintenance."

## New Release: TITAN DX



This all purpose antenna is designed to operate 10m-80m, WARC bands included. It sits on a 1-1/4" pipe and can be mounted close to the ground or up on a roof. Its bandwidth and no tune feature make it an ideal antenna for the limited space environment as well as a terrific addition to the antenna farm.

MODEL	BANDS OF OPERATION											HT	WT	MOUNT	COUNTER-POISE	COST
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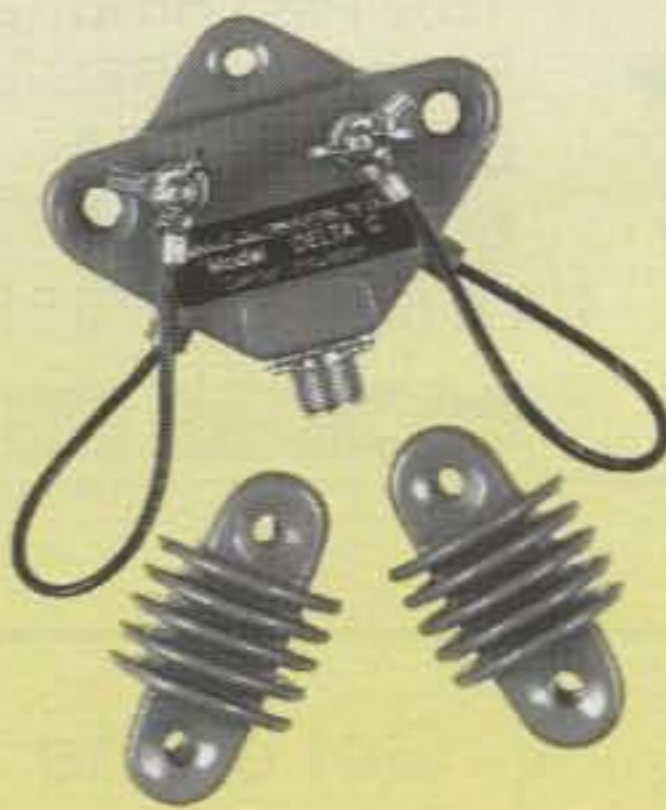
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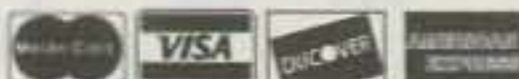
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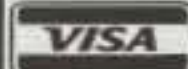
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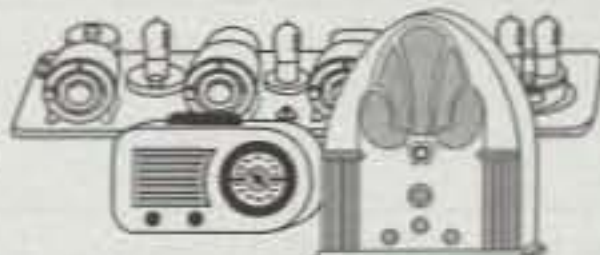
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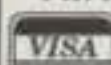
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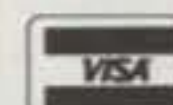
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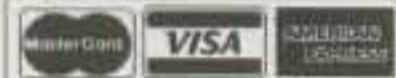
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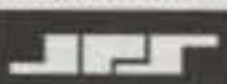
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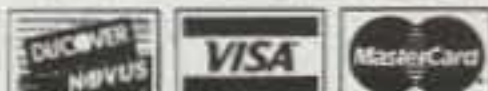


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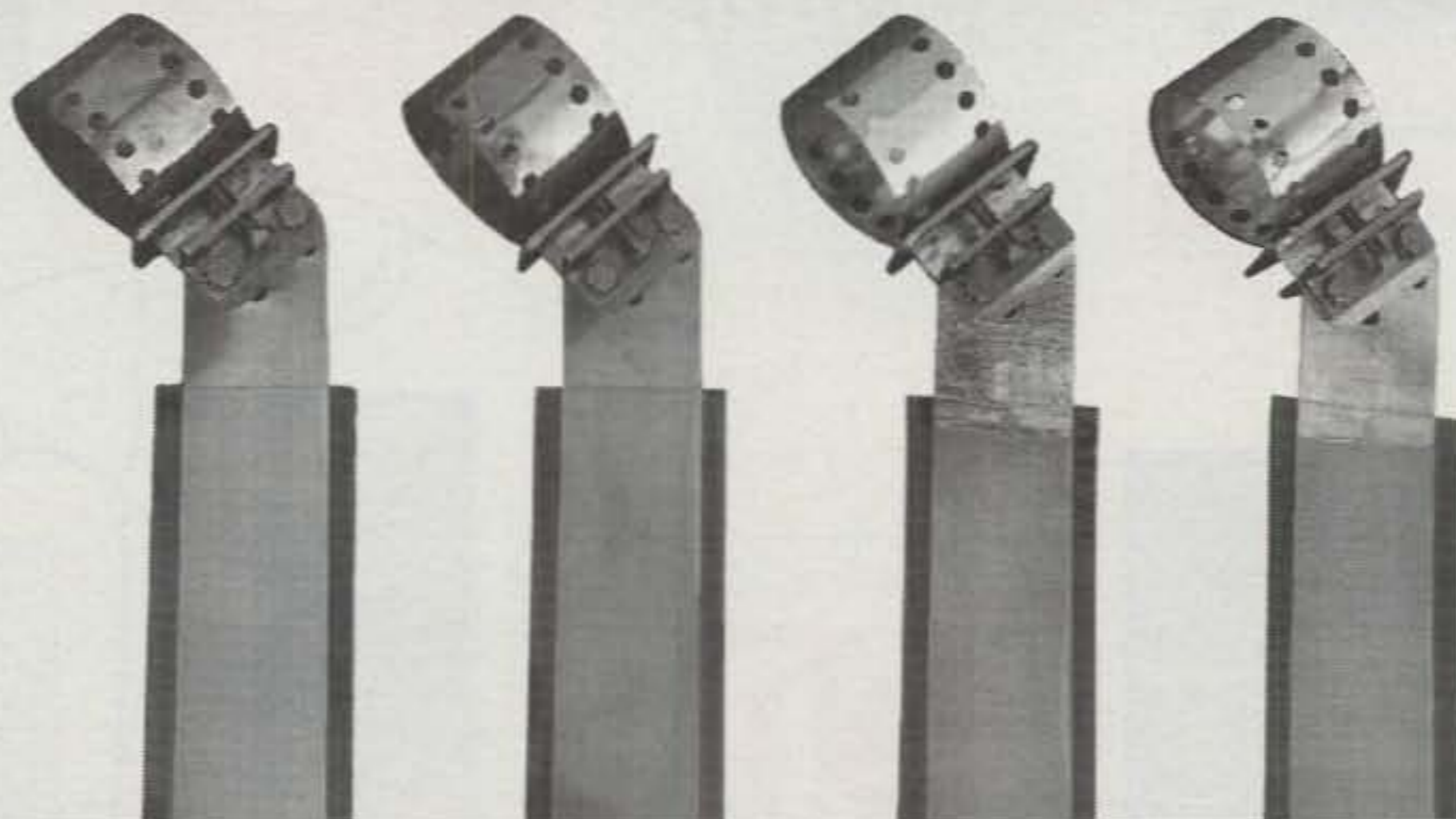
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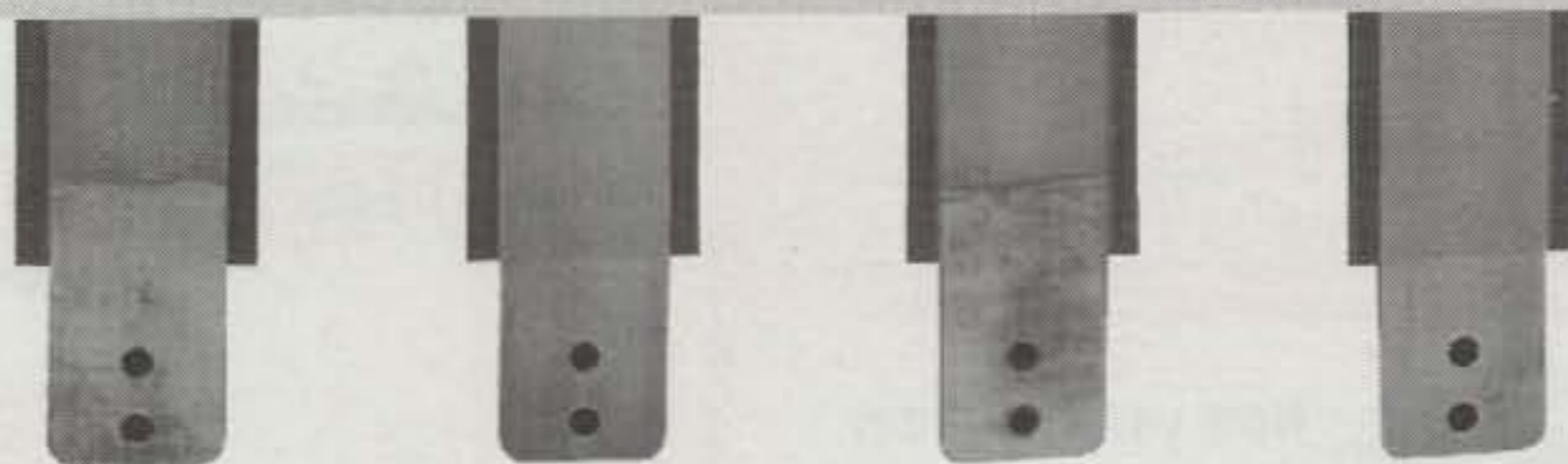
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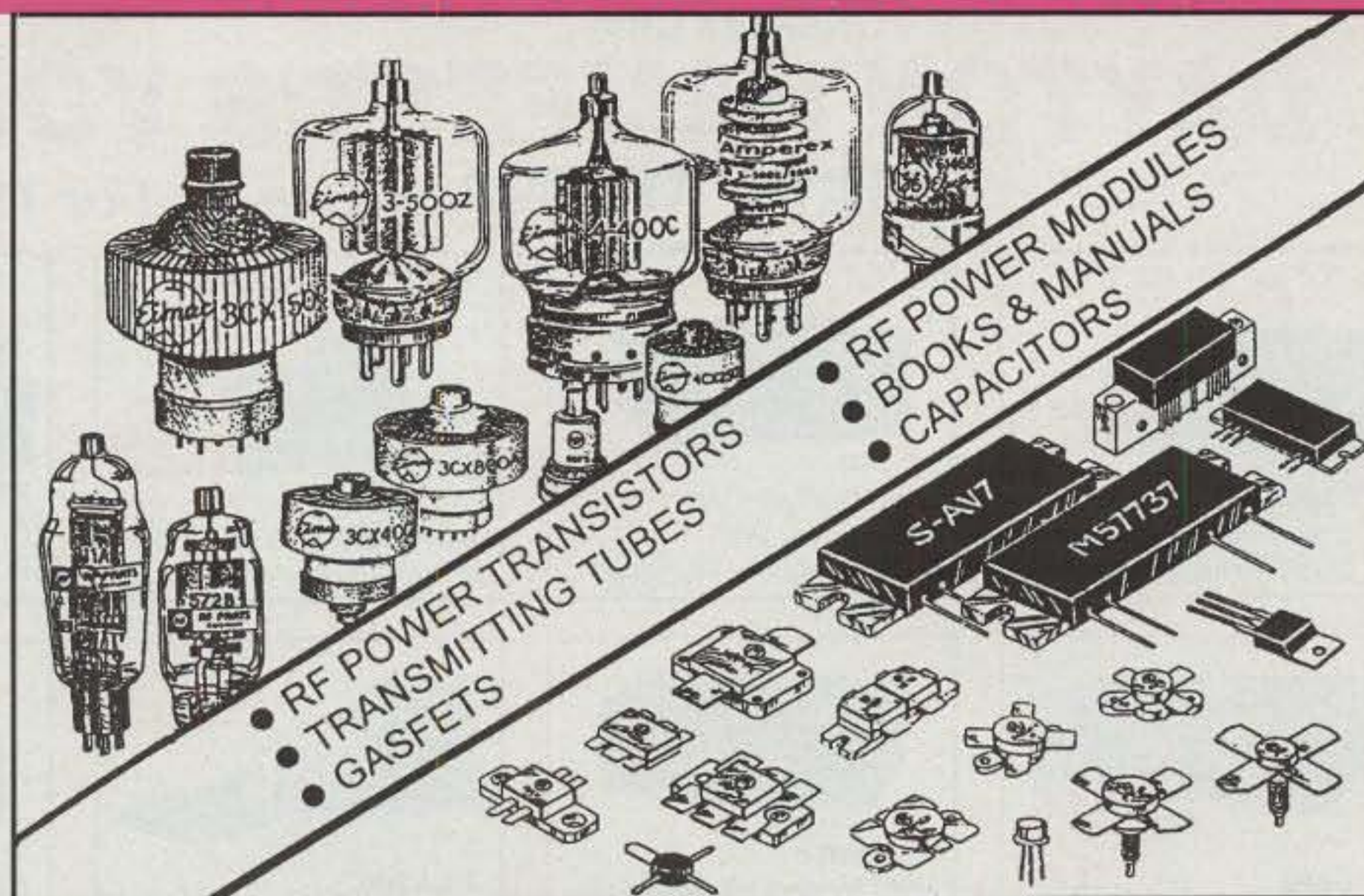
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New Compact HF Transceiver

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**FT-11R**  
2 Meter, FM Handheld. World's Smallest Size HT With Full Sized Keyboard

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**STANDARD**

**C568A**  
2M/70cm/23cm Handheld Worlds Smallest Tri-Band

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1768	\$ 45	815B	\$ 59
1786	\$249	817	\$ 69
1796	\$165	8621	\$108
1798	\$229	9020	\$144
209	\$ 94	9420	\$179
249	\$165	934	\$144
259	\$188	949E	\$119
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**C188A**  
Ultra Thin 2 Meter FM HT, 200 Memory Channels, Keyboard Under A Slide-Cover Plus Wakeup Feature



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2 M, 440MHz Mobile Packet Ready

9600 Baud Packet Ready From The Box. 50W On 2M, 40W On 440MHz



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NEW HF

# Compact HF Transceiver FT-900AT

## Introducing an HF that's going places.

"With the small snap-off remote front panel design, it's an HF mobile."



"It's a great base, too. Direct keypad entry, built-in antenna tuner, CW keyer with adjustable speed, 100 Watts, Omni-Glow display... Wow!"

"Yaesu did it again!"

speech processor, twin stacking VFOs, and IF Shift and Notch. No competitor offers this! Bonuses, such as signal



The FT-900AT controls mount almost anywhere in your car, truck or camper. 100 Watt RF deck can mount in trunk, or under seat.

Uncompromising HF quality that will change your lifestyle. It's the first transceiver with true HF technology to go mobile in any vehicle or stay at home as a compact base station.

With its revolutionary, small, snap-off remote panel, the controls of the FT-900AT can install almost anyplace in your car, truck or camper. Since the 100 Watt RF deck can be installed under a seat or in your car trunk, it's away from critical automotive electronic wizardry. And, for ultimate convenience, the built-in antenna tuner simplifies in-car operation.

As a base station, the compact full function FT-900AT includes direct keypad entry for pinpoint accuracy during quick band/frequency changes. Other features you'll like include CW keyer with front panel speed adjustment,



Remote front panel control head measures only 2-1/4"H x 9-1/8"W x 1-1/4" D.

strength, power output, SWR and ALC digital meters, add value to the FT-900AT, and the proven duct-flow cooling system provides excellent long-term transmit power output reliability and frequency stability. For ease of use, Yaesu's exclusive Omni-Glow display enhances viewing in any light condition. And, since the high speed antenna tuner is built-in, it means less clutter in your shack.

For sheer high-performance, anywhere, the incomparable FT-900AT ranks with the FT-1000 to further establish Yaesu as the choice of the world's top DX'ers.

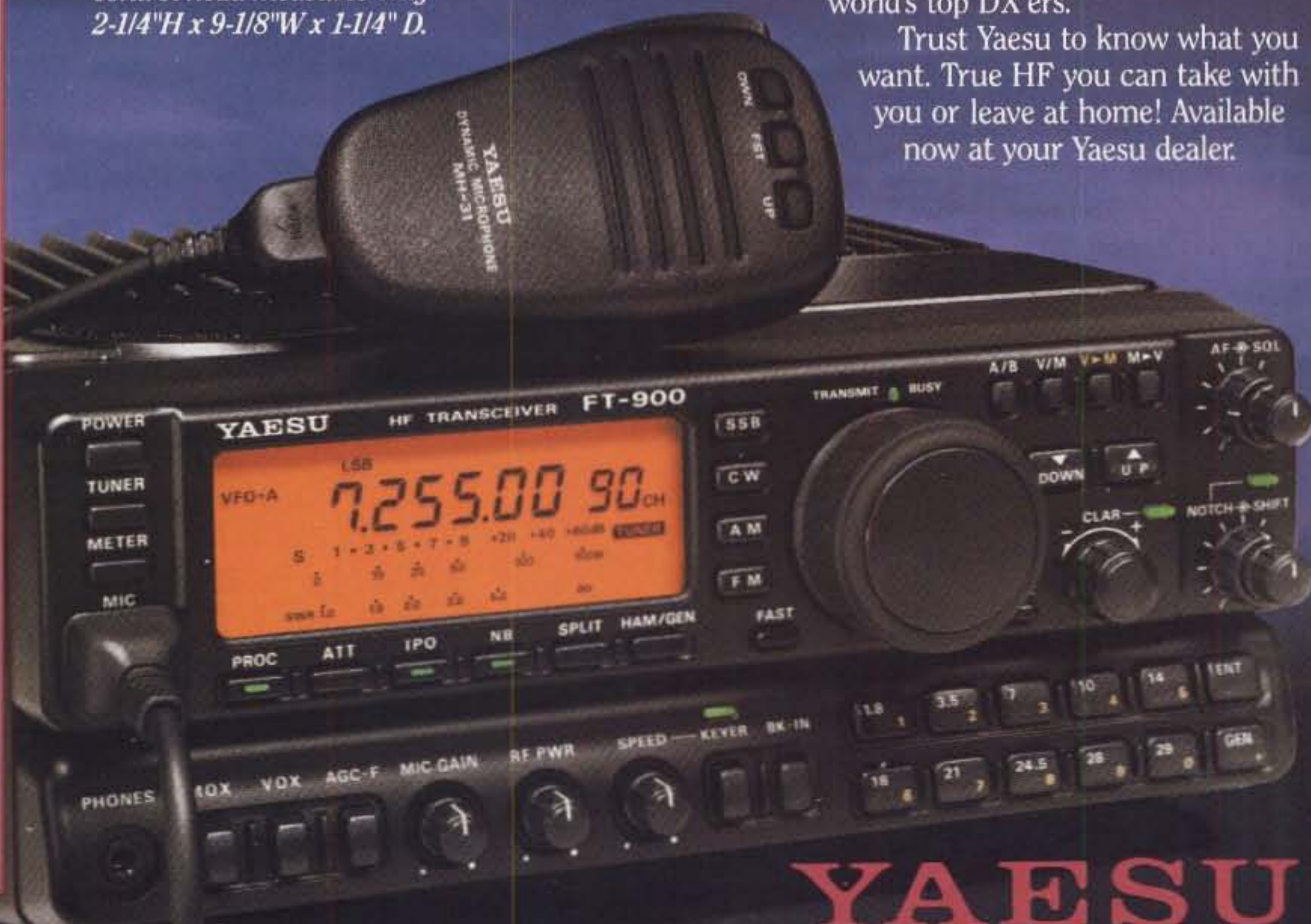
Trust Yaesu to know what you want. True HF you can take with you or leave at home! Available now at your Yaesu dealer.

### Specifications

- Remote Front Panel Design
- Built-In Auto Antenna Tuner
- Direct Keypad Entry when used as a Base Station
- Large, Bright Omni-Glow™ LCD Display
- 100W on SSB, CW, FM modes; 25W on AM
- IF Shift and 30db Notch Filter
- Digital S/RF, SWR & ALC Meters
- Programmable CTCSS Encode w/Repeater Offset
- Direct Digital Synthesis (DDS)
- 100 Memory Channels
- Frequency Range  
RX: 100 kHz-30 MHz  
TX: 160-10 meters
- CW Full Break-in Keying w/ Adjustable Speed
- Fast/Slow AGC Circuit
- Intercept Point Optimization
- Duct Flow Cooling System
- Twin Band Stacking VFOs
- Built-in Noise Blanker
- Built-in Adjustable Speech Processor

#### ACCESSORIES:

- YSK-900 Remote Mount Kit
- MMB-62 Controller Bracket
- MMB-20 Mobile Mtg. Bracket
- SP-7 Mobile External Spkr.
- SP-6 Base Station External Spkr.
- DVS-2 Digital Voice Recorder
- FP-800 20A HD Power Supply
- YH-77ST Headphone



# YAESU

Choice of the World's top DX'ers

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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.

# Dual Band Mobile FT-8500



## Specifications

- **Frequency Coverage:**  
2m RX: 110-174 MHz  
TX: 144-148 MHz  
70 cm RX: 420-500 MHz  
TX: 430-450 MHz
- Spectra-Analyzer™ w/adjustable signal width, spacing & span markers
- 6-Character Alpha-Numeric Display
- 110 Memories (in 5 memory banks)
- Omni-Glow™ Display
- Digital voltage display
- Selectable 1200/9600 baud
- 3-Level Auto-Mute w/Mute Timer
- V+V, U+U, V+U Dual Receive
- 3 Power Output Levels  
2 m 50/10/5 Watt  
70 cm 35/10/5 Watt
- Built-in Auto Power Off (APO) and Time-out Timer (TOT)
- MIL-STD 810/C Rating
- 9 Memory DTMF Autodialer
- Handy Cloning Feature
- 3 Scanning Modes w/ Clear Scan
- Adjustable LCD Contrast/Brightness Control
- **Accessories:**  
Consult your local Yaesu dealer.

Yaesu again demonstrates their world leadership position in 2-way radio communications with the introduction of the FT-8500 and Smart Controller™ Microphone. The deluxe, compact FT-8500 defines "high-tech" in mobile engineering. Just four simple flicks of the Smart Controller™ Microphone "joystick"-type lever, and you command frequencies, memories and every adjustment you need. Over 50 separate functions from the palm of your hand!

The Smart Controller™ Microphone isn't the only engineering advancement in the FT-8500. Watch the unique Spectra-Analyzer™ exhibit station activity above and below your current operating channel. Search out signal activity, then QSY direct for a QSO! See the digital voltage read-out monitor your car battery voltage big and bold in the Omni-Glow™ display. Work V+V, U+U or V+U frequencies and view custom alpha-numeric messages at the same time. There are other great features, too! Like handy cloning, selectable 1200/9600 baud, and a rear-panel data jack for packet! All of this and more in the ultimate deluxe, compact FT-8500 dual band mobile.

See the extraordinary FT-8500 Dual Band Mobile at your Yaesu dealer today, and find out how this dramatic change will affect mobile technology for you from this day forward.

## FT-5100 Unbeatable Value!

Specifications: Frequency Coverage: 2 m-130-174 MHz RX, 144-148 MHz TX, 70 cm-430-450 MHz RX/TX • 94 Memories (47 per band) • Dual in-Band Receive, V+V, U+U, V+U • DTMF Paging & Coded Squelch • Packet Radio TNC Jack • CTCSS Encode built-in • Built-in Antenna Duplexer • Back-lit DTMF Mic • Automatic 8-Level Display Dimmer • RF Power: 2 m: 50/5 W (high/low), 70 cm: 35/5 W (high/low).  
Accessories: See your authorized Yaesu dealer.



**FT2500M/7400H**  
2 m or 70 cm  
Rugged Mil Spec.

**FT-2200/7200**  
2 m or 70 cm  
Fits anyplace!



# YAESU

Performance without compromise.™



**NEW  
DUAL BAND**

# Never before has Yaesu technology changed an industry so dramatically.

Rear-panel data jack for packet with 6-pin connections for Data Input, PTT, 9600 bps and 1200 bps Receive Data, Squelch Status, Ground.



"With the Smart Controller Mic, all the radio functions are in your hand."

"And, look, the digital voltage readout monitors my car battery voltage!"



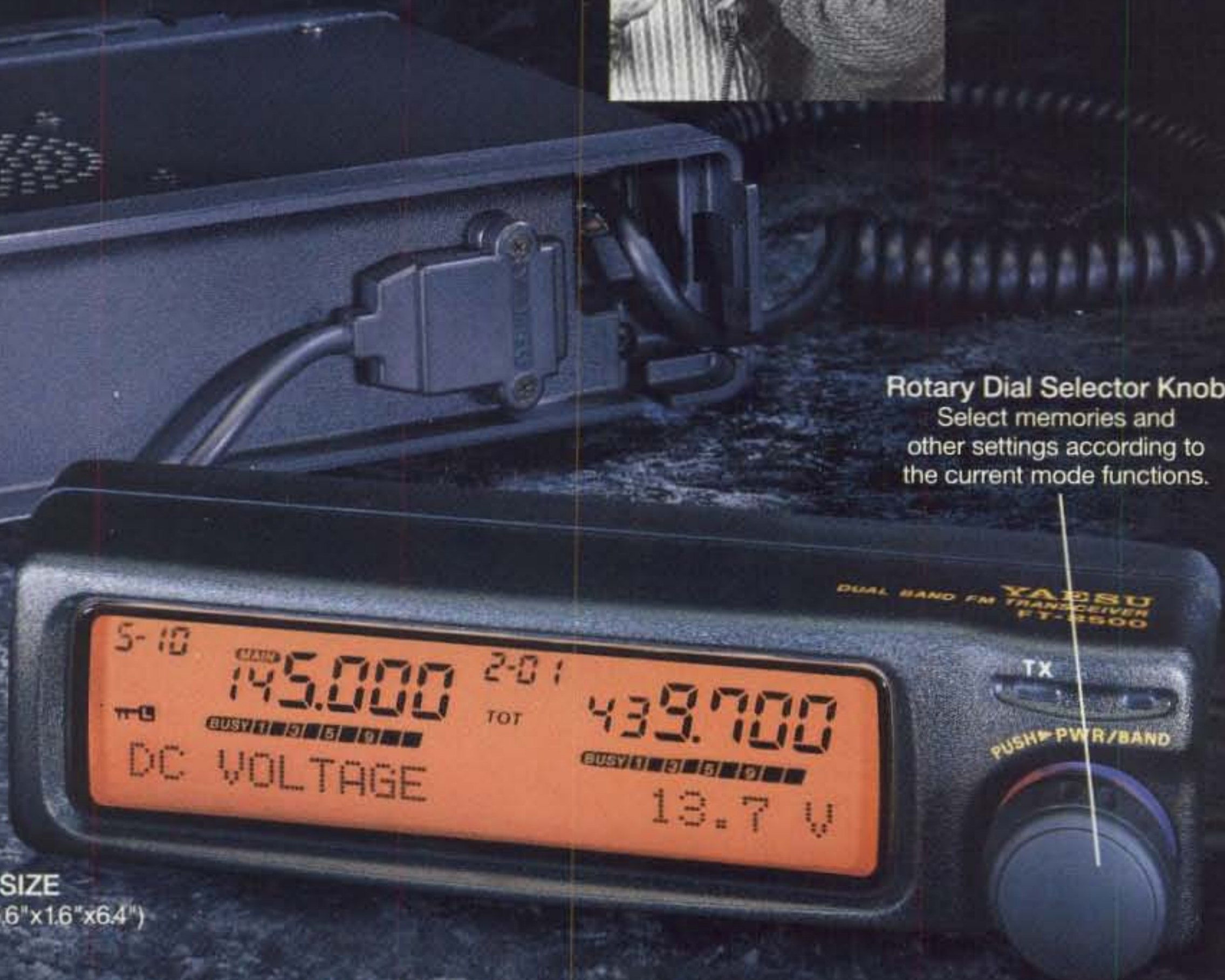
"Spectra-Analyzer lets me check out channel activity in UHF, VHF, and keep track of my favorite repeaters, too."

"Yaesu did it again!"

### Rotary Dial Selector Knob

Select memories and other settings according to the current mode functions.

**ACTUAL SIZE**  
140x40x160mm (5.6"x1.6"x6.4")



### Omni-Glow™ LCD Dual-Band Display

**VHF&VHF, UHF&UHF, VHF&UHF**  
Select three dual band configurations. Display settings are accessible from the Smart Controller™ Microphone "joystick"-type lever and keys, and the front panel Rotary Dial knob.

**Unique Spectra-Analyzer™** displays station activity above and below the current operating channel in the Dial (VFO) mode. Use Spectra-Analyzer™ to search out signal activity, then QSY direct for a QSO.

**Programmable XCVR Status Display**  
Another Yaesu exclusive, the built-in digital voltage display, monitors automobile battery voltage.



**Menu Programming/Custom Settings**  
The menu loop contains 13 headings and a total of 53 entries encompassing most functions and settings. 6-character alpha-numeric display is located below the frequency window.

**In Memory Recall (MR) mode**, all programmed channels within a selected memory bank (up to ten channels) are displayed. In both Dial and MR, the display shows relative signal strength of all monitored stations.

**Menu-Selectable Packet Baud Rate**  
Select 1200 or 9600 bps packet operation from the user menu. Move unique Smart Controller™ Microphone "joystick"-type lever left to right to select.

## IC-775<sup>†</sup>/IC-775DSP

Pull out signals no one else can!

- New ICOM DSP technology
- MOS FET PA with 200 watts
- Built in power supply & antenna tuner
- Dual receivers with independent dials and lock
- DDS (Direct Digital Synthesis)
- Advanced interference rejection features, twin PBT, IF notch, the works!

## IC-736/IC-738

Expand your HF horizons

- IC-736 – HF, 6M, built-in power supply
- IC-738 – HF, DC power supply required
- New DDS (Direct Digital Synthesis)
- 100 watts SSB, CW, FM / 40 watts AM
- High speed automatic tuner
- 100% full duty cycle (IC-736)
- Quick-split operation

## IC-2350H<sup>†</sup>

Mobile 2M (50W)+440 (35W)

- Wide band Rx (118–174 MHz)
- Independent tuning knobs
- 100 memory channels
- Remote control mic (opt. UT-101)
- Tone scan (optional UT-89)

# ICOM

## THE NEXT GENERATION

**NEW!**

# IC-706<sup>†</sup>

Incredibly small  
HF/UHF all-mode transceiver  
100W on HF & 6M  
and 10W on 2M!

- Receive 30 kHz – 200 MHz!
- Removeable, remoteable front panel allows control of all features
- Large LCD display featuring alphanumeric memory names and soft key descriptions
- User friendly design with big, easy to control dials
- First ever! Nothing else like it!

## IC-2000H

Superior wideband reception (118 – 174 MHz)!

- 2 meter FM mobile 50 watts
- Large alphanumeric display
- 50 memory channels
- Alphanumeric ID
- Rugged aluminum frame

## IC-W31A<sup>†</sup>/IC-Z1A

Powerful new dual banders

- IC-Z1A comes with a radical new removeable remote control panel
- Alphanumeric memory display, message and paging
- Independent tuning knobs
- Impressive audio
- Backlit display and keypad

## IC-T22A<sup>†</sup>/IC-T42A<sup>†</sup>

Shirt pocket small, ultra-slim and BIG crisp audio

- 5 watts of power (at 13.5V DC)
- 40 memory channels with auto "log-in" feature
- Direct 12V operation (4.5-16 volts)
- Affordable price



IC-705/IC-706



IC-T22A/IC-T42A



IC-2000H



IC-2350H



IC-W31A

IC-Z1A



IC-736/IC-738



IC-775/IC-775DSP

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