ICD 08241

Amateur Radio

SERVING AMATEUR RADIO SINCE 1945

JULY 1998

CQ

In This Issue:

- W6KW Builds A 3-Element 80M Yagi (page 42)
- A Closer Look At The Extended Double Zepp Antenna (page 28)
- Build An Effective All-Band Counterpoise (page 20)
- W3ASK: Scientists Disagree On Cycle 23 (page 101)
- K1AR Asks: "When Does A Contest Really End?" (page 77)

Joseph Johnson, K3RR, Gettysburg, PA

THE RADIO AMATEUR'S JOURNAL

POWER of TOWER

UPGRADE 1998 • HEAR comes the Sun • with ICOM

Solar Cycle 23 is here. Now's the best time to upgrade your license... or your shack. When you upgrade to General Class or higher, mail us a copy of your FCC issued license.

ICOM America is giving away one IC-706MKII each month, between April 1998 and March 1999. For complete details, visit your authorized ICOM America dealer today.

IC-706MKII

HF+6M+2M • 100 Watts (HF+6M), 20 wat (2M) • All Mode • Remoteable Front Panel • DSP* • Up to 3 Front Panel Filter Selections* • 2 Antenna Connectors

*Optional equipment requir

IC-707

HF• 100 Watts • All Mode • 100% Duty Cycl • Rugged Construction • Large, One Functio Keys and Dials • Front Facing Speake • Compact Size • ICOM's Most Affordable H

IC-746

HF + 6M + 2M • 100 Watts on All Band: • All Mode • IF-DSP • Noise Reductio • Auto Antenna Tuner • Band Scop • 3 Antenna Connectors • Twin Passban Tuning • Auto Notch Filter • Audio Peal Filter • RF Speech Processor* • Up to Front Panel Filter Selections* (3 filter slots

*Optional equipment require

IC-756

HF+6M • 100 Watts on All Bands • All Mode • IF-DSP • Noise Reduction • Twin Pass-band Tuning • Auto Antenna Tuner • True Dual Watch • Real Time Band Scope

IC-775DSP

HF • 200 Watts • Built-In Power Supply • All Mode • IF-DSP • Noise Reduction • Auto Antenna Tuner • Auto IF Notch Filter • Level/Width Variable Noise Blanker • PSN Modulation • Twin Passband Tuning • Audio Peak Filter • 3 Antenna Connectors • Dual Receiver • Twin Tuning Knobs

IC-781

HF • 150 Watts, Built-In Power Supply • All Mode • Complete & Fully Equipped: No Options Needed, Not Even Filters • CRT with Real Time Band Scope

IC-PW1

1 KW Amplifier • HF + 6M • Removable, Remoteable Control Head • Auto Band Changing • 4 Antenna Connectors • Auto Antenna Tuner • 3 Cooling Fans

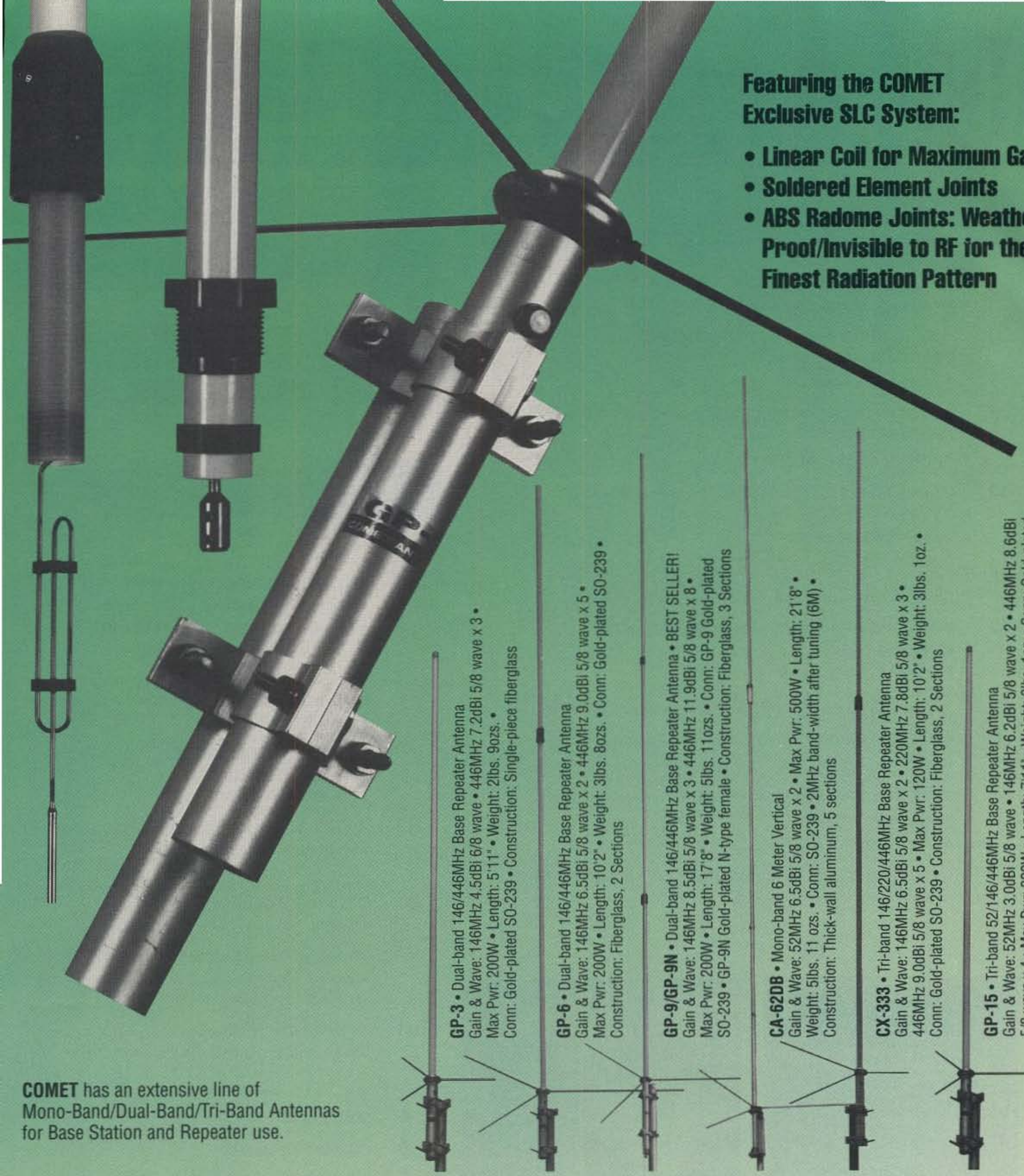
See the IC-PW1 at Dayton '98

ICOM®

www.icomamerica.com

Call 425-450-6088 for free brochures

©1998 ICOM America, Inc. 2380 116th Ave NE, Bellevue, WA 98004 • 425-454-8155. The ICOM logo is a registered trademark of ICOM, Inc. All ICOM radios exceed FCC requirements limiting spurious emissions. All specifications subject to change without notice or obligation. TOWER498Y



Featuring the COMET Exclusive SLC System:

- **Linear Coil for Maximum Gain**
- **Soldered Element Joints**
- **ABS Radome Joints: Weather Proof/Invisible to RF for the Finest Radiation Pattern**

GP-3 • Dual-band 146/446MHz Base Repeater Antenna
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 x 2 • 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: 7'11" • Weight: 3lbs. 1oz. • Conn: Gold-plated
SO-239 • 2MHz band-width after tuning (6M) • Construction: Single-piece fiberglass

COMET has an extensive line of Mono-Band/Dual-Band/Tri-Band Antennas for Base Station and Repeater use.

For a complete catalog of **COMET** Antenna products call or visit your local dealer. Or, contact **NCG Company** at 800/962-2611. Use **COMET** products, and enjoy amateur radio to it's fullest!

COMET

1275 N. Grove Street • Anaheim • California 92806
(714) 630-4541 • (800) 962-2611 • Fax: (714) 630-7024 • www.cometantenna.com

CIRCLE 170 ON READER SERVICE CARD

CQ Amateur Radio

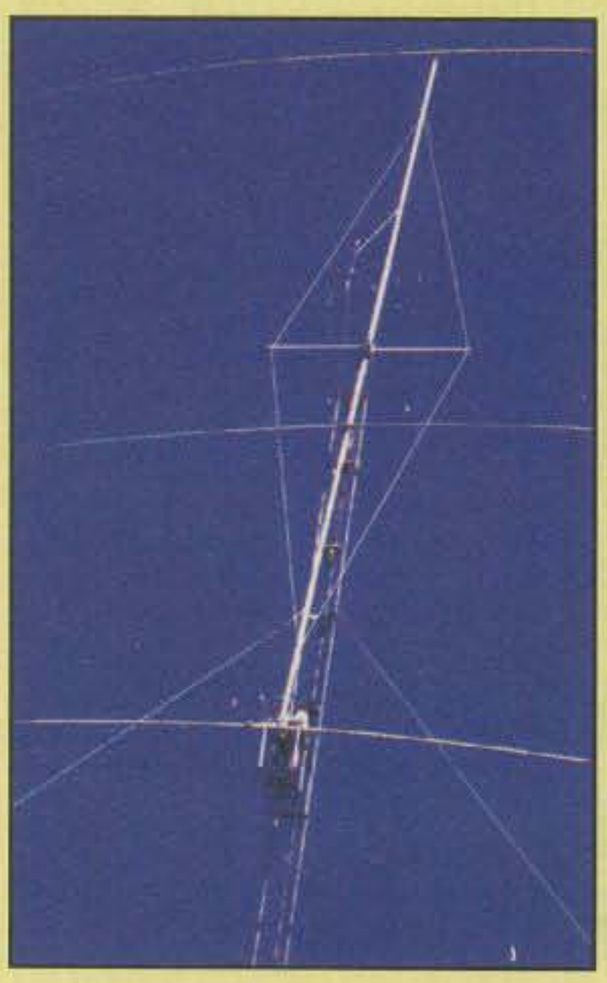
JULY 1998 VOL. 54, NO. 7

FEATURES

page 11

DEPARTMENTS

page 42



page 32

ON THE COVER: There are still those of us around who believe that the only "real" ham rig is one that lights up inside and keeps the shack warm in the winter. That seems to describe Joe Johnson, K3RR, of Gettysburg, Pennsylvania. Joe not only collects tube-type Collins and Drake gear, he uses it, too, in pursuit of North Korea on 160 (or any band, for that matter!). Joe has spent the last 28 years as an Engineer with the Mass Media Bureau of the FCC, but his 30 acres of old wheat field outside Gettysburg is where his heart is. Four towers (80 to 195 feet) and ten 1000 foot Beverages round out the antenna system, with the tallest stick only supporting the 80 and 160 meter wire antennas. If you'd like to chat with Joe, chances are you'll find him on 160 CW, but plan on cranking up the code speed, as he's really in his element at 50 to 60 wpm. His philosophy on 160 meter DXing: "As Woody Alan says about life, 80% is just showing up. Be there and you'll work the most astounding stuff." (Photo by Larry Mulvehill, WB2ZPI)

Say You Saw It In CQ

Intelligent Digital Enhanced Communications System

TS-870S HF TRANSCEIVER

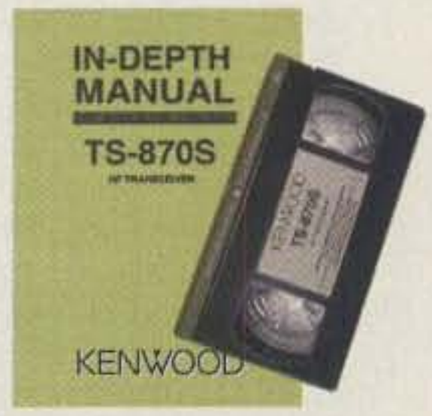
DSP at the IF stage is now a reality with Kenwood's new TS-870S HF transceiver. This new design uses state-of-the-art DSP chips that provide for receiving enhancements to bring signals out of the noise. Imagine over 100dB of noise reduction with no signal loss! Imagine CW band-width adjustable to 50 Hz! Advanced speech processing with transmit equalization that will make you the first in pile-ups! Plus, complete computer operation and control of the TS-870S is possible with supplied MS Windows® software and built-in RS-232C port. Enjoy future technology now with the TS-870S.

FEATURES

- IF Stage Digital Signal Processing
- Multi-Function Digital Filtering (no optional filters required)
- Dual-Mode Noise Reduction
- Beat Canceller
- Auto Notch Filter
- Variable AGC
- Selectable Voice Equalizer (SSB & AM)
- Speech Processor
- Selectable Transmit Equalizer
- High Speed (57.6kbps) Computer Control with MS Windows® Software included (USA only)
- Built-in RS-232C Port
- 100 Watts Output on SSB, CW, FM, FSK; 25 Watts on AM
- 100 kHz ~ 30 MHz General Coverage Receiver
- Full-Function K1 LogiKey Keyer
- Built-in Automatic Antenna Tuner (TX & RX)
- 2 Antenna Terminals
- Receiver Antenna Terminal
- Dual VFOs with 100 Memory Channels Plus 5 Quick Memory Channels
- Full Band Scan, Programmable Band Scan, Group Scan, Memory Scan with Memory Channel Lock-Out
- Built-in Tone Encoder (FM)
- Easy-to-use Menu System for Quick Setting of Functions
- High Quality 60 Second Digital Recording Unit Option (DRU-3)
- Voice Synthesizer Unit Option (VS-2)

Contact Kenwood for your FREE TS-870S Video & Indepth operating manual.

(U.S. & Canadian residence only)



South Sandwich Island DX Team
VP8SSI

Peter I Island DX Team
3Y0PI

Easter Island DX Team
XR0Y

ISO 9001
JQA-1205

Communications Equipment Division
Kenwood Corporation
ISO9001 certification

KENWOOD
Amateur Radio Products Group
98ARD-1751

KENWOOD COMMUNICATIONS CORPORATION
AMATEUR RADIO PRODUCTS GROUP
P.O. Box 22745, 2201 E. Dominguez St., Long Beach, CA 90801-5745, U.S.A.
Customer Support/Brochures (310) 639-5300
KENWOOD ELECTRONICS CANADA INC.
6070 Kestrel Road, Mississauga, Ontario, Canada L5T 1S8

INTERNET

Kenwood News & Products
http://www.kenwood.net

ZERO BIAS

AN EDITORIAL

The other day I was speaking to a reader who had called and was concerned about the future of amateur radio, more youth, and the host of other profound things amateurs like to pontificate about. While having more young people is always noble, I asked how he knew we didn't already have a bunch somewhere. Perhaps the gist of amateur radio today is that it is a hobby for middle, median, and "mature" people. Maybe it's none of the above.

What if we woke up one day—say next Thursday, for example—and read in the paper that 500,000 people were missing from Utah or Rhode Island? What's it like to lose 500,000 people, and what would our reaction be? Would we try to find them and see what happened, or would we simply see it as a couple of specific geographic areas that might need repopulation? Maybe the remaining folks in those two states would view it as gaining breathing room (at last), and think that any attempt to bring new people into those states is simply a clandestine plot by unscrupulous real estate dealers to make money.

Simply put, amateur radio has about 500,000 people out there with some form of license who do not take any active part in what's euphemistically called "traditional amateur radio." They don't share our values, they apparently don't identify with us, they're not usually included in any survey material, and they simply are an apparition that shows up occasionally on a total head count. Frankly, there's no organization or commercial interest that has the financial where-with-all to question and survey each and every one of us to find out what we're doing. These basic numbers are likely to change at the end of the current cycle, Cycle 23. By that time it is conceivable that we might have a licensed amateur population of well over 1,000,000, with about 6–700,000 of them unaccounted for.

A quick reality check would tell us that it doesn't make too much difference to our every-day amateur lives what the unenfranchised group is doing. Probably most are active, some drop out, some pass on to that great shack in the sky, and the rest weave in and out of the hobby as time and interest permit. Okay, so they don't belong to the ARRL, or subscribe to *CQ*, or join radio clubs, or do anything active to participate in what's happening with technology, public service, and what constitutes our politics. They're there and yet they're not there, so whom does it really affect?

If for a moment we set aside the amateur radio industry, which by the way does include the ARRL, and not bring money into the issue, it's easy to show how those missing people do have a very great effect on what the rest of us will be doing somewhere down the road. No, they're not going to suddenly organize and rise up as a group to take over and influence the direction of amateur radio. They've already done it, except they don't know it, and they may or may not benefit from their indifference.

Now none of this involves any nefarious plot, sinister machinations, or outward intent to deceive. It's just the way the system works, and apparently it doesn't take reality into account. At each of the WARC conferences amateur radio is represented advisedly, behind the scenes, in front of the scenes, and every which way by the IARU. The IARU is a membership organization composed of representatives from each country's national radio society—in our case, the ARRL. The dues structure for the IARU is based on the *total* number of licensed amateurs in each country. Therefore, the ARRL's dues are predicated on the *total* number of licensed US amateurs, and by extension they vote as if they speak for every single one of us. It's only fair, since they paid for the privilege.

If the ARRL, or any other national society, wished to conduct a survey as to which way their IARU representative should vote on any specific issue or issues, they could then poll their own membership. However, in our case, our national organization has less than 23% penetration into the total population. If the survey used, for example, every Nth name (some number—7, 10, 12), then an even smaller number of individuals would be queried. Yes, it's statistically possible to extrapolate the data out to a point. Supposing there were about 5,000 or so replies to this survey, and this data was extrapolated out to a total membership. You can draw whatever inference you want. However, if you were to draw that data out so as to represent the feelings of the total population, then you would be adding the element of imagination to the equation. These numbers would represent about a .007% return, which would be a giant leap of faith even if the questions were statistically neutral and valid. So, with absolutely no malevolent thought or purpose, a national society could with enthusiasm back something supported only by .007% of the total population. It would be just as if everyone said "yes" or "no" to something. It's the way the system works, and to be perfectly fair about it, there's no one around who could afford several million dollars to adequately survey each and every one of us. If you like to play with numbers, by the end of Cycle 23 there is some likelihood that the total US amateur population could very well top 1,000,000 licensed people. At that time, given what we already have and work with, as little as 7,000 amateurs (based on .007%) could set a "mandate."

Apathy, indifference, and anonymity are not confined to amateur radio. Numerous other endeavors are subject to the same ennui. After all, hobbies are not supposed to be real life. They serve to relax and enrich us, enabling us to cope with the real problems of day-to-day living. What does it take to get people motivated and concerned about something they feel so passionate about? Recently, here on Long Island, there were island- wide elections held for school board members and an opportunity to vote on the annual school budgets for numerous districts. In an area which is probably one of the highest taxed pieces of real estate in the country, you might expect a modicum of participation. Real life does include one's children, school taxes, and perceived quality of life. About 13% of the eligible voters agreed with that last sentence and actually voted on those budgets which involve the expenditure of millions of dollars for each district and which set the future tax rate for homeowners. The other 87% who didn't vote for whatever reason can complain all they want to with no avail, or simply remain silent.

Maybe I'm the only one who sees this as a gnawing problem. Maybe since it's always been this way I should just accept it for what it is. Maybe we won't reach a million, or maybe we'll go over a million. What will our composition be then? If we now have 57% with little or no code, can that figure rise to 65–70% by the end of Cycle 23? Who becomes "real" then? While we live with occasional growth plateaus and spurts of growth, our overall numbers have increased over the years, producing one evident phenomenon. People who initially want to be like "us" get a license through personal effort, and then after some varying amount of time quickly distance themselves from "us." It's not just here in the US, either. The May issue of *Break-In,* the New Zealand magazine, reported that the WIA (Wireless Institute of Australia) last year had a drop in membership of about 8%, marking the ninth straight year of declining membership.

The core group of the truly real amateur population has waved their flag for years. We tried incentive licensing, we tried with the religious fervor of a zealot to convert the miscreant CBer, we tried shouting "CW Forever" from the rooftops, and we even tried telling no-coders how unhappy they were with their piddling efforts. It must be that the rest of the world is lazy, on the Internet, and out chasing sex, drugs, and rock and roll. We, the pure enough to cast the first stone, are just becoming hard pressed to locate some of those 500,000 targets who need a good stone tossed at them.

This is not doom and gloom for amateur radio. Quite the contrary. We have a whole bunch of people out there doing all sorts of things and having fun at whatever they like. It's just that we don't happen at the moment to know who they are, and they really don't want to tell us. There is a bright future ahead for this thing called amateur radio. It may just mean that a lot of us just won't recognize it anymore.

73, Alan, K2EEK

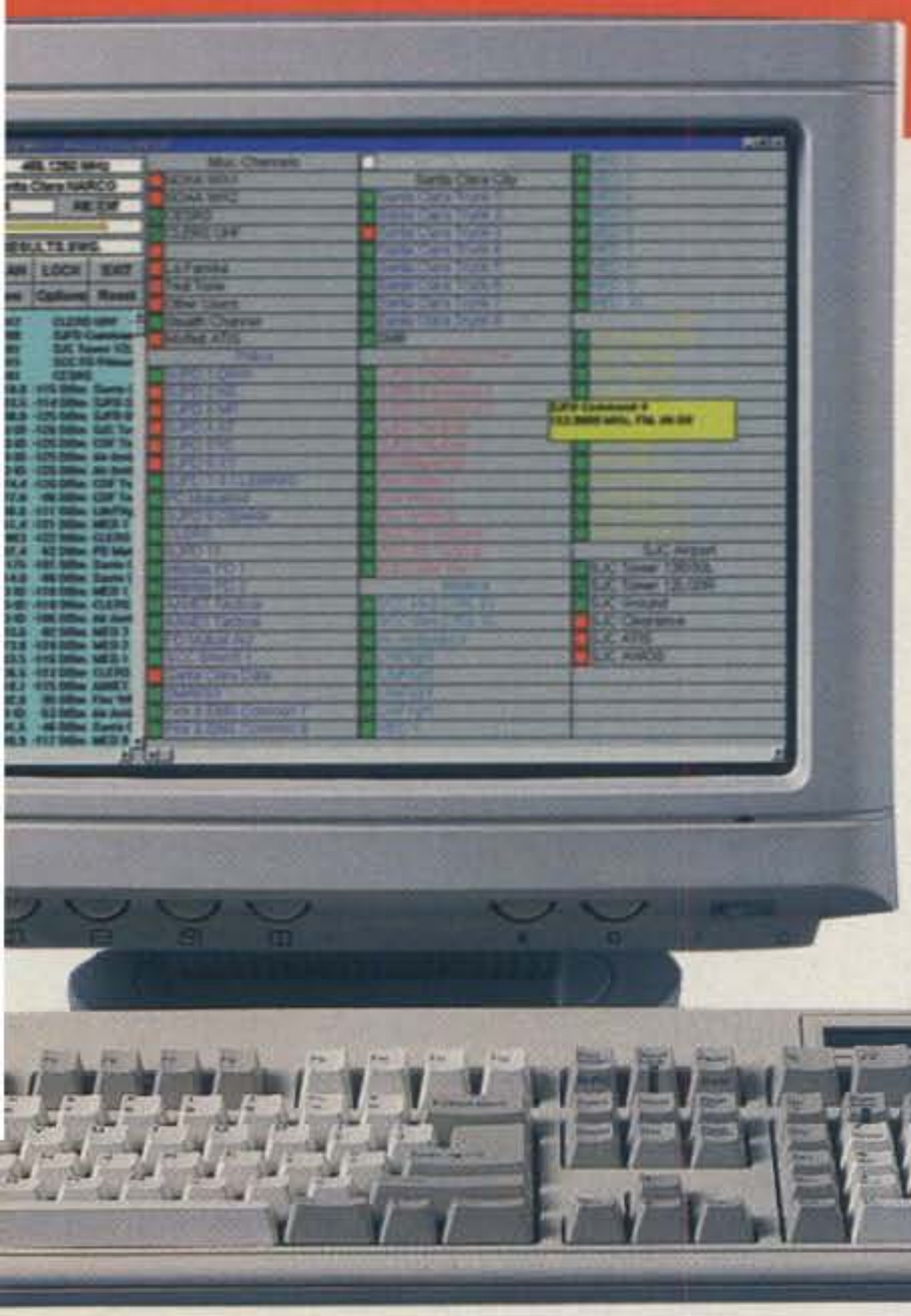
Say You Saw It In CQ

NEW!

TRACK MOTOROLA TYPE I AND II TRUNKED SYSTEMS

using your ICOM CI-V or AOR receivers

THE ALL NEW OPTOTRAKKER®



Introducing the latest in trunk tracking technology, the new Optoelectronics Optotrakker. Interface the Optotrakker with one of the compatible receivers (see below), and using the included ScanStar Windows Software, turn your receiver into a Motorola Trunked following system. The Optotrakker is the first and only product that can scan Motorola Type I and II 800MHz and 900MHz systems. The Optotrakker can also scan multiple systems such as Motorola trunk groups, LTR trunk groups and other frequencies simultaneously, as well as decode CTCSS, DCS, and DTMF tones and codes.

RECEIVERS SUPPORTED UNDER COMPUTER CONTROL:

ICOM: R7000, R7100, R8500, R9000, and R10
AOR: AR8000, AR3000, and AR5000
RADIO SHACK: Pro 2005/6 with OS456/OSLite installed and Pro 2035/42 with OS535 installed

*Discriminator audio modifications may be necessary on some receivers.

$299

Including interface cables and ScanStar Software

www.optoelectronics.com

FACTORY DIRECT ORDER LINE: 800-327-5912

OPTOELECTRONICS®

5821 NE 14th Avenue • Ft. Lauderdale, FL • 33334
Telephone 954-771-2050 Fax: 954-771-2052 EMail: sales@optoelectronics.com

Visa, Mastercard, C.O.D. • Prices and specifications are subject to change without notice.
Motorola, ICOM, AOR, Windows, and Scan Star are all registered trademarks.

Made In U.S.A

ANNOUNCEMENTS

The following Special Events are scheduled for July:

K2ARC, from 200th anniversary of Eaton's Neck Lighthouse, Northport, LI, NY, and "Lighthouses on the Air"; American Red Cross Emergency Communication Service; August 22 *(no hours given—ed.)* on 7.280, 14.280, 21.380, 28.380. For QSL send SASE and QSL to CABNY-ARCECS DX Assn., P.O. Box 1479, Huntington, NY 11743.

KB2YCT, from Nutley, New Jersey, "CQ Father Jerzy Popieluszko," Robert D. Grant United Labor ARA; 2200Z July 24 to 2200Z July 26 on 14.303, 28.420, 52.525. For certificate send QSL to RDGULARA, P.O. Box 716, Nutley, NJ 07110-0716.

W2ZZJ, from Stratford, New York, 172nd anniversary of birth of Dr. Loonis, radio pioneer; Fulton County Dr. Mahlon Loomis Committee; 1300–2000Z July 21 in General phone portion of 75, 40, 20 meters and Novice 10 meters phone, plus area 2 meter repeaters. For certificate and literature send QSL, contact #, and #10 SASE (55¢) to George P. Sadlon, W2ZZJ, 5738 STHWY 29A, Stratford, NY 13470.

K6BSA, from the Sierra Nevada near Yosemite, Rendezvous '98 International Boy Scout encampment; July26–31 on JOTA frequencies, most HF bands. For more info, contact KM6LH; <p.wesling@ieee.org; <www.sccc.scouting.org/programs/rend.html>.

K8EPV, from Port Huron to Macinac Island Yacht Race, Port Huron, Michigan; Eastern Michigan ARC; 1400Z July 12 to 0200Z July 13; CW 3.710, 7.110, 21.110; SSB 3.910, 7.272, 14.272, 21.312, 28.393. For certificate send QSL and 9 × 12 SASE to K8EPV, P.O. Box 611230, Port Huron, MI 48061-1230.

K8KZO, from Kalamazoo, Michigan, 40th anniversary of the Southwest Michigan Amateur Radio Team (SMART); 1800Z July 11 to 0200Z July 12 in the phone bands on or around 3.904, 7.204, 14.304, 28.304, 147.04. For a certificate send QSL and 9 × 12 SASE to SMART, P.O. Box 3175, Kalamazoo, MI 49003-3175.

W8AL, from Missillon, Ohio, Pro-Football Hall of Fame Festival; Canton Amateur Radio Club; 1300 July 24 to 2400 July 26 on 7.265, 14.265, 21.365, 28.430. For certificate send 9 × 12 SASE to Donald E. Perry, WQ8J, 968 Culverne Ave. NW, Massillon, OH 44647.

W8NJH, from Plymouth, Michigan, "Salute to America's Small Towns," Stu Rockafellow ARS; 1200–2000Z July 4 on SSB 7.270 and 14.270 MHz. For certificate send QSL and 9 × 12 SASE to Dave Langston, KB8RAP, 1000 Town Center, Suite 1200, Southfield, MI 48075.

W9ZL, from Oshkosh, Wisconsin, Experimental Aircraft Assn. Fly-in and Convention, Wittman Regional Airport; 8 AM to 4 PM July 31 through Aug. 2 in General phone bands, RTTY 7085 and 14085. For 8 × 10 certificate send QSL and SASE to Wayne Pennings, WD9FLJ, 913 N. Mason, Appleton, WI 54914.

W9W, from Oshkosh, Wisconsin, Wisconsin Sesquicentennial and Sawdust Days Festival; 1700–0200Z July 1–5 in General portion of 10, 15, 20, 40 meters SSB and CW. For certificate send 9×12 SASE and QSL to Mark Miller, N936 W. 8th Ave., Oshkosh, WI 54901-5928.

C6A25 plus last two letters of the Bahamian callsign (reciprocal licensees will sign /C6A25), from 25th anniversary celebration of independence of the Bahamas. Special QSLs and possibly certificates will be issued. For more information contact C6AGR.

XK3K, from 150th anniversary of Kincardine, Ontario, Canada; Kincardine DX Group; 0000Z July 26 to 2359Z Aug. 8 on all bands 10–80 meters SSB and CW. For QSL send QSL and SASE to Bill Hardie, VE3EFX, 755 Johnston Crescent, Kincardine, Ontario, N2Z 1S5 Canada.

Naturist ARC Special Event from July 6–12 from naturist resorts throughout North America on 7.265, 14.265, 21.365, 28.465 ±QRM. For certificate send QSL and 9 x 12 SASE to Naturist ARC, NU5DE, P.O. Box 200812, Austin, TX 78720-0812.

The following hamfests, etc., are in July:

July 4, **26th Annual Firecracker Hamfest**, Monagahan Fire Hall, Dillsburg, PA. Contact HRAC AnswerLine 717-232-6087; <fabinfo@fabral.com>; N3NJB@juno.com>. (Exams)

July 5, **Lisbon, Ohio Hamfest**, Columbiana County Fairgrounds, Lisbon, OH. Contact Dick Sisley, K8JKB, 1218 Northside Ave., East Liverpool, OH 43920 (330-385-1245).

July 10–12, **35th Annual International Hamfest**, International Peace Garden, between Boissevain, Manitoba and Dunseith, North Dakota. Contact Dave Snydal, VE4XN, or Lynn Nelson, WØCQ.

July 11, **24th Annual Ontario Hamfest**, Milton Fairgrounds, Milton, Ontario, Canada. Contact Burlington ARC, P.O. Box 85037, Burlington, ON, L7R 4K3; <www.bigwave.ca/~ve3coj/barc/> or VA3LOR Lorne 905-336-2999; e-mail: <ve3coj@bigwave.ca>.

July 11, **Monroe County ARC Hamfest**, National Guard Armory, Tompkinsville, KY. Call J. Bunch 502- 678-5784; or e-mail, David Welch, K4PL, at (dwelch@glasgow-ky.com>. (Exams)

July 11, **Firecracker Hamfest**, Salisbury Civic Center, Salisbury, NC. Contact N4KVF, Walter Bastow, 3045 High Rock Road, Gold Hill, NC 28071; or call 704-279-3391. (Exams)

July 11, **South Milwaukee 29th Annual Swapfest**, American Legion Post #434 grounds, Oak Creek, WI. Contact S.M.A.R.C., P.O. Box 102, South Milwaukee, WI 53172-0102.

July 11, **Straits Area ARC Swap & Shop**, Emmet County Fairgrounds, Petoskey, MI. Call Clark, KA8TIL, 616-582-6455. (Exams)

July 12, **1998 Batavia Hamfest**, Alexander Fire Department Recreation Grounds, Rt. 8 just south of Alexander, NY. Call 716-786-3622, or <carlson@hfent.com>.

July 12, 1998 **Wood Co., Ohio Hama-A-Rama**, Wood Co. Fairgrounds, Bowling Green, OH. Contact Shawn Hudson, KB8QEW, P.O. Box 534, Bowling Green, Ohio 43402 (419-354-1811) <sjhudson@wcnet.org>. (Exams)

July 12, **SweatFest 98**, Brunswick, MD. Contact MADRA SweatFest 98, 301-473-4151; e-mail: <madra@qsl.net>; or check Web page at: <www.qsl.net/madra>. (Exams)

July 12, **Valley Forge Hamfest**, Kimberton, PA Fire Co. Fairgrounds, Kimberton, PA. Contact Bob Haase, W3SA, 674 Valley View La., Wayne, PA 19087, 610-293-1919; or e-mail: <wb3joe@voicenet.com>; or write to MARC, PO Box 352, Villanova, PA 19085.

July 12, **North Hills ARC 13th Annual Hamfest**, Northland Public Library, Pittsburgh, PA. Contact Bob Ferrey, Jr., N3DOK, at 871 Rosalind Rd., Pittsburgh, PA 15237, 412-367-2393; e-mail: <n3dok@pgh.net>; or see the Web site at: <http//nharc.pgh.pa.us>. (Handicapped accessible)

July 12, **Sussex County ARC 20th Annual Hamfest**, Sussex County Fairgrounds, Augusta, NJ. Contact Daniel Carter, N2ERH, 8 Carter Lane, Branchville, NJ 07826, 973-948-6999.

July 17–19, **Annual Pacific Northwest DX Convention**, Double Tree Inn, Southcenter (Tukwila), Washington. Featured speaker at Saturday night dinner is KØIR. For registration forms contact Joe, W7QN, 206-784-1089, or W7TSQ ay <w7tsq@aol.com>.

July 18, **NOARSFEST 98**, Lorain County Fairgrounds, Ohio. Contact John Schaaf, KC8AOX, 216-696-5709 and leave message, or e-mail <kc8aox@qsl.net>, or write to NOARSFETST, P.O. Box 432, Elyria, OH 44036-0432.

July 18, **Sugar River Amateur Radio Festival**, on The Newport Town Common, Newport, NH. Contact Rob, N1CIR, 603-863-5383 or <N1CIR@WA1WOK.NH>. (Exams)

July 18, **Cleveland ARC Hamfest**, Bradley Central High School, Cleveland, TN. Contact David Evans, WD4EZC at 423-472-1421 or Bob Gault, KD4NEC, 423-479-6260; write to Cleveland ARC, P.O. Box 2683, Cleveland, TN 37320-2683; e-mail: <carc@rocketmail.com>.

July 18**, 26th Annual Cary Mid-Summer Swapfest**, Cary Community Center, Cary, NC. Contact Cary Amateur Radio Club, P.O. Box 53, Cary, NC 27512. (Exams)

July 19, **Tailgate Electronics, Computer and Amateur Radio Fleamarket**, Albany and Main St., Cambridge, MA. For information, call 617-253-3776.

July 19, **Van Wert ARC 11th Annual Hamfest**, Van Wert County Fairgrounds, Van Wert, OH. C ontact Bob, WD9LPY, 419-238-1877 after 5 PM (after July 6, call 419-795-5763). (Exams)

July 19, **Fox River Radio League Hamfest**, Waubonsee Community College, Sugar Grove, IL. Contact James Von Olnhausen, N9UZC, c/o FRRL, POB 673, Batavia, IL 60510, or call 630-879-3042; e-mail: <n9uzc@amsat.org>. (Exams)

July 24–25, **Milton, Florida '98 Hamfest**, Santa Rosa County Auditorium, Milton, FL. Contact Walt Yarbrough, WA4TFR, 850-994-7335, or Bill Couch, W4VY, 850-623-0592.

July 24–26, **Fort Tuthill Hamfest & Arizona State Convention**, Coconino County Fairgrounds, Flagstaff, AZ. Contact ARCA of Arizona, 602-779-2722. (Exams Sat. 8:30 AM)

July 25, **Western Carolina ARS 23rd Annual Hamfest**, Haywood County Fairgrounds, Asheville, NC. Contact Chet Allen, KE4VXC, 828-258-3954; e-mail: <KE4VXC@juno.com>. (Exams)

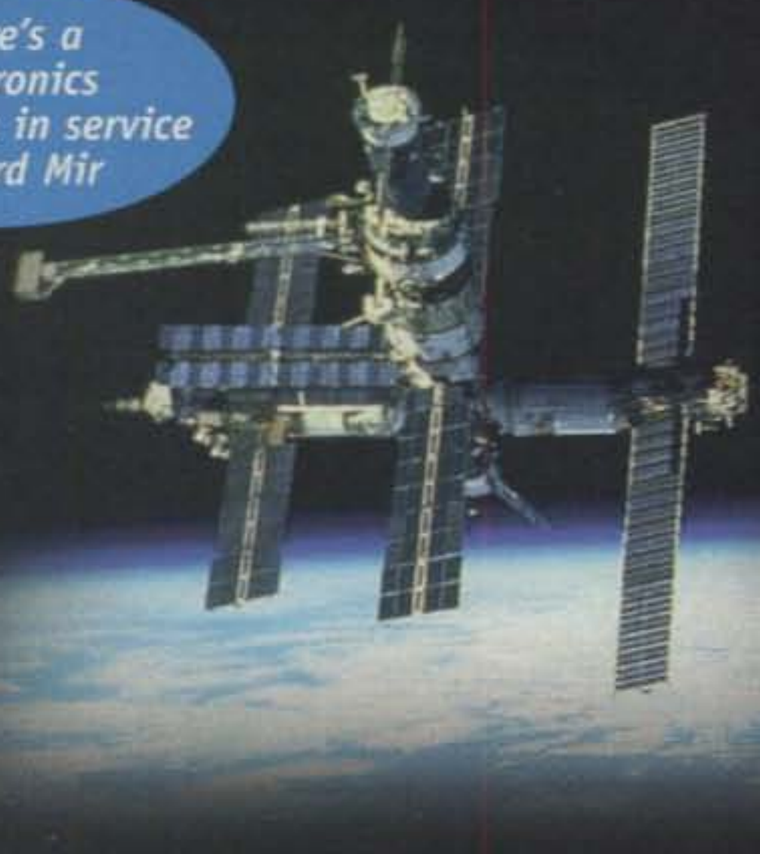
July 25–26, **Ham Holiday '98/ARRL State Convention**, Oklahoma State Fair Park, Oklahoma City, OK. Contact CORA web site: <www.geoities.com/heartland/7332>, or write to Ham Holiday ARRL State Convention, P.O. Box 850003, Oklahoma City, OK 73085 or e-mail <n1lpn@swbell.net>. (Exams)

July 26, **Paulding County AR Group 8th Annual Hamfest**, Park Lane Center on Fairgrounds Rd., Paulding, OH. Contact Jerry, KB8MAF, Hamfest Chairman, PCARG Inc., P.O. Box 86, Paulding, OH 45879, 419-399-4507; or e-mail: <jlrhod@bright.net>.

July 26, **Maryland Hamfest & Computerfest**, Timonium Fairgrounds, north of Baltimore, MD. For information, see the Web page at <http://www.smart.net/~brats>; e-mail <brats@smart.net<; call or fax 410-467-4634; or write to BRATS Hamfest, P.O. Box 5915, Baltimore, MD 21282-5915. (Handicapped accessible; exams at 9 AM only, preregistration required call John Creel, WB3GXW after 6 PM at 301-572-5124.)

Get on the Outernet!™

There's a Kantronics 9612 Plus in service aboard Mir



There's a world of digital communications fun and adventure that *only hams can enjoy* and Kantronics makes it possible for you to explore it. No matter if you call our products TNCs, wireless modems or digital controllers, the "Outernet™" offers a world of adventure, including satellite communications, APRS®, DX spotting, BBS operations, WEFAX, EMWIN, TCP/IP links, remote control and sensing, telemetry, HF e-mail with ham gateways or commercial service providers and more!

Commercial versions of Kantronics TNCs are being used in ever-increasing numbers!

Kantronics offers a number of ways to enjoy the growing field of digital communications. Choose the unit that suits your interests and budget. All Kantronics units come with a one-year limited warranty and can be upgraded when firmware updates become available.

KPC-3 Plus

8.2 Firmware now with Advanced GPS/APRS UI digipeating available for all 4 models!

- 1200 bps - Now with more features!
- Packet, GPS/APRS, Host, KISS and WEFAX modes, use with EMWIN
- Personal Mailbox (PBBS) now supports multiple calls
- Remote access, sensing and control with two A/D and two control lines
- PBBS 100k, expandable with optional 512k RAM
- Uses external power or internal 9v battery
- NEWUSER mode and online help

KPC-9612 Plus

Optional 1200 or 9600 third port expansion boards now available

- 1200 port AND second port of 4800 ~ 38,400 bps
- Most modes/capabilities of the KPC-3 Plus and POCSAG (paging)
- Unique design allows the addition of *another port, high or low speed*
- Remote access, sensing and control capability
- Telemetry transmission capability

KAM '98

New!

- **Single Port** multimode TNC for HF or VHF use
- All the modes of KAM Plus with addition of A/D inputs/TTL outputs
- HC11 for more processing power to accommodate future upgrades
- Wider range of speeds; use 1200bps packet on 10 meters

KAM Plus

- Dual port VHF/HF (1200/<=300 bps) multimode TNC
- Packet, GPS/APRS, Host, KISS, WEFAX, CW, RTTY, AMTOR, PACTOR, G-TOR™, TOR, and Free Signal Detection for HF e-mail
- 100k personal mailbox standard, expandable with optional 512k RAM
- Remote access capability
- NEWUSER mode and online help

Kantronics

1202 E. 23rd St., Lawrence, KS 66046
tel: 785-842-7745 • fax: 785-842-2031
e-mail: sales@kantronics.com
web: www.kantronics.com

Specifications subject to change without notice or obligation. APRS® is a registered trademark of Bob Bruninga, WB4APR. All registered trademarks remain the property of their respective owners.

OUR READERS SAY

Antenna Switch Correction

Re: "How To Build An Automatic Antenna Switch for ICOM Transceivers," by Art Rideout, WA6IPD, p. 32, May 1998 *CQ*. Pin 3 on the LM-3914 should be identified as going to +12 volts.

160 Article Compliments

Editor, *CQ:*

Our compliments to Cary Oler and Ted Cohen, N4XX, for their paper on the 160 meter band ("The 160 Meter Band . . ." March and April 1998 *CQ*). It's the most remarkable one on Topband propagation research that I ever read. I have put a hint within my weekly propagation report for our amateur radio broadcast on that paper and to encourage the German hams to participate in CAROS. *(CAROS is the Coordinated Amateur Radio Observation System, a means by which amateurs can submit reports of unusual propagation conditions for Cary Oler's database. The URL is: <http://solar.uleth.ca/solar/www/caros.html>.—ed.)*

Hartmut Buettig, DL1VDL
HF Manager of DARC
Germany

The War is Over

Editor, *CQ:*

I read your editorial in the April issue of *CQ* regarding participation by ham ops in emergency operations. Here in Florida there is a vast wasteland of untapped ops just dying to lend a hand on packet, or FM, or whatver. This vast untapped source is *Yahnkees!* No one here (natives) will associate or (God forbid!) talk with anyone with a so-called "Yahnkee" call (such as my K1EXE). Dropping your W1 or K1 or (my son's) N1 into a local repeater will guarantee a clear channel (silence) until they figure you've gone away. There are many others like myself who are completely ignored on the 2 meter band. I even was ignored while giving out storm reports during the week following the biggest twister that took so many lives. I couldn't believe they would ignore storm info simply because I was giving it!

I have heard VE1's ignored while asking directions. I was invited to join in the Sunday night net on the local repeater, while attending the local club's fleamarket, then was ignored while trying to check in! (They didn't know I had a *Yahnkee* call while talking face to face.)

I think a person in your position should be able to shine the light of day on these people and watch them run! It is time this was brought into the open and dealt with. The war's been over for 133 years, and this response (ignoring *Yahnkees*) is not what you'd expect from a group such as ham ops, who you would think had higher IQs than the average population.

I am from New Hampshire, and had *never* heard hams from the south being derided on the repeater(s) there.

Jim White, K1EXE
Hudson, FL

An Answer, Possibly

Editor, *CQ:*

I have been reading the 160 meter band propagation articles in *CQ* over the last two months ("The 160 Meter Band," Parts I and II, by Cary Oler and Ted Cohen, N4XX, March and April 1998) and have found them both educational and interesting. In addition, I may have found an answer to an experience that happened to me last December.

I was using an FM radio tuned to an unused frequency in my area to catch commercial broadcast stations, using meteor scatter as described in a past issue of Monitoring Times magazine. Being up before local sunrise, I decided to tune through the medium-wave AM broadcast band. While doing so, I copied a station on 1600 kHz in what I took to be Japanese, but could have been any Eastern dialect, as I don't speak Japanese. The station was strong for about 20 minutes, then started to fade as the sun rose over the horizon. This would coincide with the middle East Coast to the Far East propagation as reported in the article. This was also at the time of a meteor shower. Now whether that has anything to do with low band propagation, I have no idea. By the way, the radio was a Sangean ATS 909 using the internal ferrite rod.

Rich Dalton, WD3C
Newark, DE

Rich: It very well could have been Japan, or Korea. It would have been interesting to have the date. For example, there was a once-in-a-lifetime (mine?) opening to Japan about one-half hour before sunrise in Virginia last Christmas morning. The JA stations were running a solid S-7 on CW, and I worked three of them, two on the first call. We probably could have switched to SSB; that's how loud they were. But the time of day and the time of year were right for what you observed. December and January are probably the best two months for the East Coast to Far East path on 160.

—73, Ted, N4XX

EDITORIAL STAFF

Alan M. Dorhoffer, K2EEK, Editor
Gail M. Schieber, KC2DHK, Managing Editor
Lew McCoy, W1ICP, Technical Representative
Richard S. Moseson, W2VU, On-Line Coordinator

CONTRIBUTING STAFF

John Dorr, K1AR, Contest Calendar
Chod Harris, VP2ML, DX
Dave Ingram, K4TWJ, Special Interests
George Jacobs, W3ASK, Propagation
Joe Lynch, N6CL, VHF
Frederick O. Maia, W5YI, FCC Correspondent
Irwin Math, WA2NDM, Math's Notes
Bill Orr, W6SAI, Radio Fundamentals
Buck Rogers, K4ABT, Packet Radio Editor
Karl T. Thurber, Jr., W8FX, Antennas & Software
Ted Melinosky, K1BV, Awards & USA-CA

AWARD MANAGEMENT

Jim Dionne, K1MEM, WAZ Award
Norman Koch, K6ZDL, WPX Award
Ted Melinosky, K1BV, USA-CA Award
Billy Williams, N4UF, CQ DX Award

CONTEST MANAGEMENT

Steve Bolia, N8BJQ, WPX Contest Director
Robert Cox, K3EST, WW DX Contest Director
Roy Gould, K1RY, RTTY Contest Director
David L. Thompson, K4JRB, 160M Contest Dir.

BUSINESS STAFF

Richard A. Ross, K2MGA, Publisher
Arnie Sposato, N2IQO, Advertising Manager
Nicole Tramuta, Sales Assistant
Sal Del Grosso, Accounting Manager
Ann Marie DeMeo, Accounting Department

CIRCULATION STAFF

Catherine Ross, Circulation Manager
Melissa Kehrwieder, Operations Manager
Jean Sawchuk, Data Processing
Denise Pyne, Customer Service

PRODUCTION STAFF

Elizabeth Ryan, Art Director
Barbara McGowan, Associate Art Director
Edmond Pesonen, Electronic Composition Mgr.
Dorothy Kehrwieder, Production Manager
Emily Kreutz, Assistant Production Manager
Nicole Tramuta, Advertising/Production
Pat Le Blanc, Phototypographer
Hal Keith, Illustrator
Larry Mulvehill, WB2ZPI, Staff Photographer
Joe Veras, N4QB, Special Projects Photographer

A publication of

CQ Communications, Inc.
25 newbridge Road
Hicksville, NY 11801 USA.

Offices: 25 Newbridge Road, Hicksville, New York 11801. Telephone: (516) 681-2922. FAX (516) 681-2926. E-mail cqmagazine@aol.com. Website: http://members.aol.com/cqmagazine/. CQ (ISSN 007-893X) is published monthly by CQ Communications Inc. Periodical postage paid at Hicksville, NY and additional offices. Subscription prices (all in U.S. dollars): Domestic—one year $27.95, two years $49.95, three years $71.95; Canada/ Mexico—one year $40.95, two years $72.95, three years $110.95; Foreign Air Post—one year $52.95, two years $99.95, three years $146.95.
U.S. Government Agencies: Subscriptions to CQ are available to agencies of the United States government, including military services, only on a cash with order basis. Requests for quotations, bids, contracts, etc. will be refused and will not be returned or processed. Entire contents copyrighted CQ Communications Inc. 1998. CQ does not assume responsibility for unsolicited manuscripts. Allow six weeks for change of address.

Printed in the United States of America.

Postmaster: Please send change of address to CQ Magazine, 25 Newbridge Road, Hicksville, N.Y. 11801.

"SHOW STOPPERS!"

Check out the new radios from Alinco that have been the "must see" new models at Hamfests and conventions across the country. Maybe you couldn't make it to the show but you CAN enjoy new radios and great engineering at a low Alinco price!

DJ-C5T VHF+UHF "Credit Card" Transceiver

We've taken a great idea and made it even better!

- Internal speaker
- Full 2 meter + 440 band coverage
- 52 memories
- CTCSS encode and decode
- Extended VHF receive includes AM airband
- Internal Lithium-ion battery
- Includes snap-in charger and plastic case
- Accessory port

Alinco DJ-X10T Multimode Handheld Receiver

We've reinvented the multichannel receiver. Look at all the features!

- 100 KHz ~ 2 GHz coverage (cellular blocked)
- 1200 memories plus two VFOs
- WFM, NFM, AM, USB, LSB, CW modes
- Alphanumeric channel designations – up to 3 lines
- Multi-function Channel Scope™ display
- Internal "help" function
- PC programmable
- Beginner and Expert operating modes
- Automatic Memory Write feature
- Auto timer on/off, internal clock
- Backlit display and keys

Alinco DJ-280T 222MHz HT

Every license class can enjoy the 222 MHz band. Alinco makes it fun and affordable!

- CTCSS encode and decode
- 222 ~ 225 MHz coverage
- 10 memory channels, expandable to 50 or 200
- Easy to program
- DTMF tone pad standard
- NiCd battery and charger included
- Wide choice of accessories
- Usable by all USA Amateur license classes

Simple ▪ Clean ▪ Dependable

ALINCO®

AMATEUR RADIO'S VALUE LEADER℠

U.S.A. Alinco Branch: 438 Amapola Ave. • Suite 130 • Torrance, CA 90501
Phone: (310) 618-8616 • Fax: (310) 618-8758 • Internet: http: //www.alinco.com

Specifications subject to change without notice or obligation. Transceiver performance specifications only apply to the Amateur bands. Transceivers intended for use only by properly licensed operators. The DJ-X10T has not yet been approved by the Federal Communications Commission. It is not and may not be offered for sale or lease until the approval of the FCC has been obtained.

CIRCLE 120 ON READER SERVICE CARD

12 Store Buying Power!

ANAHEIM, CA
(Near Disneyland)
933 N. Euclid St., 92801
(714) 533-7373
(800) 854-6046
Janet, WØMF, Mgr.

BURBANK, CA
2492 W. Victory Bl., 91506
(818) 842-1786
(800) 854-6046
Marv, K6VIV, Mgr.
Victory Blvd. at Buena Vista
1 mi. west I-5

OAKLAND, CA
2210 Livingston St., 94606
(510) 534-5757
(800) 854-6046
Mark, WI7YN, Mgr.
I-880 at 23rd Ave. ramp

SAN DIEGO, CA
5375 Kearny Villa Rd., 92123
(619) 560-4900
(800) 854-6046
Tom, KM6K, Mgr.
Hwy. 163 & Claremont Mesa

SUNNYVALE, CA
510 Lawrence Exp. #102
94086
(408) 736-9496
(800) 854-6046
Ken, K1ZKM, Mgr.
So. from Hwy. 101

NEW CASTLE, DE
(Near Philadelphia)
1509 N. Dupont Hwy., 19720
(302) 322-7092
(800) 644-4476
Bob, N9GG, Mgr.
RT.13 1/4 mi., So. I-295

PORTLAND, OR
11705 S.W. Pacific Hwy.
97223
(503) 598-0555
(800) 854-6046
Ray, KI7TN, Mgr.
Tigard-99W exit
from Hwy. 5 & 217

DENVER, CO
8400 E. Iliff Ave. #9, 80231
(303) 745-7373
(800) 444-9476
Joe, KDØGA, Mgr.

PHOENIX, AZ
1939 W. Dunlap Ave., 85021
(602) 242-3515
(800) 444-9476
Gary, N7GJ, Mgr.
1 mi. east of I-17

ATLANTA, GA
6071 Buford Hwy., 30340
(770) 263-0700
(800) 444-7927
Phil, N4DRO, Mgr.
Doraville, 1 mi. no. of I-285

WOODBRIDGE, VA
(Near Washington D.C.)
14803 Build America Dr.
22191
(703) 643-1063
(800) 444-4799
Mike, KA3TMQ, Mgr.
Exit 161, I-95, So. to US 1

SALEM, NH
(Near Boston)
224 N. Broadway, 03079
(603) 898-3750
(800) 444-0047
Chuck, KM4NZ, Mgr.
sales@hamradio.com
Exit 1, I-93;
28 mi. No. of Boston

HAM RADIO OUTLET®

WORLDWIDE DISTRIBUTION

YAESU

Watch For New FT-100 Soon!

Call For Possible Extensions

Coupon Expiration June 30th

FT-840

$100. Coupon

- 100W • 12V DC • DDS
- Gen. Cov. Rx, 100 mem.
- Optional Ext. Auto • Tuners Available

Call Now For Our Low Pricing!

FT-11R/41R

2M 440mHz

- 150 Mem. Channels
- 1.5W standard
- 5W option
- Alpha-numeric display
- Compact & back lit keypad

Call For Low Price!

FT-847

Ultimate Base Station, HF, VHF, UHF

- 100w HF/6M, 50w 2M/430 mHz
- DSP • Full Duplex Cross-band
- 1200/9600 Baud Packet Ready

NEW!

Call for Low Intro. Price!

FT-3000M

- 2M 70W Mobile • Wide Band RX
- AM Aircraft RX • Dual Watch
- 9600 Baud Compatible • Alpha Numeric Display

Call For Low Pricing!

FT-1000MP HF Transceiver

$100. Coupon

- Enhanced Digital Signal Processing
- Dual RX
- Collins SSB filter built-in
- 100W, Power supply built-in

Call Now For Low Pricing!

NEW!

VX-1R

2M/440 Sub-Mini HT

- 290 Memory Channels
- .5W output
- Receives 76-999mHz plus AM BCB (Cell Band Blocked)
- Lithium Ion Battery

NEW!

Call Now For Your Low Price!

FT-920 HF+6M Transceiver

$100. Coupon

- 100w 160-6M, 12VDC
- Built-in DVR, CW Memory Keyer
- DSP, Auto-Notch • 99 Memories
- Computer controllable, CAT System

NEW!

Call For Intro. Low Pricing!

FREE YSK-900 *and* XF-110C cw filter

FT-900CAT

- Compact HF Trans., 100W, Collins Filter
- Optional built-in auto tuner
- Remotable front panel, optional kit req.
- QSK, 100 Mem. Gen Cov. Rx, OMNI-Glow display

Call Now For Low Price!

FT-50RD

$20. Coupon

2M/440mHz Compact HT

- DVR, Decode, Paging Built-in
- Alpha numeric display
- Wide Band receive
- Battery Saver
- 112 Memories
- Mil-Spec
- HiSpeed scanning

NEW!

Call For Your Low Pricing!

FT-8100R 2M/440 Mobile

$35. Coupon

NEW!

- Ultra Compact • 50w/35w 2m/440
- 110 memories • Wide Band RX
- Backlit mic • Remotable front panel w/opt. YSK-8100

Call Now For Special Pricing

AZ, CA, CO, GA, VA residents add sales tax. Prices, specifications, descriptions, subject to change without notice.

Look for the HRO Home Page on the World Wide Web
http://www.hamradio.com

COAST TO COAST FREE SHIPPING
UPS - Most Items Over $100
Rapid Deliveries From The Store Nearest To You!

The Spratly Islands conjure up all sorts of amateur radio memories, some tragic and some the thought of a country almost impossible to work. Members of the Chiltern DX Club decided it was about time in the new sunspot cycle to create some new and exciting memories of the Spratly Islands.

9MØC

The CDXC Spratly Islands DXpedition

BY STEVE TELENIUS-LOWE*, G4JVG

The Spratly Islands. The very name conjures up images of South China Seas pirates, typhoons, and—for radio amateurs—memories of ill-fated and even disastrous DXpeditions. Even today, the island group is disputed territory, with overlapping territorial claims by a number of countries in the region. Because of the uncertain political nature of the group, the Spratly Islands are considered a separate country (or "entity") for DXCC purposes, and count as AS-051 for the RSGB Islands on the Air program.

Some of the islands are unoccupied, although claimed by one or more countries, while other islands in the group are occupied sometimes by troops of one country, even though they may also be claimed by others.

In 1979 a group of DXpeditioners sailed into the Spratly group. However, on approaching Amboyna Cay, which they believed was uninhabited, they were fired upon and had to take refuge in Brunei. Later some of the group returned to operate for a short time as 1S1DX from Barque Canada Reef, while the remainder stayed behind in Brunei. Several years later, a group of German amateurs sailed to the Spratlys and were also fired upon, this time with disastrous consequences. Their yacht was sunk, and tragically two amateurs were killed, one immediately and the second after several days of drifting in a lifeboat without food or water.

With this sad history, it is perhaps not surprising that although Spratly remained high on the Most Wanted Countries list,

The 9MØC antenna farm at dusk.

there were few more attempted DXpeditions for several years. Meanwhile, Malaysia had occupied Swallow Reef in the Spratly group and set up a naval base there. They built a sea wall around exposed sand bars at one end of the reef and gradually reclaimed the land to form a larger island, which they called Pulau Layang Layang. An aircraft landing strip was constructed, and a dive center resort built on the island.

It wasn't long before amateurs discovered that there was now a safe place to operate from in the Spratly group, and in 1993 a group of mainly Finnish and American amateurs operated from Pulau Layang Layang as 9MØS.

Early Planning

In April 1996, my wife and I spent a holiday in Malaysia, during the course of which we met Eshee, 9M2FK, who had been the sole Malaysian representative on the 9MØS operation. Eshee showed me all his photographs of the DXpedition and provided me with a vast amount of useful information. There and then the idea of a major British-led DXpedition to Pulau Layang Layang formed in my mind.

**c/o Don Field, G3XTT, 105 Shiplake Bottom, Peppard Common, Henley on Thames, RG9 5HJ, England*

Birds on Pulau Layang Layang. Aircraft in background—not the ideal spot for a jet!

As a member of the CDXC (Chiltern DX Club), the UK DX Foundation, I mentioned the idea to some other members who had also operated from Malaysia in the past or who had experience on other DXpeditions. The idea was accepted with great enthusiasm: There was a feeling that the CDXC was now big enough and well-enough established to attempt a major DXpedition of its own. Spratly was now at number 25 in the Most Wanted Countries listing, so it was deemed to be an excellent location for our planned operation.

A core team was soon formed, which consisted of Neville Cheadle, G3NUG; Don Beattie, G3OZF; Don Field, G3XTT; Tony Canning, GØOPB; and John Linford, G3WGV. John and I had operated on the highly successful VK9MM DXpedition from Mellish Reef in 1993, and we invited two other members of that group—both well-known DXpeditioners in their own right, Dr. Vince Thompson, K5VT, and Atsu Asahina, VK2BEX, a Japanese-Australian—to bring their own particular skills to the Layang Layang team.

The first meeting of the core UK group was held in September 1996, when the initial plans were laid. In was soon apparent that we all were thinking along the same lines: We were planning a major DXpedition, with at least four stations operating simultaneously, with high power and multiple beam antennas. In 1993, 9MØS had only used 100 watt stations, but since then the Malaysian authorities had increased the permitted power output to 400 watts.

We looked at where Spratly was "most wanted," and decided that it was probably on the WARC bands (10, 18, and 24 MHz) and very definitely on the low bands (1.8, 3.5, and 7 MHz). Previous Spratly DXpeditions had concentrated on making as many QSOs as possible, which meant mainly operating on 14 and 21 MHz. Nevertheless, we also wished to give as many operators as possible the chance to make a contact with Spratly, and this meant not just those with linears and monoband beams, but also those with 100 watts and either a G5RV or a multiband vertical antenna. For us, this meant taking a big antenna for 20 meters, where we guessed that propagation would be best with most parts of the world.

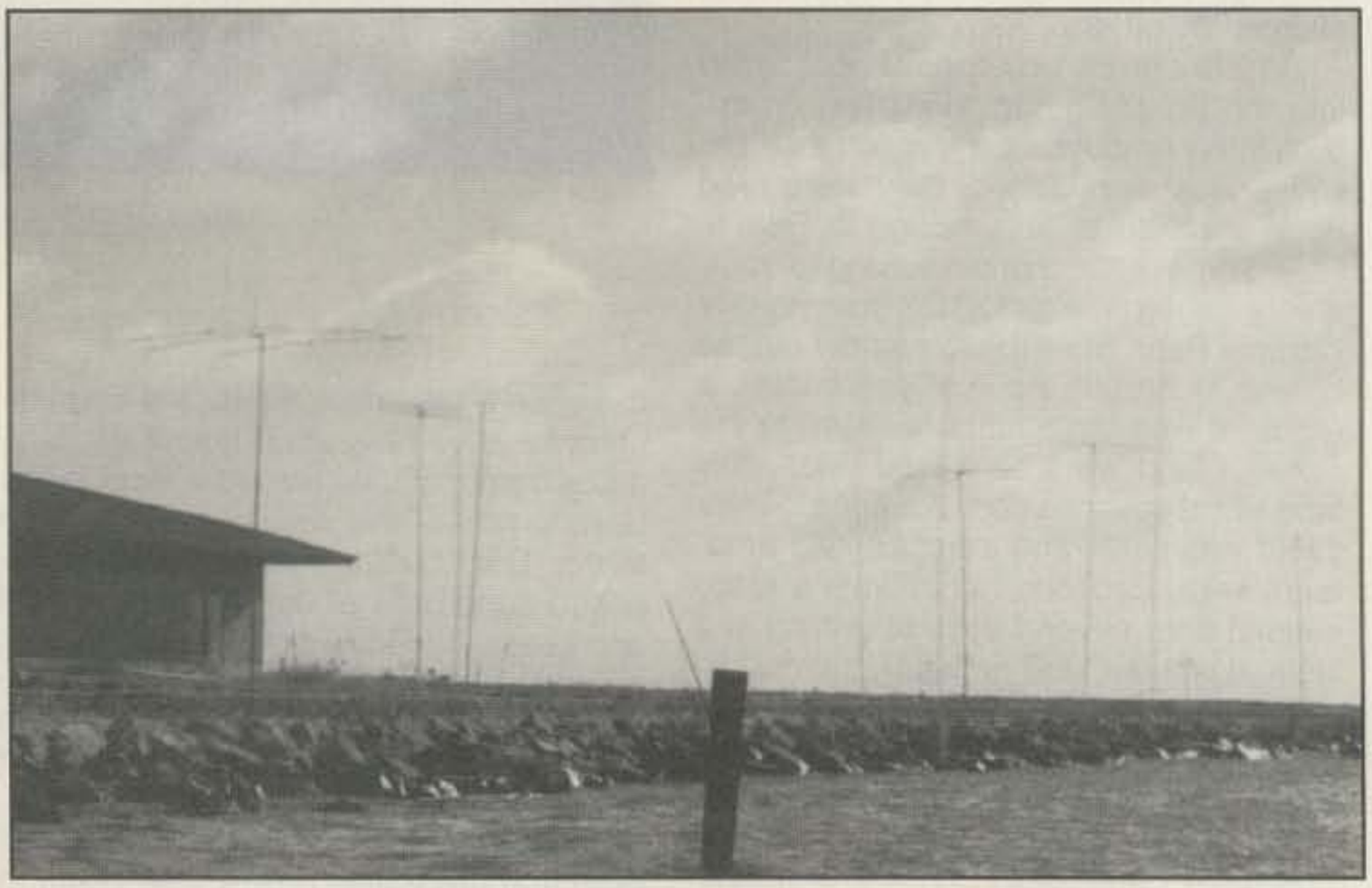
One of my tasks was to obtain the license. Licensing in Malaysia is relatively simple for overseas visitors these days, and four members of the core team had already operated from that country. Layang Layang is administered from Sabah, Eastern Malaysia, but the JTM (Malaysian licensing authority) office there can only issue 9M6 callsigns. We wanted a more distinctive callsign than this, as a 9M6 callsign would suggest only that we were in Eastern Malaysia, not Spratly. We therefore applied to the JTM head office in Kuala Lumpur for a 9MØ "group special event" callsign, specifically requesting 9MØC—the "C" standing for CDXC.

Neville volunteered to take charge of the logistics and was also in charge of raising corporate sponsorship. After the initial couple of meetings, it became apparent that if we had ambitions of putting on a major expedition, with particular emphasis on the low bands, we would have to take a lot of equipment. Taking such a lot of gear to a remote location half-way around the world, and bringing it all back again, was clearly going to be an expensive proposition.

Kingdoms

The VKØIR Heard Island DXpedition team had divided their responsibilities into areas controlled by individuals they termed "Czars." We felt that as a British DXpedition, we ought to have "Kings" instead, and so the system of "Kingdoms" was born.

As already indicated, Neville was the "Corporate Sponsorship King," while I took on the role of "DX Association Sponsorship King." Don, G3XTT, as a keen top-band operator, became our "LF Bands King," with overall responsibility for ensuring that we took the most suitable antennas for 160, 80, and 40 meters. Tony, GØOPB, drew the short straw and became the "RF King," which brought with it



A sea view of the 9MØC antenna farm.

Say You Saw It In CQ

the onerous responsibility of soldering a total of 150 PL259 plugs onto the ends of the 75 separate lengths of coaxial cable we took. Each member of the team brought a different area of expertise, and was assigned his Kingdom accordingly.

More Members

The scope of the DXpedition continued to grow, and now it was clear that we needed more operators, particularly as Atsu, VK2BEX, had to pull out as he could not take sufficient time off work. We felt that although this was a British-led and British-organized DXpedition, we nevertheless wanted at least one American and one Japanese operator on the team. Several of the members of the group had operated during contests with John Krzymuski, G4DQW, who had recently moved to New York with his job and was now licensed as N2QW. John, who was already a CDXC member, was invited to join the group, as an "honorary" second American operator. It proved more difficult to find an alternate Japanese operator, but eventually Kazu Ogasawara, JA1RJU, was signed up.

Because of our commitment to the low bands, our "Topband King," Don, G3XTT, suggested that another specialist of low band operation would be a welcome addition. Mike Devereux, G3SED, fit the bill perfectly.

Ray Gerrard, G3NOM, who was living in Kuala Lumpur and licensed as 9M2OM, helped to obtain the 9MØC license by visiting JTM headquarters in person on several occasions, so Ray was also invited to join the team. Experience had shown that having a "man on the ground" was almost essential, and Donald Soh, 9M6SU, from Kota Kinabalu was asked to help with local arrangements in Sabah.

Finally, CDXC member Jeff Morris, 9H1EL, with whom a number of us had operated in the past, was also asked to join, making a total of 13 operators from five countries.

All members of the team were on the Internet, and between meetings of the UK group, much communication took place by e-mail. We estimate that something like 15,000 e-mails were sent around cyberspace during the planning stages of the expedition.

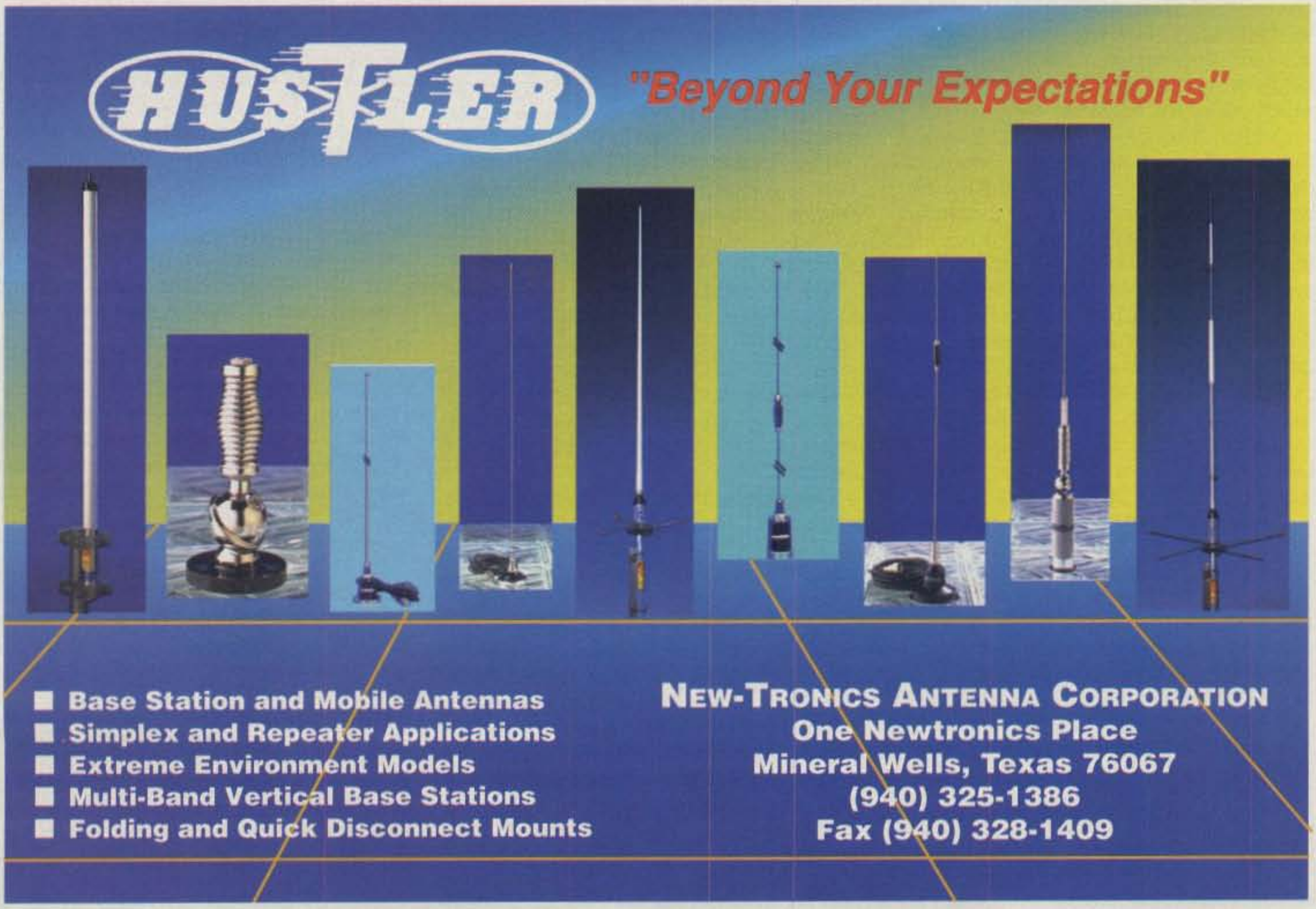
Sponsorship

Most fairly large DXpeditions receive sponsorship of some sort, usually from the various DX associations and foundations around the world. The Northern California DX Foundation (NCDXF) is particularly well-known, and for good reason, as it has considerable reserves and is able to support several small DXpeditions each year with moderate financial donations, subject to some fairly strict criteria. For larger DXpeditions, such as the one we were planning, donations in the region of thousands of dollars are possible.

CDXC, with a membership of around 350, is also able to support serious DXpeditions, usually with a donation of about $350. This sum is normally matched by the RSGB's HF DXpedition Fund, which is financed mainly by income from the raffle held each year at the RSGB HF Convention. We were delighted to receive a donation of almost $3500 from the HF DXpedition Fund, the largest sum ever provided by them for a single expedition, on the grounds that this was by now far and away the largest DXpedition ever organized by a UK group.

With financial sponsorship from the NCDXF, CDXC, the European DX Foundation, many other DX associations, generous individuals, plus material provided either free of charge, on loan, or at cost price by numerous other companies, it looked as though we would be able to keep within our original budget—just. We had now put ourselves in the major league of DXpeditions, and it looked as if it was going to become a very expensive undertaking. In order to fulfil our goals, it would be necessary to ship out large quantities of material such as antennas, mast, and coax, something that would be beyond the scope of smaller DXpeditions because of the cost.

Neville threw himself into the role of cor-



CIRCLE 60 ON READER SERVICE CARD

	1.8	3.5	7.0	10.1	14.0	18.0	21.0	24.9	28.0	50	Total
CW	1149	2830	6554	5710	4635	3563	4529	3018	2048	262	34298
SSB	0	1420	4312	0	7511	2996	7282	2576	2632	127	28856
RTTY	0	0	0	0	1315	56	635	0	69	0	2075
FM	0	0	0	0	0	0	1	0	294	0	295
Total	1149	4250	10866	5710	13461	6615	12447	5594	5043	389	**65524**

Table I– 9MØC QSOs by mode/band.

	CW	SSB	RTTY	FM	Total
Africa	115	195	4	0	314
Asia	11309	12438	823	290	24860
Europe	16844	9086	764	1	26695
North America	5345	5695	442	1	11483
Oceania	442	1120	33	3	1598
South America	243	322	9	0	574

Table II– QSOs by continent/mode.

	1.8	3.5	7.0	10.1	14.0	18.0	21.0	24.9	28.0	50
Africa	2	17	51	28	116	25	27	32	16	0
Asia	398	1497	3090	1268	4541	3038	5313	2442	2884	389
Europe	567	1718	5501	3617	5100	2038	4283	2306	1565	0
N. Amer.	150	879	1927	695	2991	1320	2406	698	417	0
Oceania	32	123	186	68	536	167	296	90	100	0
S. Amer.	0	16	111	34	177	27	122	26	61	0

Table III– QSOs by continent/band.

porate sponsorship fund raiser with considerable enthusiasm. Because of the excellent relationship between the RSGB IOTA program and Yaesu, he was able to negotiate a deal with Yaesu which meant we could take four FT-1000MP transceivers, fully filtered, with four of their new VL-1000 solid-state linear amplifiers. We wanted to operate 6 meters, and Yaesu kindly provided two FT-920 transceivers, which cover 1.8–50 MHz.

Cushcraft was another major sponsor, through UK importer Nevada Communications, and provided our HF and 6 meter beams. These included a 3-element monobander for 20 meters, two A3S tribanders, an A3WS WARC bands Yagi, and a 5-element monobander for "six."

UK amateur radio dealer Martin Lynch & Son agreed to provide much of our coaxial cable requirements. We took 6600 ft. of coax in total(!)—and added two of the excellent Heil Pro headsets with boom microphones. Martin also made up the DXpedition T-shirts, which bear his logo along with that of CDXC.

Dunestar of USA loaned three complete sets of their single-band band-pass filters which proved essential in preventing interstation interference; vital in a multi-transmitter environment.

We are extremely grateful to all the sponsors who have helped, and a complete list can be found at the end of this article.

Arrival

Around 1.5 tons of equipment was shipped out to Kota Kinabalu at the end of 1997. It was taken to Layang Layang on an open-deck fishing trawler by Donald, 9M6SU, and three other 9M6 amateurs, all of whom succumbed to sea sickness during the 24-hour voyage. Donald had also hacked seven 35–40ft bamboo poles from the jungle and took these to the island on the boat. These were later to prove invaluable for supporting ancillary wire antennas.

Eventually the day came when we all met up for the first time as a single group, in Kota Kinabalu. We were met at the airport by Donald and Phil Weaver, 9M6CT (formerly VS6CT). They had arranged a welcome dinner for us at a local Chinese restaurant, where we met many members of the Sabah and Borneo radio clubs.

The following morning we were again transported to the airport for the 70-minute flight by Twin Otter to Layang Layang. We were greeted by Steve and Coralie Stewart, the friendly Australian managers of the Layang Layang Island Resort, which is now a premier, world-standard dive location.

The temperature on Layang Layang was 95°F in the shade—except there was no shade. A stiff breeze made the temperature bearable, but antenna work in the midday sun risked second-degree sunburn. Steve and Coralie allowed us to use the conference room on the island for our stations. This was so large (about 80 by 60 ft.) that most of the antenna construction could take place indoors, in air-conditioned comfort. Of course the antenna erection itself had to be done outside, but with over 20 different antennas to make we were not ready to do this until the following day.

A combination of jet-lag and excitement at the forthcoming operation meant that few slept well, so accordingly we were all up at 6 AM the following morning for the massive antenna erection party, before the sun became too strong. Everything went very smoothly; the months of detailed planning paid off, as everyone knew exactly where each required part was located.

The conference room was located at one end of the resort, with about half a mile of open scrubland and coral sand to the west, on which we could plan our antenna farm.

We had decided that to do a serious job on the low bands, we would need to take either a Yagi or something similar for 40 meters. A Yagi was eventually dismissed on the grounds that in order to work effectively, it would have to be mounted high above the ground, which would prove to be difficult on a coral sand island. We eventually decided on a 40 meter four-square (4-SQ) array—four phased quarter-wave verticals with quarter-wave spacing. This decision was made before the Heard Island DXpedition, but we were certain our choice was the correct one after the Heard Island team reported excellent results with their 4-SQ arrays. Although we originally planned to take a single vertical for 80 meters, once we had decided on a 4-SQ array for 40 meters, it didn't take too long before it was suggested we also take one for 80 meters.

The 80 meter 4-SQ array, based on center-loaded US-made Gladiator verticals, with 65 ft. spacing between the elements and 65 ft. elevated radials, took up the most space, and this antenna was sited about 1000 ft. away from the shack. Because of the long feeder run, the array was fed with RG214 low-loss coax; even on 80 meters every dB counts. The Yagis were mounted in a line along the shore, all within just a few feet of the sea, and with a perfect salt-water take-off for hundreds of miles.

To ensure we had a good signal on 160 meters, we took Neville's Titanex vertical. This is an 85 ft. vertical made from titanium alloy. Extremely light and flexible, it can be erected by just two people. We were also loaned a Battle Creek Special for 160, 80, and 40 meters by the Battle Creek, Michigan, DX group.

By 11.30 PM local time, a full 24 hours ahead of schedule, everything was ready to go. I had the privilege of making the first QSO, with K5DV, on 20 meters SSB.

9MØC On the Air

Thus began 12 days of continuous operation. We had the four FT-1000MP plus VL-1000 stations located in the four corners of the conference room, and all four stations were kept on the air around the

Say You Saw It In CQ

AMERITRON . . . 800 Watts . . . $795

Ameritron AL-811H gives you four 811A tubes, 800 watts, superior quality -- for less money -- than the competitor's 3 tube 600 watt unit . . . Why settle for less power, less quality and pay more money?

AL-811H
$795
Suggested Retail

AL-811
$649
Suggested Retail

Only the Ameritron AL-811H gives you *four fully neutralized* 811A transmitting tubes. You get absolute stability and superb performance on higher bands that can't be matched by un-neutralized tubes.

Ameritron mounts the 811A tubes *vertically* -- not horizontally -- to prevent hot tube elements from sagging and shorting out. Others, using *potentially damaging horizontal mounting*, require special 811A tubes to retard sagging and shorting.

A *quiet*, powerful computer grade blower draws in plenty of cool air. It *pressurizes* the cabinet and efficiently cools your 811A tubes. Our air flow is so quiet, you'll hardly know it's there -- unlike noisy, poorly chosen blowers.

You also get efficient full size heavy duty tank coils, full height computer grade capacitors, heavy duty high silicon core power transformer, slug tuned input coils, operate/standby switch, transmit LED, ALC, dual meters, QSK compatibility with QSK-5 plus much more.

AL-811 has three 811A tubes and gives 600 Watts output for only $649.

Kilowatt Amplifier

AL-80B
$1249
Suggested Retail

Full kilowatt PEP output from a whisper quiet compact desktop linear Only 8½x14x15½ inches. Plugs into nearest 120 VAC outlet. All bands 160-15 Meters, 1000 watts out on SSB, 850 watts out on CW, genuine Amperex 3-500ZG tube has graphie plate, nearly 70% efficiency, inrush current protection, multi-voltage tranformer.

NearLegalLimit™ Amp

AL-572
$1395
Suggested Retail

New class of *Near Legal Limit*™ amplifier gives you 1300 Watt PEP SSB power output for *65%* of price of full legal limit amps! Four rugged *Svetlana* Russian 572B tubes. Instant 3-second warm-up. Plugs into 120 VAC. Compact 8½Hx15½Dx14½W. 160-15 Meters. 1000 Watt CW output. Tuned input, instantaneous RF Bias, dynamic ALC, parasitic killer, inrush protection, two lighted Cross-Needle meters, multi-voltage transformer.

AMERITRON HF Linear Amps with Eimac™ 3CX800A7

AL-800H
$2295
Two tubes
1500 Watts plus

Suggested Retail
Call your dealer for your best price!

AL-800
$1595
Single tube
1250 Watts

AMERITRON's new AL-800/H amps cover 160-15 Meters including WARC bands. The AL-800 has a single Eimac™ 3CX800A7 tube and produces 1250 Watts PEP. The AL-800H has two 3CX800A7s giving 1500 Watts *plus*.

Both amps have an adjustable slug tuned input circuit, grid protection, ALC control that is front panel adjustable,vernier reduction drives, heavy duty 32 pound grain oriented silicone steel core transformers and high capacitance computer grade filter capacitors.

These amplifiers have multi-voltage operation (14 user selectable AC line voltage from 90-140; 200-250 VAC), quiet pressurized ventilation systems, dual illuminated Cross-Needle meters that read peak forward and reflected power, SWR, high voltage, grid current and plate current.

Vernier reduction drives make tuning adjustments smooth and easy Ameritron's exclusive *Step-Start Inrush Protection*™ stops damage to your amplifier from inrush current. Ameritron amps feature an attractive Lexan front panel decal and superior, all metal construction -- it's built to last! Ultra compact desktop size is perfect for your operating station. 8½x16½x14¼".

AMERITRON offers the best selection of legal limit amplifiers

AMERITRON's* legal limit *amplifiers use Peter Dahl super heavy duty Hypersil® power transformer capable of 2500 watts!

Ameritron's most powerful Amplifier

AL-1500 *with Eimac® 8877 ceramic tube*
$2795
Suggested Retail

Ameritron's *most powerful* amplifier uses the herculean Eimac® 8877 ceramic tube. It's so powerful that 65 watts drive gives you the full legal output -- and it's just loafing because the power supply is capable of 2500 Watts PEP.

Ameritron's toughest legal limit Amp

AL-1200 *with Eimac® 3CX1200A7 tube*
$2295
Suggested Retail

Get ham radio's *toughest* tube with the Ameritron AL-1200 -- the Eimac 3CX1200A7. It has a 50 watt control grid dissipation. What makes the Ameritron AL-1200 stand out from other legal limit amplifiers? The answer: A super heavy duty power supply that loafs at full legal power -- it can deliver the power of more than 2500 watts PEP two tone output for a half hour.

Ameritron's Classic legal limit linear amp with a pair of graphite plate

AL-82 *Amperex® 3-500ZG tubes*
$2195
Suggested Retail

Get full legal output using a *pair* of durable 3-500ZGs. Most competing linears using 3-500s *can't* give you 1500 watts because their light-weight power supplies *can't* use these tubes to their full potential. AL-82 is ham radio's *only* super 3-500 amp!

AMERITRON no tune Solid State Amplifiers

Ameritron ALS-500M Mobile no tune Solid State Amp has 500W out, covers 1.5-22 MHz

ALS-500M
$799
Suggested Retail

Ideal Mobile amplifier -- uses 13.8 Vdc mobile electrical system, very compact 3½x9x15 in., extremely quiet, 500W output, 1.5-22 MHz coverage, instant bandswitching, no tuning, no warm up, no tubes, SWR protected.

Ameritron ALS-600 no tune Solid State FET amp includes heavy duty power supply, 600 Watts out

ALS-600
$1299
Suggested Retail

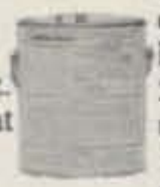
No tuning, no fuss, no worries -- just turn it on and operate. *Includes* AC power supply, 600 W output, continuous 1.5-22 MHz coverage, instant bandswitching, *fully* SWR protected, extremely quiet, very compact. Amp is 6x9½x12 inches.

AMERITRON brings you the finest high power accessories!

RCS-8V Remote Coax Switch . . . $149

Replace 5 coax feedlines with a single coax. 1.2 SWR at 250 MHz. seable to 450 MHz. 1kW at 50 MHz. **RCS-4, $139.** 4 position remote HF switch.

ADL-1500 Dummy Load with oil . . . $59.95



Oil cooled 50 ohm dummy load handles 1500 W for 5 minutes. SWR under 1.2 up to 30 MHz. Low SWR to 400 MHz.

ICP-120/240 Inrush Current Protector . . . $79

Stops power-up inrush current and absorbs momentary high voltage spikes to your amplifier. 120 or 220VAC models.

ATR-15 Legal Limit Antenna Tuner . . . $399

Designed for legal limit amplifiers! Covers 1.8-30 MHz, peak reading SWR/Wattmeter, 6 pos. antenna switch, 1:1 or 4:1 balun.

ARB-700/702 amp-to-radio interface . . . $39.95

Protects your costly transceiver from damage by *keying line transients*, steady state current and excessive voltages.

QSK-5 Pin Diode T/R Switch . . . $349

Self-contained, connects externally to most HF amps. Handles 2.5 KW PEP, 2 KW CW. Six times faster than vacuum relay. 6x4x9½ in.

TP-100 Tuning Pulser lets you safely tune your amplifier . . . $49.95

Pulse tuning lets you *safely* tune up your amplifier for full power output and best linearity. Keeps average power to low safe level to prevent overheating, tube damage, power supply loss and premature component failure.

ADL-2500 fan cooled 2500 Watt dry dummy load . . . $199.95

Whisper quiet fan. Handles any legal limit amplifier -- 2500 Watts average power for 1 minute on, ten off. 300 Watts continuous. SWR below 1.25 to 30 MHz and SWR below 1.4 to 60 MHz.

Free Catalog: 800-713-3550

Call your favorite dealer for your best price!

AMERITRON®

. . . the world's high power leader!

AMERITRON, 116 Willow Road, Starkville, MS 39759
TECH (601) 323-8211 • **FAX** (601) 323-6551
8 a.m. - 4:30 p.m. CST Monday - Friday
For high power amplfier *components*, call (601)-323-8211
Web Site . . . http://www.ameritron.com

CIRCLE 115 ON READER SERVICE CARD

The 9MØC team. Left to right: Tony, GØOPB; Mike, G3SED; Don, G3OZF; John, G3WGV; John, G4DQW/N2QW; Donald, 9M6SU; Neville, G3NUG; Jeff, 9H1EL; Don, G3XTT; Steve, G4JVG; Vince, K5VT; Ray, 9M2OM/G3NOM; and Kazu, JA1RJU.

clock. One problem we faced early on was having to make a strategic decision as to which four bands to operate, as—especially around dawn and dusk—there were times when all nine HF bands were open simultaneously.

One of the FT-920s was operating in break-in beacon mode on 50.102MHz, but with no callers on 6 meters at all, it was soon decided that, at peak HF propagation times, the 6 meter station should be put on a fifth band. It didn't take long before the "spare" FT-920 was also pressed into service on a *sixth* band!

It was, of course, not possible to keep six stations on the air simultaneously all the time. For a start, there were not enough operators. We did have to eat and sleep as well! Second, from around 11 AM local time (0300 UTC) until perhaps 4 PM (0800 UTC) daily, absorption meant that the only bands that were really open were 21 and 24 MHz. There were some short openings into Japan during this period, but often signals were weak and business slow. However, for 24 hours a day we kept four stations on the air, and there were long periods with five or six stations active.

During the first 24 hours of operation, 8000 QSOs were put into the 9MØC log. The pile-ups were intense, but—at least from our end—appeared to be well-disciplined for the main part.

A major difficulty was the extremely high level of tropical thunderstorm static, especially on 160 and 80 meters. This meant that although we were receiving reports that the Titanex vertical was putting out a very strong signal on 160 meters, our topband operators, G3SED and G3XTT, had the greatest of difficulty in receiving any station at all, even those with extremely strong signals.

Many hours were spent experimenting with Beverages, a magnetic loop, and a low dipole as receive antennas, but it was only in the last few days of the operation, when the static level suddenly decreased, that it became possible to receive many stations on 160 meters.

Eighty meters was somewhat more successful, although on at least one night I found it impossible to hear any signals other than the relatively local JAs and VKs because of the atmospheric noise. However, the directional 4-SQ array proved a useful, relatively low-noise antenna, and on quieter nights a great many European and North American stations were put into the log.

The 40 meter 4-SQ worked superbly well. It was so directional that European stations could easily be worked through S9+ JA's, simply by switching from the NE to the NW direction. Our most difficult target area, the East Coast of North America, was worked with relative ease on 40 meters, and much to our surprise, 40 meters quickly became the band of choice for working the East Coast.

During our 12 days of operation, the solar flux peaked at 107, with the A index falling to zero for a couple of days. This led to some good 28 MHz openings to North America and Europe, with G stations being worked between about 0900 and 1100 UTC on several consecutive days.

Most of the time, however, conditions on the higher bands were not particularly good. To a large extent our antennas made up for this, with the Cushcraft 203CD full-size, 20 meter, 3-element Yagi being the star performer. We installed this antenna on a 40 ft. pole, 50 ft. directly above the sea. Comparing it directly with a tri-bander at a lower height revealed about two "S" points difference over the important long path to Europe. Again, this made us feel we had taken the right antenna, and made the effort of putting it up at that height really worthwhile.

Internet Integration

One relatively recent development for DXpeditions is that of integration with the Internet. John Linford, G3WGV, was our "Technology King" and wrote some software specially for the DXpedition, which further developed techniques used by the Heard Island group.

One really useful feature of John's software was that the four main operating positions were linked to a central server by means of a low-power 70 cm wireless LAN (in effect this was a temporary Spratly Packet Cluster system). This meant that all the operators knew exactly who was operating which station, and through utilizing the FT-1000MP band data, on which frequency and mode. When stations asked the inevitable questions such as "When are you going to be on 10 meters CW?" it was great to be able to say, "We're actually on 28022 kHz CW, 24945 kHz SSB, and 14195 kHz SSB right now!"

It was also possible to interrogate the server from any of the operating positions, for example to show how many QSOs had been made by any particular callsign, and on which bands and modes those QSOs had taken place.

Of course, all our stations were in one (very large) room, but the idea of this system is that it could link several remote operating sites up to a distance of several hundred meters from each other. The effect was that each DXpedition operator was almost uniquely well-informed about the activity of the other stations, and just as important, was able to give out this information on request to the waiting pile-up.

Having the logs from all six stations merged into a central server provided almost instantaneous back-up of the whole log, and allowed for an easy means of providing the log on the Internet.

The integration of the DXpedition with the Internet worked in three main ways. First, the DXpedition had (and still has) its own Internet page, at <http://members@aol.com/spratly98>. The page was gradually built up over the 18-month planning period, and included an overview of the planned operation, along with a map of the area, pictures of the core team, links to our sponsors' pages, and so on. During the DXpedition itself, the page was maintained by Martin Atherton, G3ZAY, who was able to upload pictures of the island and antennas which we took using a digital camera and sent by e-mail to Martin.

Second, daily feedback during the

Say You Saw It In CQ

John, G3WGV, operating the Yaesu FT-1000MP with the VL-1000 linear amplifier.

course of the operation was from a series of "pilots," using e-mail. For the Americas, our pilot was Don Greenbaum, N1DG; in Asia, Yoichi Sakurada, JP1NWZ; while for the remainder of the world it was Martin, G3ZAY. Don, Yoichi, and Martin's e-mail addresses were published, and amateurs were invited to provide feedback via the appropriate pilot. The pilots would then pass on a digest of the comments to us. These were both of the "heard other south-east Asians on 10 meters long path but you weren't on," and the "worked you first call on 160 meters—you're doing a great job, guys" type. Both types of message were very valuable to us.The former type alerted us to possible openings that we might otherwise have missed, while the latter gave our egos an at times much needed boost.

The third way the Internet was used was with the provision of log servers. Each day John, G3WGV, uploaded the complete 9MØC log by e-mail to Don, N1DG, and Richard Everitt, G4ZFE. John Clayton, G4PDQ, also posted the logs on the DX Packet Cluster system. This enabled amateurs to check that they were indeed in our log, and thus hopefully reduce the number of duplicate contacts on a given band or mode. This service proved to be extremely popular, with over 20,000 "hits" being recorded by the log servers.

Summing Up

We went to Spratly with the target of making 40,000 QSOs. We felt this was realistic, given the number of operators, stations, and antennas we were taking. However, I don't think any of the operators really thought we would exceed this target by such a large margin. Our final QSO tally was 65,558. This makes the 9MØC operation the fourth biggest DXpedition of all time in terms of QSO numbers.

We were also very pleased at the quality of these contacts, not just the quantity. G3SED and G3XTT between them made over 1100 contacts on 160 meters in extremely difficult circumstances. This included no fewer than 39 UK stations. On all bands, especially 40 meters, we worked large numbers of East Coast USA/Canadian stations across a very difficult, almost antipodal path, across the auroral zone.

On the WARC bands, we often worked the pile-ups dry on 18 and 24 MHz. There was one occasion when I was calling CQ on 18145 kHz and getting no replies at all. Then JF1IST/7J on Okino Torishima opened up on 18150 kHz and immediately had a large pile-up of JA operators, which proved that the band was open, but that we had worked all those who were around at that time. On the other hand, on 10 MHz we made around 6000 QSOs, and even at the end of the operation there were still large pile-ups.

On RTTY we made 2075 QSOs, which we believe is more than any other DXpedition. On 6 meters we worked 389 stations, mainly in Japan and including all 10 JA call districts. We also worked almost all the active 6 meters operators in Hong Kong.

As expected, the toughest areas to work were the East Coast and mid-west of the US, though we were able to give many amateurs in those areas the last one they needed for 5BWAZ. To our surprise, 40 quickly became the preferred band for working into the East Coast, the four-square putting excellent signals into that area. Thirty meters also gave good results. We used a pair of phased verticals much of the time, fashioned from modified CB whips, and a typical comment from an N2 amateur to our US pilot N1DG was "I just worked 9MØC on 30 meters with 100 watts and my A3W (dipole) at 20 feet high!"

JUN'S ELECTRONICS

IN BUSINESS SINCE 1976

Out of State
1-800-882-1343
California
1-800-564-6516
310-390-8003 FAX 310-390-4393
http://www.juns.com

PREMIER communications
AR-146 • $199.95
2 Meter Mobile w/ 50W

KENWOOD
• $279.95
TH-79AD/H
2M/440 MHz Handheld
$279.95 5W, $339.95
• $1349.95 Inc. $200 Coupon
TS-790A
2M/440 MHz, All Mode Base
TM-461A
440 MHz Mobile
$399.95 List $509.95
TM-261A 2M Mobile $229.95

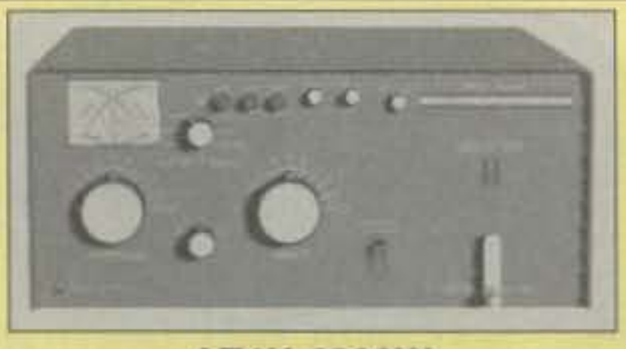
ICOM
• CALL TODAY!
NEW
IC-746
HF+6M+2M All Mode
IC-706MKII
Mobile Sized HF+6M+2M
IC-2GXA 2M HT w/Alkaline Pack, BC-105 .....$149.95
(Export only)
IC-3SAT 220MHz HT (No Box).....$279.95
IC-V21AT 2M/220MHz HT.....Call For $$
(Limited Quantities 30 Day Jun's Warranty)

YAESU
FT-847 • CALL!!
HF+50+144+430MHZ All Mode
• $479.95 List $639.00
FT-51RH
5W 2M/440MHz HT
FREE MH-29 LCD Display Speaker/Mic
$109.95 Value
FT-8500/HS10
2M/440 MHz Mobile
List $859.95 • $399.95
FT-8500/MH39
2M/440 MHz Mobile • $379.95

SR STANDARD
$189.95 List $469.00
C168A
Deluxe Sub-Mini 2M HT
Featues for C168A
40 Mem. Airband 115-175MHz CTCSS En/Decode DTMF Sql. W/Paging
CNB160 6V 300mAh • $29.95 List $72.00
CNB161 7.2V 700mAh • $49.95 List $78.00
CAX160 Remote Bat. Adapter • $29.95 List $78.00

JUN'S ELECTRONICS
HRS M-F 10:00 - 6:00 SAT 10:00 - 5:00
5563 SEPULVEDA BLVD.
CULVER CITY, CA 90230
2 1/2 miles from LAX-North on I-405
ESPANOL • KOREAN

CIRCLE 57 ON READER SERVICE CARD



AT4K 4000W
ROLLER INDUCTOR TUNER

AT1500 1500W PEP
ROLLER INDUCTOR TUNER

AT300CN 300W
TOROIDAL INDUCTOR TUNER

WATTMETER
WM150
1.8-150MHz

PALSTAR COMPONENTS

- VARIABLE CAPACITORS
- LOW PASS FILTERS
- ROLLER INDUCTORS
- VERNIER DRIVES
- TURNS COUNTERS
- DUMMY LOADS

PALSTAR INC.™
9676 N Looney Rd.,
PO Box 1136-1482
Piqua, Ohio 45356

Great Amateur accessory products designed and manufactured in Ohio using superior materials, attention to detail and performance. These products are built to last and give you the most value for your money.

Contact your favorite Dealer or call us direct
@1-937-773-6255 Tel • 1-937-773-8003 Fax
E-mail Palstar@erinet.com
See Our Web Page at
WWW.PALSTARINC.COM

Participating Dealers:

Amateur Electronic Supply
Milwaukee, WI
1-800-558-0411

Horizon Sales
Reston, VA
1-800-575-3461

Lentini Communications
Newington, CT
1-800-666-0908

Ventures International
Minneapolis, MN
1-612-881-9019

R&L Electronics
Hamilton, OH
1-800-221-7735

Ham Central
Poughkeepsie, NY
1-914-462-0415

ARW Amateur Sales
Youngstown, OH
1-330-759-3655

Canada: Norham Radio
North York, Ont., Can.
1-416-667-1000

Europe: Nevada Communications
Portsmouth, England
44-705-698-113

CIRCLE 62 ON READER SERVICE CARD

Pulau Layang Layang from the air. If you were one of the lucky ones, this is what you worked.

A very important factor in this success was that all the antennas and equipment worked flawlessly throughout. The Yaesu FT-1000MP is tried and tested and is a superb performer, but it was arguably a risk taking VL-1000 amplifiers, which are so new as to be virtually untested in the amateur market. We needn't have worried: With automatic band-switching and tune-up, when used with the FT-1000MP, you simply could forget that they were there. Band changing was virtually instantaneous and involved just pressing one button on the 1000MP and switching to the correct antenna. Without exception, all the 9MØC operators were very impressed indeed with this new piece of equipment.

As for the antennas, the Cushcraft beams were easy to assemble, well made, and performed flawlessly. In the mornings all the Yagis would be beaming at Japan and North America. This was an awesome sight indeed, particularly as they were all in line and within 10 ft. of the sea. There must have been a huge amount of RF going in that direction! In the evenings we turned them all towards Europe, another wonderful sight as the tropical sunset highlighted the mass of aluminum. Equally, the LF antennas were a dream, with the all-around sea-water take-off obviously helping those low angles.

All in all we were delighted with the success of the operation and by the feedback received from the amateur community. Thanks to all the sponsors, to all the amateurs in Sabah who helped us in many ways, and to Phil Whitchurch, G3SWH, who in a moment of weakness volunteered to take on the task of QSL manager! Phil is QTHR and will be answering both direct and bureau QSLs.

CDXC

The 9MØC DXpedition was organized by CDXC (Chiltern DX Club), The UK DX Foundation. For a CDXC prospectus, please contact Alan Jubb, G3PMR, Secretary CDXC, 30 West St., Great Gransden, Sandy, Beds SG19 3AU, England or e-mail Alan at <SHACKLOG@aol.com>.

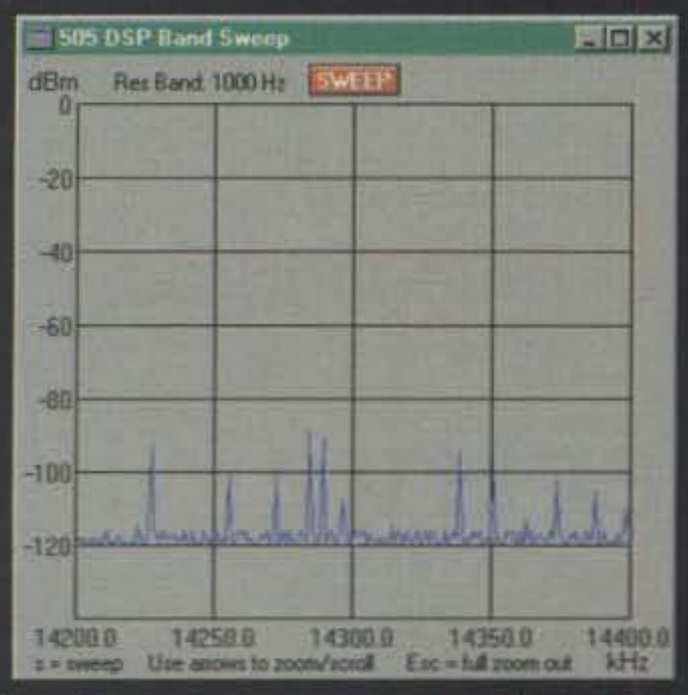
Sponsors

Corporate (amateur radio): AEA Timewave, *CQ Amateur Radio* magazine (Japan), Cushcraft, Dunestar, Gladiator Antennas, Martin Lynch & Son, Nevada, Radio Active Publications, *The 59(9) DX Report*, Yaesu.

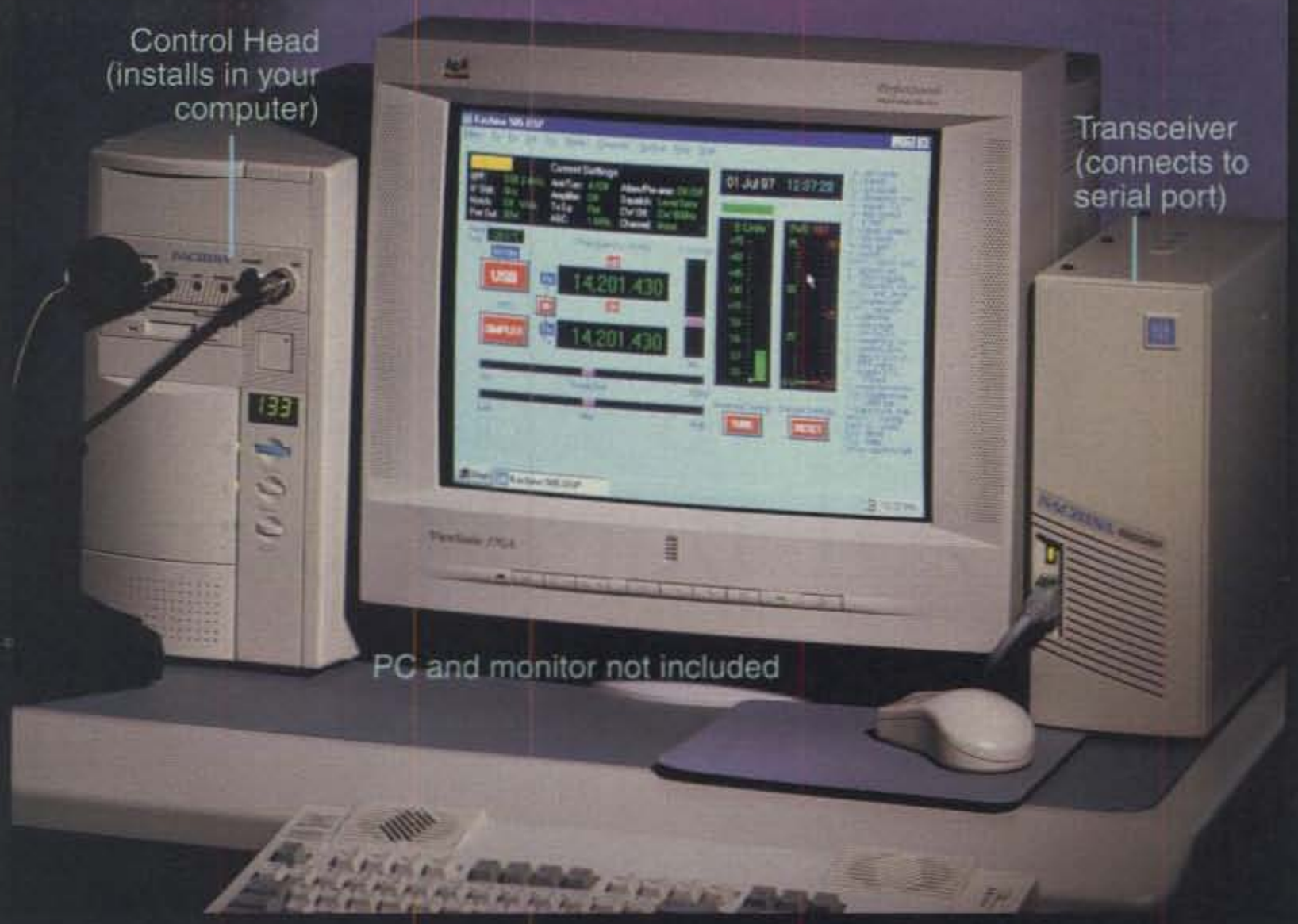
Corporate (non-amateur): Camel, Layang Layang Island Resort, Malaysian Tourism Promotion Board, NCT Forwarding & Shipping Sdn Bhd (Sabah), Sabah Boys' Brigade, Sabah Tourism Promotion Corporation.

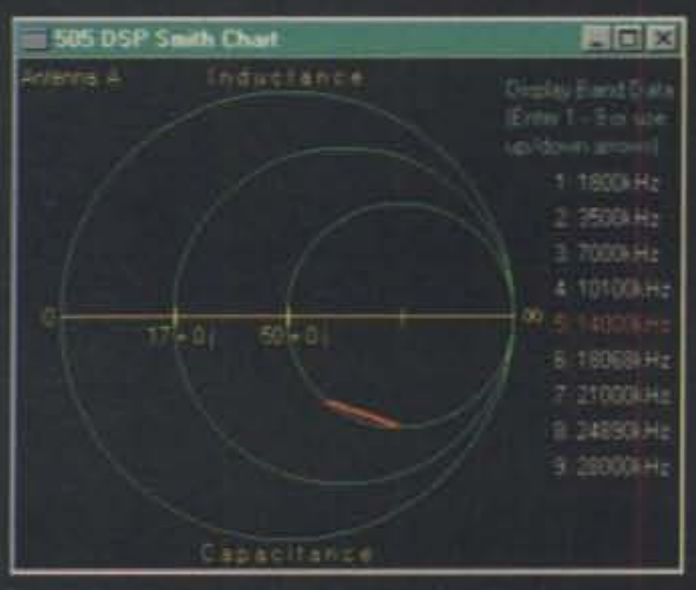
DX Associations and Radio Clubs: Arkansas DX Association, Battle Creek DX Group, CDXC, Central Arizona DX Association, Clipperton DX Club, Danish DX Group, Dateline DX Association, Eastern Arizona DX Club, Eastern Iowa DX Association, European DX Foundation, German DX Foundation, GACW Argentina, GM DX Group, INDEXA, LA-DX-Group, NCDXF, Northern Ohio DX Association, OK (Czech) DX Foundation, the Oklahoma DX Association, RSGB DXpedition Fund, Sabah Amateur Radio Society, SE Michigan DX Association, Stockport Radio Society, Virginia DX Century Club.

Individuals: GØWAZ, G2FNK, G3JNB, G3OFW, G3PEM, G3PMR, G4JMB, G4VJM/M, GW4VEQ, JH1AJT, JH1UUT, K4QD, NI6T, VK5WO, XE1CI. ■



"Band Sweep" window allows you to look for the pile-ups. "Point and click" the mouse to instantly change frequency and join in.





"Smith" chart window instantly displays your antenna Z for the entire band.

Built-in logging software lets you keep track of your QSOs.

The New Approach to HF Radio!

The Kachina 505DSP Computer Controlled Transceiver

Features:

- Operates with any Computer Running Windows 3.1, 95 or NT. (Computer need not be dedicated to 505DSP control)
- 100 Watts PEP Output
- Covers all Amateur HF Bands on TX, plus 30 kHz-30 MHz Receive
- IF Stage 16/24 Bit DSP
- 11 DSP Bandpass Filters
- CW Keyboard Transmission and 9 CW Buffers
- 2 Antenna Ports and 3 Accessory Ports to Interface with External Amplifiers, Antenna Tuners and TNCs
- Automatic Frequency Calibration from WWV or other External Standard
- "Snapshot" Keys for Instant Recall of Frequencies and Settings
- Optional Internal or External Antenna Tuners

You will have heard about the revolutionary new Kachina 505DSP Computer Controlled Transceiver by now. Perhaps you're in the market for a new rig, and wondering if computer control is really the way to go.

If the other 100 watt radios on the market could draw you a graph of band activity, antenna impedance, calibrate meters to show S-units, volts, dBm, ALC, VSWR, forward power or reflected power, let you type your CW messages from a keyboard, or calibrate themselves from WWV, you wouldn't need a 505DSP. But the simple fact is, most other rigs don't have any of these features.

Even without the extras afforded by computer control, the 505DSP is a heck of a rig, above all, built in the USA to commercial standards. With sophisticated IF stage, 16/24 bit DSP technology, 11 "brick-wall" bandpass voice/CW/data filters down to 100 Hz wide (no ringing), excellent receiver sensitivity, carrier and opposite-sideband suppression and a low distortion P.A.; you'll soon wonder why all radios aren't designed this way.

To ensure that your 505DSP stays current for years to come, Kachina has a policy of providing free software upgrades from our internet website, so you won't be stuck with "last years model" as revisions are made.

And our customer service is among the best in the business. You'll speak to a real person, not a machine. Guaranteed!

Like more information? Visit our website listed below for detailed specifications, to download a demo version of our control software or for a list of the dealers nearest you.

KACHINA COMMUNICATIONS, INC.

Now Includes Keyboard CW, QRZ Callsign Data Base!

P.O. Box 1949, Cottonwood, Arizona 86326, U.S.A.
Fax: (520) 634-8053, Tel: (520) 634-7828
E-Mail: sales@kachina-az.com ▫ Website: www.kachina-az.com

CIRCLE 126 ON READER SERVICE CARD

AA1P presents a down-to-earth solution for a down-to-earth antenna. With a bit of effort you can improve your antenna, too.

How To Build An Effective All-Band Counterpoise

BY RICHARD BRUNNER*, AA1P

For several years I have been using a vertical antenna (Butternut HF9V-X) on all bands, 160 through 10 meters, using a simple all-band counterpoise with great satisfaction. A 1/4-wave or 3/4-wave vertical must have a counterpoise or ground grid to work properly and be effective, and here in New England, with thin rocky soil, a ground grid looks more like a 50 ohm dummy load (at least in my backyard)! Also, a counterpoise is much less trouble to install and gives performance comparable to a very extensive ground system.[1] This counterpoise will work very well with any antenna requiring a ground system, principally 1/4- or 3/4-wave verticals.

Everyone knows what a ground grid is—many (20 to 120) radials, 1/4 wavelength long, laid on the ground or buried, and connected to the base of the vertical antenna. A counterpoise is a wire or system of a few wires suspended above ground. Both have their physical hazzards. You haven't lived until you've tripped on your own ground grid. Always be wary and careful.

With a vertical antenna, the antenna currents return through the ground, causing series resistive losses. One way to minimize losses is to put many wires in or on the ground (ground grid), shorting-out the resistive path. The other way is to use a counterpoise, which keeps most of the electric field and return currents out of the ground, also minimizing losses. Counterpoises have been used with high-power VLF transmitters, and worked as well as or better than in-ground systems, depending on ground conductivity. They were eventually replaced with in-ground systems because of maintenance problems from ice storms and their occasionally starting field fires. The counterpoises were 10 feet off the ground.[2]

Purists will object that one radial (80

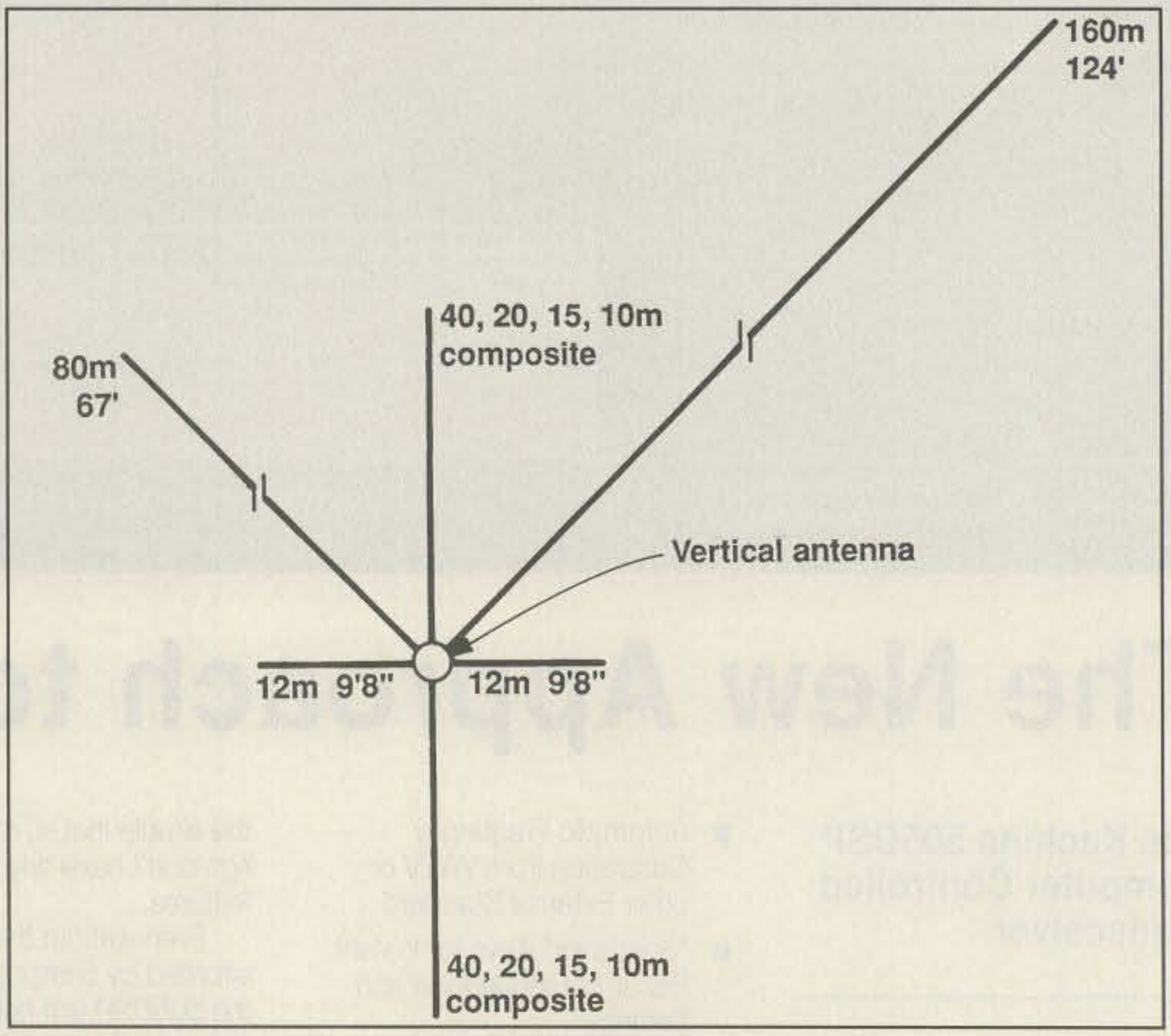


Fig. 1– The overall plan for the all-band counterpoise.

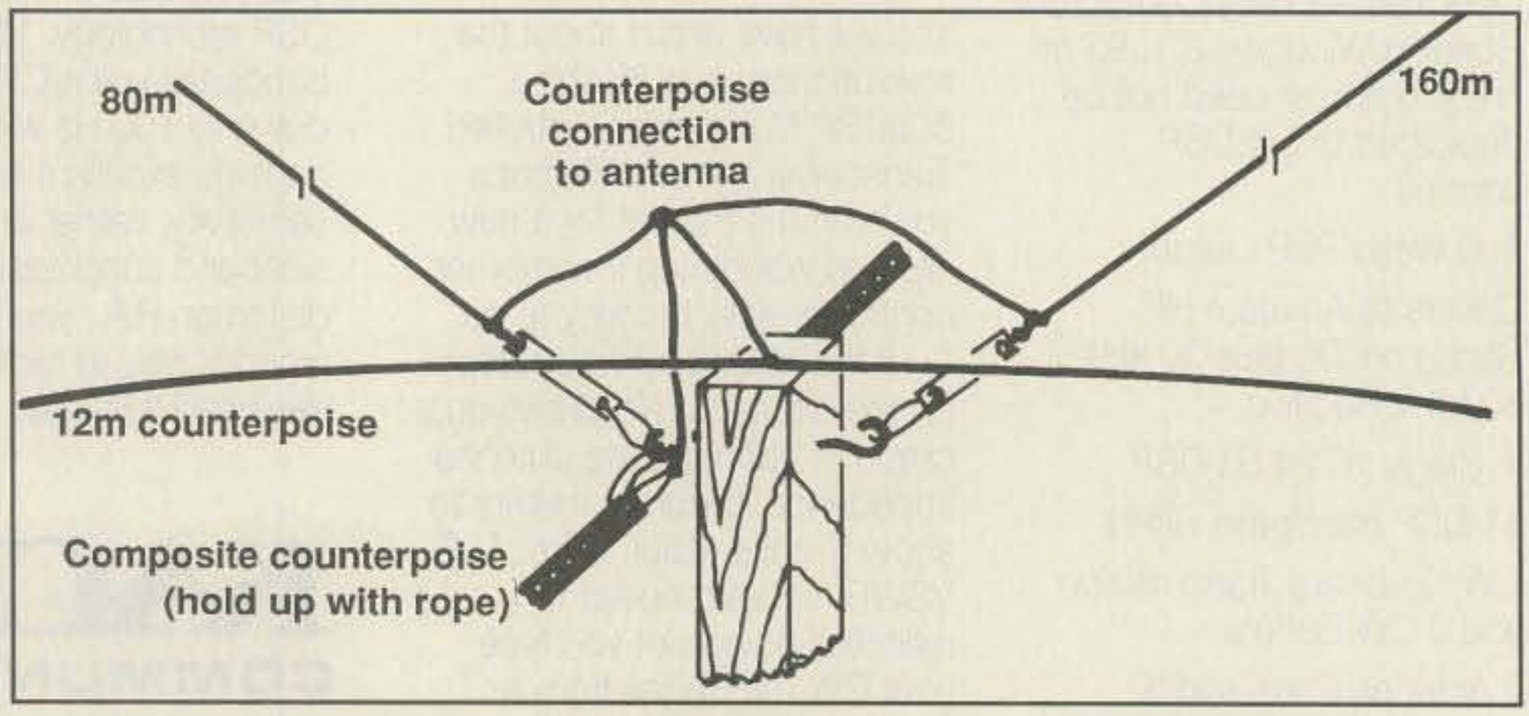


Fig. 2– How to connect the counterpoise to your vertical antenna.

*10 Brookside Drive, Foxboro, MA 02035
e-mail <richard.brunner@stoneweb.com>

Say You Saw It In CQ

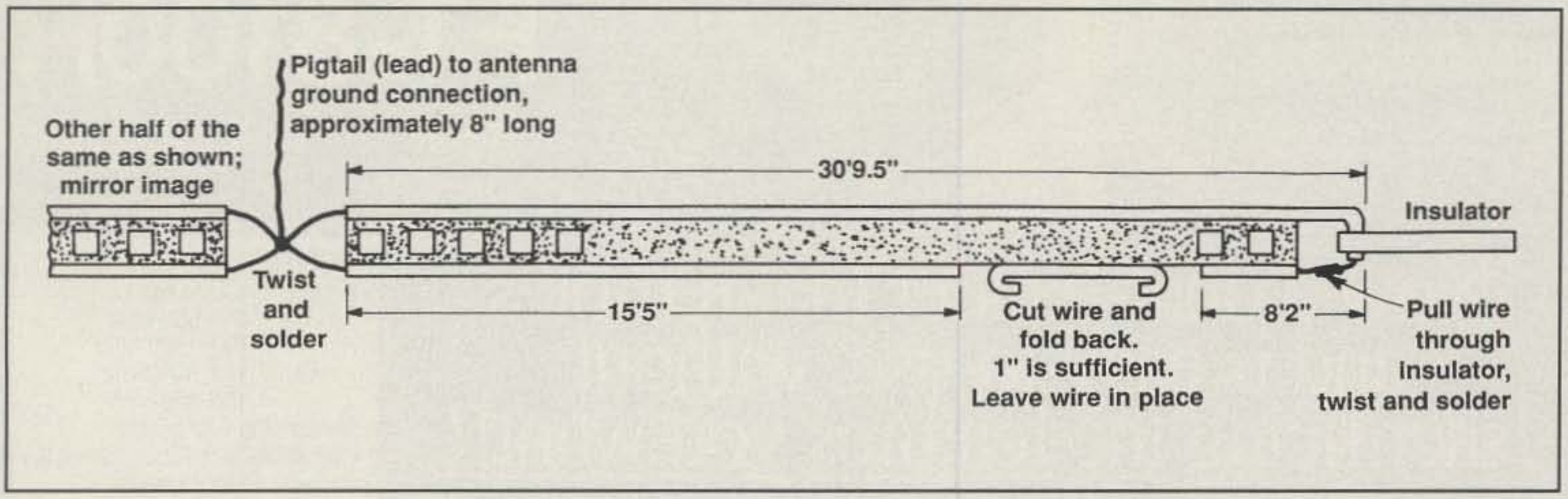


Fig. 3– The 40, 20, 15, and 10 meter ladderline counterpoise.

meters and 160 meters) is unbalanced and will permit horizontally polarized radiation from the counterpoise. That is true, as from a 10 foot high antenna, and we are in favor of radiation!

• For 160 and 80 meters I use *one* radial each. This is a variation on the old "1/4 wave up and 1/4 wave out," popular back in the 1920s. It worked well then and works well now. (See figs. 1 and 2.)

• For 40, 20, 15, and 10 meters I use a composite counterpoise made of 450 ohm ladderline. One conductor is full length for 1/4-wave resonance on 40 meters and 3/4 wave on 15 meters, and one conductor is 1/4 wavelength for 20 meters. The long conductor is folded back to form a 10 meter stub, which isolates the first 3/4's to form 3/4 wavelength on 10. (See fig. 3.)

• No additional counterpoise is required for 30 and 17 meters, probably due to multiple wavelength resonance on the 80 and 160 meter counterpoises.

• 12 meters: Use two radials 9 ft. 8 in. long. Actually, I used two radials from an old ground-plane, 9 ft. long with a 20 in. pigtail.

Place the counterpoise high enough off the ground so you cannot hang yourself on it. Mine is 10 ft. off the ground at the ends and something less in the middle of the spans. More height is acceptable. Another reason to keep it off the ground is because there is some coupling to the ground, and closer proximity will cause higher losses. I notice some detuning

This is no MIRAGE !

This Is Real !

DXR Model shown with meter option installed.

TELETEC DXP Linear Amplifiers

Clearly the best all-mode amplifiers around.

"Well constructed" "Designed to be installed and forgotten" QST October 1996

Model #	Freq.	Pwr Rating (In/Out) *	Sugg. Retail
DXP-L180	6 meter	15W/180W	$379.00
DXP-V175	2 meter	50W/175W	$329.00
DXP-V220	220 MHz	20W/150W	$369.00
DXP-U150	70 cm	30W/150W	$429.00

Model # R=Rack D=Desktop	Freq.	Pwr Rating (In/Out) *	Sugg. Retail
DXR-L180_	6 meter	15W/180W	$639.00
DXR-V175_	2 meter	50W/175W	$629.00
DXR-V220_	220 MHz	20W/150W	$659.00
DXR-U150_	70 cm	30W/150W	$789.00

*** Output Power level is determined by the input power level. Units will operate with input power level as low as 1 watt.**

TELETEC's DXP Series Linear Amplifiers clearly outperform the competition. The die cast aluminum heat sink provides an attractive low profile, but powerful package. Theses amplifiers operate in all modes: FM, SSB, CW, and AM. Transmit/Receive Switching is automatic - RF sensed. Over/Reverse Voltage, Over-Temp, and VSWR protection are provided. Available Options include: ATV tuning, Repeater tuning, Preamp disable and keying wire kit. "N" connectors are also available (std on DXP-U150).

TELETEC's DXR Series Linear Amplifiers are 100% continuous duty packages available in **Rack Mount or Desktop versions**. Super quiet fans are used to keep the heatsink and internal components extremely cool. DXR series amplifiers provide the same operational features as the DXP series. "N" connectors standard on all DXR models.

"We meet or exceed all published specifications, - We GUARANTEE IT"

Contact your dealer for your best pricing !

12 Month Warranty -- VISA/MASTERCARD Accepted

Prices and specifications subject to change without notice.

TELETEC CORPORATION

For more information, call or write: 10101 Capital Blvd., Wake Forest, NC 27587 - USA
Order Line: Toll Free (888) 323-6888 Technical: (919) 556-7800 Fax: (919) 556-6180
E-mail Address: teletec@sprintmail.com Website Address: www.teletec-usa.com

CIRCLE 74 ON READER SERVICE CARD

"The quick-release remote front panel gives you so many installation options ."

"And with dual receive you can talk on one band, and listen on another!"

"Plus, the high-tech Enhanced Smart Search™ is great for finding repeaters --and you can watch it all on the dual display."

"Looks like Yaesu did it again!"

FT-8100R

Compact Dual Band Mobile

Now a dual-bander that remotes and is easy-to-use, without sacrificing the features you want!

With its quick-release, remote front panel system, the FT-8100R combines high-performance dual-band features in a simple-to-operate rugged mobile built to the endurance standards of commercial radios. The result is installation flexibility and industry-first, "must-have" advantages!

Use dual receive (V+V, U+U or V+U), or talk on one band while listening on another. Watch Yaesu's exclusive Enhanced Smart Search™ automatically seek out and load active frequencies--great for finding new repeaters while traveling.

Get wide receive coverage--from 110 to 550 MHz and 750 to 1300 MHz* for public safety, marine, aircraft, and weather channels. Enjoy up to 50 Watts of VHF power output (35 Watts on UHF) with High/Medium/Low choice on each band, and "plug and play" 1200 or 9600 bps packet. Utilize 208 memory channels--the greatest available on any remote mobile--to store repeater offset, CTCSS tone, packet baud rate, and power level.

Yaesu's popular Omni-Glow™ display provides a wide field of view, and includes a DC voltage meter. Quickly program, or clone frequency memories with optional Windows™ PC programmable ADMS-2D.

"User-friendly" describes the streamlined front panel layout. Eight clearly-marked keys, and separate Volume/Squelch controls for each band, make operation easy. And the backlit DTMF microphone includes 3 user-programmable keys...but no awkward keypad cover!

Don't sacrifice high-performance features in your dual-band mobile installation Get the easy-to-use FT-8100R at your Yaesu dealer now!

YAESU

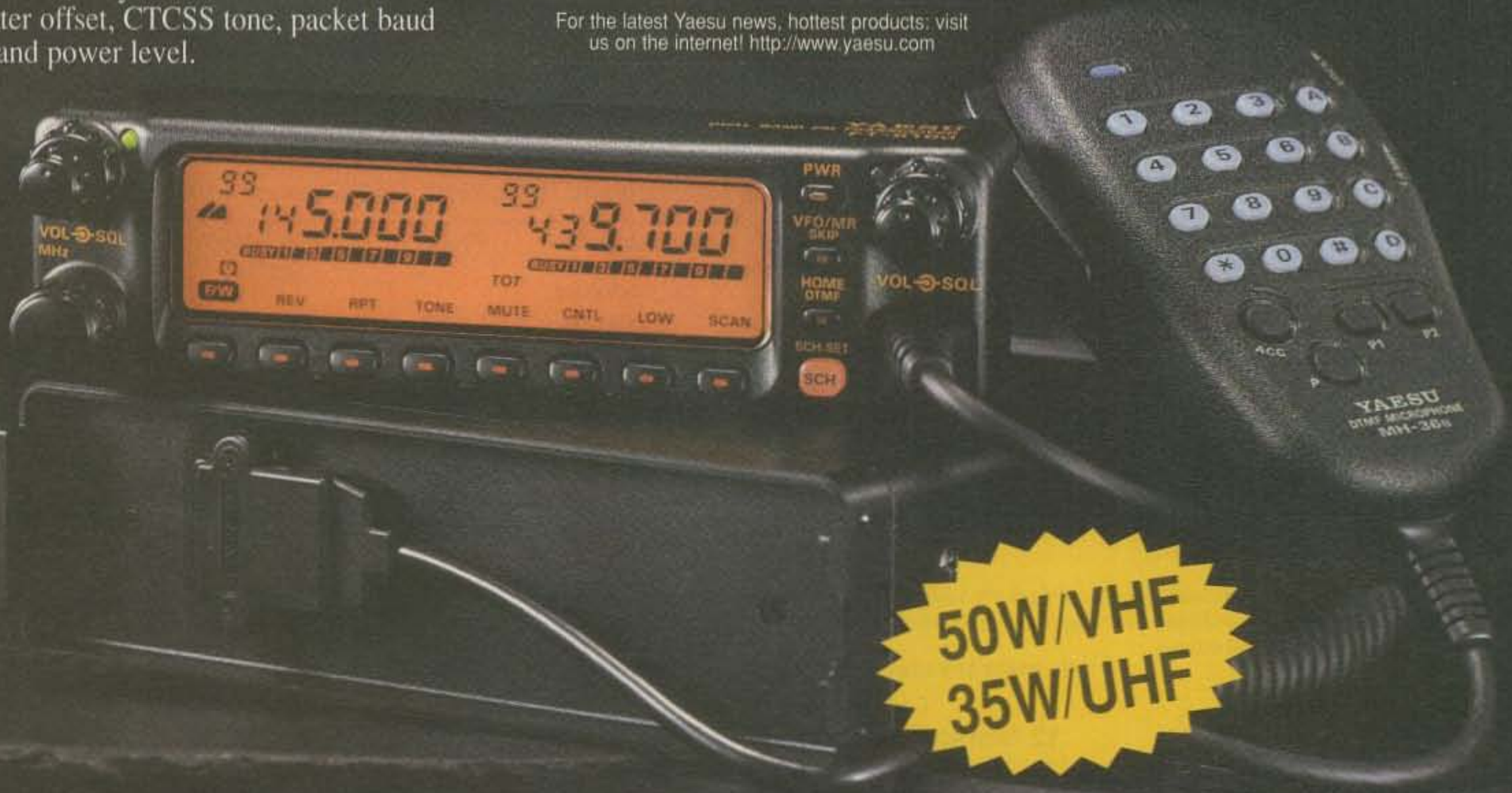
...leading the way.℠

For the latest Yaesu news, hottest products: visit us on the internet! http://www.yaesu.com

Features

- Frequency Coverage
  - RX: 110~550 MHz
  - 750~1300 MHz*
  - TX: 144~148 MHz
  - 430~450 MHz
- Detachable Front Panel (remotable w/optional YSK-8100)
- 3 Power Output Levels
  - 2m 50/20/5 Watt
  - 70cm 35/20/5 Watt
- 208 Memory Channels
- Enhanced Smart Search™
- CTCSS Encode
- Built-in Duplexer
- S-Meter Squelch
- Dual Receive (V+V,U+U,V+U)
- Crossband Repeat (bidirectional or one-way)
- PC Programmable w/optional ADMS-2D
- Digital Battery Voltage Display
- Auto Power Off (APO)
- Omni-Glow™ Display
- 1200/9600 bps Packet Compatible
- Alternating-Band Memory Selection (ABMS)
- DTMF Autodialer (6 Memories)
- Time Out Timer (TOT)
- Accessories: Consult your local Yaesu dealer.

*Cellular & 900 MHz Cordless Phone frequencies blocked.



50W/VHF
35W/UHF

©1997 Yaesu USA, 17210 Edwards Road, Cerritos, CA 90703, (562) 404-2700
Specifications subject to change without notice. Specifications guaranteed only within the 2-m and 70-cm amateur bands. Some accessories and/or options are standard in certain areas. Check with your local Yaesu dealer for specific details.

EARTH STATION FT-847

HF/50/144/430 MHz All Mode Transceiver

"Compact, too--great for our next 'rover' operation."

"HF, VHF/UHF, and satellite, all-in-one!"

"Looks like Yaesu did it again!"

"And the DSP helped me hear my first moonbounce signal ever!"

The FT-847 changes base station operation forever. Now, three radios in one--HF, VHF/UHF, satellite; technology in its finest application, from the world leader in amateur communication.

With its unequaled combination of features, like DSP filters—notch, NR and BPF, built-in 6-meter, voice monitor, separate sub-band dial, Shuttle Jog dial, Smart Search, and digital meter, the FT-847 is the only radio of its kind! Exclusively for satellite work, 19 memories exceed any other radio. For performance, power-up with 100W for HF/6-meter, and 50W for 2-meter and 430 MHz. Additional "must-haves" include cross-band full duplex, normal/reverse tracking, CTCSS and DCS encode/decode, and direct keypad frequency entry. Plus, the FT-847 is 1200/9600 bps packet-ready.

Take the next step in all-band performance and take home the FT-847 today!

Only one transceiver gives you all mode operations on HF/50/144/430 MHz with full Satellite capability.

NEW Yaesu Patented Design

ATAS-100

Active Tuning Antenna System

Designed for the FT-847. Works on 7/14/21/28/50/144/430 MHz Amateur Bands for mobile operation.

YAESU

Choice of the World's top DX'ers

For the latest Yaesu news; hottest products, visit us on the Internet! http://www.yaesu.com

© 1998 Yaesu USA. 17210 Edwards Road, Cerritos, CA 90703. (562) 404-2700

Specifications subject to change without notice. Specifications guaranteed only within amateur bands. Some accessories and/or options are standard in certainareas. Check with your local Yaesu dealer for specific details.

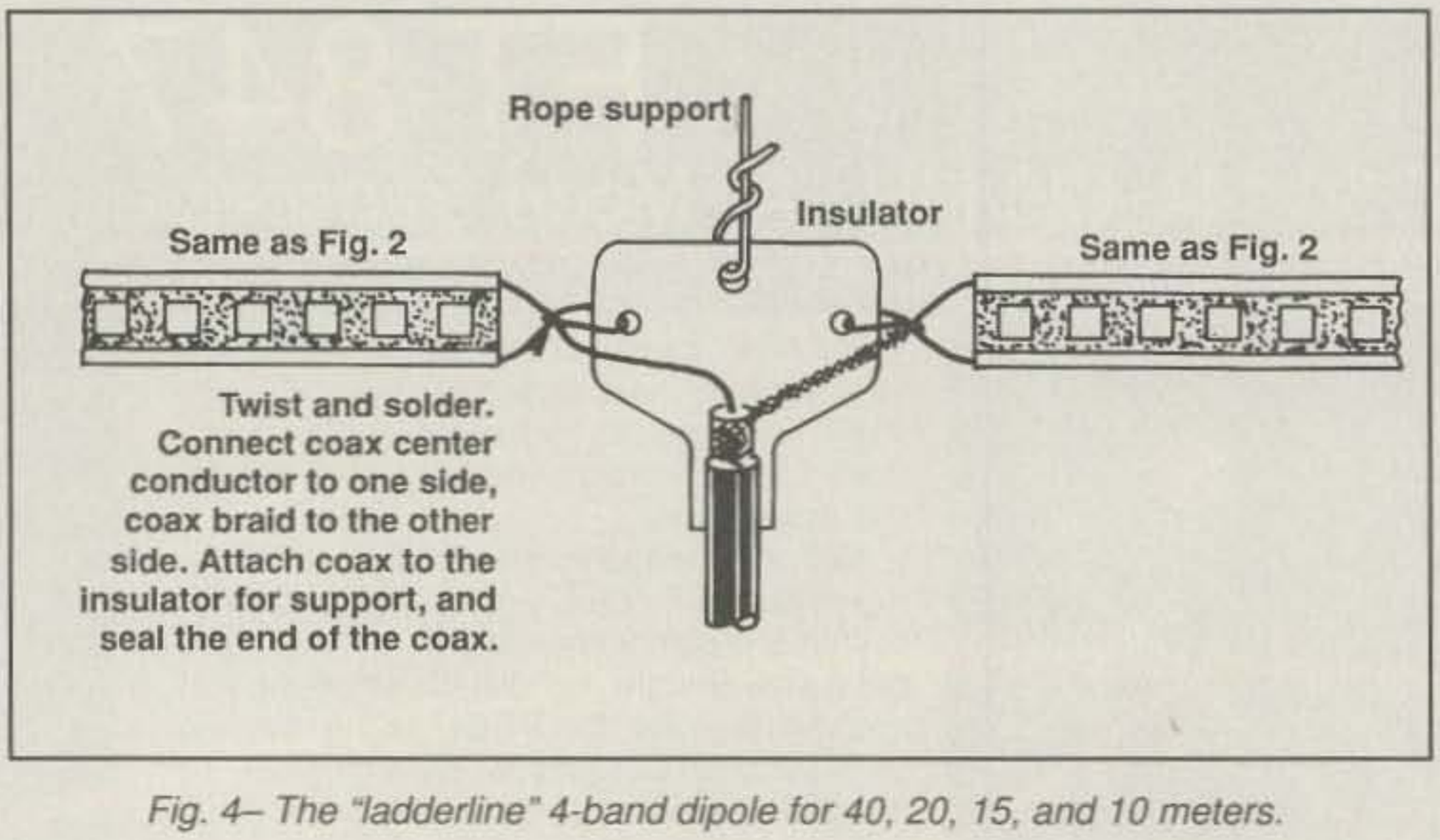


Fig. 4– The "ladderline" 4-band dipole for 40, 20, 15, and 10 meters.

(lower resonant frequency) when the ground is wet, but it is not a problem.

In constructing the counterpoise, the ends must be insulated the same as for any wire antenna. Strictly speaking, the ends of the counterpoise wires at the antenna are at ground potential and need not be insulated, but I insulate them anyway where possible to assure control of where the RF currents are going, and to prevent conductors rubbing together causing strange noises in the receiver. Also, cover your soldered joints with Vaseline® or grease or something, or in a few years the solder will deteriorate and you will have non-performing joints. The leads shown as "Pigtails" in the figures are merely short lengths of wire connecting the counterpoise elements to the antenna, in my case to the coaxial cable braid.

When installing the counterpoise elements, space them as far apart as practicable (see fig. 1). If they are too close together they will couple with unpredictable results. I originally suspended the 12 meter wires beneath the ladderline elements, and could not achieve 15 meter resonance on the antenna! Rotating the 12 meter elements 90 degrees solved the problem.

Note that the composite counterpoise will also make a good four-band dipole if fed in the center with coaxial cable (but not at the same time). With the dimensions given, resonance was measured at 7.1, 14.12, 21.23, and 28.47 MHz (see fig. 3). Seal the end of the coaxial cable, because you will have very bad results if water gets into your cable. Coax is heavy, so this antenna should be supported at the center.

For composite design of the ladderline counterpoise/antenna, other frequencies may be easily calculated:

- 1/4 wavelength resonance: L (ft.) = (246/f(MHz) × VF × end effect)
- 3/4 wavelength resonance: L (ft.) = 2 (246/f(MHz) × VF) + (246/f MHz × VF × end effect)
- 3/4 wavelength resonance with isolation stub: 3(246/f(MHz) × VF) + stub = approx. 4(246/f(MHz) × VF)

VF = Velocity Factor, 0.92 for 450 ohm ladder line (measured)

End effect = 0.97 (3%)

One could also use 300 ohm ribbon using a VF of 0.75, but it is not recommended. The conductors are easily broken, and then it stretches like taffy!

By now you are wondering if the counterpoise really works. The answer is yes! My first contact on 80 meters was a G3 (England), and on the higher bands it works as well as any antenna I've ever had. On 30 meters I easily worked Australia and Japan, and on 20 meters I worked the South Pole through a pileup with 100 watts! On 160 meters a short vertical antenna is inferior to a horizontal "Cloud Warmer" for nearby contacts, and usable bandwidth is narrow (12 kHz), but I have had many good contacts, and DX is always a possibility.

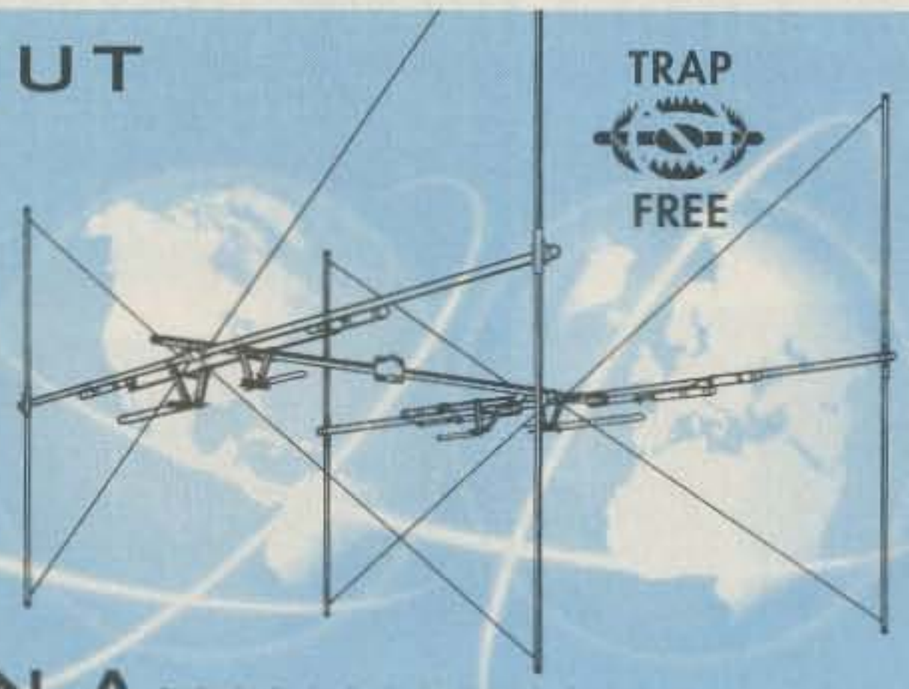
References

1. *Build Efficient, Short Vertical Antennas,* Thomas Kuehl, AC7A, *QST,* March 1998, pp. 39–44.

2. *Antenna Engineering Handbook,* Henry Jasik, McGraw-Hill Book Co., 1961, Section 19.4, Low-Frequency Ground Systems. ■

BUTTERNUT

HF5B BUTTERFLY BEAM ANTENNA



If you hunger for a directional antenna, but can't put up a full-size Yagi...

WE'VE GOT THE ANSWER!

Designed for the amateur with limited space, it offers significant improvement over omni-directional antennas. Light enough to turn easily with a standard TV antenna rotator, it mounts easily on a mast or roof tripod.

Call or write for Free New Color Brochure!
(Ask for the designers Dirty Little Secrets!)

630-238-1183

831 N. Central Avenue, Wood Dale, IL 60191
Fax: 630-238-1186
http://www.bencher.com email: bencher@bencher.com

Wingspan: 12 ft. 6 in (3.8m)
Boom Length: 6 ft. (1.8m)
Turning Radius: 6 ft. 11 in (2.1m)
Vert. Spreaders: 6 ft. (1.8m)
VSWR @ Resonance: 1.5:1 or less all bands
Frequency: 10,12,15,17,20M
Minimum Height: 30 ft. (9.1m)

butternut ANTENNAS

CIRCLE 41 ON READER SERVICE CARD

MFJ TUNERS

MFJ's world famous 3 KW Antenna Tuner

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

The MFJ-989C is not for everyone.

However, if you make the investment, you'll get the finest 3 KW antenna tuner money can buy.

Here's why . . .

Massive Transmitting Capacitors

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

Precision Roller Inductor

A precision roller inductor, 3 digit turns counter and spinner knob gives you *exact* inductance control for absolute minimum SWR.

Ball bearings on steel shafts give you a velvet smooth vernier feel and long term durability.

You won't have arcing problems with this roller inductor. Firm springs put high pressure on a plated contact wheel for excellent electrical contact.

Wide, low inductance straps are used for high currents and a new core minimizes RF loss.

$369.95
MFJ-989C

Cross-Needle Meter

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

Super Heavy Duty Balun

You get a super heavy duty current balun for balanced lines. It has two giant 2½ inch powder iron toroid cores and is wound with *Teflon*® wire connected to high voltage ceramic feedthru insulators. It lets you operate high power into balanced feedlines without core saturation or voltage breakdown.

Ceramic Antenna Switch

A two wafer 6 position *ceramic* antenna switch with extra large contacts gives you trouble free switching.

Plus much, much more

You also get a 300 watt dummy load, full one year *unconditional* guarantee, flip stand, all aluminum cabinet, tough baked on paint, locking compound on all nuts and bolts. 3 KW PEP. 10¾x4½x15 in.

Don't settle for less, get yours today!

More hams use MFJ tuners than all other tuners in the world! Why settle for an imitation when you can have the real thing?

MFJ's *deluxe* 300 Watt Tuner

MFJ-949E **$149.95**

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

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

New 8 position antenna switch lets you pre-tune into dummy load to minimize QRM.

The inductor switch is designed for high RF voltages and currents--it's not a *plastic* switch made for small signals and wired with *tiny* gauge wire.

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.

MFJ's *versatile* 1.5 KW Tuner

MFJ-962D **$269.95**

Use your barefoot rig now and have the capacity to add a 1.5 KW PEP amplifier later! Lighted Cross-Needle SWR/Wattmeter. *6* position antenna switch, *Teflon*® wound balun, ceramic feedthru insulators for balanced lines. 1.8-30 MHz. 10¾x4½x14⅞ in.

MFJ's *portable/QRP* Tuner

Tunes coax, balanced lines, random wire 1.8-30 MHz. Cross-Needle Meter. SWR, 30/*300 or 6 watt QRP* ranges. 6x6½x2½ in.

MFJ-971 **$99.95**

MFJ's *super value* Tuner

MFJ-941E **$119.95**

The new MFJ-941E gives you a 300 watt PEP tuner with *lighted* Cross-Needle Meter. Covers 1.8-30 MHz.

Antenna switch selects 2 coax lines (direct or thru tuner), random wire, balanced line or external dummy load. 4:1 balun. 1000 volt capacitors.

2 Knob *Differential-T*™ Tuner

MFJ-986 **$329.95**

The MFJ-986 Differential-T™ 2 knob tuner uses a differential capacitor to make tuning foolproof and easier than ever. It ends constant re-tuning with broadband coverage and gives you minimum SWR at only one best setting. 3 KW PEP. 1.8-30 MHz.

Roller inductor makes tuning smooth and easy. Turns counter lets you quickly re-tune to frequency.

Lighted Cross-Needle Meter reads SWR/forward /reflected/*peak*/average power in 2 ranges. Current balun reduces feedline radiation and forces equal currents into unbalanced antennas.

MFJ's *mobile* Tuner

MFJ-945D **$109.95**

Don't leave home without this mobile tuner! Let the MFJ-945D extend your antenna bandwidth so you don't have to stop, go outside and adjust your mobile whip.

Small 8x2x6 inches uses little room. Lighted Cross-Needle SWR/Wattmeter with lamp switch. 1.8-30 MHz. 300 watts PEP. **Mobile mount**, MFJ-20, $4.95.

MFJ's *6 Meter* Tuners

The MFJ-906 has lighted cross-needle SWR/Wattmeter, bypass switch. Handles 100W FM, 200W SSB. For coax fed antennas. MFJ- 903, same as MFJ-906, less SWR/Wattmeter, bypass switch.

MFJ-903 **$49.95**
MFJ-906 **$79.95**

MFJ's *smallest* Versa Tuner

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

MFJ-901B **$79.95**

MFJ's *random wire* Tuner

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

MFJ-16010 **$49.95**

MFJ's *VHF or UHF* Tuners

MFJ-921 or MFJ-924 **$69.95**

MFJ-921 covers 2 Meters/220 MHz. **MFJ-924** covers 440 MHz. SWR/Wattmeter. 8x2½x3 in. Simple 2-knob tuning for mobile or base.

MFJ's *artificial* RF Ground

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

MFJ-931 **$79.95**

Nearest Dealer/Orders: 800-647-1800
24 Hour FAX: (601) 323-6551
Technical Help: 800-647-TECH (8324)

Free MFJ Catalog
Write or call toll-free . . . 800-647-1800

MFJ ENTERPRISES, INC.
P. O. Box 494, Miss. State, MS 39762
(601) 323-5869; 8-4:30 CST, Mon-Fri.
Web: http://www.mfjenterprises.com ;
Add s/h

Prices and specifications subject to change . © 1995 MFJ Enterprises, Inc.

MFJ . . . the World Leader in Ham Radio Accessories!

CIRCLE 123 ON READER SERVICE CARD

Put on your thinking cap, get a pencil and paper (you can use your computer if you want to), and follow along with VE3ERP as he describes an affordable, available-space antenna.

A Closer Look at The Extended Double Zepp Antenna

BY GEORGE MURPHY*, VE3ERP

The Zepp could possibly be the daddy of all antennas, harking back to the very early years of the 20th century, when it was used in Zepplins while the Wright Brothers were still building bicycles. The Extended Double Zepp (EDZ) has been in popular amateur radio use almost ever since. I call it "Daddy Long Legs" because in its pristine form (see fig. 1) it requires a lot of real estate. For instance, a 1/2-wave dipole cut for the electrical center of the 12 meter band (24.940 MHz) is a sparse 5.7 m (18' 9") long, while an EDZ for the same frequency needs about 14.6 m (48'0") of countryside to stretch out in. The good news (conveyed to me by Dean Manley, KH6B) is that in its multiband configuration the EDZ can be shortened to fit a more reasonable available space!

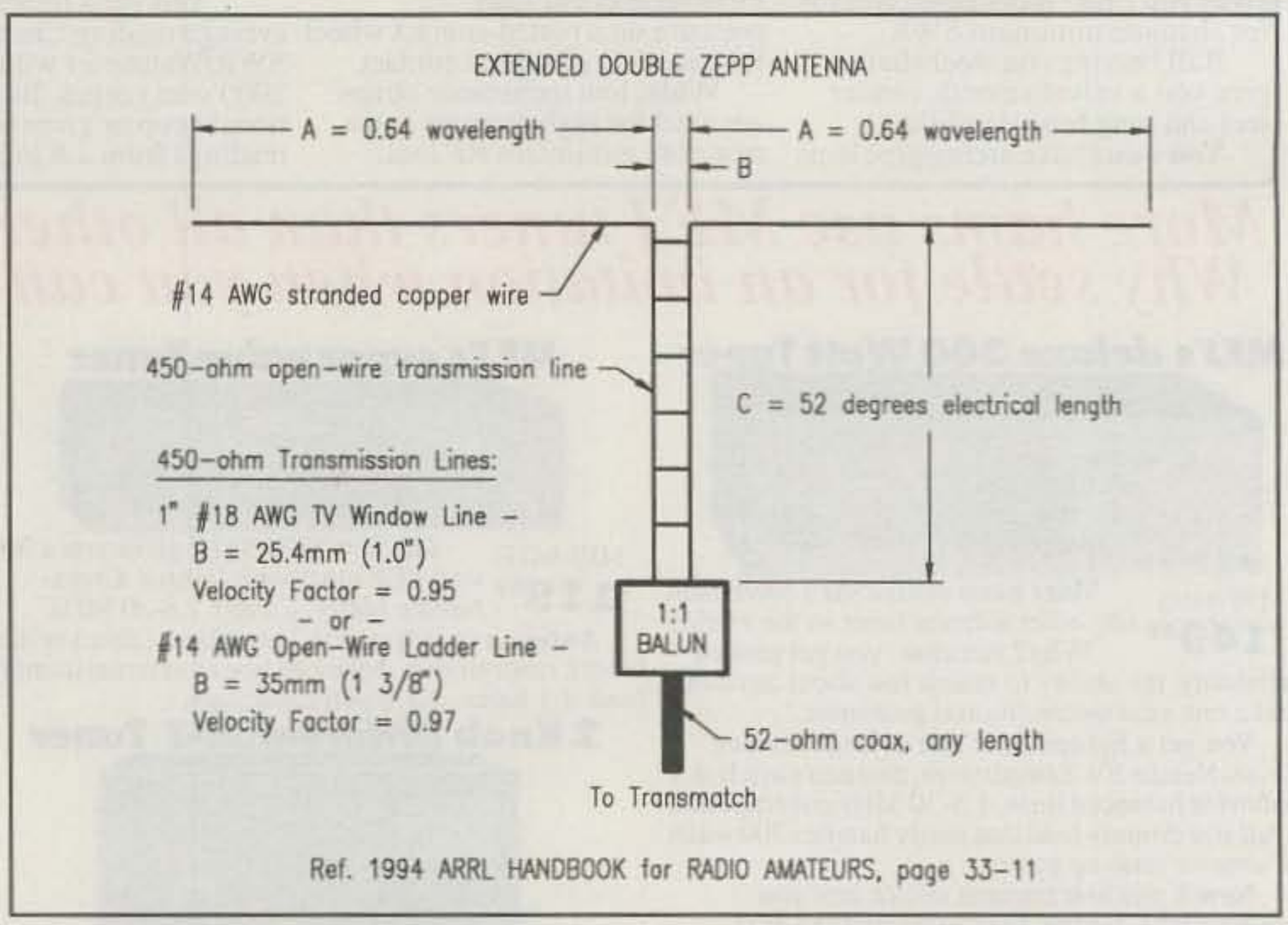


Fig. 1– The extended double Zepp antenna.

Design Considerations

If you think this is a studious dissertation containing impressive equations, think again. I know very little about antenna theory, and I do all my math on a computer.[1] If you want an excellent technical description of the EDZ, you can find one in the *1994 ARRL Handbook*.[2]

Basically, the EDZ is a two-element collinear array that exhibits superior gain and directivity over a conventional 1/2-wave dipole. Any necessary pruning should be done on the 450 ohm transmission line, not on the horizontal elements, which should retain their 0.64 wavelength dimension. Pruning the line to a low SWR will ensure that the transmission line length is close to the optimum 52% electrical length. If this length is altered, the antenna tends to act more like a center-fed longwire, resulting in (good news!) the possibility of multiband operation at the (bad news!) expense of some gain. In any event, a Transmatch is required for multiband operation.

You can design your own EDZ very easily either by using the following simplified equations or by a computer using *HAMCALC*.[3]

The (shudder) Math

There are two choices to start things off. If you have decided on a frequency for a monoband EDZ, you can determine the length of each 0.64 wavelength leg and of the open-wire transmission line. If you are restricted to a leg length for a multiband antenna, you can determine the base frequency. The following equations include factored-in allowances for end effect and velocity factor of the horizontal legs of the antenna.

Step 1: Determine frequency and length of horizontal legs:

To find leg length *A* where frequency is known:

(Eq. 1) $$A\ (ft.) = \frac{598.5}{f\ (MHz)}$$

$$A\ (m) = \frac{182.4}{f\ (MHz)}$$

To find frequency *f* where leg length *A* is known:

(Eq. 2) $$f\ (MHz) = \frac{598.5}{A\ (ft.)}$$

$$f\ (MHz) = \frac{182.4}{A\ (m)}$$

*77 McKenzie Street, Orillia, ON L3V 6A6 Canada

Say You Saw It In CQ

Step 2: Calculate length of transmission line:

To find length *C* of the transmission line for a monoband EDZ:

$$\text{(Eq. 3)} \quad C\ (\text{ft.}) = \frac{142\ VF}{f\ (\text{MHz})}$$

$$C\ (\text{m}) = \frac{43.3\ VF}{f\ (\text{MHz})}$$

where VF = Velocity Factor of line

That's all there is to designing an EDZ monoband antenna. The real fun starts if you decide to create a multiband EDZ by altering the length of the transmission line. It has long been known that a dipole fed with open-wire line and a Transmatch is capable of multiband operation. While the EDZ is designed as a center-fed longwire, its two legs also form a dipole cut for some seemingly unrelated frequency. You may want to know this frequency.

Step 3: Find resonant frequency of a dipole formed by the legs of an EDZ:

To find resonant frequency Df of a dipole 2 × A long:

$$\text{(Eq. 4)} \quad Df\ (\text{MHz}) = \frac{234}{A\ (\text{ft.})}$$

$$Df\ (\text{MHz}) = \frac{71.3}{A\ (\text{m})}$$

The multiband EDZ can be designed for a *lowest* frequency that is less than Df. This lowest frequency is determined by the new length of transmission line.

Step 4: Choose the desired lowest frequency of operation and determine the length of transmission line required. The chosen frequency Lf must be lower than Df from Equation 4.

To find new length *C* of transmission line:

$$\text{(Eq. 5)} \quad C\ (\text{ft.}) = VF\left[\frac{466}{Lf} - 2.1A\ (\text{ft.})\right]$$

$$C\ (\text{m}) = VF\left[\frac{142}{Lf} - 2.1A\ (\text{m})\right]$$

where Lf = lowest frequency of operation and Lf < Df
VF = Velocity Factor of line

Some Design Examples

Suppose you want to design a monoband EDZ cut for 24.940 MHz, fed by 450 ohm 1 inch TV window line (velocity factor of 0.95):

From Eq. 1 the length of each leg is:

$$598.5 \div 24.94 = 24.00' = 24'\ 0"$$

From Eq. 3 the length of the transmission line is:

$$142 \times .95 \div 24.94 = 5.41' = 5'\ 5"$$

You then decide to turn this into a multiband EDZ. From Eq.4 the resonant frequency of the horizontal legs as a dipole is:

$$234 \div 24.00 = 9.75\ \text{MHz}$$

The lowest operating frequency must be less than 9.75 MHz, so you decide on starting at the 40 meter band with a lowest operating frequency of 6.9 MHz.

From Eq.5, the new length *C* of the transmission line is:

$$.95 \times (466 \div 6.9 - 2.1 \times 24.00) = 16.28' = 16'\ 3"$$

Proof of the Pudding

Just in case you have any doubts about any of this, let's try one more. You have only 102 feet of yard space available and you want to see what you can do with it. From Eq. 4 you find you can erect a multiband EDZ with a lowest operating frequency less than:

$$234 \div 51 = 4.5\ \text{MHz}$$

Now we're getting somewhere. Why not build an EDZ that will operate on 3.5 to 30 MHz, using AWG #14 open-wire ladder line with a velocity factor of 0.97? Let's choose an 80 meter band lowest operating frequency at random—say, oh, about 3.278 MHz[4]? From Eq.5 the length of the transmission line is:

$$0.97 \times (466 \div 3.278 - 2.1 \times 51) = 34.0\ \text{ft.}$$

You have just designed a 102 ft. flat top antenna center-fed with a 34 ft. matching section of open-wire line, connected by any length of 52 ohm coax back to the shack. Sound familiar? It should. If the Zepp is the daddy of antennas, what you have just cloned is its most famous offspring, the G5RV.[5]

Footnotes

1. *HAMCALC—Painless math for radio Amateurs,* containing nearly 200 programs, is *free* software obtainable from its author (me) at the address shown at the beginning of this article. For a 3½" 1.44 Mb MS-DOS/Windows disk send US$5 check or money order (no stamps or IRCs, please) to cover cost of materials and airmail shipping anywhere in the world.

2. "An Extended Double Zepp for 12 Metres," pp. 33-11 to 33-13.

3. HAMCALC version 34—"Zepp EDZ Antenna" program.

4. I am pulling a fast one on you. There is nothing random about 3.278 MHz. I worked it out using *HAMCALC*'s "Zepp EDZ Antenna" program to prove a point, as you are about to find out.

5. Contrary to some advertised claims, any antenna the dimensions of which have been scaled up or down from those of the original G5RV is *not* a G5RV, but is, and will perform as, some form of center-fed random-wire antenna. ■

A CQ Advertiser
Since 1947
AMERICAN MADE

VIBROPLEX®


Square Brass Racer


Double Key


Straight Key

The Newest Additions to the Vibroplex Line!

Other great gift items also available. Vibroplex Logo items: pennants, mouse pads, hats, t-shirts, key chains and more. Dust Covers are now available for ALL models. Write or see your local dealer. Mastercard, VISA, and Amex accepted.

The Vibroplex Company, Inc., 11 Midtown Park, E., Mobile, AL 36606
1-800-840-8873 FAX 1-334-476-0465 email: w4oa@vibroplex.com
Call for Current Catalog Dealers wanted outside the US. Call or FAX

BY IRWIN MATH, WA2NDM

MATH'S NOTES

WHAT'S NEW AND HOW TO USE IT

Computer Video vs. Conventional NTSC (TV) Video

We often are asked the question as to what the real differences between computer-related video and conventional closed-circuit NTSC TV video are and why we cannot easily use the various monitors we may have on hand for both. This month we will try to clear up some of the uncertainty.

Computer video monitors and conventional TV monitors differ in two major areas. The first is the actual vertical and horizontal scanning rates, and the second is the video signal itself. In the case of scanning, a computer often uses horizontal scanning rates that can range from 24 kHz to over 85 kHz. Standard NTSC, on the other hand, operates at a horizontal scanning rate of only 15.75 kHz. The vertical rate for computers can range from 60 Hz to over 75 Hz, while for NTSC it is nominally fixed at 60 Hz. These differences alone mean that the horizontal and vertical sweep oscillators in most NTSC monitors will not have enough range to lock onto those used for computers and will not produce a stable picture.

The video signal produced by a computer is also a very different "animal" compared to that produced by an NTSC-compatible closed-circuit TV camera. In the case of computer video, the red, green, and blue portions of the image are transmitted as separate signals on three separate conductors (appropriately called RGB), and the horizontal and vertical sync signals are transmitted on the green carrier, or on separate V sync and H sync conductors. This is why the video connector on your computer has 15 pins. In conventional NTSC, horizontal and vertical sync pulses—as well as the red, blue, and green portions of the video—are combined into what is called "composite video." This signal is then separated into its individual components by the circuitry within the TV monitor. Here, of course, the connector of choice is a simple BNC, an F style, or in some cases even an RCA type phono connector. In any event, only the center conductor and a shield are required. Table I is a chart of the most common pin connections for both types of video signals.

In addition to horizontal and vertical scanning rates, there are other less obvious differences. The conventional video system produces a complete picture (or frame) from two separate fields that are interlaced with respect to each other in 1/30 of a second. This means that during the scanning operation the "odd" lines of a picture are first scanned in 1/60 of a second and displayed, and then the "even" lines are scanned and displayed in the second 1/60 of a second. The "merging" of the two by the persistence of vision of the human eye is what results in the final "complete" image. The fact that this "complete image" is changing at a rate of 30 frames per second is what produces the illusion of smooth motion. As a point of reference, motion pictures "update" images at 24 frames per second.

The problem with interlaced scanning is that in some scenes, especially those with thin horizontal lines (such as the patterns in some clothing), or in the case of rapid motion, there are differences between an odd and the corresponding even line 1/60 of a second later. This produces an annoying flickering in those portions of the image. In computer video interlaced scanning is not used. The computer monitor produces a complete picture in each pass so that at a 60 Hz rate, a field and a frame are the same. This effectively produces 60 frames per second. The result is that this type of flicker does not exist.

Anyone looking at a computer monitor is aware of the overall quality and resolution of the picture compared to the conventional TV. Tiny 1/16 inch high letters are clearly visible on the computer monitor screen, while 1/2 inch letters begin to blur on a TV set. This is due to two factors. The first is that the video bandwidth of conventional NTSC ranges from approximately 20 Hz to 5 or 10 MHz, while for computer video an upper bandwidth limit of from 25 to 125 MHz (or even more) is not unusual. This alone accounts for five to ten times the resolution in the vertical mode. Also, the number of scanning lines that result from the faster scanning rate can differ widely for the two formats, which also helps to produce greater resolution. Normal NTSC video produces a theoretical 525 lines per frame (15,750 ÷ 60 Hz × 2), of which 450 or so wind up in the picture. Computer video produces 700 or so lines for most formats (25,000 ÷ 70 × 2), of which almost all wind up in the picture. Some systems even produce as many as 1600 lines (65 kHz and 75 Hz × 2). Couple the increase in number of scanning lines with the much wider video bandwidth, and it is clear why the computer video signal is so superior.

With all of these differences, it is plain to see that converting from one format to another is not a simple task. There is a specialized family of equipment called *scan converters*, which are available from a number of companies to specifically accomplish this task. These devices usually employ dedicated microprocessors to do the scan conversions with proprietary software to handle the interlace problem. Building and programming one is a formidable task and beyond the capabilities of most experimenters. Purchasing a commercial scan converter also can easily entail several hundred dollars. It is far less expensive for the amateur simply to have two monitors on hand, one for each format. Careful shopping at a fleamarket or garage sale can accomplish this for minimal cost. 73, Irwin, WA2NDM

VGA or Macintosh HD-15 (High Density 3-pin rows) Monitor Connector

1. Red Input
2. Green Input
3. Blue Input
4. Monitor Ground
5. Ground or No Connection
6. Red Ground Return
7. Green Ground Return
8. Blue Ground Return
9. No Connection
10. Sync Ground Return
11. Monitor Ground
12. ID Bit or No Connection
13. Horizontal Sync
14. Vertical Sync
15. ID Bit or No Connection

VGA or Macintosh DB-15 (Standard 2-pin rows) Monitor Connector

1. Ground
2. Red Input
3. N/C VGA, Composite Sync MAC
4. ID Bit
5. Green Input
6. Red Ground Return
7. ID Bit
8. No Connection
9. Blue Input
10. ID Bit
11. Monitor Ground
12. Vertical Sync Input
13. Computer Present or Ground
14. Ground
15. Horizontal Sync Input

Composite NTSC Video BNC Connector

Center pin	Video
Shell	Video Ground Return

Table I– Pinouts for common computer and video monitors.

c/o CQ magazine

Say You Saw It In CQ

Calendars, Pins, Cards & Books

The Quad Antenna

by Bob Haviland, W4MB

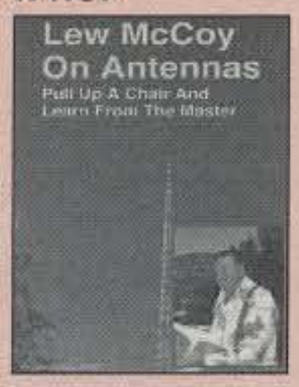
Second Printing

An authoritative book on the design, construction, characteristics and applications of quad antennas.

Order No. QUAD..... $15.95

McCoy on Antennas

by Lew McCoy, W1ICP



Unlike many technical publications, Lew presents his invaluable antenna information in a casual, non-intimidating way for anyone!

Order No. MCCOY $15.95

The Vertical Antenna Handbook

by *Paul Lee, N6PL*

Learn basic theory and practice of the vertical antenna. Discover easy-to-build construction projects.

Order No. VAH..... $9.95

Keys, Keys, Keys

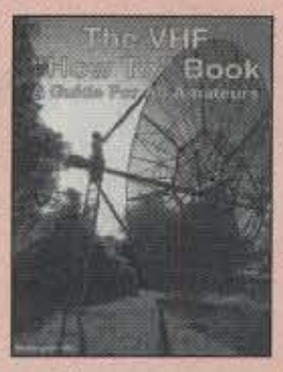
by Dave Ingram, K4TWJ

You'll enjoy nostalgia with this visual celebration of amateur radio's favorite accessory. This book is full of pictures and historical insight.

Order No. KEYS $9.95

The VHF "How-To" Book

by Joe Lynch, N6CL

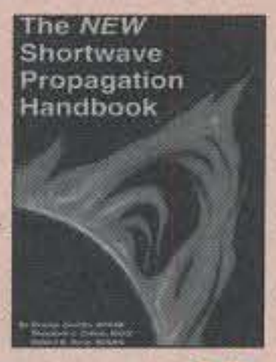


This book is the perfect operating guide for the new and experienced VHF enthusiast.

Order No. BVHF..... $15.95

The NEW Shortwave Propagation Handbook

by W3ASK, N4XX & K6GKU



A comprehensive source of HF propagation principles, sunspots, ionospheric predictions, with photography, charts and tables galore!

Order No. SWP..... $19.95

W6SAI HF Antenna Handbook

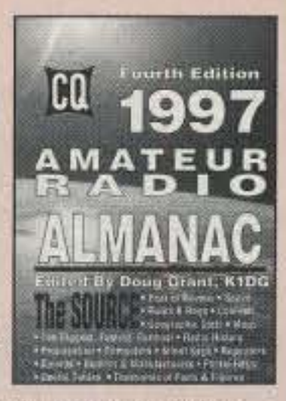
by Bill Orr, W6SAI

Inexpensive, practical antenna projects that work! Guides you through the building of wire, loop, Yagi and vertical antennas.

Order No. HFANT..... $19.95

CQ Amateur Radio Almanac

by Doug Grant, K1DG

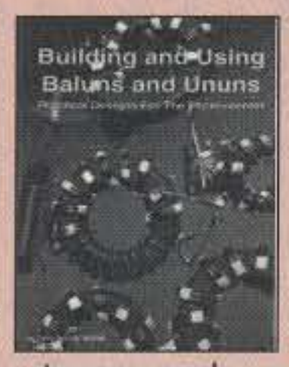


Filled with over 600 pages of ham radio facts, figures and information. 1997 edition,next volume won't be published until 1999.

Order No. BALM97..... ~~$19.95~~ $15.95

Building and Using Baluns and Ununs

by Jerry Sevick, W2FMI



This volume is the source for the latest information and designs on transmission line transformer theory. Discover new applications for dipoles, yagis, log periodics, beverages, antenna tuners, and countless other examples.

Order No. BALUN . . . $19.95

33 Simple Weekend Projects

by Dave Ingram, K4TWJ

Do-it-yourself electronics projects from the most basic to the fairly sophisticated. You'll find: station accessories for VHF FMing, working OSCAR satellites, fun on HF, trying CW, building simple antennas, even a complete working HF station you can build for$100. Also includes practical tips and techniques on how to create your own electronic projects.

Order No. 33PROJ.... $15.95

Amateur Radio Equipment Buyer's Guide

This New 144-page book is your single source for detailed information on practically every piece of Amateur Radio equipment and every accessory item currently offered for sale in the United States. From the biggest HF transceiver to Ham computer software, it's in the CQ Guide, complete with specs and prices. Over 2100 product listings (3100 including transceiver accessories!).

Also includes the most comprehensive directory anywhere of Ham product manufacturers and dealers in the USA, complete with phone and FAX numbers, web sites, and E-mail addresses, with 475 dealers and manufacturers listed.

Order No. EBG..... $15.95

CQ Award Pins

If you've earned any of CQ's Awards, you can also display the corresponding CQ Award pin. Available for WAZ, 5 Band WAZ, 160 Meter WAZ, CQ DX, CQ DX Honor Roll, WPX, WPX Honor Roll, and USA-CA awards.

ONLY $5.00 EACH.

Playing Cards

Top quality, plastic coated playing cards.

ONLY $9.95 per deck

1998/99 Calendars

Fifteen month calendars - January '98 through March '99

Please specify Amateur Radio or Classic Radio Calendar

YES! Rush me my book(s), calendar(s), cards and pins right away!

Qty	Item #	Description	Price	Total Price
U.S. and possessions - add $4 shipping/handling. FREE S/H on orders $50 and over. Foreign - shipping/handling charges are calculated by order weight & destination. A $4 credit will be applied for Foreign orders over $50.			Shipping/Handling	
			Total	

Name _____

Callsign _____ Phone/Fax No. _____

Street Address _____

City _____ State _____ Zip _____

CQ Communications, Inc.
25 Newbridge Road, Hicksville, NY 11801 Phone: 516-681-2922/Fax: 516-681-2926

or call toll-free 800-853-9797

MasterCard VISA DISCOVER AMERICAN EXPRESS

Results of the 1997 CQ/RJ WW RTTY DX Contest

BY ROY GOULD*, K1RY, AND RON STAILEY**, K5DJ

As conditions improve, the number of entries keeps increasing, again this year by another 15 percent. It was a record-breaking year, with 601 logs and 93 countries sending in logs. The level of activity grew substantially from all parts of the globe. There were six new world records and three new world single band records. We had a total of nine new continent records set (in total categories)—not too bad, considering we are just starting the up swing toward better conditions.

Last year's new plaque design went over in a big way. Everyone thought they were something very special. However, the selection of colors wasn't exactly in line with *CQ*'s colors. Their color is red, so this year's plaques will be just like last year's except the face will be red in color.

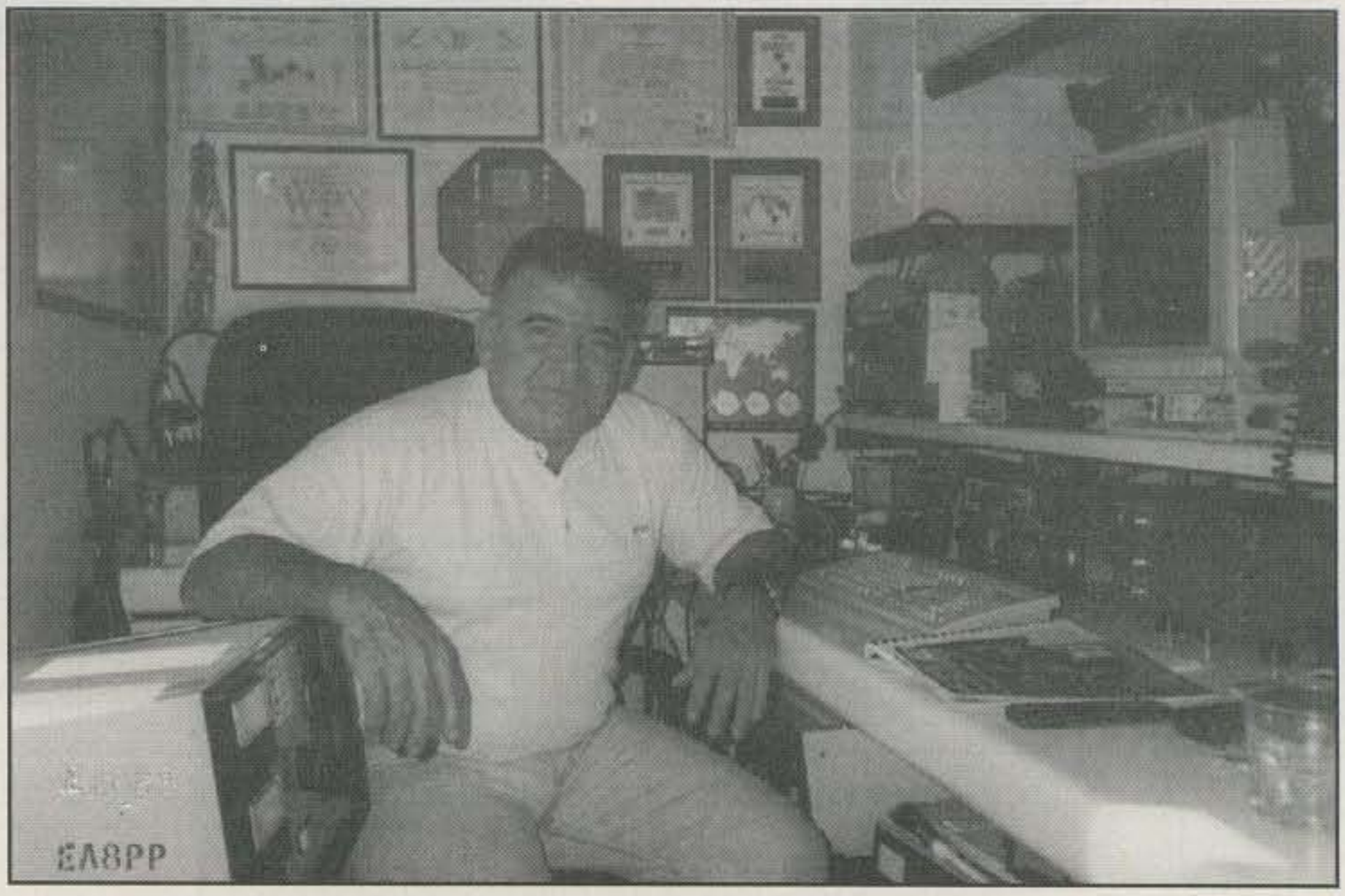
For the first time another major RTTY contest is supporting a world plaque in the CQ/RJ WW RTTY DX Contest. BARTG's *Datacom Magazine* is sponsoring the world plaque in the Single Operator Assisted category. We want to thank you and all of the plaque sponsors for your support.

Tina Muller, YO3FRI, a regular RTTY contester from SP-land.

Single Operator Category

Single Operator High Power category (SOH): This year's race for top seat was a hot one. The top 13 slots all had over a million points. Alejandro, XQ8ABF, took the world plaque and set a new world record in the SOH category with 1,616 QSOs and a final score of 2,071,686. Next and not too far behind, taking the European plaque and setting a new European record, was UTØI (Opr: Nick, UT2IZ), who had 1,657 QSOs for a score of 1,916,291. Then came FS5PL (Opr: Eddie, EA3NY), who took the North American plaque and set a new N.A. record with 1,493 QSOs, scoring 1,628,957. Juan, EA8PP, took the Africa plaque with 1,217 QSOs, scoring 1,551,718. Jeff , K1AM, picked up the U.S. plaque and set a new US record at the same time with 1,227 QSOs, scoring 1,212,534. Ariosto, PS2A, took the South American plaque with 1,086 QSOs, scoing 1,112,135. Romeo, UN5PR, won the Asia plaque and also set a new Asion record, with 1,013 QSOs, scoring 1,104,444 points. Norm, VK6GOM, picked up the Oceania plaque with 656 QSOs, scoring 472,119.

Single Operator High Power Assisted category (SOA): The Single Operator Assisted category also had some competition for top honors. K1NG (Opr: Rick, KI1G) took the world plaque and set a new world record as well with 1,550 QSOs, scoring 1,985,276. Then came OT7T (Opr: Marc, ON4MA) who took the European plaque and set a new European record, with 1,426 QSOs, scoring 1,891,403. Next was Roland, DK3GI, with 1,174 QSOs and a 1,554,237 score. Fred, PY2XB, took the South American plaque and also set a new South American record, with 1,080 QSOs and a score of 1,512,756. Jim, K4ZAM, took the North American plaque with 933 QSOs, scoring



Juan, EA8PP, winner of the Single Operator High Power Africa plaque.

*P.O. Box DX, Stow, MA 01775
**504 Dove Haven Drive, Round Rock, TX 78664

Say You Saw It In CQ

888,516. Brian, K3KO, took the US plaque with 712 QSOs and finished with a score of 553,035. Igor, UAØZBK/Ø, picked up the Asian plaque and finished with 463 QSOs, and 249,184 points.

Single Operator Low Power category (SOL): It can't be said there was a great race for the winner's circle. However, P40TT (Opr: Ray, WF1B), really wanted the top slot. Not only did he take the world plaque and set a new world record, his low power category score is now the highest score of any record holder. Only two scores were higher than his and they were both multi-multi stations. Ray finished with 2,049 QSOs and a score of 3,287,160. Congratulations, Ray ,on a job well done. Next was Walter, DJ6QT, who took the European plaque and set a new European record as well with 922 QSOs and a 1,073,166 point score. Jody, VP5JM, took the North American plaque and set a new North American record of 1,117 QSOs, for a 993,018 score. Gabriel, OD5NJ, picked up the Asian plaque with 1,237 QSOs and a 899,708 score. Having a new baby girl sometimes helps improve your score, as Mike, KA4RRU, demonstrated by taking the US plaque and setting a new US record with 1,000 QSOs and a 847,616 score. Jorge, LU9VET, won the South American plaque with 677 QSOs and a score of 641,225 points. Anton, YB5QZ, took the Oceania plaque, scoring 515 QSOs and 298,312 points. Clyde, 5N7YZC, got the Africa plaque, scoring 104 QSOs and 28,785 points.

Single Band Category

28 MHz: Carlos, LW9EPB, led the pack with a score of 293 QSOs and 52,762 points. Nestor, LU6AUM, finished second, scoring 256 QSOs and 44,073 points. LU4FQC was next with 145 QSOs and 31,376 points. I'm sure 28 MHz scores will really improve starting in '98.

21 MHz: LU6ETB (Opr: Ernesto, LU2BRG) took the 21MHz plaque and set a new 21MHz record, making 985 QSOs and scoring 456,146. Daniel, LU8EKC, finished next with 686 QSOs, and a 305,171 score. Next was Nilola, 9A5W, with 559 QSOs and 232,965 points. Jan, FR/N3NW, finished with 545 QSOs and 201,128 points.

14 MHz: Hermani CT3BX, had a few problems and had to operate single band this time. Hern came in strong as usual, setting a new 14 MHz record as well as taking the plaque. This is three years in a row for him to set a new world record. He finished with a score of 1,059 QSOs, 571,503 points. Zelimir, 9A2DQ, definitely in the race, finished with 962 QSOs and 462,441 points. Stefano, IK2QEI, finished with 851 QSOs and 403,332 points.

7 MHz: Barry, W2UP, had a little more time to spend during the '97 contest than last year. Barry took the 7 MHz plaque with 536 QSOs, scoring 159,390 points. Not far behind was Jan, OY3JE, with 626 QSOs and 146,034 points. Next wasYW1A with 397 QSOs and 129,315 points.

3.5 MHz: Emil, 9A9A, easily took the plaque with his new world record of 489 QSOs and 99,037 points. Then came Janez, S53MJ, with 416 QSOs and 76,736 points. Janez, S51DX, finished with 357 QSOs and 68,130 points.

Multi-Operator Category

Multi-Operator High Power category (MOH): The multi-single category had several teams

Force 12

The Secret Ingredient is Performance

People often ask, "What in the world makes a ***Force 12*** antenna so good?" Sometimes we kid around and say, "We load each element with RF sensitive plasma." The real reason is that the antennas are efficient. They perform just as the specs have ALWAYS said; ***Force 12***, the only company with TrueSpec™ & not a trap in the house!

"Putting up a *Force 12* is like turning on an amplifier."
John Crovelli, W2GD, P40W

With more than 100 HF antennas, ***Force 12*** has performance antennas to meet your needs and your dreams. For example:

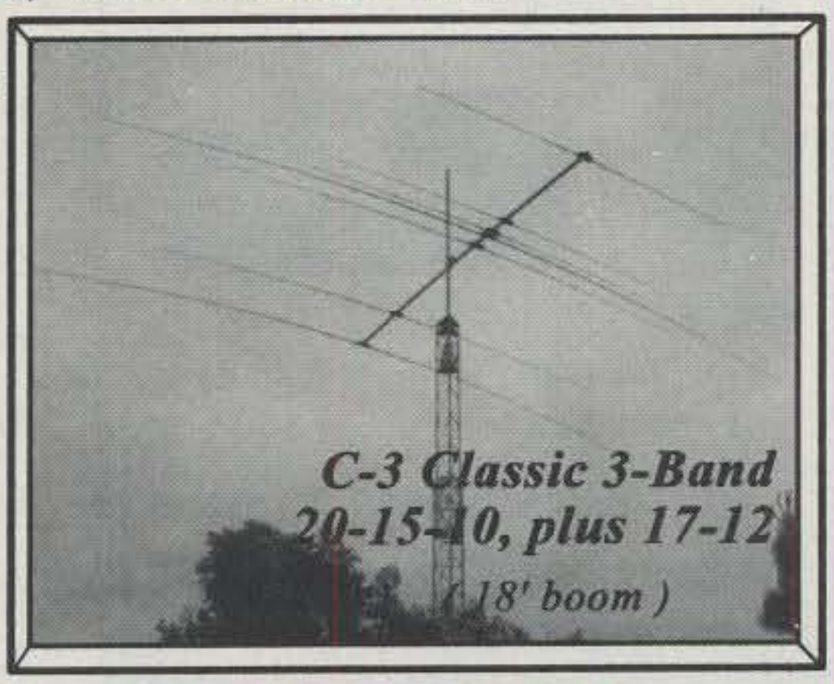
2el40 + 20-10	**C-4XL** 30' boom,	**C-4SXL** 23' boom
40 + 20-10	**C-4** 18' boom,	**C-4S** 12' boom
20-10	**C-3** 18' boom,	**C-3S** 12' boom
2el40	**EF-240X** 24' boom,	**EF-240S** 18'boom
80	**EF-180B** 68' rotatable dipole	
80 & 160 Verticals	**(the big signals from 6Y4A)**	
	EF-180BV 37' tall	**EF-160V** 55' tall

Force 12 continues to Sharpen the Leading Edge.
Buy the real thing from the leader in High Performance Antennas.

The ***increasingly popular C-3*** trapless multi-monobander™ shown below provides outstanding performance on 20-15-10. It also has real gain on the 17 & 12 mtr WARC bands, making a great 5-band beam. The ***C-3*** has set a new standard since its introduction more than 4 years ago.

Electrically and mechanically superior.
If it's riveted, it's a Force 12 !

Pre-assembled and marked.
Quick, easy assembly.
Easy-On™ mount.
Low profile, strong design.



Order and Brochures:
(800) 248-1985
Tel: (805) 227-1680
Fax: (805) 227-1684

Force 12 East:
Natan, W6XR
(607) 275-9747

Internet:
force12e@lightlink.com
Web Site:
http://www.QTH.com/force12

Force 12
Antennas and Systems
P.O. Box 1349, Paso Robles, CA 93447

CIRCLE 55 ON READER SERVICE CARD

DENVER AMATEUR RADIO SUPPLY

KENWOOD

TH-G71A
144/440 MHz
FM Dual Bander

TS-570D
Full Featured HF Base
(S) Model includes 6 meters

YAESU

FT-50RD
Ultra Compact, Dual Band
Handheld, Wide Band Receive

FT-847
All Mode HF/50/144/430 MHz
Unequaled Satellite Rig

ICOM

T8A
Miniature 50/144/430 MHz
5W, Handheld

NEW

IC-746
100 Watt HF/6M/2M Transceiver

Ameritron Belden Cushcraft
Diamond Kantronics MFJ
Larsen Mirage MAHA Pyramid

Quotes & Orders 1-800-891-9199
Tech & Info (717) 336-6060
FAX (717) 336-6044

We Service Most Brands
Route 272, Wabash Center
1233 N. Reading Road
Stevens, PA 17578
www.denverradio.com
Located 2 miles south of the PA Turnpike exit 21 on Rt 272
M,T,F 9-6 W,TH 9-8 Sat 9-3

PLAQUE WINNERS

World Single Operator, High Power: Station XQ8ABF, Alejandro Fernandez. Sponsored by: Dunestar Systems.

World Single Operator, High Power Assisted: Station K1NG, (Opr: Rick Davenport, KI1G). Sponsored by: *CQ* Magazine.

World Single Operator, Low Power: Station P40TT (Opr: Ray Ortgiesen, WF1B). Sponsored by: *Amateur Radio Trader.*

World Multi-Op Single Transmitter High Power: Station IQ4A (Ops: I4VEQ, IK2NCJ, IK2MBZ, IK2JUD, IK4MPG). Sponsored by: *Amateur Radio Trader.*

World Multi-Op Single Transmitter Low Power: Station KP2D (Ops: NP2E, KP2N, NP3W, NP2DZ, W5TTY). Sponsored by: Hal Communications Corp.

World Multi-Op Multi Transmitter: Station W3LPL (Ops: K3MM, K3TZV, N3UN, ND3F, NO2T, NE3H, N3OC, K4GMH). Sponsored by: *CQ* Magazine.

North America Multi-Op Multi-Transmitter: Station W5WMU (Ops: W5WMU, K5DJ, AA5AU, WS71, WU3V, N5SYF). Sponsored by: *The New RTTY Journal.*

Europe Multi-Op Multi-Transmitter: Station RW6AWT (Ops: RN6BN, RN6MN, RA6ZX, UA6NP, RW6BQ, RX6BA, RV6YY, RA6YY, RX6BA, RA6YDX, RW6ADA). Sponsored by: The W3LPL Contest Group.

North America Single Operator, High Power: Station FS5PL (Opr: Eddie Shark, EA3NY). Sponsored by: TG9VT Memorial (by Roy Gould, K1RY, and Jules Freundlich, W2JGR).

North America Single Operator, High Power Assisted: Station K4ZAM, Jim Floyd. Sponsored by: Jeff Bouvier, K1AM.

North America Multi-Op Multi-Transmitter: Station W5WMU (Ops: W5WMU, K5DJ, AA5AU, WS7I, W5XD, WU3V, N5SYF). Sponsored by: *The New RTTY Journal.*

Europe Single Operator, High Power Assisted: Station OT7T (Opr: Marc Wullaert, OH4MA). Sponsored by: *The New RTTY Journal.*

Asia Single Operator, High Power Assisted: Station UAØZBK/Ø, Igor Pyastolov. Sponsored by: Kazuaki Ohya, JH1HRJ.

South America Single Operator, High Power Assisted: Station PY2XB, Fred Carvalho. Sponsored by: Great Lakes DX and Contest Club.

North America Single Operator, Low Power: Station VP5JM, Jody Millspaugh. Sponsored by: Dick Stevens, N1RCT.

North America Multi-Op Single Transmitter High Power: Station KG4GC, (Ops: W4WX, WV3N, WV3R, N1WON, KD4OHH). Sponsored by: Eddie Schneider, GØAZT.

North America Multi-Op Single Transmitter Low Power: Station KE1FO (Ops: KE1FO, KT1M, KB1W, K1TTT). Sponsored by: Don Hill, AA5AU, and Eddie Schneider, GØAZT.

United States Single Operator, High Power: Station K1AM, Jeff Bouvier. Sponsored by: John Devoldere, ON4UN.

United States Single Operator, High Power Assisted: Station K3KO, Brian Alsap. Sponsored by: RTTY by WF1B.

United States Single Operator, Low Power: Station KA4RRU, Michael Trowbridge. Sponsored by: *The New RTTY Journal.*

Oceania Single Operator, Low Power: Station YB5QZ, Anton Iriawan. Sponsored by: Dave Barr, K2YG.

Africa Single Operator, Low Power: Station 5N7YZC, Clyde Zimberelman. Sponsored by: Bill Gallier, W4WX.

South America Single Operator, Low Power: Station LU9VET, Jorge Krienke. Sponsored by: Jim Hollenback, NK6L.

United States Multi-Op Single Transmitter High Power: Station K4PX (Ops: K4PX, K4AW, K4QD, AF4Z, NF4F, WT4I, KC4HW, KT4DI, KT4FY, WA4HDS, W4JHH, KE4MMI). Sponsored by: WriteLog Contest Software for Windows (by Ron Stailey, K5DJ).

United States Multi-Op Single Transmitter Low Power: Station W4CV (Ops: W4GKM, W4CQE, W4RRE, W4EYJ). Sponsored by: Platinum Coast Amateur Radio Society.

Europe Multi-Op Single Transmitter Low Power: Station YL8M (Ops: YL2KL, YL2KF, YL2KA, RZ3WB, RA3CQ). Sponsored by: Euraf Communications, Benin (by: Peter Schulze, TY1PS).

Oceania Single Operator, High Power: Station VK6GOM, Norman Gomm. Sponsored by: HamStuff by W7NN.

Africa Single Operator, High Power: Station EA8PP, Juan Salvador Peraza Rodriquez. Sponsored by: Phil Duff, NA4M.

South America Single Operator, High Power: Station PS2A, (Opr: Ariosto Rodriquez de Souza, PT2BW). Donated in the name of: Elmers worldwide who help new amateurs get started.

Europe Single Operator, High Power: Station UTØI (Opr: Nick Nikitjuk, UT2IZ). Sponsored by: Hal Communications Corp.

Europe Single Operator, Low Power: Station DJ6QT, Walter Skudlarek. Sponsored by: Don Hill, AA5AU.

Europe Multi-Op Single Transmitter, High Power: Station OT7E (Ops: ON4AOI, ON4GG, ON4ANT, ON4CBA, ON4AME). Sponsored by: Ron Stailey, K5DJ, & Wayne Matlock, K7WM.

Asia Single Operator, High Power: Station UN5PR, Romeo Loparev. Sponsored by: David Busick, N5JJ Memorial (by Don Busick, K5AAD).

Asia Single Operator, Low Power: Station OD5NJ, Gabruek Mardiros. Sponsored by: Bruce D. Lee, KD6WW.

World 21 MHz: Station LU6ETB (Opr: Ernesto Gruenebe, LU2BRG). Sponsored by: Denis Catalano, W4DC, and Mike Trowbridge, KA4RRU.

World 14 MHz: Station CT3BX, Hermani Correia. Sponsored by: Kunihiko Fujii, JH1QDB.

World 7 MHz: Station W2UP, Barry Kutner. Sponsored by: Tri-County DX Assoc.

World 3.5 MHz: Station 9A9A, Zdravko Balen. Sponsored by: Neal Campbell, K3NC/ON6CNC.

CIRCLE 50 ON READER SERVICE CARD

Jose, ZP6CC, a 21 MHz entrant.

looking for a win in the '97 contest. IQ4A took the world plaque with 1,605 QSOs, finishing with a score of 2,469,450. Close behind was OT7E, who took the European plaque with 1,461 QSOs and 2,002,924 points. S57NW scored 1,433 QSOs and 1,923,404 points. KG5G,C at Guantanamo Bay made their move setting a new North American record as well as taking the plaque, scoring 1,659 QSOs and 1,870,128 points. (Nice job, guys.) RW2F finished with 1,419 QSOs and 1,803,794 points. PI4COM had 1,204 QSOs, scoring 1,487,434 points. HV4NAC at the Vatican had 1,383 QSOs, scoring 1,279,032. K4PX, the Florida Boys, picked up the US plaque with 1,383 QSOs, scoring 1,175,940.

Multi-Operator Single Transmitter Low Power category (MOL): KP2D made a great showing, picking up the world plaque and setting a new multi-op low power world record at the same time with 1,420 QSOs, and 1,638,958 points. YL8M took second world and picked up the Europe plaque with 1,288 QSOs and 1,349,530 points. Z30M was next with 1,140 QSOs and 1,122,501 score. ZB2/DL2NBU had 1,260 QSOs and 798,000 points. KE1FO picked up the North American plaque with 933 QSOs and 761,596 points. GU3HFN had 636 QSOs and 397,015 points. A new club call, W4CV, for the Tennessee group, got them their first plaque in this event with 408 QSOs and 202,460 points.

Multi-Multi category: Speaking of competition, there was a pretty good race in the Multi-Multi category, to say the least. This is the closest race for the world plaque in the history of the CQ/RJ WW RTTY Contest. At the end of the contest W3LPL once again came out ahead

The KG4GC team. Left to right: Cory, N1WON; Rusty, WV3N; Wayne, KD4OHH; and Bill, W4WX. Ken, WV3R, took this photo.

Mr. NiCd

THE BEST BATTERIES IN AMERICA!

JULY '98 SPECIALS!

Packs & Charger for ***YAESU*** *FT-50R / 40R / 10R:*

FNB-40xh Slim-NiMH	**7.2v**	**650mAh**	**$41.95**
FNB-47xh (NiMH)	**7.2v**	**1800mAh**	**$49.95**
FNB-41xh (5w NiMH)	**9.6v**	**1000mAh**	**$49.95**
BC-601c	**Rapid/Trickle Charger**		**$54.95**

For ***YAESU*** *FT-51R / 41R / 11R:*

FNB-31 pk.	**4.8v**	**700**mAh	**$31.95**
FNB-38 pk. (5w)	**9.6v**	**700**mAh	**$39.95**
BC-601b	**Rapid / Trickle Charger**		**$54.95**

For ***YAESU*** *FT-530 / 416 / 816 / 76 / 26:*

FNB-26 pk.	**7.2v**	**1200**mAh	**$29.95**
FNB-27s pk. (5w)	**12.0v**	**800**mAh	**$35.95**
BC-601a	**Rapid / Trickle Charger**		**$54.95**

For ***YAESU*** *FT-411 / 470 / 73 / 33 / 23:*

FNB-10 pk.	**7.2v**	**600**mAh	**$20.95**
FNB-11 pk. (5w)	**12.0v**	**600**mAh	**$24.95**
FBA-10	**6-Cell AA case**		**$14.95**
BC-601a	**Rapid / Trickle Charger**		**$54.95**

Packs for ***ALINCO*** *DJ-580 / 582 / 180 radios:*

EBP-20ns pk.	**7.2v**	**1500**mAh	**$29.95**
EBP-22nh pk. (5w)	**12.0v**	**1000**mAh	**$36.95**
EDH-11	**6-Cell AA case**		**$14.95**

For ***ICOM*** *IC-Z1A / T22-42A / W32A / T7A:*

BP-180xh pk. NiMH	**7.2v**	**1000**mAh	**$39.95**
BP-173 pk. (5w)	**9.6v**	**700**mAh	**$49.95**
BC-601d	**Rapid / Trickle Charger**		**$54.95**

For ***ICOM*** *IC-W21A / 2GXAT / V21AT:(Black or Gray)*

BP-131xh (NiMH)	**7.2v**	**1500**mAh	**$39.95**
BP-132s (5w)	**12.0v**	**850**mAh	**$39.95**
BC-601e	**Rapid / Trickle Charger**		**$54.95**

For ***ICOM*** *IC-2SAT / W2A / 3SAT / 4SAT etc:*

BP-83 pack	**7.2v**	**600**mAh	**$23.95**
BP-84 pack	**7.2v**	**1200**mAh	**$34.95**
BP-83xh pk. (NiMH)	**7.2v**	**1500**mAh	**$39.95**
BP-90	**6-Cell AA case**		**$15.95**
BC-79A	**Rapid/Trickle Charger**		**$52.95**

For ***ICOM*** *IC-02AT etc &* ***RadioShack*** *HTX-202/404:*

BP-8h pk.	**8.4v**	**1400**mAh	**$32.95**
BP-202s pk.	**7.2v**	**1400**mAh	**$29.95**
IC-8	**8-Cell AA NiCd / Alkaline Case**		**$15.95**
BC-350	**Rapid Charger**		**$52.95**

For ***KENWOOD*** *TH-79A / 42A / 22A:*

PB-32xh pk. (NiMH)	**6.0v**	**1000**mAh	**$29.95**
PB-34xh pack, (5w)	**9.6v**	**1000**mAh	**$39.95**
KSC-14	**Dual Rapid / Trickle Charger**		**$62.95**

For **KENWOOD** *TH-78 / 48 / 28 / 27:*

PB-13 (original size!)	**7.2v**	**700**mAh	**$26.95**
PB-13xh pk. (NiMH)	**7.2v**	**1500**mAh	**$39.95**
BC-15A	**Rapid / Trickle Charger**		**$54.95**

For ***KENWOOD*** *TH-77, 75, 55, 46, 45, 26, 25:*

PB-6 pk. (w/chg plug!)	**7.2v**	**600**mAh	**$27.95**
PB-8sh pk. (5w)	**12.0v**	**1000**mAh	**$39.95**
KSC-14	**Dual Rapid / Trickle Charger**		**$62.95**

For ***STANDARD*** *C-628A / C558A / 528A / 228A:*

CNB-153xh pack	**7.2v**	**1500**mAh	**$32.95**
CNB -152 pk. (5w)	**12.0v**	**800**mAh	**$32.95**
CSA-181	**Rapid/Trickle Charger**		**$54.95**

For ***MOTOROLA*** *GP-300 radios:*

HNN-9628 pack	**7.2v**	**1200**mAh	**$39.95**

Mr. NiCd also supplies batteries for your
LAPTOP COMPUTERS / CELLPHONES
CAMCORDERS / NiCd & NiMH INSERTS
We can rebuild your Computer pack! Call!
Mail, Phone, & Fax orders welcome! Pay with
MC / VISA / DISCOVER / AMEX

CALL OR WRITE FOR OUR FREE CATALOG!

Mr. NiCd - *E.H. Yost & Company*
2211-D Parview Rd., Middleton, WI 53562
Phone (608) 831-3443
Fax (608) 831-1082
E-mail: ehyost@midplains.net

CIRCLE 82 ON READER SERVICE CARD

with 2,914 QSOs and 3,946,822 points, also setting a new world record. Right behind him was W5WMU, who picked up the North American plaque with 2,948 QSOs and a score of 3,941,970. Next was RW6AWT, who took the Europe plaque with 1,988 QSOs and 2,654,579 points. RK9CWA finished with 1,861 QSOs and 2,561,706 points.

Summary

Thanks to all who participated. Logs continue to be a problem. Please follow the rules, and separate logs for each band! Also, when e-mailing logs name the files with your call—i.e. ,K1RY.sum, K1RY.dup, etc. Many of you are naming them CQWW97.sum, etc. This makes it most difficult to figure who is who when pulling them from the attach folders. Once again, a special thanks to Gail at *CQ*, who always is a big help to us.

73, Roy, K1RY, and Ron, K5DJ

Comments From Around The World

3DAØCA . . . I managed to break 100 countries, so all those I worked pse QSL via W4DR so I can be the first 3DA to claim DXCC on RTTY. *9A8A* . . . Sorry I didn't have time for serious effort. *AA4NC* . . . Didn't have much time in between rock & roll; had fun. *AC4AA* . . . This was my first RTTY contest and had a ball. *CT1AOZ* . . . Thanks to all who have developed a program like (writelog); you guys need to try this. *DF3CB* . . . I slept much more than last year. *DKØIU* . . . Our first RTTY contest. *F6AOE* . . . Very good conditions. I do need a new antenna for 80m. *GØLII* . . . It was pulling teeth; the Ryder cup golf won me over after lunch. CU next year.

GU3HFN . . . Once again a great test. See you again next year. *IKØHBN* . . . Saturday was great propagation even on 10m. P40TT was a real 579. *JA2MOG* . . . Wanted to work KG4; they couldn't hear me! *JJ1HRJ* . . . I enjoyed the contest with good conditions, for a change. *JH4UYB* . . . Most participants showed better typing skills than I. *KØBX* . . . Doubled my score from last year. XYL went out of town for the weekend, kids had to work, and TVI next door neighbor gone for the weekend. What could be better! *K1JN* . . . Had a ball. Will be back for more. *K1NG (Op: KI1G)* . . . Conditions seemed better than last year.

K3PP . . . This was a fantastic event. *K4BU* . . . Did not make a big splash, but had fun. *K4PX* . . . First try at CQWW RTTY test. Highlight of contest was HV4NAC called me! *K6CT* . . . Worked 12 new DXCC countries. RITTY software incredible. *K9YY* . . . Great contest, lots of fun. Was beat to have VQ9SS es 4Z4DX call us in the test on 40m, Looking forward to the next contest. *KE1FO* . . . We had a great time again this year in multi-op low power, a very interesting category that I enjoy. *KF8TM* . . . Second time entered. Had fun as little pistol search & pounce without contest logging program. Should have spent more time working states and provinces.

KL7/KG5EG . . . Another great contest. *KL7AC* . . . Had a ball. *KP2D* . . . 60 percent increase over last year's score. *LU6ETB* . . . My trip to ZP was canceled. Arturo agreed to lend me his station, thanks. *LU9VET* . . . This was my first CQWW with more than 30 hrs of operation. *LY2FN* . . . Worked 10 new DXCC countries. *N2FF* . . . No great effort this year. Did not start until Saturday. We weren't ready at the start of the contest, for the zillionth time. *NH6XM* . . . Great contest. Had lottsa fun. *NN50CIA* . . . We are glad we had the opportunity to participate in the contest from our special event station commemorating 50 years of the Central Intelligence Agency. Thanks to everyone who worked us. *(Who are these guys??—ed.)*

NX4W . . . Not bad for lousy antennas. Used RTTYRITE for the first time and liked it very much. *OZ5MJ* . . . Celerbrated my 41st wedding anniversay over the weekend, hi hi. Not very popular! *P40TT (Op: WF1B)* . . . My strategy was to run Europe and not the states (guess that worked). *PI4COM* . . . We all enjoyed the contest. Maybe we will participate next year in the multi-multi class. *PS2A* . . . Great contest. Beat my last year's participation. *RA9FA* . . . This was my first RTTY contest. Hope my next will be more successful. *RA6AR* . . . My first RTTY contest with three weeks experience. Very exciting.

SM6BSK . . . How could they put the Ryder cup on this weekend? *TM7XX* . . . I was active for 45 hrs of the test; strong QRN on 80m. *UAØAGI* . . . This was my first RTTY contest. It was fantastic! *VA3NN* . . . Fine contest. Next time I will definitely have some RTTY contest s/w. *VA3WTM* . . . Definitely the most fun since I started contesting. *VE7KD* . . . Nice to see some familiar calls again after a few years absence from this fine contest. Couldn't do without sleep so it cost me. *VK3EBP* . . . Finally worked Wyoming after 7 years. Great contest. *W1TE* . . . Was fun. Only had 20 hours to operate, though.

W3LPL . . . RTTY mode is definitely on the rise! *W5WMU* . . . We had a lot if fun trying to take on W3LPL from way back in Louisiana. Next time we will get them. *W6CN* . . . Great to have some sunspots again! *W9ILY* . . . Had a ball. *W9OL* . . . Severe TVI problems; tried filters and chokes. Anybody have any ideas? *WB4M* . . . I sure had a great time. RTTY is booming. *WW2R* . . . High point was being called by FK8 and two FR stations. *XE1VV* . . . I sure need some contest s/w for RTTY mode. *YO3JF* . . . Great fun as last year. *ZL2AMI* . . . peculiar multi-path distortion on 40m from North American signals on the second day made copy very difficult. Next year a full effort. *ZL3JON* . . . Had a ball. Condx improving at long last. *K1RY and K5DJ* . . . Thanks to all.

Station Operators: Multi-Op, Single & Multi-Transmitter

W3LPL: K3MM, W3EKT, K4GMH, NO2T, NE3H, N3OC, ND3F, N3UN. **W5WMU:** W5WMU, K5DJ, AA5AU, WS7I, W5XD, WU3V, N5SYF. **RW6AWT:**

CQ 33 Simple Weekend Projects

ALL NEW FUN FROM
DAVE INGRAM, K4TWJ!

"33 Simple Weekend Projects for the Ham, the Student, and the Experimenter" gives only a hint at the fun and satisfaction to be found between the covers of this little book. Dave Ingram, K4TWJ, has pulled together a wide ranging collection of do-it-yourself electronics projects from the most basic to the fairly sophisticated, and even touching on the frivolous.

You'll find an interesting and very do-able array of useful devices: station accessories for VHF FMing, working OSCAR satellites, joining the fun on HF, trying CW, building simple antennas, even a complete working HF station you can build for $100.

Add a measure of practical tips and techniques on how to build electronic projects yourself, and you've got an information-packed book that will keep the newcomer or the most experienced home-brewer busy for many a pleasant weekend.

Please phone or fax your orders to:
CQ Communications, Inc.
25 Newbridge Road, Hicksville, NY 11801/Phone: 516-681-2922/Fax: 516-681-2926
or call toll-free 800-853-9797

TOP SCORES

Single Op, High Power

XQ8ABF	2,071,686
UTØI (Op: UT2IZ)	1,916,291
FS5PL (Op: EA3NY)	1,629,957
EA8PP	1,551,718
TM7XX (Op: F5MUX)	1,53,224

Single Operator, Low Power

P40TT (Op: WF1B)	3,287,160
DJ6QT	1,073,166
VP5JM	993,018
OD5NJ	899,708
KA4RRU	847,616

Single Operator, Assisted

K1NG (Op: KI1G)	1,985,276
OT7T (Op: ON4MA)	1,891,403
DK3GI	1,554,237
PY2XB	1,512,756
DF3CB	1,134,600

Multi-Operator, High Power

IQ4A	2,469,450
OT7E	2,002,924
S57NW	1,923,404
KG4GC	1,870,129
RW2F	1,830,794

Multi-Operator, Low Power

KP2D	1,638,958
YL8M	1,349,530
Z30M	1,122,501
ZB2/DL2NBU	798,000
KE1FO	761,596

Multi-Operator, Multi-Transmitter

W3LPL	3,946,822
W5WMU	3,941,970
RW6AWT	2,654,579
RK9CWA	2,561,706

3.5 MHz

9A9A	99,037
S53MJ	76,736
S51DX	68,130

7.0 MHz

W2UP	159,390
OY3JE	146,034
YW1A	129,315

14 MHz

CT3BX	571,503
9A2DQ	462,441
IK2QEI	403,332
IG9/IK2PZC	383,542
IT9STX	373,680

21 MHz

LU6ETB (Op: LU2BRG)	456,146
LU8EKC	305,171
9A5W	232,965
FR/N3NW	201,128
YN6WW (Op: JA6WFM)	173,106

28 MHz

LW9EPB	52,762
LU6AUM	44,073
LU4FQC	31,376

RN6BN, RN6MM, RA6ZX, UA6NP, RW6BQ, RW6ADA, RV6YY, RY6YY, RX6BA, RA6YDX. **RK9CWA:** RW9CF, UA9CR, UA9CGA, RA9DK. **IQ4A:** I4VEQ, IK2NCJ, IK2MBZ, IK2JUB, IK4MGP. **OT7E:** ON4AOI, ON4GG, ON4ANT, ON4CBA, ON4AME. **S57NW:** S57NW, S52ZW, S56A, S59A, S58A, S58AB. **KG4GC:** W4WX, WV3M, WV3R, N1WON, KD4OHH. **KP2D:** NP2E, KP2N, NP3W, NP2DZ, W5TTY.

PI4COM: PA3BWD, PA3ERC, PA3EWP, PA3GBQ, PAØAIC, DF8MQ. **YL8M:** YK2KL, YL2KF, YL2KA, RZ3BW, RA3CQ. **HV4NAC:** K6AW, W6OSP, W6OTC. **K4PX:** K4PX, K4AW, K4QD, AF4Z, NF4F, WT4I, KC4HW, KT4DI, WA4HDS, W4JHH, KE4MMI. **S57M:** S51ZO, S55OO, S51TA, S53CC, S53ZO, S51DM, S51RS. **Z30M:** Z31GX, Z31JA, Z31GB, Z32XX, Z32RY, Z32ZT, OH3MIG. **K9YY:** K9YY, KB9MET. **N9NCX:** N9NCX, KS9W, N9BR. **WX7M:** NI6T, KN6J, N6OXR, WX7M. **ZB2/DL2NBU:** DL6RAI, DL2NBU.

KE1FO: KE1FO, KT1M, KW1K, KB1W, K1TTT. **F8KCF:** F6FNL, F5UAM, F4BMX, F6BXL, F1BGO, F5OWB. **EA3BT:** EA3BT, EA3AOK. **GU3HFN:** GOØSUP, GØARF. **PI4ZLD:** PA3GCU, PA3EOB, PE1RMN. **WB8YTZ:** WB8YTZ, KF8UN. **VE5RI:** VE5CMA, VE5FD, VE5FN, VE5WI, VE6BBP, VE6ZX, VE6PW. **SP3PLD:** SP3IBM, SP3HBF. **W4CV:** W4GKM, W4CQE, W4RRE, W4EYJ. **DKØIU:** DJ4KW, DJ6TK. **SK7BQ:** SM7BHM, SM7FTG. **SL3ZV:** SMØOJR, SM3UKE, SM3VHF, SM3VYD. **PA2AQL:** PA3AQL, PDØRSF. **VE3UR:** VE3UR, VE3PKA, VE3AIZ, VE3LID, VE3VDG, VE3FRD. **K9OSH:** K9OSH, KB9OBQ. **NN50CIA:** (No team members were given; guess it's a secret.) **VE3FJB:** VE3FJB, VA3CW, VE3MKX. **WN1E:** WN1E, N1MGO. **PI4ALK:** PI4ALK, PE1RZM.

CALL TOLL FREE
(800) 292-7711 orders only
Se Habla Español

YOUR ONE STOP SOURCE FOR ALL YOUR TEST EQUIPMENT NEEDS

CALL OR WRITE FOR OUR NEW FREE 64 PAGE CATALOG!
(800) 445-3201

NEW **XK-700 Digital / Analog Trainer**
Elenco's newest advanced Digital / Analog Trainer is specially designed for school projects. It is built on a single PC board for maximum reliability. It includes 5 built-in power supplies, a function generator w/ continuously sine, triangular and square waveforms, 1,560 tie point breadboard area. Tools and meter shown optional. (Mounted in a professional tool case made of reinforced metal).

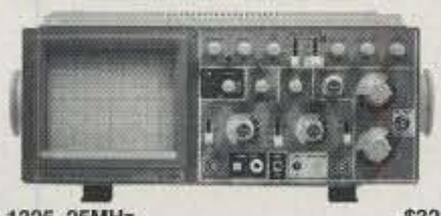
XK-700
Assembled and Tested
$189.95

XK-700-SEMI Kit
Assembled and Tested
$174.95

XK-700K - Kit
$159.95

Made in U.S.A.

Elenco Scopes
Free Dust Cover & Probes



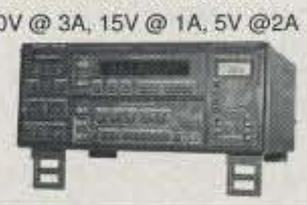
S-1325 25MHz		$325
S-1330 25MHz	Delayed Sweep	$439
S-1340 40MHz		$475
S-1345 40MHz	Delayed Sweep	$569
S-1360 60MHz	Delayed Sweep	$749
S-1390 100MHz	Delayed Sweep	$895

DIGITAL SCOPE *SUPER* SPECIALS

DS-203 20MHz/10Ms/s Analog/Digital	$695
DS-303 40MHz/20Ms/s Analog/Digital	$895
DS-603 60MHz/20Ms/s Analog/Digital	$995

4 Functions in One
MX-9300
$459.95

Features
- One instrument w/ four test leads and measuring systems.
  - 1.3GHz Frequency Counter
  - 2MHz Sweep Function Generator
  - Digital Multimeter
  - Digital Triple Power Supply
- 0-30V @ 3A, 15V @ 1A, 5V @2A



NEW **Tektronix DMMs**
- 40,000 Count
- High Accuracy
- Tektronix Quality
- 3 Year Warranty

DMM 912 ~~$249~~ $179
DMM 914 ~~$249~~ $229
DMM 916 ~~$269~~ $275

20MHz Sweep/Function Generator with Frequency Counter
Model 4040
- 0.2Hz to 20MHz
- AM & FM Modulation
- Burst Operation
- External Frequency Counter to 30MHz
- Linear and Log Sweep

$399

10MHz - Model 4017 $309
5MHz - Model 4011 $239

Fluke Scopemeters

123	NEW	$950
92B		$1445
96B		$1695
97		$1695
99B		$2095
105B	NEW	$2495

ALL FLUKE PRODUCTS ON SALE!!

Technician Tool Kit
TK-1500

26 tools plus a DMM contained in a large flexible tool case with a handle ideal for everyone on the go!
$49.95

Fluke Multimeters

Model 26II	$63	Model 12	$84
Model 70III	$85	Model 83	$235
Model 73III	$115	Model 85	$269
Model 75III	$139	Model 87III	$299
Model 77III	$154	Model 863E	$475
Model 79III	$175	Model 867BE	$650

B&K Precision Multimeters

Model 389	$109	Model 388A	$99
Model 390	$127	Model 2707	$75
Model 391	$143	Model 2860A	$79
Model 5360	$195	Model 5370	$219
Model 5380	$265	Model 5390	$295

DIGITAL LCR METER NEW
Model LCR-1810
- Capacitance 0.1pf to 20MF
- Inductance 1µH to 20H
- Resistance .01Ω to 2000MΩ
- Temperature -20°C to 750°C
- DC Volts 0-20V
- Frequency up to 15MHz
- Diode/Audible Continuity Test
- Signal Output Function
- 3 1/2 Digit Display

$99.95

B&K High Current DC Power Supply
- Variable 3-14VDC
- Thermal Function
- Current Limiting

Model 1686 12A $159
Model 1688 28A $239

B&K 13.8V Fixed DC Power Supplies

Model 1680 6A	$39
Model 1682 15A	$75

Quad Power Supply Model XP-581
Four Fully Regulated DC Power Supplies in One Unit
4 DC Voltages: 3 Fixed;
- +5V @ 3A
- +12V @ 1A
- –12V @ 1A
- 1 Variable 2.5 - 20V @ 2A

$89.95

Digital Multimeter
Model M-1740
$39.95
Free Holster
11 functions including freq to 20MHz, cap to 20µF. Meets UL-1244 safety specs.

10% OFF ON ALL STANDARD AMATEUR RADIO PRODUCTS
Including Accessories

Elenco LCR & DMM
Model LCM-1950
$69
12 Functions
Freq to 4MHz
Inductance
Capacitance

Handheld Universal Counter
F-2800
1MHz - 2.8GHz

Features:
- 16 segment RF signal strength bargraph 1MHz - 2.8GHz.
- 16 segment RF signal strength bargraph.
- 6 hour NiCd battery operation.
- High speed 250MHz direct count for high resolution

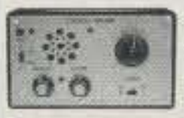
NEW
$99

Specifications
Input Sensitivity (Typical)

Amplifier	50Ω
Impedance	50Ω, VSWR<2:1
Range	1MHz - 2.8GHz
Sensitivity	<1.5mV @ 100MHz <5mV @ 250MHz <5mV @ 1GHz <100mV @ 2.4GHz
Maximum Input	15dBm

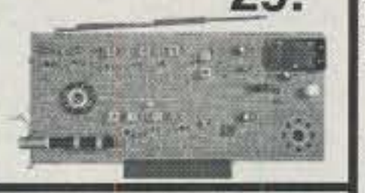
Kit Corner over 100 kits available

Model AR-2N6K
2 Meter / 6 Meter Amateur Radio Kit



$34.95

Model AM/FM-108K
Transistor Radio Kit $29.95



35mm Camera Kit
Model AK-540 $14.95
Learn all about photography

No Soldering Required

Radio Control Car Kit
Model AK-870

- 7 Functions
- Radio Control Included

$24.95

No Soldering Required

Repair System Soldering and Desoldering Station Model SL-916
Top-of-the-line repair system will handle desoldering. Temperature controlled soldering from 300°F to 790°F (150°C to 420°C), desoldering temperature range 410°F to 900°F (210°C to 480°C). The system is based on principle of vacuum absorption of the solder from the PC board.

SL-926 - Desoldering System with Digital Display also available. $325.00

$425.00

Guaranteed Lowest Prices
UPS SHIPPING: 48 STATES 5%
OTHERS CALL FOR DETAILS
IL Residents add 8.25% Sales Tax

C&S SALES, INC.
150 W. CARPENTER AVENUE
WHEELING, IL 60090
(847) 541-0710 • FAX: (847) 541-9904
http://www.elenco.com/cs_sales

VISA MasterCard

15 DAY MONEY BACK GUARANTEE
FULL FACTORY WARRANTY

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

CIRCLE 42 ON READER SERVICE CARD

NOTE: Following the call is the Class of Operation, Final Score, QSOs, Points, Zones, Countries, and US/VE. Winners are in bold.

AFRICA

AFRICAN ITALY

G9/IK2PZC	14	383,542	879	2,627	26	80	40

BURUNDI

9U5CW	SOL	24,208	124	356	23	45	0

CANARY ISLANDS

EA8PP	SOH	1,551,718	1,217	3,634	73	248	106
EA8KK	SOH	511,940	606	1,790	60	149	77
EA8AG	SOL	11,592	88	252	16	29	1
9A6D/MM	SOH	17,820	102	220	24	56	1

MADEIRA ISLANDS

CT3BX	14	571,503	1,059	3,163	34	99	51

MELILLA

EA9JZ	SOH	817,656	875	2,604	53	178	83

NIGERIA

5N7YZC	SOL	28,785	104	303	26	51	18

REUNION IS.

FR/N3NW	21	201,128	545	1,622	21	70	33

SWAZILAND

3DAØCA	SOH	73,112	162	481	54	56	42

ASIA

ASIATIC RUSSIA

RK9CWA	MOM	2,561,706	1,861	5,271	112	328	46
RAØFU	SOL	500,080	622	1,645	90	157	57
UAØZBK/0	SOA	249,184	463	1,198	66	115	27
RA0Ø0FA	SOL	169,119	376	989	49	87	35
RUØSL	SOH	153,824	372	874	47	114	15
UAØSJ	14	73,111	248	647	28	62	23
UAØAGI	SOL	70,290	232	639	24	60	26
UA9YAB	21	44,440	201	505	25	63	0
UOØFDX	14	10,152	75	188	21	31	2

BERUIT

OD5NJ	SOL	899,708	1,237	3,434	64	198	0

CYPRUS

5B4AGE	SOL	452,115	819	1,773	60	178	17

HONG KONG

VR97BG	SOH	605,352	885	2,293	76	144	44

ISRAEL

4X6ZK	SOH	314,944	745	2,128	32	90	26
4X6UO	14	188,985	501	1,465	24	71	34

JAPAN

JS3CTQ	SOH	823,989	844	2,361	88	202	59
JA5EXW	SOH	718,146	842	2,418	72	225	0
JH4UYB	SOH	565,577	742	2,087	70	147	54
JE2UFF	SOL	337,053	438	1,191	85	155	43
8J1WAK	MOL	299,207	481	1,207	76	136	36
JA2BY	SOL	179,920	322	865	59	109	40
7L4IOU	SOL	152,973	297	739	68	98	41
JA1WSK	SOL	150,735	271	773	53	108	34
JH1HRJ	SOA	148,512	319	884	46	76	46
JL6HKJ	SOL	137,970	261	730	51	112	26
7K4QOK	14	114,540	300	830	32	67	39
						(Op: JR2BNF)	
JA2MOG	14	51,030	173	483	29	48	28
JA7KM	SOL	43,419	125	353	42	81	0
JH4ADK	SOH	40,480	123	352	39	68	8
JK1ATT	SOA	40,078	142	351	50	72	15
JAØAXA	SOH	30,210	134	318	27	36	32
JA2AXB	SOH	28,634	103	278	37	58	8
JH7AJD/1	SOA	28,496	105	274	33	59	12
JA1SJV	21	27,412	131	356	22	50	5
JR1BAS	14	20,046	93	257	26	42	10
JQ1BVI	14	18,602	99	262	21	40	10
JR3PZW/1	SOL	15,604	68	188	30	47	6
JAØUMV	21	12,546	87	246	14	30	7
7L1MFS	14	11,220	62	170	21	35	10
JA1EUL	14	10,293	77	219	7	25	15
JA2BHK	SOL	6,993	41	111	27	26	10
JR1KSK	SOL	4,262	148	371	46	57	19
JA2NNI	7.0	4,120	44	103	16	18	6
JA2KPV	21	3,500	35	100	14	21	0
JA4RTX	SOH	2,065	21	59	15	20	0
JA4CZM	14	1,800	22	60	12	14	4
JE2OTM	3.5	180	12	18	5	3	2

KAZAKHSTAN

UN5PR	SOH	1,104,444	1,013	2,789	95	263	38

KUWAIT

9K2HN	SOH	623,445	811	2,335	56	185	26
OK1DX/MM	SOH	981,407	1,003	2,983	64	204	61

QATAR

A71A	SOL	61,360	198	590	20	74	10

TAIWAN

BV2KI	21	26,803	208	547	13	26	10

EUROPE

BELARUS

EW8OS	14	57,008	323	509	24	68	20

BELGIUM

OT7E	MOH	2,002,924	1,461	3,716	106	301	132
OT7T	SOA	1,887,187	1,426	3,589	100	290	137
						(Op: ON4MA)	
ON6CR	SOL	14,800	86	185	19	60	1
ON4TO	21	11,986	63	176	19	36	13
ON4CAS	SOL	8,556	60	138	20	35	7

BOSNIA

T94KM	SOL	18,423	90	207	26	56	7

BULGARIA

LZ2UF	SOL	237,820	458	1,034	61	148	21
LZ2MP	SOL	158,191	322	803	55	108	34
LZ4BU	SOL	14,318	66	159	29	53	8

CRETE

SV9/DJ9XB	SOL	141,094	413	893	37	112	9

CROATIA

9A2DQ	14	462,441	962	2,527	36	95	52
9A5W	21	232,965	559	1,503	31	83	41
9A9A	3.5	99,037	489	1,021	13	63	21
9A8A	SOH	58,656	195	416	34	90	17

CZECH REPUBLIC

OK1MR	SOH	647,319	684	1,699	88	217	76
OK2VWB	SOL	173,880	301	756	65	129	36
OK2DB	SOL	143,208	252	648	64	119	38
OK2PAD	SOL	140,835	287	687	60	120	25
OK2BXW	SOH	123,830	235	610	51	105	47
OK1JN	SOL	66,340	236	535	27	91	6
OK2PCL	14	43,780	153	398	28	57	25
OK2EQ	21	25,066	108	302	26	53	4
OK2BJT	SOL	16,517	82	199	29	47	7
OK2PIP	14	13,650	92	210	17	41	7

DENMARK

OZ5MJ	SOL	201,348	333	799	63	155	34
OZ9AG	SOH	35,960	128	310	33	67	16
OZ7XE	SOL	25,250	83	250	23	61	17
OZ1IRJ	14	12,420	68	180	14	45	10

ENGLAND

GB5RY	SOL	309,673	479	1,079	57	178	52
						(Op: G5LP)	
G3YJQ	SOH	105,244	267	634	35	88	43
GØLII	21	12,240	71	176	22	37	9

ESTONIA

EF7FQ	14	217,600	567	1,360	31	43	86

EUROPEAN RUSSIA

RW6AWT	MOM	2,654,579	1,988	4,649	122	349	100
UA6LO	SOH	1,147,512	1,211	2,792	90	257	64
UA4RZ	SOH	516,571	728	1,661	71	218	22
RZ3Q	SOL	497,240	701	1,604	71	201	38
9XØA	SOH	483,560	740	2,198	62	95	63
UA3AAE	SOL	135,280	335	712	50	133	7
UA4LCQ	21	134,431	469	1,111	31	89	1
RA1AW	14	99,796	355	818	25	70	27
RA6AR	14	46,698	251	543	14	50	22
RV3DND	7.0	9,064	92	206	12	32	0
RU6BV	SOL	4,680	43	90	20	32	0
UA6ATG	SOL	1,650	32	50	9	24	0

FAROE ISLANDS

OY3JE	7.0	146,034	626	1,281	22	78	14

FINLAND

OH2BP	SOH	542,457	705	1,629	75	215	43
OH3NXW	14	172,029	504	1,203	26	79	38
						(Op: OH3MMF)	
OH5TF	SOL	94,608	265	584	36	116	10
OH3KCB	SOL	79,872	229	512	37	109	10
OK2SG	21	11,180	60	172	25	37	3
OK1KAG	3.5	6,747	86	173	7	32	0
OH3LQK	21	3,344	34	88	16	22	0
OH1LVR	14	496	15	31	5	11	0

FRANCE

TM7XX	SOH	1,530,224	1,266	3,242	92	249	131
						(Op: F5MUX)	
F6AOE	SOH	760,562	825	2,101	74	191	97
F8KCF	MOH	600,300	701	1,740	66	185	94
F2AR	SOH	182,835	320	765	52	143	44
F5YJ	SOL	106,403	251	569	43	120	24
F6KWP	MOL	43,008	133	336	30	84	14
F6FGY	14	38,220	145	364	19	57	29
F5TCN	SOH	36,616	151	398	16	45	31
F5RAB	SOH	29,493	109	261	28	62	23
F6DZD	SOL	5,424	47	113	14	34	0

GERMANY

DK3GI	SOA	1,554,237	1,174	2,927	107	290	134
DF3CB	SOA	1,134,600	960	2,440	104	263	98
DJ6QT	SOL	1,073,166	922	2,298	99	258	110
DLØGK	MOH	921,264	923	2,258	84	223	101
DL4MCF	SOH	592,312	636	1,511	67	232	93
DL7VOG	SOA	517,621	570	1,373	89	223	65
DL5ZB	SOL	209,529	307	751	67	171	41
DKØIU	MOH	160,520	300	701	57	141	31
DL7VBJ	SOL	152,928	303	708	53	137	26
DL7VBO	SOL	138,226	317	671	51	132	23
DL1JPL	SOH	134,820	274	630	54	131	29
DL5IAM	SOL	127,032	260	632	50	110	41
DL1ARJ	SOL	113,454	251	573	53	122	23
DF5BX	SOL	77,751	232	489	39	109	11
DK9IP	SOL	67,257	175	423	37	91	31
DL8SDC	SOL	65,036	169	458	40	69	33
DJ8XT	SOL	64,779	163	453	42	77	24
DJ3OE	SOL	57,900	157	386	46	81	23
DL3ARK	SOL	52,220	166	373	32	92	16
DL1SWB	7.0	48,165	245	507	19	62	14
DF1GW	SOH	45,500	338	350	39	66	25
DK7OM	SOL	44,744	157	329	24	112	0
DL9MBZ	14	41,448	188	471	17	43	28
DK7FP	SOL	37,089	142	317	31	68	18
DJ2YE	7.0	34,668	206	428	13	56	12
DL4RCK	3.5	29,304	233	444	10	47	9
DJ3IW	3.5	27,324	200	396	9	51	9
DL3JXN	SOL	24,442	100	242	25	68	8
DJ1OJ	SOL	17,954	85	191	26	62	6
DL4VAD	SOL	14,350	77	175	27	55	0
DJ9GR	14	13,130	78	202	13	37	15
DL2AL	14	11,275	99	205	15	20	20
DL9QJ	SOL	10,804	60	146	22	45	7
DK2OY	SOL	7,930	57	122	20	42	3
DL5JBN	SOL	6,901	69	103	19	47	1
DL5JWL	SOL	6,195	40	105	22	31	6
DL1AKL	14	4,961	50	121	11	25	5
DL7MAE	SOH	2,891	27	59	21	27	1

GIBRALTAR

ZB2/ DL2NBU	MOL	798,000	1,260	2,625	60	209	35

GREECE

SV1CER	SOL	88,182	300	621	37	100	5

GUERNSEY

GU3HFN	MOL	397,015	636	1,465	53	159	59

HUNGARY

HA4YF	SOL	230,824	405	946	58	157	29
HAØHW	SOA	187,736	316	757	69	146	33
HA5BSW	SOL	133,678	337	751	46	112	20

ITALY

IQ4A	MOH	2,469,450	1,605	4,075	116	330	160
I1COB	SOH	799,690	838	2,110	81	197	101
IK2RZP	SOH	572,072	701	1,663	72	189	83
IK2QEI	14	403,332	851	2,204	34	96	53
IKØHBN	SOA	379,080	463	1,170	76	167	81
I2HWI	SOL	312,220	500	1,165	53	163	52
IØKHP	SOL	160,262	283	706	55	123	49
IK2BUF	21	112,560	306	804	31	74	35
IKØZTU	SOL	79,520	202	497	44	90	26
IK2OPW	SOH	63,002	224	578	34	71	4
IK7YUA	7.0	50,666	252	539	16	64	14
IK1DFH	SOL	42,037	148	331	29	87	11
IN3XUG	14	34,920	147	360	23	54	20
I4HRH	SOL	23,474	99	242	28	51	18
IK7RVY	SOL	22,050	97	245	24	45	21
IK3SSJ	3.5	18,036	183	334	8	45	1
IK7YUC	SOL	7,150	60	130	20	35	0
IN3VZE	3.5	6,650	90	175	5	33	0
I8BVW	SOL	4,600	42	100	14	27	5
IK/DK7XT	14	3,104	46	97	8	22	2

Say You Saw It In CQ

IK2AUK	SOL	2,405	31	65	14	20	3
IK3SCB	SOL	1,749	25	53	15	18	0
IK4YNR	14	1,326	21	51	7	14	5

KALININGRAD

RW2F	**MOH**	**1,830,794**	**1,419**	**3,514**	**108**	**322**	**91**
RA2FZ	**SOH**	**36,557**	**160**	**263**	**42**	**67**	**30**

LATVIA

YL8M	**MOL**	**1,349,530**	**1,288**	**2,966**	**106**	**292**	**57**

LITHUANIA

LY2FN	**SOL**	**178,978**	**372**	**821**	**56**	**151**	**11**
LY3JY	**21**	**17,822**	**108**	**266**	**22**	**45**	**0**

LUXEMBOURG

LX1OM	**SOL**	**153,058**	**299**	**743**	**44**	**117**	**45**

MACEDONIA

Z30M	**MOL**	**1,122,501**	**1,140**	**2,679**	**89**	**245**	**85**

NORWAY

LA7AJ	**SOH**	**181,016**	**314**	**748**	**61**	**155**	**26**
LA5TFA	**14**	**35,867**	**158**	**403**	**15**	**41**	**33**

POLAND

SP3PLD	**MOH**	**253,764**	**406**	**954**	**59**	**170**	**37**
SP1MHV	**SOH**	**226,260**	**362**	**838**	**62**	**174**	**34**
SP7NMW	SOH	210,308	353	812	69	164	26
SP9LKS	**SOL**	**114,380**	**249**	**602**	**53**	**110**	**27**
SP4TXI	SOL	102,026	285	734	28	75	36
SP2FAV	SOL	94,875	259	575	40	113	12
SP7FQI	SOL	69,806	175	418	54	97	16
SP5GKN	SOL	67,606	195	439	36	100	18
SP4SKA	SOL	56,144	112	242	27	205	0
SP2UUU	**SOA**	**55,845**	**161**	**365**	**39**	**104**	**10**
SP4CHY	**7.0**	**44,814**	**213**	**462**	**22**	**66**	**9**
SP1RKB	SOL	39,856	163	376	40	52	14
SP3JHR	SOL	35,360	153	340	30	66	8
SP8FHJ	SOL	31,746	124	286	32	74	5
SP2EWQ	SOL	27,588	96	228	42	73	6
SP2FOV	**21**	**27,472**	**148**	**404**	**25**	**43**	**0**
SP4HHI	SOL	25,132	105	244	36	67	0
SP6NVK	SOL	24,273	113	261	21	63	9
SP4BOS	SOL	23,760	115	240	26	73	0
SP2EIW	SOL	16,000	72	200	28	52	0
SP4MPH	SOL	15,405	84	195	28	49	2
SP3XR	14	8,736	73	182	10	31	7
SP2GNB	14	7,850	65	157	12	38	0
SP3EJJ	3.5	5,400	68	135	7	32	1
SP4OZ	14	3,492	41	97	12	19	5

PORTUGAL

CT4NH	**14**	**274,116**	**770**	**1,724**	**27**	**83**	**49**
CT1AOZ	**21**	**161,447**	**435**	**1,129**	**29**	**74**	**40**
CT1CTE	21	33,970	150	395	18	39	29
CT1BNW	14	33,666	146	362	17	52	24

ROMANIA

YO3APJ	**SOL**	**667,048**	**588**	**1,676**	**95**	**252**	**51**
YO3JF	SOL	325,666	517	1,243	71	151	40
YO3FRI	SOL	271,872	550	944	79	175	34
YO5AY	SOL	35,784	123	284	36	83	7
YO5TP	**14**	**27,808**	**132**	**316**	**21**	**38**	**29**
YO2IS	SOL	11,160	75	155	27	41	4
YO8CKT	14	5,236	70	154	9	25	0

SARDINIA

ISØWBT	**SOL**	**174,484**	**438**	**724**	**58**	**137**	**46**

SICILY

IT9STX	**14**	**373,680**	**847**	**2,076**	**33**	**90**	**57**
IT9JOF	**SOL**	**164,250**	**282**	**730**	**56**	**107**	**62**
IT9ORA	SOL	51,013	160	367	36	83	20

SLOVAKIA

OM3KFF	**SOH**	**439,460**	**589**	**1,505**	**57**	**166**	**69**
OM5XX	**21**	**62,700**	**258**	**627**	**30**	**30**	**40**
OM3RJB	**MOH**	**102,486**	**253**	**589**	**44**	**98**	**32**
OM1II	**SOL**	**26,159**	**112**	**259**	**30**	**44**	**27**
OM3TA	SOL	4,482	52	83	17	37	0

SLOVENIA

S57NW	**MOH**	**1,923,404**	**1,433**	**3,764**	**104**	**301**	**145**
S57M	MOH	1,136,960	1,222	2,584	96	226	118
S59AA	**SOH**	**1,135,640**	**1,032**	**2,552**	**97**	**251**	**97**
S57U	**SOL**	**443,205**	**545**	**1,323**	**75**	**197**	**63**
S57J	**7.0**	**81,190**	**306**	**706**	**21**	**69**	**25**
S53MJ	**3.5**	**76,736**	**416**	**872**	**11**	**56**	**21**
S51DX	3.5	68,130	357	757	13	60	17
S57KM	SOL	45,399	200	409	23	73	15
S53BB	**SOA**	**33,072**	**136**	**318**	**29**	**65**	**10**
S59D	SOL	29,274	100	246	39	72	8
S52SK	28	1,300	22	50	10	16	0

SPAIN

EA3BT	**MOH**	**439,890**	**567**	**1,419**	**70**	**173**	**67**
EA1MV	**SOL**	**221,604**	**328**	**939**	**55**	**135**	**46**
EA4CI	SOL	194,360	388	904	47	120	48
EA3GJH	SOL	181,396	356	898	41	112	49
EA2ASB	SOL	158,500	333	634	54	145	51
EA1FAK	**SOH**	**134,992**	**315**	**767**	**38**	**90**	**48**
EA5GRC	**SOA**	**122,815**	**242**	**605**	**53**	**107**	**43**
EA3RH	**14**	**120,651**	**376**	**921**	**26**	**63**	**42**
EA3FQV	SOH	93,072	224	554	38	92	38
EA7FTR	**21**	**60,996**	**314**	**663**	**25**	**67**	**0**
EA4AFP	SOL	59,740	174	412	36	81	28
EA4CT	14	54,736	287	622	17	56	15
EA1BAF	SOL	50,196	163	356	35	66	40
EA1AAA	SOH	19,296	79	201	29	43	24
EA1AHA	SOL	16,356	78	174	27	54	13
EA1FFC	SOL	14,022	77	171	19	46	17
EA4CKC	SOL	10,064	70	148	20	45	3
EA4BNQ	SOL	5,152	50	112	12	27	7
EA2SN	SOL	510	12	30	7	9	1

SWEDEN

SM5FUG	**SOH**	**729,864**	**851**	**1,962**	**81**	**234**	**57**
SK7BQ	**MOL**	**142,676**	**303**	**673**	**57**	**142**	**13**
SM4RGD	SOH	139,612	403	836	40	122	5
SM4GVR	SOH	138,006	308	697	45	123	30
SL3ZV	MOH	134,121	314	741	48	111	22
SM6BSK	SOL	74,412	210	468	35	113	11
SM5LNS	SOL	43,940	150	338	33	89	8
SM3AFR	14	20,698	103	262	18	37	24
SM5EIT	SOH	18,879	85	203	33	57	3
SM7ATL	SOL	18,779	94	211	27	60	2
SM4RLD	SOL	12,728	81	172	19	55	0

SWITZERLAND

HB9HK	**SOH**	**235,466**	**370**	**973**	**55**	**115**	**72**
HB9HFK	**SOL**	**201,072**	**331**	**852**	**51**	**123**	**62**
HB9CRV	SOL	93,756	285	601	34	110	12
HB9AWS	SOL	44,196	155	348	31	84	12
HB9NL	21	11,524	62	172	18	27	22

THE NETHERLANDS

PI4COM	**MOH**	**1,487,434**	**1,204**	**3,011**	**94**	**272**	**128**
PA3DHR	**SOH**	**578,697**	**681**	**1,621**	**63**	**211**	**83**
PI4ZLD	MOH	387,684	646	1,452	51	158	58
PA3EVY	**SOA**	**133,136**	**250**	**628**	**50**	**104**	**58**
PA3AQL	**MOL**	**119,730**	**273**	**614**	**42**	**121**	**32**
PA3GQF	SOL	117,410	351	590	42	130	27
PAØVHA	SOA	116,280	300	684	38	95	37
PA3GKT	SOL	98,910	265	630	32	83	42
PI4ALK	MOL	28,455	122	271	25	67	13
PAØEHF	SOL	11,169	61	153	25	42	6

UKRAINE

UTØI	**SOH**	**1,916,291**	**1,657**	**3,887**	**105**	**314**	**76**
							(Op: UT2IZ)
US9Q	**SOH**	**505,461**	**781**	**1,749**	**72**	**188**	**29**
UT7EF	**14**	**29,394**	**188**	**414**	**14**	**51**	**6**
UY1HY	**3.5**	**11,163**	**153**	**183**	**9**	**48**	**4**

VATICAN

HV4NAC	**MOH**	**1,279,032**	**1,383**	**3,288**	**79**	**214**	**96**

WALES

GW5NF	**SOA**	**711,660**	**853**	**2,045**	**71**	**194**	**83**
GW4KHQ	**SOL**	**281,388**	**453**	**1,074**	**48**	**149**	**65**

YUGOSLAVIA

YU7YG	**SOH**	**607,050**	**716**	**1,710**	**84**	**206**	**65**
YU7AL	**SOL**	**403,224**	**500**	**1,272**	**77**	**186**	**54**
YU7NR	**14**	**262,602**	**654**	**1,621**	**31**	**84**	**47**
YU7AM	SOL	220,337	409	997	45	124	52
YU7AE	SOL	122,040	300	678	44	117	19
YU7NW	**21**	**14,000**	**72**	**200**	**23**	**39**	**8**
YU1BO	**3.5**	**12,549**	**134**	**267**	**7**	**39**	**1**

NORTH AMERICA

ALASKA

KL7AC	**SOH**	**147,320**	**399**	**1,016**	**34**	**63**	**48**
KL7/KG5EG	**SOL**	**82,522**	**283**	**682**	**25**	**46**	**50**
KL7WP	SOL	47,310	178	415	26	38	50

CANADA

VD3MM	**SOH**	**1,157,508**	**1,159**	**2,844**	**76**	**177**	**154**
VE3WQ	SOH	687,645	845	2,065	61	147	125
VE7KD	SOH	473,393	803	1,709	46	84	147
VY2CC	**SOL**	**455,615**	**655**	**1,555**	**50**	**132**	**111**
VE6RAJ	SOL	306,033	611	1,239	42	64	141
VE5RI	MOH	276,960	546	1,154	45	78	117
VE7BTO	SOH	222,200	454	1,010	45	73	102
VX7CFD	SOL	216,132	494	996	44	61	112
VE6FR	SOL	207,932	429	908	45	72	112
VE3IAY	SOL	157,725	312	701	42	88	95
VE7TLK	SOL	153,272	387	782	38	48	110
VE3BUC	SOL	118,389	257	589	37	85	79
VE7QO	SOL	107,300	253	580	46	68	71
VA3NN	SOH	98,552	239	532	38	71	77
VE3UR	MOL	91,176	230	524	36	68	70
VE7IRA	**14**	**82,340**	**326**	**716**	**25**	**44**	**46**
VA3WTM	SOH	68,804	179	412	37	65	65
VE3FJB	MOH	66,424	193	437	38	64	50
VE8NC	14	34,265	168	385	16	34	39
VE3CWE	SOH	24,388	105	268	20	41	30
VE2KAD	SOL	19,928	100	212	23	25	46
VE5SF	SOH	13,940	72	164	23	30	32
VE6JY	14	6,477	47	127	18	28	5

CUBA

CO2KG	**SOH**	**80,275**	**374**	**845**	**29**	**40**	**26**

GUANTANAMO BAY

KG4GC	**MOH**	**1,870,120**	**1,659**	**3,848**	**80**	**203**	**203**

HAITI

HH2PK	**SOH**	**1,513,152**	**1,462**	**3,552**	**63**	**188**	**175**

MEXICO

XE1VV	**SOH**	**130,625**	**257**	**625**	**52**	**64**	**93**

NICARAGUA

YN6WW	**21**	**173,106**	**642**	**1,467**	**19**	**49**	**50**
							(Op: JA6WFM)

PANAMA

HP1AC	**SOL**	**149,760**	**345**	**768**	**41**	**54**	**100**
HP1KZ	SOL	86,112	274	598	19	37	88

PUERTO RICO

KP3A	**SOL**	**211,878**	**396**	**894**	**34**	**86**	**117**

SAINT MARTIN

FS5PL	**SOH**	**1,620,957**	**1,483**	**3,474**	**72**	**199**	**198**
							(Op: EA3NY)

ST. THOMAS

KP2D	**MOL**	**1,638,958**	**1,420**	**3,338**	**79**	**207**	**205**

TURKS & CAICOS

VP5JM	**SOL**	**993,018**	**1,117**	**2,634**	**53**	**163**	**161**

USA

W3LPL	**MOM**	**3,946,822**	**2,914**	**5,882**	**116**	**333**	**222**
W5WMU	**MOM**	**3,941,970**	**2,948**	**5,713**	**125**	**328**	**237**
K1NG	**SOA**	**1,985,276**	**1,550**	**3,331**	**110**	**286**	**200**
							(Op: KI1G)
K1AM	**SOH**	**1,212,534**	**1,227**	**2,542**	**82**	**224**	**171**
K4PX	**MOH**	**1,175,940**	**1,383**	**2,502**	**83**	**198**	**189**
N8PR	**SOH**	**1,086,422**	**1,187**	**2,393**	**86**	**206**	**162**
K9YY	**MOH**	**1,029,366**	**1,146**	**2,158**	**95**	**214**	**168**
N9NCX	**MOH**	**1,005,039**	**1,172**	**2,279**	**91**	**190**	**160**
N8NR	MOH	924,648	1,039	1,959	92	207	173
K4ZAM	**SOA**	**888,516**	**933**	**2,052**	**81**	**206**	**146**
KA4RRU	**SOL**	**847,616**	**1,000**	**1,892**	**80**	**201**	**167**
WX7M	MOH	798,660	1,202	1,972	85	147	173
KE1FO	**MOL**	**761,596**	**933**	**1,822**	**72**	**200**	**146**
W7GG	SOH	748,720	1,062	1,910	85	146	161
WB2HMF	SOH	678,304	895	1,804	61	172	143
N2DL	SOL	604,232	741	1,607	74	182	120
W3FV	SOH	571,692	709	1,562	68	171	127
K3KO	**SOA**	**553,035**	**712**	**1,603**	**69**	**170**	**106**
W9MU	SOA	536,796	729	1,443	75	167	130
WC1X	SOH	506,550	825	1,535	56	139	135
NX4W	SOL	484,770	863	1,430	59	127	153
WA4ZXA	SOH	469,224	641	1,372	71	147	124
KF2OG	SOA	436,396	721	1,381	53	135	128
ND5S	SOH	417,944	646	1,174	73	145	138
WW2R	SOL	389,244	754	1,194	60	113	153
AA7A	SOA	378,451	734	1,123	67	119	151
K2YG	SOL	376,050	525	1,090	69	157	119
WB8YTZ	MOH	370,414	581	1,243	61	145	92
KØKO	SOH	362,085	734	1,195	60	109	134
K7ON	SOA	356,304	720	1,142	62	101	149
W6/GØAZT	SOH	328,391	686	1,091	63	96	142
N6GG	SOH	320,760	559	990	72	114	138
W1RY	SOH	313,788	520	1,076	54	142	94
KJ7TH	SOL	303,761	848	1,081	50	74	157
WB5B	SOH	295,800	625	1,020	66	108	116
W7TI	SOH	293,844	674	1,042	59	81	142
W1TE	SOL	292,800	443	915	66	148	106
W4PK	SOA	288,981	423	973	69	153	75
K8UC	SOH	271,492	473	908	58	127	114
N9THC	SOL	266,952	629	908	51	105	138
WF5T	SOH	265,213	513	887	65	108	126
W8EB	SOA	264,914	443	886	63	133	103
K4BU	SOH	264,330	539	990	55	128	84
K1SM	SOH	242,858	517	1,162	40	95	74
W4OX	SOH	225,990	347	729	73	139	98
W9IL	SOL	208,359	397	799	55	115	91
KØBX	SOA	207,432	419	774	58	111	99

W4CV	**MOL**	**202,460**	**408**	**764**	**55**	**120**	**90**
KA2CYN	SOL	202,288	396	752	61	120	88
W2UD	SOH	199,290	419	730	53	108	112
KE3ZZ	SOH	194,023	544	773	43	83	125
KA3JFI	**14**	**180,815**	**546**	**1,247**	**25**	**76**	**44**
K6CT	SOA	180,757	365	667	65	110	96
N9CK	SOA	180,736	449	706	50	91	115
K6CT	SOA	177,390	363	657	65	109	96
KC1F	SOA	171,891	343	807	47	106	60
W2UP	**7.0**	**159,390**	**536**	**1,035**	**26**	**76**	**52**
W1BIH	SOH	157,731	298	609	62	120	77
WBØDBM	SOH	152,692	357	647	53	88	95
N5XUS	SOL	144,525	413	615	49	74	112
W8JGU	SOH	141,816	396	933	31	75	46
W3MR	SOL	140,850	306	626	50	100	75
W6IWO	SOH	139,515	391	655	51	73	89
K3PP	SOA	138,920	283	604	61	96	73
KB5BOB	SOH	138,460	444	805	37	70	65
WØHW	SOH	137,562	313	606	49	93	85
W7NN	SOH	136,718	411	694	39	54	104
N1AU	SOA	135,235	291	629	55	96	64
N8JF	SOH	126,420	255	602	50	110	50
W8PT	SOH	126,408	268	552	46	99	84
N3IXR	SOL	125,846	470	623	33	60	109
AC4PY	SOL	124,950	274	525	59	101	78
KF8TM	SOH	121,260	228	564	44	111	60
KC1YF	SOL	118,448	313	673	43	76	57
W5YM	MOH	117,626	347	571	41	76	89
N5PU	SOL	113,288	360	578	33	67	96
WA4JQS	14	112,038	349	789	28	74	40
KD5QI	SOL	109,725	358	525	39	65	105
K7DSR	SOH	108,808	416	812	26	63	45
W4LC	14	108,794	371	818	27	66	40
K6HGF	SOH	107,736	378	536	41	42	118
N8YYS	SOL	107,215	280	523	41	83	81
N4GJ	SOL	105,400	268	527	43	88	69
WM7D	SOH	103,943	306	479	48	64	105
N2FF	SOA	103,601	243	491	48	99	64
KC4SAW	SOL	101,600	275	508	44	75	81
K8AB	SOL	101,304	239	469	46	90	80
KA1O	SOL	98,903	278	497	43	83	73
N4AN	SOH	93,590	229	490	48	89	54
N5RXF	SOL	89,397	333	473	37	58	94
K0RC	SOH	87,710	282	490	39	67	73
AA7CP	SOL	85,470	354	462	38	42	105
W1EM	SOL	85,188	266	458	34	71	81
W9OL	SOL	81,700	271	475	39	68	65
WE2K	SOL	80,910	245	522	36	68	51
KI5IB	SOL	80,400	223	400	43	72	86
W2JGR	SOH	79,130	255	410	45	62	86
KC9UU	SOL	78,854	220	443	42	73	63
WA6BOB	SOL	77,760	259	405	45	51	96
AG4W	SOL	77,468	269	428	40	58	83
WO9S	SOA	76,467	211	432	41	79	57
WØML	SOH	76,105	201	491	38	86	31
KE9NA	SOL	75,348	272	414	38	52	92
N2QLQ	SOL	74,700	217	415	40	72	68
K8PYD	SOH	73,476	166	468	51	96	10
KR6E	14	72,842	410	602	25	47	49
K9OSH	MOL	72,800	250	400	39	59	84
W3SE	SOL	72,468	278	396	39	49	95
WB4M	SOL	70,409	168	389	45	89	47
K8SIA	SOL	70,380	256	414	33	56	81
W1HFN	SOL	70,000	650	400	45	83	47
W7WHY	SOL	69,696	253	363	40	50	102
NN5T	SOL	68,996	193	367	53	68	67
K6ZSR	14	68,676	370	582	25	46	47
W2YR	14	68,510	249	527	26	65	39
NN50CIA	MOH	67,860	224	377	39	62	79
WA1EHK	SOL	66,901	194	449	30	81	38
K5ZD	SOH	64,883	179	403	39	75	47
AC5AA	SOH	64,416	194	366	44	70	62
WK0F	SOL	63,375	223	375	41	64	64
W6JOX	SOL	63,145	228	365	42	50	81
W9ISC	SOL	58,986	204	339	36	65	73
W9ILY	SOL	58,855	193	395	34	68	47
AE4RG	SOL	58,824	182	342	43	64	65
AA4NC	14	58,740	250	534	23	51	36
W6CN	SOH	58,482	176	342	44	57	70
WN1E	MOL	58,384	171	356	37	76	51
WB3WPM	SOL	58,080	170	352	42	77	46
N6VH	SOH	51,660	209	315	38	45	81
KØMP	SOH	51,269	188	307	37	52	78
NØAEV	SOH	49,742	254	374	26	38	69
KØBJ	SOH	48,773	179	323	35	55	61
KB2OPQ	SOL	48,300	190	322	37	56	57
N7VGO	SOL	47,874	201	303	35	43	80
W8VLK	SOL	46,060	167	329	30	64	46
K1JN	SOL	46,001	160	293	33	62	62
W4WS	SOL	44,795	169	289	33	53	69
						(Op: N4VHK)	
KB2POP	SOL	43,776	200	342	26	49	53
WW3S	SOL	42,456	143	285	40	62	47
K4WW	7.0	40,964	300	418	16	34	48
KIØBF	SOL	38,690	168	265	28	47	71
AA9RR	SOL	37,500	146	250	37	58	55
AA6JT	SOL	37,101	180	249	35	34	80
W8IDM	SOL	36,432	157	253	30	47	67
KF9LI	SOL	36,297	181	277	22	40	69
NØRN	SOL	36,045	117	267	41	63	31
N4DXS	SOL	35,500	118	250	39	64	39
WA5ABW	SOL	35,321	181	247	29	33	81
K8CV	SOH	35,178	141	286	26	52	45
AA2QR	SOL	29,960	137	280	20	43	44
WA6NOL	SOL	28,826	148	203	27	27	88
K5PK	7.0	28,638	226	333	12	30	44
W7RH	SOL	28,222	140	206	31	33	73
W3MF	SOL	27,156	107	219	38	53	33
K8CLA	SOL	25,654	137	202	29	34	64
AF3D	SOL	25,172	112	203	28	45	51
W3GG	14	23,040	141	320	18	33	21
WA3GPP	SOL	19,700	118	197	25	38	37
NY3C	SOL	19,570	117	190	21	30	52
WAØTDQ	SOL	19,549	138	173	22	20	71
K6XX	SOH	18,942	96	246	32	26	19
K7MK	SOL	18,704	124	167	23	23	66
N7UJJ	SOL	16,168	108	172	25	23	46
K2FR	14	12,834	79	186	16	37	16
W7BWI	SOL	11,919	74	137	26	27	34
KA3DSX	SOL	10,148	72	118	24	27	35
KE2XF	SOL	9,963	70	123	22	27	32
WB4UDB	SOA	9,135	50	145	24	17	22
K3RON	SOL	9,048	64	116	23	29	26
AAØCY/7	SOH	8,496	90	118	13	11	48
WA3ZKZ	SOL	6,496	45	112	14	24	20
K1NU	SOL	6,368	96	206	36	61	31
KG2JE	14	5,400	51	108	10	24	16
N3TG	14	4,465	49	95	13	20	14
N1AFC	SOL	2,604	29	84	8	23	0
KI7RW/Ø	SOL	1,190	25	34	10	8	17
W4UW	14	570	12	30	7	8	4

OCEANIA

AUSTRALIA

VK6GOM	**SOH**	**472,119**	**656**	**1,959**	**64**	**129**	**48**
VK3EBP	**14**	**35,154**	**132**	**378**	**25**	**47**	**21**
VK5GN	SOL	12,540	74	220	21	19	17

HAWAII

NH6XM	**SOH**	**324,324**	**469**	**1,386**	**54**	**66**	**114**

INDONESIA

YB5QZ	**SOH**	**298,312**	**515**	**1,522**	**59**	**128**	**9**
YB2BRW	**21**	**15,351**	**120**	**357**	**11**	**32**	**0**
YC2OK	3.5	8,428	68	172	16	33	0

MALAYSIA

9M2TO	**SOL**	**128,871**	**392**	**999**	**40**	**89**	**0**

NEW CALEDONIA

FK8VHN	**14**	**128,225**	**377**	**1,115**	**29**	**54**	**32**
FK8HC	14	121,716	460	1,323	31	61	0

NEW ZEALAND

ZL3JON	**SOL**	**107,146**	**215**	**634**	**48**	**78**	**43**
ZL2AMI	**SOH**	**101,426**	**209**	**611**	**51**	**77**	**38**

PHILIPPINES

DU3RCM	**SOL**	**159,180**	**389**	**1,137**	**47**	**82**	**11**
DU1SAN	**14**	**94,368**	**334**	**983**	**28**	**56**	**12**

SOUTH AMERICA

ARGENTINA

LU9VET	**SOL**	**641,225**	**677**	**1,973**	**68**	**137**	**120**
LW2DFM	**SOH**	**622,368**	**749**	**2,161**	**60**	**128**	**100**
LU6ETB	**21**	**456,146**	**985**	**2,887**	**26**	**82**	**50**
						(Op: LU2BRG)	
L20H	**SOA**	**417,564**	**561**	**1,657**	**63**	**82**	**107**
						(Op: LU8HWD)	
LU8EKC	21	305,171	686	2,021	26	74	51
LU6FAZ	SOL	90,013	187	539	50	68	49
LW6DYB	SOL	67,473	200	441	47	57	49
LW9EPB	**28**	**52,762**	**293**	**851**	**19**	**43**	**0**
LU6AUM	28	44,073	256	747	18	41	0
LU4FQC	28	31,376	145	424	15	25	34
LU5HA	14	2,784	62	174	8	8	0
LU4D	7.0	2,475	28	75	13	20	0

ARUBA

P40TT	**SOL**	**3,287,160**	**2,049**	**5,955**	**81**	**248**	**223**
						(Op: WF1B)	

BRAZIL

PY2XB	**SOA**	**1,512,756**	**1,080**	**3,132**	**92**	**237**	**154**
PS2A	**SOH**	**1,112,135**	**1,086**	**3,205**	**71**	**173**	**103**

CHILE

XQ8ABF	**SOH**	**2,071,686**	**1,616**	**4,614**	**80**	**202**	**167**
CE8SFG	**14**	**193,664**	**497**	**1,424**	**25**	**63**	**48**

ECUADOR

HC1JQ	**14**	**242,844**	**558**	**1,652**	**28**	**69**	**50**

PARAGUAY

ZP6CC	**21**	**125,247**	**519**	**1,509**	**22**	**61**	**0**

VENEZUELA

YW1A	**7.0**	**129,315**	**397**	**1,165**	**13**	**53**	**45**

Check Logs: KK5OQ, SM6APB, F6KWP, UA9XK, LU6AUM, SP4KM, F8KCF, SM7BUN, F20037, KK5OQ, W9FFQ, OH2DW, SM7CAN, SP3QDU, RA3LX, DL6MBV, K8UCB, VE4YU, XE2JHB, SP9NWB, N6YHH, SP6BSL, JI3KMA, LY1KAT, W5JYE, SP5XSB, VQ9SS, IV3KSE, LA7CL, LW7EPS, SP7QHS.

THE ORIGINAL WD4BUM
HAM STICK™ ANTENNAS
for HF MOBILE OPERATION
$19.95 each

The only lightweight HF mobile antenna recommended by noted author Gordon West, WB6NOA

- Monobanders for 75 to 6 meters.
- Very rugged fiberglass & stainless steel.
- Telescopes for easy adjustment.
- 3/8 x 24 TPI base fits most mounts.
- Low profile & low wind load.
- Needs no springs or guys.
- Complete tuning & matching instructions included.
- Approximately 7 ft. tall.
- 600 watts.

Cat. #	Band	Cat. #	Band
9175	75 meters	9115	15 meters
9140	40 meters	9112	12 meters
9130	30 meters	9110	10 meters
9120	20 meters	9106	6 meters
9117	17 meters		

NEW !!AT LAST!! NEW
2 METER ANTENNA
NO GROUND REQUIRED

- Boats
- R.V.s
- Fiberglass roof vans
- Plastic cars
- Bicycles
- Motorcycles
- Can be used with ground plane

CAT. # HW-1
$44.95

- 3 Db Gain
- Power rated at 100 watts
- NMO base mount
- Only 40" tall
- 17-7 ph stainless steel whip
- Adapter and fully adjustable marine mount available
- Patent Pending

NEW LICENSE PLATE MOUNT NEW

- Mounts behind license plate
- Mount is constructed of type 304 Stainless Steel
- Complete with S/S hardware
- For Antenna's with 3/8" x 24 Thread
- Accepts PL-259 Direct
- Ground strap included
- Complete mounting instructions included

100% MADE IN USA
$44.95 CAT. # TM-1

Tri-Magnetic Mount
MODEL 375
Only $39.95
Now with no-rust all stainless steel hardware

- Holds all Hamstick Antennas and many others.
- Over 400# of holding power.
- 12" X 14" foot print.
- 3/8 x 24 thread mounting.
- 15' RG 58 coax w/PL-259.
- No rust aluminum construction.

Lakeview Company, Inc.
3620-9A Whitehall Rd., Anderson, SC 29626 • 864-226-6990
FAX: 864-225-4565 • E-Mail: hamstick@hamstick.com • www.hamstick.com

ALL 100% MADE IN USA Add $7 per order S/H

CIRCLE 66 ON READER SERVICE CARD

CQ SHOWCASE

"TELETEC TOUGH" RF Linear Amplifiers

TELETEC has introduced a new line of linear amplifiers housed in a die-cast aluminum heat sink. The amplifiers operate in all modes without the necessity of manually switching between SSB, FM, CW, and AM. The units offer TR switching, over/reverse voltage protection, ATV tuning, repeater tuning, pre-amp disable, and keying wire kit. The DXR series of linears offers the same features but with a 100% duty cycle in wither the rack mount or desktop version.

For more info, contact TELETEC Corp., 10101 Capital Blvd., Wake Forest, NC 27587-7788 (phone 1-888-323-6888; on web <www.teletec-usa.com>, or circle number 102 on the reader service card.

Radio Amateur Callbook Summer 1998 Edition

The summer edition of the 1998 Radio Amateur Callbook CD-ROM is now available. Prefix maps have been updated and new maps have been added. In addition, the summer edition features: over 1.450 million US and International listings; revised label printing routines (choose from a variety of standard Avery label formats); print the entire Windows help file with one button click; TSR and DLL's needed for compatibility with most logging programs are included; and e-mail and fax numbers.

For more information, contact Radio Amateur Callbook, P.O. Box 2013, Lakewood, NJ 08701 (732-905-2961), or circle number 105 on the reader service card.

Alinco DJ-C5T VHF/UHF "Credit Card" HT

The new DJ-C5T HT from Alinco is designed to operate on the 2 meter and 70 cm bands. Only slightly larger and thicker than a credit card, it features an internal speaker, runs on an internal lithium-ion battery, has 50 memories, CTCSS encode and decode, includes AM aircraft band receive, and has adjustable tuning

steps, auto power off, battery save setting, MARS/CAP capability, packet radio capability, and more. The unit puts out 300 milliwatts. The transceiver can utilize a variety of speaker/mic combinations and its accessories are interchangeable with the DJ-C1 and DJ-C4.

The DJ-C5T comes with a clear-plastic case and "snap-in" charging unit and is priced at $239. For more information, contact Alinco, 438 Amapola Ave., Suite 130, Torrance, CA 90501 (310-618-8616), or circle 104 on the reader service card.

Buckmaster "Copy This & Pass" Code Practice Audio CD

Buckmaster's new International Morse Code practice audio CD collection, "Copy This and Pass," is a set of three CDs to help you learn code at home or while traveling. The 5 wpm disc teaches code with left channel voice assist. The 13 and 20 wpm build skill and proficiency. All are in stereo. Each disc can stand on its own and does not require a computer for use. The discs feature: nearly 74 minutes of audio practice on each audio CD; nearly perfect computer-generated and DSP filtered Morse Code; letters, numbers, punctuation, groups, words, and prosigns; printed content/answer keys included; Farnsworth spacing; choice of "random" or "mix" on audio CD player for selection variety.

Each audio is priced at $10, or all three for $25 (plus $5 s&h per order). For more information, contact Buckmaster, 6196 Jefferson Hwy., Mineral, VA 23117 (540-894-5777; e-mail <info@buck.com>), or circle 106 on the reader service card.

HIGH SIERRA ANTENNAS

New mobile antennas

MODEL 1500
MODEL 1600
RV SPECIALS

$275

Price includes control panel and mounting hardware kits

For details, check out our webb pages or request a copy of our all new brochure. Call our toll free number today:

1-888-273-3415

We can solve your mounting problems. Call

High Sierra Antennas, Box 2389
Nevada City, CA 95959 USA
Tel: 530-273-3415, fax: 530-273-7561
http://www.hsantennas.com/info
e-mail: cobler@hsantennas.com

24 DIFFERENT PANELS PRE-PUNCHED FOR POPULAR CONNECTORS

MAKE TEST FIXTURES QUICKLY!
PANELS ARE 0.040" RAW ALUMINUM

Lab Box-It™

MODEL	W x D x H in.	PRICE
LAB-1	1.5 x 2.0 x 0.75	3.75
LAB-2	1.5 x 4.0 x 0.75	4.50
LAB-3	1.5 x 6.0 x 0.75	5.25
LAB-4	2.0 x 2.0 x 1.0	4.00
LAB-5	2.0 x 4.0 x 1.0	4.75
LAB-6	2.0 x 6.0 x 1.0	5.60
LAB-7	2.0 x 2.0 x 1.5	4.10
LAB-8	2.0 x 4.0 x 1.5	5.00
LAB-9	2.0 x 6.0 x 1.5	6.00

www.sescom.com

$30.00 MINIMUM ORDER INCLUDES FREE SURFACE SHIPPING (US, CANADA & MEXICO)
FREE ENCLOSURES CATALOG

SESCOM, INC. sescom@sescom.com
2100 WARD DR., HENDERSON, NV 89015 USA
ORDERS ONLY 800-634-3457
Tech Line 702-565-3993 (weekdays 8 am - 4 pm PST)
Office 702-565-3400 Fax 702-565-4828
FAX TOLL-FREE U.S. and Canada (Mexico dial 95 first) 800-551-2749
SESCOM, INC. is not responsible for inadvertent typographical errors; prices and specifications subject to change without notice.

Be a Ham Operator
without learning Morse Code!
NO CODE TECHNICIAN Updated Questions! Home study course contains 200-pg. textbook, FCC Rules & IBM compatible software.
VISA or MasterCard Accepted.
Toll Free 1-800-669-9594
The W5YI Group, Box 565101, Dallas, TX 75356
$29.95
Money Back Guarantee! Plus $3 Shipping

CIRCLE 78 ON READER SERVICE CARD

LOGic 5 for Win 95/98
because a great hobby deserves state-of-the-art

Introducing the best all around software package for your shack! New 32-bit, Windows 95/98/NT 4 application! Complete logging, online awards tracking for *any* award, prints QSL cards/labels, contesting, radio interfacing, antenna rotor control, digital communications for all modes, unequaled packet spotting, CW keyer, sound card support, customizable screens and reports, prints graphics and color, superb documentation, unsurpassed tech support, grayline propagation chart, interface to callbook databases, customizable for foreign languages, and much more. **Free Infopak! Download the new demo from our web site today!** No gimmicks, simply the best. Specs: Pentium, 12 megs RAM, CD ROM drive, Win 95/98 or NT 4.0. $129. Foreign shipping extra. Visa/MC. GA residents add 7% tax. Also available: PDA QSL Route List, SARtek rotor interface, rig and keyer interfaces, RA Callbook.

Personal Database Applications, Dept C, 1323 Center Dr., Auburn, GA 30011. 770-307-1511.
770-307-0760 fax. 770-307-1496 tech support. e-mail: sales.cq@hosenose.com
web: http://www.hosenose.com
hours: 9-6 M-Th, 9-noon Fri.

New! CD-ROM version!

How big is big? The old adage if it's still standing it's not big enough is an amateur's fantasy. This beam is W6KW's dream come true. It's up, it's big, and most of all, it does quite a job.

Designing and Building A Three-Element 80 Meter Yagi

BY PETER J. DALTON*, W6KW

When I decided to reconstruct my 80 meter antenna after an absence of over ten years, I asked questions most serious amateurs would likely ask: Is it possible to assemble these individual pieces on the ground so that they become a "killer" array when installed at the top of a 165 ft. tower? Is there a way to make this antenna perform even better than it did? Is there a way to design it so it is easier to troubleshoot?

Design Challenges

This "how to make it better" approach was particularly challenging given that my previous 80 meter antenna—a KLM 4-element, dual-driven, linear loaded array on a 76 ft. boom and 120 ft. tower—had allowed me to become a fairly significant west coast competitor in the 1980s.

My first design consideration was with respect to wind loading. The KLM 4-element array had withstood recorded winds of 96 MPH at the antenna site located on the side of Mount Hamilton in San Jose, California. This particular location experiences up-slope winds every bit as threatening as lateral winds. My new station was to be located at my ranch some 200 miles farther north, where the winds are even stronger and more frequent. I decided to undertake a design of a 3-element array that would perform equally to the 4-element but with reduced wind-loading due to one less element. This meant changing from the KLM dual-driven feed to one with a new matching system.

Mike Staal, former designer for KLM and presently owner of M^2, suggested I obtain a popular antenna modeling program to experiment with my ideas using computer simulation. Over the next year or so I spent many hours calculating, adjusting, and experimenting—all from the vantage point of an easy chair and a home computer.

The intrepid antenna team. From left to right: Dave, W6ANR, Peter, W6KW, and Pete, W6OOL.

Here Peter, W6KW, hefts one of the big coils.

I finally discovered the optimum result I wanted. It would require a boom length of 76 ft., happily the length of the boom I still owned, forward gain within .2 of or equal to that of my previous 4-element array, and a front-to-back ratio which would exceed the dual-driven antenna. The feed point impedance would be 23 ohms, requiring a beta match. The bandwidth remained a question; although by modeling the element design, it appeared likely that the bandwidth needed for the single-driven array would be the same as that for the dual-driven. This bandwidth issue was especially critical for me, because linear loaded antennas are a high Q system and only work on or near their design frequency.

Mechanical Considerations

Spacing of Elements. The first consideration was whether to equally space elements or space them for optimum front-to-back ratio. By using the fundamental premise that antennas on 80 meters should be designed for best-receiving, I chose front-to-back spacing.

Relay Connections. The second consideration was how to solve the relay problem. The KLM design used vacuum relays to switch the array from 3.79 MHz phone to 3.510 MHz CW. Both Bob W6RJ, who had been encouraging me for some time to return to 80 meter DXing, and I in

*2930 Corvin Dr., Santa Clara, CA 95051

Say You Saw It In CQ

MIRAGE ...160 Watts on 2 Meters!

Turn your mobile, base or handheld into 160 Watt powerhouses and talk further, longer, clearer . . . All modes: FM, SSB, CW . . . Superb GaAsFET preamp . . . Overdrive, high SWR, Over-temperature protection . . . Remote controllable . . .

B-5016-G
$299
Suggested Retail

The MIRAGE B-5016-G gives you 160 watts of brute power for 50 watts input on all modes -- FM, SSB or CW!

Ideal for 20 to 60 watt 2 Meter mobile or base. *Power Curve* chart shows typical output power.

Hear weak signals -- low noise GaAsFET preamp gives you excellent 0.6 dB noise figure. Select 15 or 20 dB gain.

B-5016-G has legendary ruggedness. *We know of one that has been in constant use since 1979!*

Heavy-duty heatsink spans entire length of cabinet -- prevents overheating. Power transistors protected by MIRAGE's *Therm-O-Guard*™.

Fully protected from high SWR and excessive input power. Has warning LED.

Has smooth adjustable Transmit/Receive switching with remote external keying.

RC-1B, $45, Remote Control. On/Off, preamp On/Off, selects SSB/FM. With 18-ft cable.

Draws 17-22 amps at 13.8 VDC. 12x3x5½ in.

Power Curve -- typical B-5016-G output power								
Watts Out	130	135	140	145	150	155	160	165
Watts In	20	25	30	35	40	45	50	55

More 160 Watt, 2 Meter Amplifiers . . .

B-2516-G, $299. For 10 to 35 watt mobile or base stations. 160 watts out for 25 watts in.

B-1016-G, $379. MIRAGE's most popular *dual purpose* HT *or* mobile/base amplifier. 160 watts out/10 W in. For 0.2-15 watt transceivers.

B-1016-G Great for ICOM IC-706!

B-215-G, $379. MIRAGE's most popular *handheld* amp. 150 watts out/2 watts in; 160 watts out/3½ W in. For 0.25 to 5 watt handhelds.

100 Watts for 2 Meter HTs

B-310-G
$199
Suggested Retail

Power Curve -- typical B-310-G output power							
Watts Out	25	50	75	95	100	100+	100+
Watts In	¼	½	1	2	4	6	8

- *100 Watts out with all handhelds up to 8 watts*
- *All modes: FM, SSB, CW*
- *Great for ICOM IC-706*
- *15 dB low noise GaAsFET preamp*
- *Reverse polarity protection/SWR Protection*
- *FREE mobile bracket* • *Auto T/R switch*
- *FREE handheld BNC to B-310-G cable*
- *Ultra-compact 4¾x1¾x7¾ inches, 2½ pounds*
- *One year MIRAGE warranty*

***Boost** your 2 Meter handheld to 100 Watts!* Ultra-compact all mode B-310-G amp is perfect for *all* handhelds up to 8 watts and multimode SSB/CW /FM 2 Meter rigs. *Great for ICOM IC-706!*

35 Watts for 2 Meter HTs

B-34-G
$89.95
Suggested Retail

Power Curve -- typical B-34-G output power								
Watts Out	18	30	33	35+	35+	35+	35+	35+
Watts In	1	2	3	4	5	6	7	8

- *35 Watts Output on 2 Meters*
- *All modes: FM, SSB, CW*
- *18 dB GaAsFET preamp*
- *Reverse polarity protection*
- *Includes mobile bracket*
- *Auto RF sense T/R switch*
- *Custom heatsink, runs cool*
- *Works with handhelds up to 8 watts*
- *One year MIRAGE warranty*

MIRAGE RUGGED!

35 watts, FM only . . . $69.95

B-34, $69.95. 35 watts out for 2 watts in. Like B-34-G, FM only, less preamp, mobile bracket. 3⅛x1¾x4¼ inches.

MIRAGE Dual Band 144/440 MHz Amp

BD-35
$159.95
Suggested Retail

MIRAGE RUGGED!

Power Curve -- typical BD-35 output power							
Watts Out (2Meters)	30	40	45	45+	45+	45+	45+
Watts Out (440 MHz)	16	26	32	35+	35+	35+	35+
Watts In	1	2	3	4	5	6	7

- *45 Watts on 2 Meters/35W on 440 MHz*
- *Auto Band Selection* • *Auto T/R switch*
- *Full Duplex Operation* • *5x1¾x5 inches*
- *FREE mobile bracket* • *"On Air" LEDs*
- *Single Connector for dual band radios and antennas*
- *Reverse polarity protection*
- *Works with all FM handhelds to 7 watts*
- *One year MIRAGE warranty*

Add this Mirage *dual band* amp and boost your handheld to a *powerful* mobile or base -- 45 watts on 2 Meters or 35 watts on 440 MHz! **Mirage's** exclusive *FullDuplexAmp*™ lets you talk on one band and listen on the other band at the same time -- *just like a telephone conversation.* (Requires compatible HT).

6 Meter Amplifier

FCC Type Accepted

The A-1015-G, $389, is the *world's most popular* all mode FM/SSB/CW 6 Meter amplifier. 150 watts out for 10 in. For 1 to 15 watt transceivers.

70cm Amplifiers (420-450 MHz)

D-3010-N, $365, -- 100 W out/30 in. For 5 to 45 watt *mobile/base*. **D-1010-N, $395**, 100 W out/10 in. *Dual purpose* -- for handhelds or mobile/base. **D-26-N, $269**, 60 W out/2 in, for *handhelds*.

Amateur TV Amps

Industry standard ATV amps -- **D-1010-ATVN, $414**, 82 watts PEP out / 10 in. **D-100-ATVN, $414**, 82 watts PEP out/2 in. (without sync compression).

Remote Control Head for Amps

RC-1, $45, remote controls most MIRAGE amps. Power On/Off, preamp On/Off, switch for SSB/FM. 18 foot cable (longer available). 1¾x3¾x2½ inches.

Repeater Amps

11 models -- continuous duty all modeFM/SSB/CW repeater amps for 6, 2, 1 1/4 Meters, 70cm, 450 MHz ATV.

Low noise GaAsFET preamps

KP-1

KP-2

High gain *ultra low noise* GaAsFET preamps for receiving weak signals. Selectable gain prevents receiver intermod. 15 to 22 dB gain. Less than 0.8 dB noise figure. Automatic RF switching up to 160 Watts. **Choose** In-*Shack* model or *Mast-Mount* (includes remote control) model to reduce loss. Rugged die-cast enclosure.

Frequency (MHz)	*In Shack $139*	*Mast Mount $195*
28-30	KP-1/10M	KP-2/10M
50-54	KP-1/6M	KP-2/6M
144-148	KP-1/2M	KP-2/2M
220-225	KP-1/220	KP-2/220
430-450	KP-1/440	KP-2/440

1¼ Meter Amps (223-225 MHz)

Choose from 10 models -- 20 to 220 watts out for 2 to 50 watts in, $129 to $655.

Commercial Amps ($199 to $395)

FCC Type Accepted

Commercial amps for 150 - 174, 450-470 MHz and VHF marine bands, 70 -130 watts out.

Accurate SWR/Wattmeters

Read SWR directly andForward/ Reverse, Peak/Average power. Remote Coupler. 1.8-30, 50-200, 420-450, 1260-1300 MHz band models.

One Year Mirage Warranty

Call your dealer for your best price!
Nearest Dealer/Free Catalog: 800-647-1800

http://www.mirageamp.com

Technical: 601-323-8287 Fax: 601-323-6551

MIRAGE
COMMUNICATIONS EQUIPMENT
300 Industrial Park Road
Starkville, MS 39759, USA

Prices and specifications subject to change. © 1996 Mirage Communications

MIRAGE . . . the world's most rugged VHF/UHF amplifiers

CIRCLE 135 ON READER SERVICE CARD

the past had experienced multiple failures in the KLM-designed relay connections. Rod, NR7E, had solved the failing relay problem caused by vibration and weather by designing a 100% weather-proof enclosure that eliminates all vibration at the relay connections and ensures a durable connection of the leads to the linear loading.

Non-Inductive Guys. As other antenna designers know, it is highly desirable to have as little conductive material as possible around and near the antenna, especially in the plane of the elements. On my former antenna I had used Phillystran for the top guys and side guys to the boom as well as to guy the 120 ft. tower. So I used noninductive boom guys once again.

I discovered that over the last few years the tower guying connector for Phillystran had become quite expensive, so I looked for a less costly substitute. I ended up using NUPLA rod, a fiberglass rod used by the military for guying. Glass grips which take a thimble are made for 3/8 inch NUPLA; this answered my need for using noninductive guys for the tower. This 3/8 inch NUPLA has a guying strength of 16,000 lbs., equivalent to that of steel guy wire.

When Pete, W6OOL, and I constructed the tower to a height of 165 feet using Tri-Ex T-26, we used NUPLA rod for the guys down to 40 feet from the ground, at which point we then spliced to steel to reduce the hazard from fire.

Boom Guying. I made my own connectors for guying the boom guying out of 1 1/2 inch aluminum plate, using wire nuts to secure the NUPLA rod and being careful not to break the jacket. I then bonded the connectors in casting resin using small margarine tubs for the molds. In one case where I needed a very small mold, I used a 35 mm film canister and added a 3/8 inch hole in the bottom. The connectors were bolted to the eye of the turnbuckles for final tensioning of the boom.

Boom Support. When I began to assemble the elements, I noticed that two of the insulators used to separate the linear loading points were cracked. A quick call to KLM in Washington state had new ones to me in three days.

While at lunch one day with Bob, W6RJ, and Rich, K7ZV, Rich suggested I should have a support that would enable the boom to rotate from the horizontal to the vertical. This seemed an excellent and workable idea, since Pete, W6OOL, and I had mounted the top section NUPLA guy rod 20 ft. below the top of the tower. Rich then designed a boom cradle made out of 5 inch aluminum channel 2 1/2 feet long which perfectly held my 5 inch boom. The last three inches of each end of the bottom of the 2 1/2 foot long cradle is cut out and a 5/8 inch hole cut through the remaining tabs and boom, so that the boom can swivel vertically from either side of the cradle. This boom cradle design proved to be cornerstone in making the modifications to the antenna discussed here later on.

The cradle is welded to a side plate which holds the original steel blocks which bolt around the 3 inch chrome molly mast.

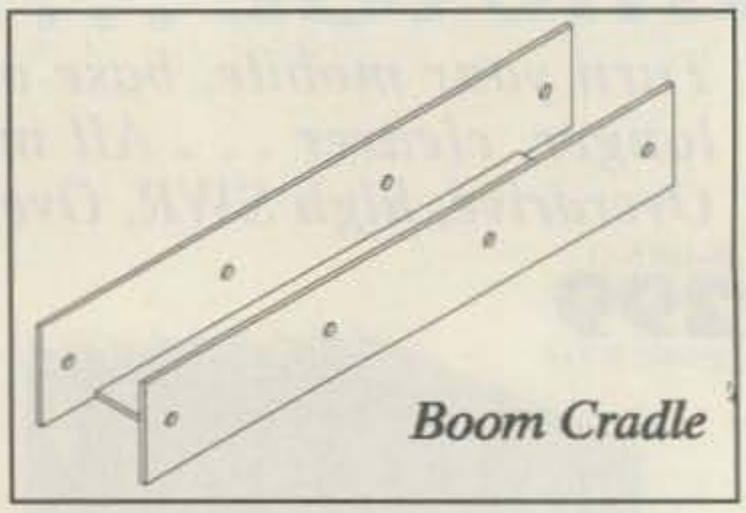


Fig. 1– The simple boom cradle design which allows the Yagi to be vertically rotated.

Building the Antenna

I built the new antenna entirely on the ground, as I planned to raise and mount it fully assembled to the top of the tower. I constructed the antenna in a sheltered clearing at the foot of a small earthen dam some 300 ft. from the tower and some 200 ft. below it. This was the only area with proximity to the tower that had enough room for the 76 ft. boom and three 90 ft. elements.

During the two years or more of conceptualizing and constructing this antenna, I vacillated between whether to lift the antenna into place on the tower using a helicopter or pull it up a catanary as I had done before with my 4-element beam. The catanary seemed the wiser and less expensive choice, so the tower was back-guyed and the catanary was stretched out using a tractor. It took five people two days to get the antenna positioned on top of the 165 ft. tower.

How well did it work the first season I used it? Unfortunately, I experienced two unanticipated mechanical failures, both caused by broken elements. One failure occurred at the polyethylene insulator for the linear loading. This turned out to have been a weak spot in KLM's original design, which the company corrected years later by triple-walling elements at this point for greater strength. The second failure was the loss of a tip, and this took as much effort to remedy as the first failure.

Once these element problems were corrected, the antenna appeared to compare favorably with other west coast arrays. It was not, however, definitely superior. One limitation I perceived was a possible on-the-air front-to-back of 18 dB and a front-to-side of 15 dB. I returned, therefore, to "the technology drawing board."

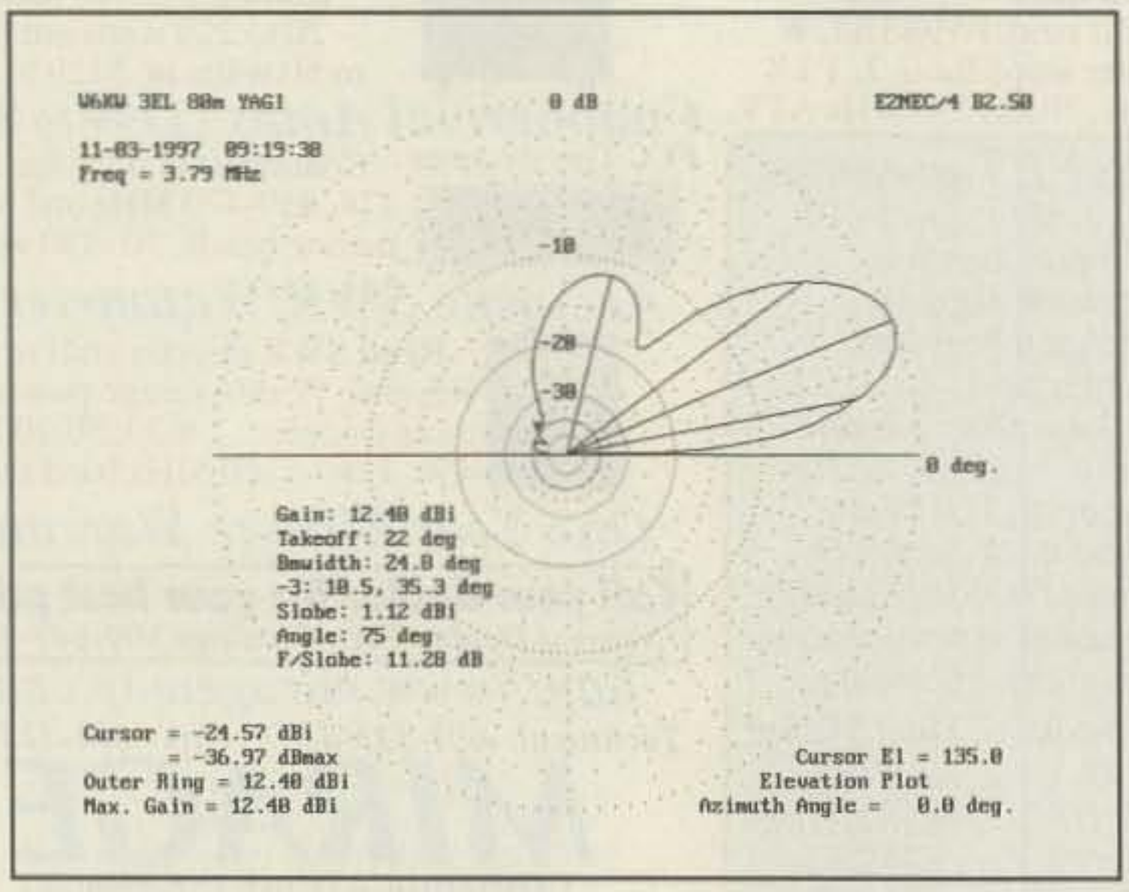


Fig. 2– (A) The elevation plot for the 3-element Yagi. (B) The azimuth plot for the same antenna.

Say You Saw It In CQ

JRC

JST-245

160-10 Meters PLUS 6 Meter Transceiver

Fifteen reasons why your next HF transceiver should be a JST-245. . .

1 ALL-MODE OPERATION (SSB,CW,AM,AFSK,FM) on all HF amateur bands and 6 meters. JST-145, same as JST-245 but without 6 meters and built-in antenna tuner.

2 MOSFET POWER AMPLIFIER • Final PA utilizes RF MOSFETs to achieve low distortion and high durability. Rated output is 10 to 150 watts on all bands including 6 meters.

3 AUTOMATIC ANTENNA TUNER • Auto tuner included as standard equipment. Tuner settings are automatically stored in memory for fast QSY.

4 MULTIPLE ANTENNA SELECTION • Three antenna connections are user selectable from front panel. Antenna selection can be stored in memory.

5 GENERAL COVERAGE RECEIVER • 100 kHz-30 MHz, plus 48-54 MHz receiver. Electronically tuned front-end filtering, quad-FET mixer and quadruple conversion system (triple conversion for FM) results in excellent dynamic range (>100dB) and 3rd order ICP of +20dBm.

6 IF BANDWIDTH FLEXIBILITY • Standard 2.4 kHz filter can be narrowed continuously to 800 Hz with variable Bandwidth Control (BWC). Narrow SSB and CW filters for 2nd and 3rd IF optional.

7 QRM SUPPRESSION • Other interference rejection features include Passband Shift (PBS), dual noise blanker, 3-step RF attenuation, IF notch filter, selectable AGC and all-mode squelch.

8 NOTCH TRACKING • Once tuned, the IF notch filter will track the offending heterodyne (±10 Khz) if the VFO frequency is changed.

9 DDS PHASE LOCK LOOP SYSTEM • A single-crystal Direct Digital Synthesis system is utilized for very low phase noise.

10 CW FEATURES • Full break-in operation, variable CW pitch. built in electronic keyer up to 60 wpm.

11 DUAL VFOs • Two separate VFOs for split-frequency operation. Memory registers store most recent VFO frequency, mode, bandwidth and other important parameters for each band.

12 200 MEMORIES • Memory capacity of 200 channels, each of which store frequency, mode, AGC and bandwidth.

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

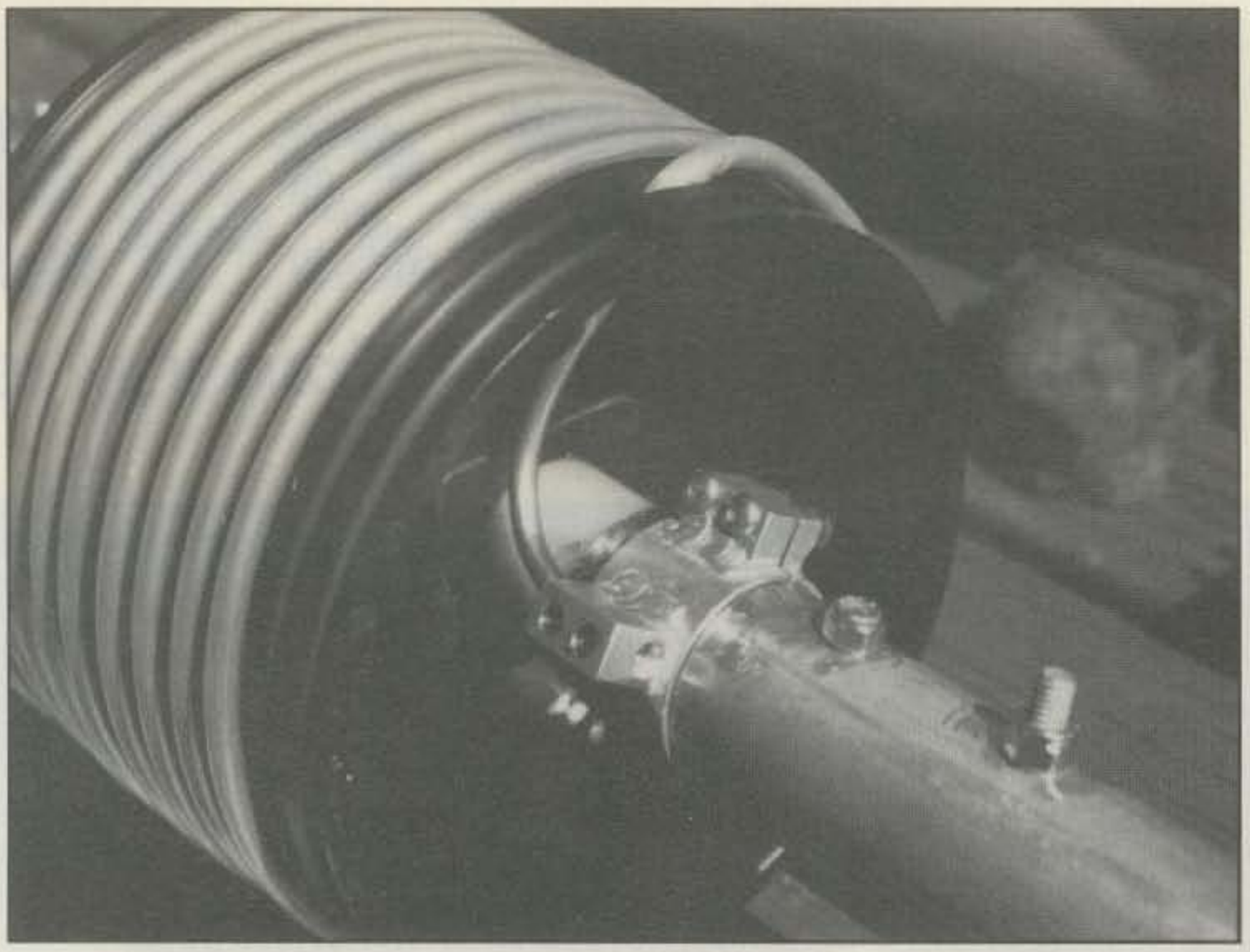
14 ERGONOMIC LAYOUT • Front panel features easy to read color LCD display and thoughtful placement of controls for ease of operation.

15 HEAVY-DUTY POWER SUPPLY • Built-in switching power supply and a cooling system designed for continuous transmission at maximum output.

JRC *Japan Radio Co., Ltd.*

430 Park Ave., 2nd Floor New York, NY 10022 Phone: (212) 355-1180 Fax: (212) 319-5227

CIRCLE 165 ON READER SERVICE CARD



Close-up detail of the coil and mounting hardware.

Inductive Loading—The Remake

In a conversation with Rich, K7ZV, I learned he had also been unable to get a linear loaded antenna to work any better than a dipole on 80 meters. He told me that when he discussed the problem with Dave, W6ANR, Dave had suggested he replace the linear loading with inductive loading coils and move the loading farther out on the element.

I contacted Dave, who then undertook an extensive research project on the ability of constructing loading coils with very high Q's. He eventually experienced success in creating coils with Q's in excess of 700.

When Dave's results were transferred to K7ZV's shortened 2-element beam, the performance turned out to be "awesome." Once Rich installed the coils on his beam, his antenna had a pattern. He heard weak ones through the noise, something he had never been able to copy before.

Rich also had a 3-element linear loaded antenna at his home in Oregon, which exhibited the same lack of pattern he had found before he installed the coils on his 2-element version. W6ANR therefore went back to his engineering board and created a new set of coils for the 3-element antenna. After a few weekends of work, the new antenna was up and running. It was summer and too early to tell much about the effects of the change except that the revised antenna already exhibited better than 30 dB front-to-back and 25 dB front-to-side.

Dave then took on the task of redoing another 3-element linear loaded beam at W6ZJ's. Each successive modification gave him greater insight into the abilities of NEC 2 and what adjustments had to be factored into our formula. Once again the results on the modified antenna were dramatic: 30 dB front-to-back reports over and over again.

My plan was to use the same 76 ft. boom I had used with my original 4-element, dual-driven 80 meter Yagi. Dave undertook extensive computer modeling of a 3-element Yagi on a 76 ft. boom. In doing so, we found we could not depend on NEC 2 as many other designers did, so we purchased NEC 4. The resultant pattern design we finally settled on is in fig. 2. Note that the program shows a front-to-back in excess of 40 dB—results many people have heretofore thought impossible. Our experience proves that these greater front-to-back ratios are achievable with shortened elements.

With these technical issues behind us, it was now time to eliminate the mechanical problems associated with linear loading, take advantage of the electrical advantages of inductive loading, and get on with rebuilding the 3-element beam!

The Dalton Catwalk

Because I would be doing some experimenting, I knew I would need the elements to be easily accessible. To accomplish this, I designed and built an 8 ft. long catwalk with 4 ft. hand rails, a pulley, and guys and mounted it some 30 ft. below the boom on one side of my tower. I mounted clamps and swivels so that it readily attaches to the tower legs. The walking area is constructed of mesh, and the entire platform attaches with hinges so that it lies flat against the tower when not in use.

I calculated that since my guys were 20 ft .below the top of the tower, the antenna was 2 ft. above, and the boom was 30 ft. at the swivel point, the reflector would come into contact with the guys 6 feet down from their top when the boom was rotated to the vertical position. The guys at 120 degrees apart called for a catwalk only 3 ft. long (half the distance). However, because work on the director required a much longer reach, I made the platform 8 ft. in length.

This maintenance (catwalk) platform turned out to be a great idea. Using it shortened the time to remove the old reflector and put on a new one from 8 hours to about 2 hours.

In fact, if I were to do it over again, rather than assembling the entire antenna on the ground and then raising it to the top as a single unit, I would use the platform to raise each element, attaching it from the catwalk to the boom. After many raisings and lowerings of the elements, Dave and I found we could lower, adjust, and raise either the director or the reflector in 11 minutes with two helpers on the catwalk.

Element Length

The linear loading design adjusted the element length by tuning the length of the linear loading wires. The linear loading also acted as back-guying support for the elements. Now that I had changed the loading to high Q coils, the element length is determined by overall length and adjusted at the tips. The coils were made of 1/4 inch copper tubing wound on a 7 inch diameter, 10 inch long ABS water pipe. The inductance of these coils is 17 microHenries. I used a length of Phillystran to back support the elements from the coil back to the boom. This gives the element slightly more support than the linear loading did since the Phillystran is farther out on the element.

Mounting the Coils

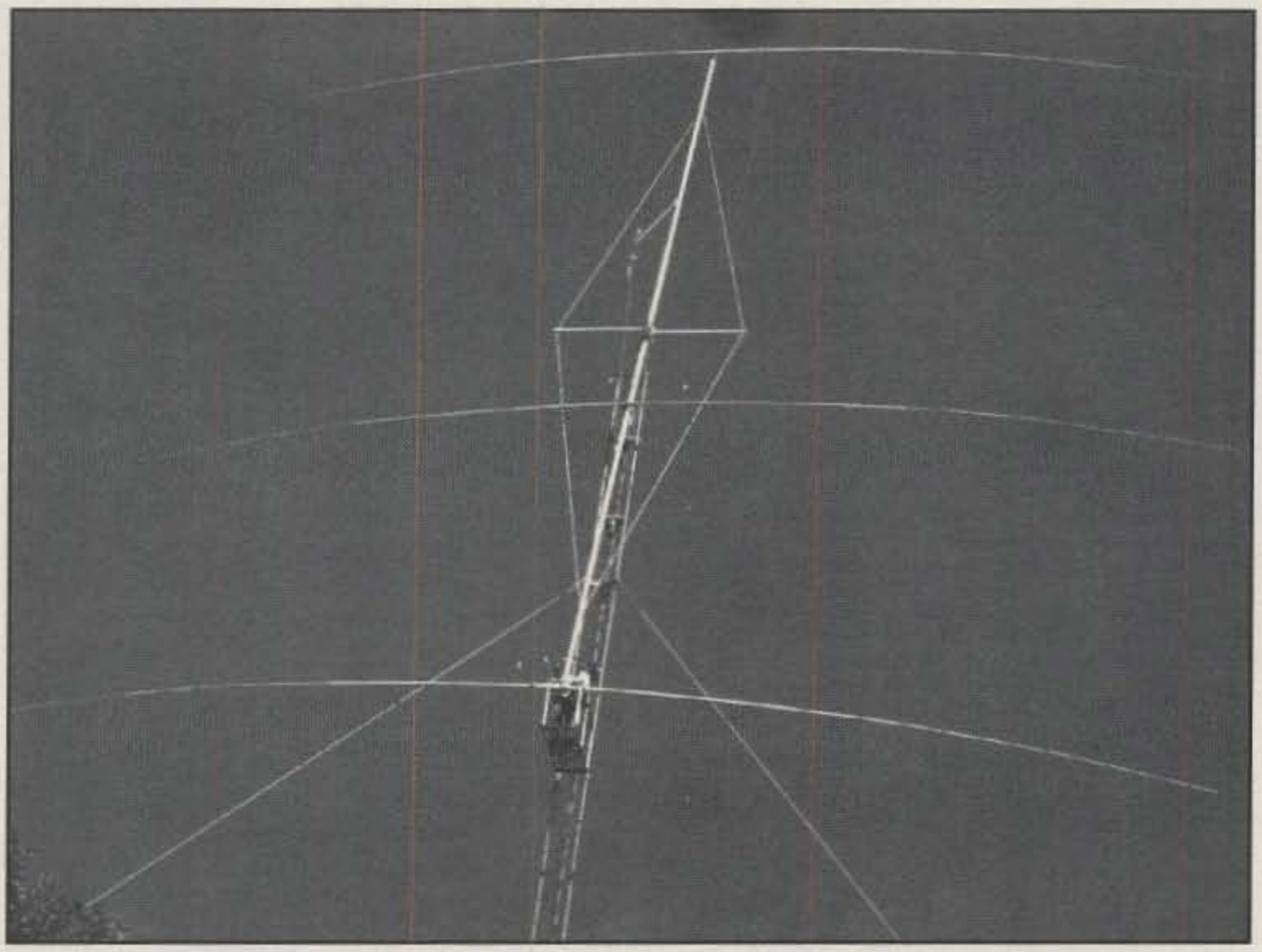
The very important location of the coils was selected to be at a point where the current is reduced but not to the point where the voltage rises high enough to cause significant losses in the coils. The farther out from the boom the coil is located, the greater the inductance needed and the greater the loss becomes. This consideration resulted in my locating the coils 22 1/2 feet from the boom. Element back guys were made from 1/4 inch Phillystran and were connected from the loading coils back to the original 3 ft. risers mounted on the boom.

An aluminum reducer was machined for each of the six half elements to replace the poly insulators. When I took the poly insulators out of the remaining elements

Say You Saw It In CQ

of the linear loaded design, I found four of the six insulators had cracked from weather and fatigue (the other two were replaced earlier due to cracks). This aluminum reducer takes the 3 inch element and attaches it to the 2 inch diameter section. The coils have a 1 3/8 inch diameter 2 foot long solid fiberglass rod running through the center which sleeves into the cut section of the 1 1/2 inch tube of each of the six half elements. The copper tube ends of the coils have solid copper rod inserted as a dowel in the ends, eliminating compression when the ends are inserted in the aluminum press collar on the element. The coil mounting hardware was designed by W6ANR and built by K7ZV.

All three elements were assembled and measured on the ground based on W6ANR's calculations and were pulled up to the work platform 30 ft. from the top of the tower where they were attached to the boom. The first measurements showed the pattern to be about 60 kHz high in targeted frequency.



With the antenna in the vertical position, removing the reflector element for adjustment is not that big a job from the catwalk.

Tuning the Array

W6ANR and I began the relatively short-term process of tuning the array. We followed the old amateur radio principle of "find a local station to tune the pattern of the antenna." The local station we used to listen on 80 meters was my 20 meter antenna, located only 700 ft. away.

We kept in mind another important principle: When tuning a Yagi, two distinct operations need to be performed. The first is tuning the antenna for its desired pattern; the second is tuning the driven element for a perfect match at pattern frequency to the feedline impedance. In order not to get confused in the pattern tuning phase of the task, we left the beta match and the beta coil off the driven element, knowing we would have a 2 to 1 mismatch while tuning the reflector and director for desired pattern.

Our design called for close coupling of the reflector for maximum front-to-back and lighter coupling of the director for maximum forward gain. To achieve the desired performance, the reflector was designed at 3745 kHz and the director at 3895 kHz.

Also key in the execution of the design was the transition of aluminum size in each of the elements. Antennas using different size elements will have dramatically different dimensions. This is not what one would typically expect. However, the fact is, when using shortened elements, a 1/4 inch change in length in any of the element pieces makes a significant difference in performance. When these elements were raised, we found ourselves within .1% of our target frequency—the closest reached so far in any of the modified antennas. What we found on the initial rotation of the array—with 10 watts of power into the antenna and the 20 meter station listening with 40 dB of front-end attenuation—was that the front-to-back was greater than 35 dB and front-to-side was a few dB less. In fact, when the 80 meter Yagi was pointed at the 20 meter antenna, the receiver was indicating S-9;

Don't Miss It

The W6SAI HF Antenna Handbook!

This is an antenna handbook unlike any other—written by one of ham radio's most respected authors, Bill Orr, W6SAI. Rather than filling nearly 200 pages with theory andcomplicated diagrams, CQ has produced a thoroughly practical text for any antenna enthusiast. The *W6SAI HF Antenna Handbook* is jam-packed with dozens of inexpensive, practical antenna projects that work! This invaluable resource will guide you through the construction of wire, loop, yagi, and vertical antennas. You'll also learn about the resources and tools available to make your future antenna installations easy-to-build with world-class results. Don't miss out. Order your copy today!

Only $19.95 plus $4 s/h

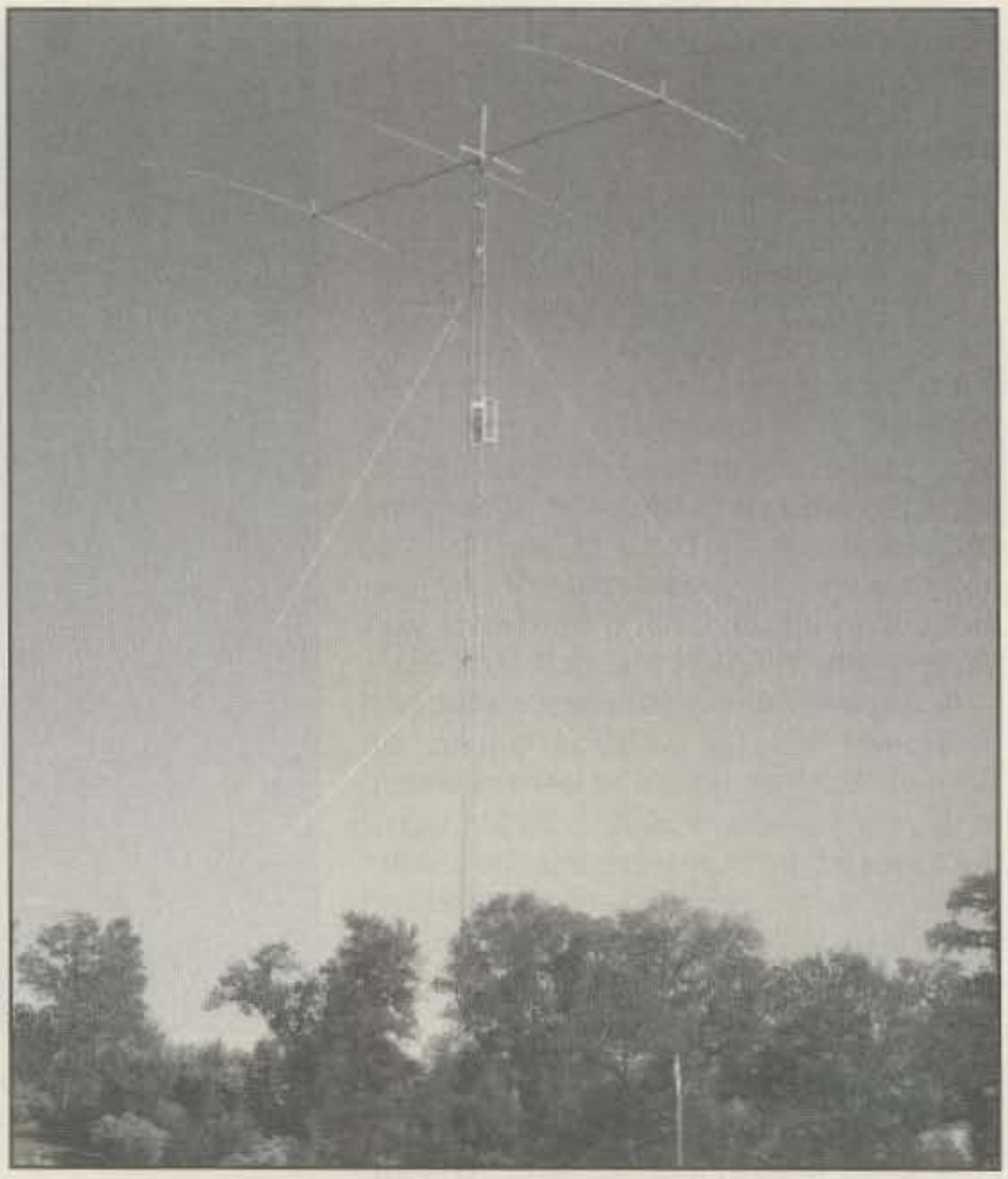
Here's just a sample of what you'll find inside:

- Multiband dipole antenna designs
- Off-center-fed multiband antennas
- All about baluns, tuners, and matching networks
- Valuable information on loop antennas
- How antenna analysis programs can work for you
- A triband quad for 20-15-10 meters
- Feedlines and antenna accessories
- Low-cost yagi beam projects
- A high-gain 2-element yagi you can build
- What your SWR meter readings are really telling you
- How to adjust your yagi beam—on the ground
- Easy-to-build 160 meter antennas
- Latest data on the G5RV antenna

Call 1-516-681-2922 or FAX 516-681-2926

CQ Communications, Inc.,
25 Newbridge Road, Hicksville, NY 11801

You can judge the size of the array by the two men on the catwalk. The catwalk folds up against the tower when not in use.



This view shows everything finished, up, and working. It's a sight that makes the whole project worthwhile.

when the beam was turned 180 degrees away, the S meter showed S-0 and we could not hear the signal and could hear band noise on the frequency.

Dave and I were overwhelmed by these preliminary results and knew we had created an antenna with incredible pattern, even though the pattern was high in frequency. We then plotted the curve of the front-to-back ratio and entered the data to the computer. We found the front-to-back ratio to be maximum over a 10 kHz span, and better than 15 dB up to 50 kHz either side of center. The computer model showed we needed to add 7 1/4 inches to each of the six half elements. Once we did this, we rechecked the pattern and found it to be exactly where we wanted it—at 3794 kHz.

It was time now to tune the driven element for a match to 50 ohm coax. We used the coil formula identified by ON4UN in his publication *Low Band DXing* and wound three turns of 3/8 inch copper tubing 7 1/2 inch in diameter. With a little pruning on the tips of the driven element, we were able to achieve a flat match at 3794 kHz. We installed a ferrite choke balun at the feedpoint and measured a 2 to 1 bandwidth of 90 kHz.

On-the-air tests verified that we had achieved incredible front-to-back and front-to-side ratios. In the past when the antenna was pointed long path, QRM from Asia would become a problem. The new antenna eliminated this. We found we could now peak signals while turning the antenna, something not always possible with the former design. DX stations S-9 on the front of the antenna disappeared off the sides and the back. What's more interesting is that this antenna hears earlier in the opening and longer after the opening weakens than any antenna I've ever used on 80 meters.

Differences in propagation obviously make specific comparisons difficult. I offer, however, that the group of west coast DXers on 80 meters will agree that this new antenna out-hears the former linear loaded version I used and it hears as well or better than other west coast arrays. The W6ANR modification has now been made at W6ZJ and K7ZV, and the improvement in antenna performance over their linear loaded antennas is undeniable.

As I look back on what it took to design and erect this "improved" 80 meter antenna, I find that the effort while challenging, was also a lot of fun. Much credit and appreciation goes to the many who collaborated with me—K6MYC, W6RJ, NR7E, W6OOL, K7ZV, and W6ANR. Not only did these individuals play a key role in the design, engineering, construction, or testing, all were consistently encouraging and supportive throughout! ■

PETER DAHL CO.

Heavy Duty Components

FOR THE SERIOUS HAM

Hipersil Plate & Filament Transformers,
High Voltage Rectifiers,
DC Filter Chokes & Capacitors,
Vacuum Variables, Roller Inductors,
RF Plate & Filament Chokes.

Write or FAX for an extensive catalog

5869 Waycross Avenue
El Paso, Texas 79924
http://www.pwdahl.com

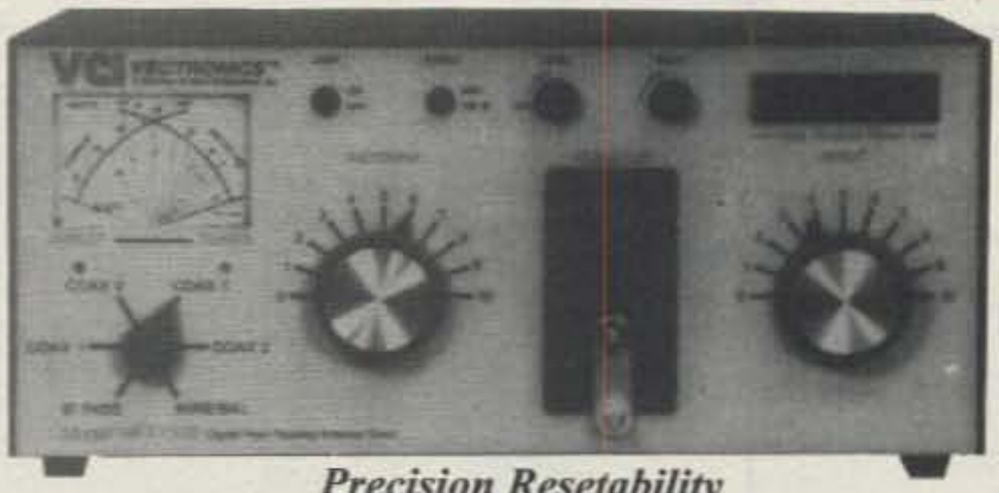
TEL:(915)751-2300
FAX:(915)751-0768
E MAIL: pwdco@1eagle1.com

CIRCLE 48 ON READER SERVICE CARD

THE VECTRONICS HFT-1500 . . .
THE FINEST HIGH POWER ANTENNA TUNER MADE!

- *high current Roller Inductor*
- *SSB*Analyzer Bargraph™*
- *Cross-Needle Meter*
- *6 position Antenna Switch*
- *built-in 4:1 Balun*
- *gear driven Turns Counter*

HFT-1500
$459.95



The VECTRONICS HFT-1500 is not just an antenna tuner . . . it's a beautifully crafted work of art, using the finest components available and the highest quality construction.

Every HFT-1500 aluminum cabinet is carefully crafted with a durable baked-on paint that won't scratch or chip.

The attractive two-color Lexan front panel is scratch-proof. Take a quarter. Scratch the HFT-1500 front panel as much as you want. *You won't leave a mark!*

Arc-Free Operation

Two *heavy duty* 4.5 kV transmitting variable capacitors and a massive *high current* roller inductor gives you arc-free operation up to 2 kW PEP SSB.

Precision Resetability

A sturdy hand cranked roller inductor lets you quickly *fly* from band to band. A precision 5-digit *gear* driven turns counter lets you accurately return to your previous settings.

Large comfortable knobs and smooth vernier drives on the variable capacitors make tuning precise and easy. Bright red pointers on logging scales make accurate resetability a breeze.

Absolute Minimum SWR

***You** can tune your SWR down to absolute minimum!*

Why? Because *all* three matching network components, the roller inductor and both variable capacitors, are *fully* adjustable.

Tune any Antenna

You can tune any real antenna from 1.8 to 30 MHz, including all MARS and WARC bands. You can tune verticals, dipoles, inverted vees, yagis, quads, long-wires, whips, G5RVs, etc . . .

*SSB*Analyzer Bargraph™*

***VECTRONICS'** exclusive* 21 segment bargraph display lets you visually follow your instantaneous voice peaks. Has level and delay controls.

Accurate SWR/Power Meter

A *shielded* directional coupler and backlit Cross-Needle meter displays *accurate* SWR, forward and reflected power simultaneously. Reads both peak and average power on 300/3000 Watt scales.

6 Position Ceramic Antenna Switch

Select two coax fed antennas (tuned or bypassed), balanced line/wire or bypass.

Built-in Balun

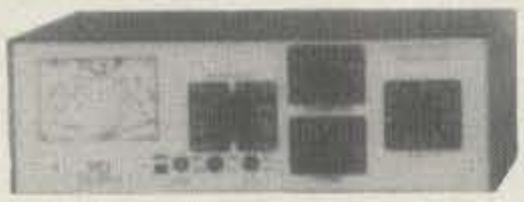
A 4:1 Ruthroff voltage balun feeds dual high voltage Delrin terminal posts for balanced lines. HFT-1500 is 5.5x12.5x12 inches.

Try any product for 30 days

Call toll-free 800-363-2922 and order any product from VECTRONICS. Try it for 30 days. If you're not completely satisfied return it for a full refund, less shipping and handling -- no hassles. All VECTRONICS products come with a one year warranty.

300 Watt Antenna Tuner

VC-300DLP
$159.95



VECTRONICS uses the finest components available to build the highest quality 300 Watt antenna tuner ever made.

You can tune any antenna 1.8-30 MHz. Custom 48 position switched inductor and continuous rotation 1000 Volt capacitors provide arc-free operation. Handles 300 Watts PEP SSB, (150 Watts on 1.8 MHz).

8 position antenna switch, built-in 50 ohm dummy load, peak reading backlit cross-needle SWR Power meter, 4:1 balun for balanced line antenna. Scratch-proof Lexan front panel. 10.2x9.4x3.5 in. Weighs 3.4 lbs.

300 Watt *Mobile* Tuner

VC-300M
$109.95

The VC-300M *Mobile* Antenna Tuner is compact, lightweight, easy-to-operate and is our most economical tuner.

It's compatible with *any* mobile antenna and *any* mobile HF transceiver and is compact enough to fit in the most compact car.

It can also be used at home with dipoles, vees, verticals, beams or quads fed by coax.

Backlit dual movement meter simultaneously monitors Power and SWR. Covers 1.8-30 MHz. Handles 300 Watts SSB PEP, 200 Watts continuous, (150 Watts on 1.8 MHz.). 7.25x8.75x3.6 in. Weighs 3.4 lbs.

SWR/Power Meters

PM-30
$79.95
PM-30UV
$89.95

PM-30, $79.95, for 1.8 to 60 MHz. Displays forward and reflected power and SWR simultaneously on dual movement Cross-Needle Meter. True *shielded* directional coupler assures accuracy. Backlit meter displays peak or average power in 300/3000 Watt ranges. First-rate construction includes scratch-proof case/front panel. 5.3x5.75x3.5 inches. SO-239 connectors.
For 144/220/440 MHz, 30/300 Watt ranges. PM-30UV, $89.95, has SO-239 connectors. PM-30UVN, $89.95, has N connectors. PM-30UVB, $89.95, has BNC connectors.

1500 Watt *dry* Dummy Load

DL-650M, $64.95. Handles 100 watts continuous, 1500 Watts for 10 seconds to 650 MHz. Ceramic resistor. SWR < 1.3. SO-239 connector. **DL-650MN, $69.95** has N connector.

Low Pass TVI Filter

LP-30, $69.95. Eliminates TVI by attenuating harmonics at the source. Plugs between transmitter and antenna or tuner. Handles 1500 watts.

High Pass TVI Filter

HPF-2, $24.95. Installs between VCR/TV and cable TV or antenna lead-in cable. Eliminates or reduces interference caused by nearby HF transmitters.

VECTRONICS®

. . . the finest amateur radio products made

VECTRONICS 1007 Hwy 25 S, Starkville, MS 39759 USA **VOICE:** (601)323-5800 **FAX:** (601)323-6551 **Web:** http://www.vectronics.com

Free catalog, nearest dealer or to order call 800-363-2922

CIRCLE 15 ON READER SERVICE CARD

BY KARL T. THURBER, JR., W8FX

THE DIGITAL DIPOLE

FROM SOFTWARE THROUGH ANTENNAS FOR THE SHACK

July Junket '98

A "junket" is a pleasurable excursion, especially one at public expense—something like, say, some of our elected officials take. Needless to say, this month's column isn't at public expense. However, we hope that our romp *will* be a pleasurable excursion as we examine some of the familiar commodities of this column: antennas, software, and books. Let's kick off with antennas.

Fig. 1– Bytemark Corporation dedicates a portion of its Web site to the Amidon product line of ferrite and powdered-iron components. The Bytemark site includes the Amidon Technical Reference Online. This online reference contains useful electrical and physical information on popular Amidon components and includes detailed technical data on every part stocked. You also can download CoreCalc for Windows!, a versatile turns calculation tool. You'll find the site at <http://www.bytemark.com>.

Antenna Notes

BB3 Base Station Antenna and other Goodies. In the October 1995 column we profiled the Broadbander BB3 Mobile Antenna, especially for use on automobiles, mobile homes, and RVs. As we noted, the BB3 is a 10 through 80 meter motorized antenna that tunes all HF bands at the flip of a switch. The antenna is priced at from $265 to $299.95, depending on finish. A new "Park 'n' Talk" range-extending whip option is $49.95. Other products are offered, including transmitting loop antennas, remotely tuned "hidden fence" antennas, "lightning prevention" systems (the Gila-Stat dissipators), and commercial broadcast antennas.

Now the mobile BB3 has been revamped for base station use as the BB3 Base Station Antenna. With a maximum height of just under 34 ft., the antenna easily can fit on a rooftop or in a suburban yard. You can tune it by remote control continuously from 160 through 10 meters, including MARS, CAP, and other HF frequencies. Claimed SWR is less than 1.5:1 from 160 through 40 meters, and less than 3:1 on the higher frequencies.

The BB3 requires a modest ground system, which may be satisfied by mounting it on a steel roof, as on mobile homes and RVs, or on a fixed metal building. A backyard antenna needs a minimum of 16 wire radials at least 25 ft. long, according to the manufacturer.

The BB3 base portion is 2 inch diameter aluminum tubing 10 ft. up to the BB3 coil assembly. Above is a flexible, telescoping aluminum whip 22 ft. long. When telescoped, the whip is only 75 inches long, making it easy to stow. The remote control sites at your operating position and is powered by 12 VDC. The antenna is $364.95, with 16 ft. of control cable. Included is the BB3 motorized loading coil, base section, top whip, remote control, ground stake with base plate, and toroidal matching network.

For more information, contact TJ Antenna Co./Nott Ltd., 4001 La Plata Hwy., Farmington, NM 87401 (1-800-443-0966; e-mail <ka7w@tjantenna.com> or <judy@tjantenna.com>; Web <http://www.tjantenna.com>).

Arrow Antennas. In January 1995 we described the Arrow Antenna fox hunt (hidden transmitter) products offered by Allen Lowe, NØIMW. His fox-hunting line includes a 5-step attenuator ($59 assembled, $39 kit form), as well as beams that are suitable for finding those elusive ones.

To recall, the Fox Hunt Attenuator is a heavy-duty RF signal attenuator used to reduce the received signal for radio direction finding. It offers up to about 75 dB of attenuation in 5 dB steps. It's constructed of double-sided copper and fiberglass PC board, and it sports full-size slide switches for reliability.

The Arrow Antenna catalog shows a variety of portable ("Walking Stick," back pack, and handheld unit) antennas for 146 and 440 MHz; fixed VHF and UHF Yagis; corner reflectors (beams) for 148, 220, and 450 MHz, including a dual-band unit for 148 and 450 MHz; a 146 MHz/437 MHz satellite antenna; several J-poles ("Arrow Poles"); and ground planes ("Arrow Planes"). A dual-band duplexer and a versatile mounting bracket also are offered.

Contact Arrow Antenna, 1803 S. Greeley Hwy. #B, Cheyenne, WY 82007 (307-638-2369; e-mail <Arrow146@aol.com>; Web <http://Members.aol.com/Arrow146/index.html>).

ByteMark Online. Bytemark Corporation is Amidon's master distributor. The firm has a portion of its Web site devoted

289 Poplar Drive, Millbrook, AL 36054-1674

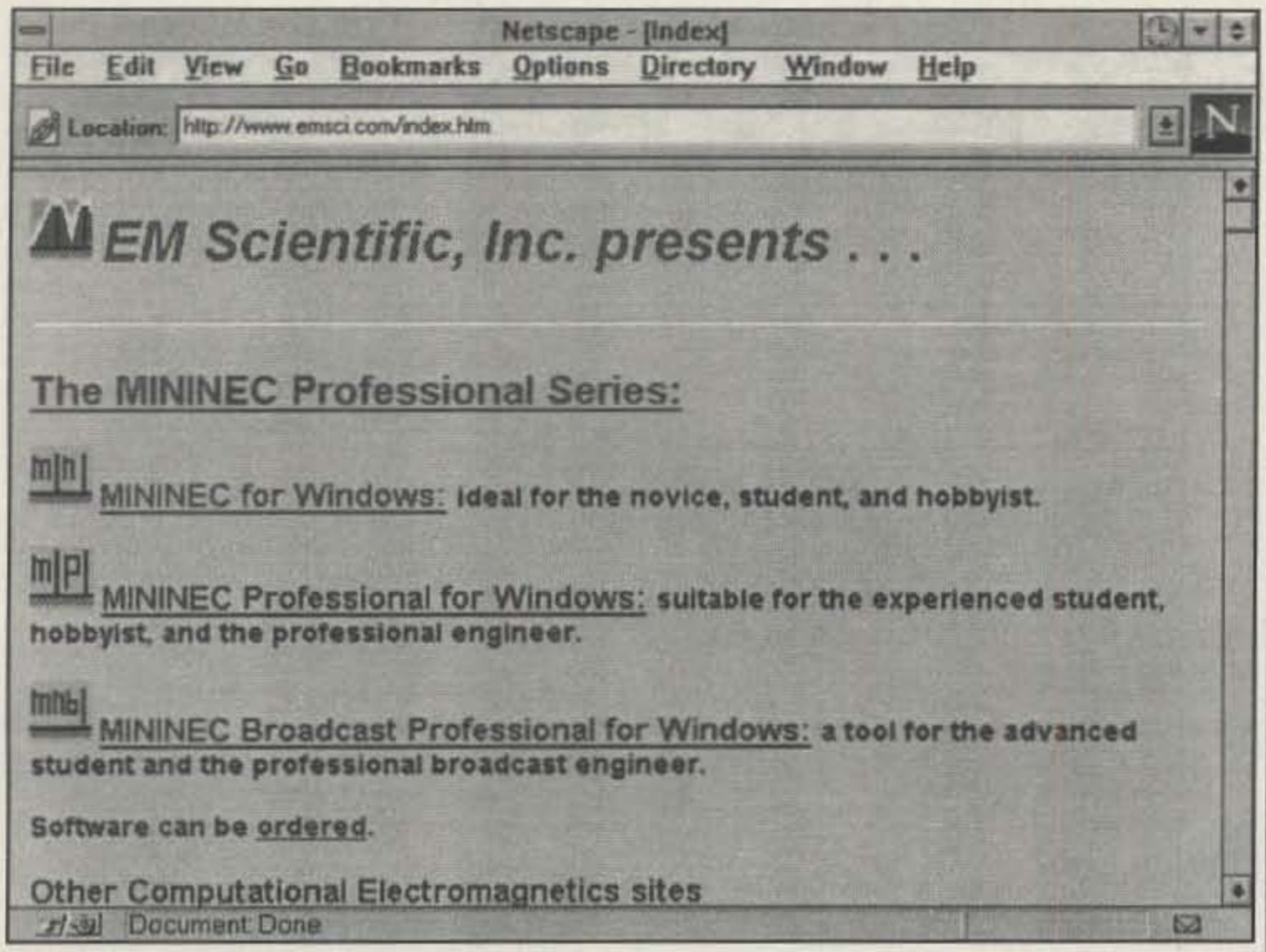


Fig. 2– EM Scientific, Inc. offers the MININEC Professional Series software, an advanced, Windows™ based engineering tool for the design and analysis of wire antennas. Three different versions are available from the publisher. These are MININEC for Windows, for amateurs, students, and hobbyists; MININEC Professional, with powerful engineering design capabilities; and MININEC Broadcast Professional, for the professional broadcast engineer. The site is at <http://www.emsci.com>.

to the Amidon product line of ferrite and powdered iron components.

Products include ferrite toroids, powered iron toroids, ferrite rods, ferrite beads, and the technical data to use them. The parts are widely used for and in RF and digital applications such as resonant circuits, power supplies, RFI/EMI suppressors, transmission line transformers, signal transformers, and DC chokes. Amidon also produces the superb baluns (balanced-to-unbalanced transformers) and ununs (unbalanced-to-unbalanced transformers) developed by Dr. Jerry Sevick, W2FMI.

The Bytemark/Amidon Web site includes the Amidon Technical Reference Online (see fig.1). Based on the Amidon product reference book, this online reference contains useful electrical and physical information on popular Amidon components and includes detailed technical data on every part stocked. Also included is information on component usage and the application of formulas for optimal part selection. Amidon's CoreCalc™ for Windows!™ toroid calculation software is available for download to registered owners of any powered iron core from Amidon, with a rebate toward purchase of Amidon parts.

Contact ByteMark Corporation, 7714 Trent Street, Orlando, FL 32807 (1-800-679-3184; e-mail <info@bytemark.com>; Web <http://www.bytemark.com>).

Bird Electronic Corp.® Update. Bird Electronic Corp. is a respected RF instrument manufacturer that offers a premium line of wattmeters, loads, attenuators, and accessories for RF power measurement and management in coaxial 50 ohm systems from 50 kHz to 2500 MHz. Other termination and attenuator products include a variety of high-power air-, oil-, and water-cooled terminations to 80 kW, and dry- and oil-dielectric attenuators to 4 kW. Although aimed at commercial markets, many products, such as their wattmeters, are used by quality-conscious amateurs.

Also, the Bird accessory sensors are used in other firms' power and SWR measurement equipment. For example, the P-100A digital/analog wattmeter from RF Applications, Inc. uses standard line sections and plug-in sensor elements from Bird Electronics as well as from Coaxial Dynamics®. (RF Applications, Inc., 7345 Production Drive, Mentor, OH 44060 [1-800-423-7252; e-mail <sales@rfapps.com>; Web <http://www.rfapps.com>].)

Recently, Bird Electronics released a new line of 50 ohm, air-cooled, bidirectional RF terminations and attenuators. These include 2, 5, 10, 25, 50, 75, 100, 150, and 300 watt, convection-cooled terminations and attenuators for high-end applications. You can get them with N, BNC, TNC, and other connectors, and you also can order up custom configurations.

For data sheets, contact Bird Electronic

Handheld

CIA-HF™

400kHz–54MHz

Complex Impedance Analyzer

Graphical display of:

- Impedance
- Reactance
- Resistance
- Phase angle (Vector)
- SWR and Return Loss

Also shows:

- L&C/conjugate match
- 2:1 BW & Q factor
- Factory direct $359.95 add $7.50 S&H

AEA

Div. Tempo Research Corp.
1221 Liberty Way
Vista, CA 92083
Tel: 1-800-258-7805
FAX: 1-760-598-5634
www.aea-wireless.com

MININEC for Windows

by J. Rockway and J. Logan

Antenna design/modeling software.
Design Long Wires, Yagi's & Quads!

- **MININEC for Windows** - Design Long Wires, Yagi's & Quads.

Features Include:

- MININEC for Windows is New!
- This is not just another DOS version.
- On-line Context Sensitive Help.
- Real time diagnostics.
- Up to 800 unknowns.
- Visualize geometry & results in 3-D.
- A fully Windows application.

For more information, visit our WEB site.

Special limited time offer for Hams:

- Ham Radio price $99.95 (Regularly $125)
- Offer extended through Jan. '98
- Mention this ad and include your call sign with your order to obtain the discount.

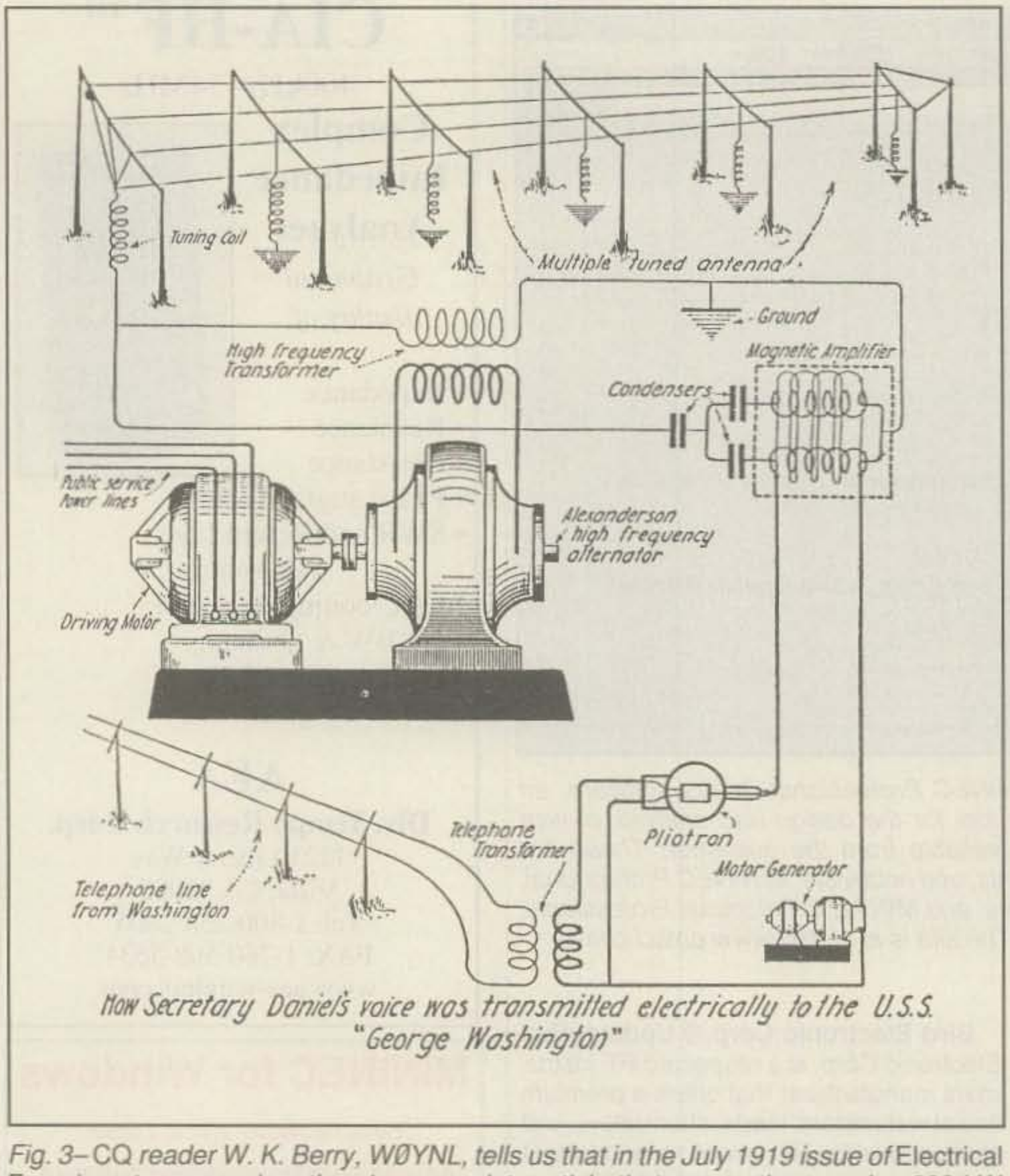
ORDER TODAY from:

EM Scientific, INC.
2533 N. Carson Street, Suite 2107
Carson City, NV 89706

TEL: (702) 888-9449
FAX: (702) 883-2384
TELEX: 170081

E-MAIL: 76111.3171@compuserve.com
WEB SITE: http://www.emsci.com

CIRCLE 52 ON READER SERVICE CARD



How Secretary Daniel's voice was transmitted electrically to the U.S.S. "George Washington"

Fig. 3–CQ reader W. K. Berry, WØYNL, tells us that in the July 1919 issue of Electrical Experimenter *magazine, there's a complete article that covers the massive 200 kW Alexanderson Alternator system which was located at New Brunswick, NJ, and which used the callsign NSS. See "We Get Letters" in this month's column and the station diagram and caption shown here which notes an important Naval communications demonstration mentioned in the 1919 article.*

Corp., 30303 Aurora Rd., Solon, OH 44139-2794 (216-248-1200).

Soft Stuff

MININEC Windows Software. The MININEC Professional Series is an advanced, Windows™ based engineering tool for the design and analysis of wire antennas. Three different versions are available from EM Scientific, Inc. These are MININEC for Windows ($125), for amateurs, students, and hobbyists; MININEC Professional ($390), with powerful engineering design capabilities; and MININEC Broadcast Professional ($790), for the professional broadcast engineer. The computational engines of all versions are written in FORTRAN for speed and to make maximum use of memory. Square loops and Yagi antennas may be solved accurately.

Most amateurs will be interested primarily in MININEC for Windows. This sophisticated design and analysis program's features include the handling of up to 800 unknowns; visualizing and rotating geometry, with results presented in 3-D displays; online, context-sensitive help; and real-time diagnostics.

Contact EM Scientific, Inc., 2533 N. Carson Street, Suite 2107, Carson City, NV 89706-0147 (702-888-9949; e-mail <76111.3171@compuserve.com>; Web <http://www.emsci.com>).

Incidentally, their Web site (fig. 2) has some interesting development background on the classic MININEC series of antenna modeling programs dating back to 1980, as well as descriptions of the modeling process, capabilities and limitations, and accuracy. Check it out.

ARRL 1998 Handbook CD 2.0. In October 1996 we featured the first ARRL CD-ROM, the 1995 ARRL Periodicals CD-ROM. To recall, it contained the full text of every 1995 article in three major publications—*QST*, *QEX*, and *NCJ*. Since then, the ARRL has issued additional on-disc publications, even including *The ARRL Handbook for Radio Amateurs* on CD-ROM 2.0 ($49.95). Since we reviewed the 1998 *Handbook* itself recently, we won't rehash our review, other than to mention that the 1998 "75th Anniversary Edition" tops out at 1191 pages in some 30 chapters plus an index, and as such stands as the definitive amateur radio sourcebook.

The second (1998) V2.0 of the *Handbook* CD-ROM sports a number of real improvements and enhancements that make it very easy to use. It now has a souped-up word index feature to let you type in a word and see the matching index words as you type, and auto-sizing and thumbnail print preview features in the image viewer. Web URLs (locations) in the text are "hotspots" you can click to launch your Web browser to view the contents.

The *Handbook*'s template packages now also are available as Adobe Portable Document Files (PDFs), and a copy of the necessary reader software is included so you can view and print the template packages. Very important to me, the installation program lets you run the *Handbook* completely from the CD-ROM if you so choose, quite handy if your hard disk space is at a premium.

The *Handbook* CD-ROM is $49.95 plus $7 s/h from the American Radio Relay League (ARRL), 225 Main Street, Newington, CT 06111-1494 (1-888-277-5289; e-mail <pubsales@arrl.org>; Web <http://www.arrl.org>).

From the Bookshelf

DXing on the Edge. Subtitled "The Thrill of 160 Meters," this ARRL book is by Jeff Bridges, K1ZM, who is well-known as a "Topband" (160 meter) expert. It's designed to appeal to diehard 160 meter operators as well as those who have always wondered "what goes on down there" in our lowest-frequency HF band.

In part a fond dedication to 160 meter pioneer Stew Perry, W1BB, the book provides a great deal of historical information and achievements, practical receiving and transmitting antenna ideas, DX operating techniques and procedures, and more. Also bundled with the book is an audio CD that chronicles many memorable, long-haul contacts that attest to the DX excitement that awaits you on 160 (although I must warn you that many of the tracks are Morse code that may only appeal to the avid CW DXer).

The 224-page book is $29.95 plus $5 s/h from the ARRL, contact information as above.

The FCC Rule Book. You should have available a copy of the Federal Commun-

Say You Saw It In CQ

ROTATORS

HF, VHF, Satellite Antenna Rotators

G-2800SDX
The top-of-the-line rotator for extra heavy-duty antenna installations. Maximum antenna wind load, 34 sq. ft.

For the best choice in rotators, and the only rotators made by a major amateur radio manufacturer, ask for Yaesu! Weatherproof, and permanently lubricated for maintenance-free operation, Yaesu rotators are designed for smooth, quiet operation without noisy wedge brakes, and are compatible with most US-made antenna tower accessory shelves. These quality-built rotators are backed by a 1-Year Warranty. For full details and specifications, see your Yaesu dealer.

Our rotators keep you spinning.

Model	Application	Mast Size	Rotator Size	Pre-sets	Wind Load
G-450XL	Light/medium-duty	1 3/4 - 2 inches	12 1/2"Hx7 1/2" Dia.	No	10 Sq. Ft.
G-800X	Medium-duty	1 1/2-2 1/2 inches	12 1/2"Hx7 1/2" Dia.	No	17 Sq. Ft.
G-800SDX	Medium-duty	1 1/2-2 1/2 inches	12 1/2"Hx7 1/2" Dia.	Yes	17 Sq. Ft.
G-1000SDX	Heavy-duty	1 1/2-2 1/2 inches	12 1/2"Hx7 1/2" Dia.	Yes	23 Sq. Ft.
G-2800SDX	Extra Heavy-duty	1 7/8-2 1/2 inches	13 5/8"Hx 8" Dia.	Yes	34 Sq. Ft.
G-5400B	Azimuth-Elevation Rotator combination	1 1/2-2 1/2 inches (Boom Dia.1 1/4-1 5/8 in.)	Mounted together 12 1/2"Hx7 1/2" Dia.**	No	11 Sq. Ft.
G-500A	Elevation only	1 1/2-2 1/2 inches (Boom Dia.1 1/4-1 5/8 in.)	10 1/2" Hx7 1/2" Dia.	No	12 Sq. Ft.

Rotators not shown: G-800S, G-800SDX, G-1000SDX
Call or write Yaesu for a free guide to help you select which rotator is best for your installation.
*Wind load ratings are valid when rotator is mounted in tower.
**Rotator size mounted together.

Accessories:
GC-038 Mast Clamp. **GC-048** Mast Clamp
GS-050 Thrust Bearing. **GS-065** Thrust Bearing
GS-23 Computer Interface for G-800/1000/2800.
GS-232 Computer Interface for G-5400B.
GA-2500 Absorber Joint for G-450/800.
GA-3000 Absorber Joint for G-1000/2800.

YAESU
...leading the way.SM

For the latest Yaesu news: hottest products, visit us on the Internet! http://www.yaesu.com

G-450XL
An entry-level rotator priced low, for light to medium duty antennas. Maximum antenna wind load, 10 sq. ft.

G-500A
Elevation rotator for space communication antennas. Maximum antenna wind load, 12 sq. ft.

G-5400B
Azimuth-Elevation combination for space communication antennas. DIN connection provided for computer operation. Maximum antenna wind load, 11 sq. ft.

©1998 Yaesu USA, 17210 Edwards Road, Cerritos, CA 90703 (562) 404-2700
Specifications subject to change without notice. Some accessories and/or options are standard in certain areas. Check with your local Yaesu dealer for specific details.

Down East Microwave Inc.

Stocking K1FO design Yagi's and TELETEC Power Amps.

Transverters & Down Converters, Linear power amplifiers, Low Noise Preamps, Loop Yagi and other antennas, Power dividers, coaxial components, Hybrid Power modules, relays, GaAsFET, PHEMT's & FET's, MMIC's, Mixers, chip components, and other hard to find items for small signal and low noise applications.

We can interface our transverters with most radios

Please call, write or see our web page
www.downeastmicrowave.com
for Catalog, detailed Product descriptions and interfacing details.

Down East Microwave Inc.
954 Rt. 519
Frenchtown, NJ 08825
Tel. (908) 996-3584
Fax. (908) 996-3702

CIRCLE 47 ON READER SERVICE CARD

NEW

DUAL BAND *WITH GAIN!*

PRE-TUNED ANTENNA
For
144 MHz to 148 MHz
440 MHz to 450 MHz
3.7DB Gain on VHF
6.0DB Gain on UHF

- NMO Mount
- Very Strong Black Powder Coated Magnet
- 15 ft. RG-58 Coax
- PL-259 or BNC Connector Installed
- Only 37" Tall
- Free Magnet Pad
- 150 Watts
- PL-259 CAT# DB-5
- BNC CAT# DB-6

$44.95
Whip only $29.95
Magnet Mount Only $16.95

Add $7 UPS S/H
AK & HI Higher

LAKEVIEW COMPANY, INC.
3620-9A Whitehall Rd.
Anderson, SC 29626
(864) 226-6990 • FAX (864) 225-4565
e-mail: hamstick@hamstick.com
www.hamstick.com
"The Hamstick People"

CIRCLE 70 ON READER SERVICE CARD

ications Commission (FCC) rules and regulations for amateur radio, whether you're required to or not. A little $12, 316-page ARRL book meets this need handily.

The 10th edition of *The FCC Rule Book*, appropriately subtitled the "Complete Guide to the FCC Regulations Governing Amateur Radio," is edited by Tom Hogerty, KC1J. The book's heart is, of course, Part 97 of the FCC rules governing the Amateur Service. In addition, there are 12 appendices that provide a wealth of supplemental information, including extracts from the Communications Act of 1934; FCC reports and orders since 1989; a listing of landmark amateur radio legal cases; and much more.

There also are 16 up-front chapters that provide a very good overview of the regulatory environment of amateur radio in a number of different areas, some covered by Part 97 and some not. These environmental aspects include good amateur practice, antenna restrictions, technical standards, prohibited practices, self-regulation, and much more. The book is $12 plus $4 s/h from the ARRL, contact information as above.

Official America Online Yellow Pages. Although a member, I have mixed feelings about America Online (AOL). It's not my first choice as an Internet Service Provider (ISP) for a number of reasons, including the fact that it's so big (about 11 million members) and slow. While I can't argue with the fact that AOL's role as an online service "content provider" is unparalleled, I have to ask, how do I easily "find stuff" on AOL?

A new book that should help you get comfortable with AOL is the *Official America Online Yellow Pages* by John Kaufeld and Jennifer Kaufeld. The 512-page, $24.99 softcover covers Windows and Mac platforms and has over 2,500 AOL "keywords" listed alphabetically for easy access to AOL service information.

Besides alphabetical keyword listings, the book provides two indexes that give you easy entry points to information listed. The Keyword Index is a comprehensive listing of keywords listed throughout the book, while the Topic Index lets you look up your topic of interest, find descriptions of pertinent sites, and find relevant keywords to take you to exactly where you need to go.

Contact Osborne/McGraw-Hill, 2600 Tenth Street, Berkeley, CA 94710 (1-800-262-4729; Web <http://www.osborne.com>).

P.S.: There's not a tremendous amount of amateur-radio-specific information on AOL. However, if you're a member, you might want to check out the Radio Communications Forum (keyword: Ham or Ham Radio) in the Hobby Central area (keyword: Hobby). Included in the forum is a wide selection of areas for the ARRL, callsign updates, digital and packet amateur radio, news bulletins, CB, conferences and chat, and the like.

We Get Letters

Once again, we're just about out of space. Before wrapping it up this month, however, we'd like to acknowledge just a few of the folks who have written, faxed, e-mailed, phoned, or otherwise corresponded with your columnist over the past several months. A tip of the hat goes to W. K. Berry, WØYNL; Jerry Webster, K7ENP; Stan Balk, ZS6CFC; David Allard, N1DA; and Harry A. Weber.

One of the more interesting letters we received was from W. K. Berry, WØYNL, who saw the information on the Alexanderson Alternator in last December's column. To recall, the Alexanderson Alternator, a rudimentary VLF (very low frequency) wireless transmitter, was developed during the early 1900s by Ernst F. W. Alexanderson (1878–1975) for very long distance communications.

The Alexanderson Alternator was a large, electromechanical sender with a high-speed rotor connected *directly* to the antenna. GE and RCA built 20 of the units for worldwide coverage, including one on Long Island, NY, and at New Brunswick, NJ. Today only Grimeton, in Sweden, exists. It cranked up in 1924 on 16.7 kHz using the callsign SAQ.

WØYNL says that in the July 1919 issue of *Electrical Experimenter* magazine, there's a complete article and a station radio circuit diagram (fig. 3) that covers the massive, 200 kW system at New Brunswick, NJ, with the callsign NSS. It was used by the government for communication with both ships and aircraft, being able to send both voice or code. Reportedly, the antenna masts were 400 ft. high and had 32 cables attached at each end. The author of the article, a Mr. Ripley, even stated that sparks could be observed arcing from the nails in one's shoes as a visitor entered the area!

P.S.: There's more on the extremely fascinating world of the "longwaves"—and what lies below them—in my two-part article "Longer Than Longwave," in *CQ* for January and February 1998.

Wrap-Up

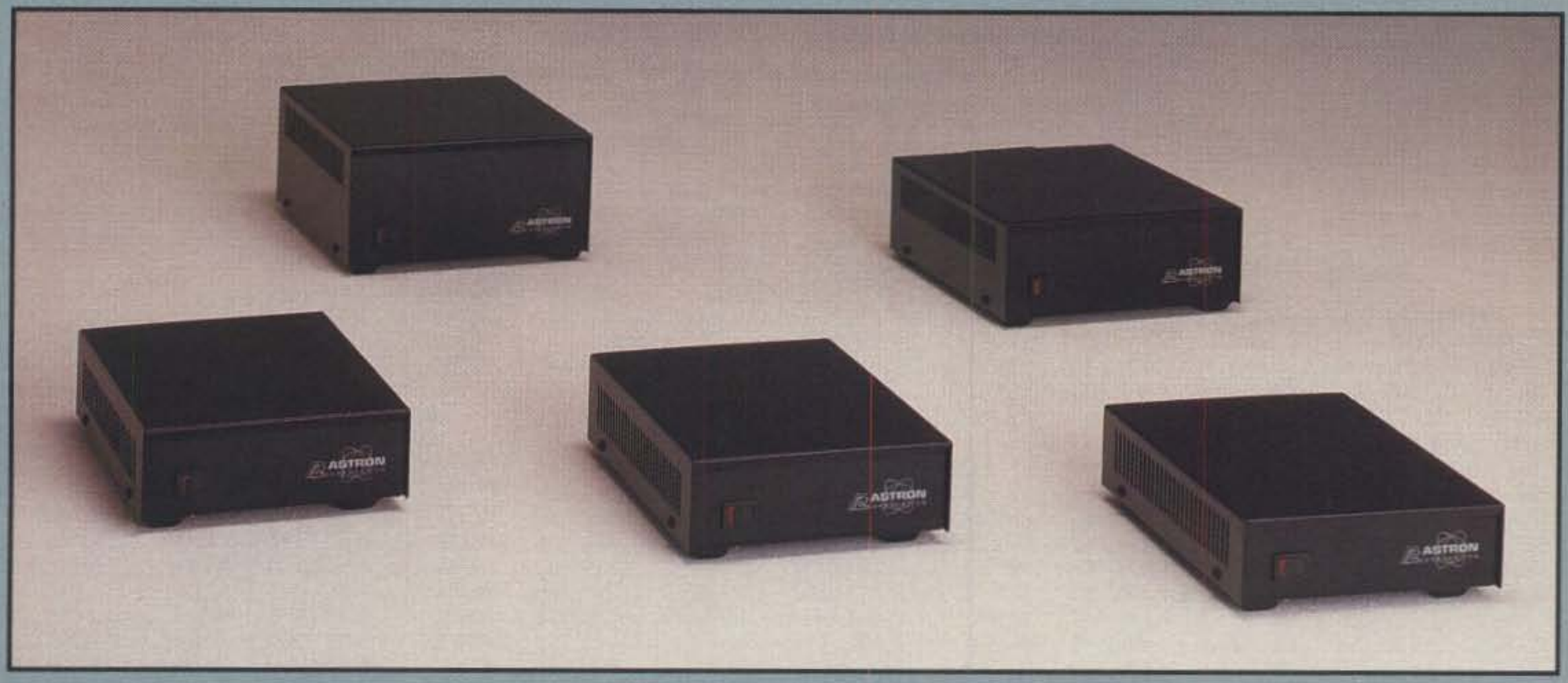
That's all for this time, gang. Next time more "Digital Dipole" topics of current interest. See you then.

Overheard: "Getting organized" is a great idea, but sometimes I find I'm *too* organized for my own darned good.

73, Karl, W8FX

Say You Saw It In CQ

.... POWER ON WITH ASTRON
SWITCHING POWER SUPPLIES ....



SPECIAL FEATURES:

- HIGH EFFICIENCY SWITCHING TECHNOLOGY SPECIFICALLY FILTERED FOR USE WITH COMMUNICATIONS EQUIPMENT, FOR ALL FREQUENCIES INCLUDING **HF**.
- HEAVY DUTY DESIGN
- LOW PROFILE, LIGHT WEIGHT PACKAGE.
- EMI FILTER
- MEETS FCC CLASS B

PROTECTION FEATURES:

- CURRENT LIMITING
- OVERVOLTAGE PROTECTION
- FUSE PROTECTION
- OVER TEMPERATURE SHUTDOWN

SPECIFICATIONS:

INPUT VOLTAGE: 90-132 VAC 50/60Hz
OR 180-264 VAC 50/60Hz
SWITCH SELECTABLE

OUTPUT VOLTAGE: 13.8 VDC

MODEL	CONT. AMP	ICS	SIZE (Inches)	WT.(LBS)
SS-10	7	10	2.3 x 6 x 9	3.2
SS-12	10	12	2.3 x 6 x 9	3.4
SS-18	15	18	2.3 x 6 x 9	3.6
SS-25	20	25	2 7/8 x 7 x 9 3/8	4.2
SS-30	25	30	3 3/4 x 7 x 9 5/8	5
SS-25M*	20	25	2 7/8 x 7 x 9 3/8	4.2
SS-30M*	25	30	3 3/4 x 7 x 9 5/8	5

- *with separate volt & amp meters
- All SS power supplies are available in a RACK MOUNT VERSION (3.5 x 19 x 9 3/8)
- To order Rack Mount Version change SS to SRM (example: SRM-10)

ASTRON CORPORATION

9 AUTRY, IRVINE, CALIFORNIA 92618
714-458-7277 FAX 714-458-0826
www.astroncorp.com

CIRCLE 163 ON READER SERVICE CARD

1997 CQWW DX CW Contest High-Claimed Scores

BY THE CQWW CONTEST COMMITTEE
e-mail: <questions@cqww.com>

The following are raw scores only, subject to verification.

WORLD

SINGLE OP ALL BAND

P4ØE 13,165,480
EA8EA.....12,271,790
HC8N 11,025,945
9Y4H 9,570,213
8P9Z.....9,438,960
K1AR.....8,144,760
8R1K 7,085,133
A45XR.....6,734,701
GIØKOW.....6,685,688
W1KM 5,732,776
N2NT.....5,608,458
KQ2M/1 5,582,375
K3ZO.....5,456,890
N2LT 5,451,138
VK6BAT 5,382,450
3DA5A.....5,368,465
W4AN.....5,266,852
V8EA.....5,235,776
N6BV/1.....5,070,208
VK8VJ 4,734,718
7Z5OO 4,639,821
DX1S.....4,537,567
YB1AQS.....4,528,335
DL6FBL.....4,432,653
4N9BW.....4,358,592
G4BUO.....4,333,440
W3BGN.....4,253,060
JH5FXP.....4,184,320
JH4UYB 4,166,958
S51BO.....4,099,810
K1RU.....4,046,852

28 MHz

CX5X.....903,282
CX5BW 871,780
CX9BAG.....624,084
KH8/N5OLS ..432,666
PY2XB.....424,212
9XØA 413,032
ZB2X 306,776
PY1KS.....281,232
S53X 198,660
LU3HIP.....198,292
W4YV 159,689
DK5QN.....119,377
W4XJ.....119,370
IR4D 113,076
EA2IA.....108,928
KZ5MM.....106,835

21 MHz

ZD8Z 2,519,882
ZP5XF 2,103,660
FM5DP.....1,204,416
9Y4VU.....791,084
LU4FPZ.....694,038
JA5DQH.....619,320
CV1A.....603,544
US1E.....598,732
CT1FJK.....571,067
VK5GN.....522,410
K4ZA 514,878
N4CT 507,600
S50R 487,572
K9IG 472,416
UN9LW.....442,617
WW4RR 428,800
S54AA.....421,410
W6YA.....402,780

14 MHz

P4ØJ.....1,730,260
P4ØR.....1,639,002
CT3BX.....1,531,680
9K2GS.....1,373,760
5X1T.....1,307,443
5B4AGC.....1,245,332
VE6JY 1,118,442
KL7RA.....822,185
IR4T 807,120
YT7A.....800,800
K8DX.....787,200
WØUN 775,008
M7Z.....722,970
CW5W.....636,012
YU1ZZ.....626,619
RX9SX 613,713
W9IW 612,374

7 MHz

C4A.....1,373,790
9M6NA 1,070,082
9A5Y 963,550
ZL3CW.....921,014
OHØMAM 898,619
S52AW.....880,680
OK1RF 867,146
S5ØC.....804,940
N7DD 788,757
UN7LG 762,280
JA5THU.....758,178
T99W.....640,984
UAØAGI.....627,356
YU7NU.....620,215
TK/DF9LJ.....605,748

3.5 MHz

SN3A.....619,512
GW3YDX.....591,769
TK5EP.....399,542
SM4HCM.....378,708
9A7A 355,074
LY6K 343,700
W1MK 322,453
S53R 259,118
PYØFF.....256,074
UUØJM.....248,920
S5ØY 230,926
IU2X 230,100
YX1D.....229,112
OHØJJS.....223,123
9A2AJ.....221,892

1.8 MHz

TI1C 206,056
VE3BMV/1.....202,700
GW7J 191,180
TK5NN 175,324
CT3/OH1MA..157,056
UA2FJ 147,680
SP5GRM.....128,538
S5ØU.....126,518
OY9JD.....117,218
OM5ZW.....92,684
YL2SM 89,089
SMØAJU.....85,839
SM6CPY 81,536
OH5VT 75,051

LOW POWER ALL BAND

3V8BB.....7,759,294
VP2EEB 5,744,521
WP2Z.....4,240,340
UAØJQ 3,263,660
S5ØA 2,464,182
N2BA.....2,401,794
S59AA.....2,093,000
TA3D 2,077,875
FG5EY 2,028,598
HA1CW 1,896,450
WA1LNP 1,842,256
K1VUT.....1,779,000
WA1S.....1,753,920
UN6P.....1,717,608
Z31JA.....1,674,764
S57J.....1,559,148
9M2TO 1,551,600
KM1X 1,537,424
G4KIV.....1,493,175
VK2AYD.....1,489,851
NA2U.....1,482,597
DL2OBF 1,412,670
W2TZ 1,396,500
LU8HSO.....1,373,184
RAØFF.....1,331,545
S51F.....1,328,141
GD4UOL 1,310,984
XO7X.....1,287,384
RUØLL.....1,269,190
WO4O 1,264,384

28 MHz

LU9AUY 783,846
AZ9W 783,543
LW4DYI.....611,040
PU2RUX.....400,920
LU3WEU 377,630
LU2DPW 358,013
VK4XA.....247,265
3B8/F6HMJ ...205,737
CU2/G3WVG.185,526
EA8ADJ.....151,152

21 MHz

VP5EA.....828,960
PU2MHB 543,114
7X2RO 410,316
LW9ETY.....370,136
UA4LL 366,320
UA4POL.....348,062
CT1BQH.....320,178
YBØECT 283,671
VA3MG.....283,416
WB4TDH.....280,166
HA3MQ 269,804
DU3RCM.....258,633
YZ4IZ 247,962
WA1FCN.....228,480
JHØEPI.....226,996
Z38G 210,375

14 MHz

VK2APK 616,140
LU4FM 541,320
S58AL 415,324
RA9AA 373,464
HA8RH.....370,524
ES2RJ.....343,536
U5WF 327,750
JA7XBG 322,806
RZ3FA.....319,392
CX9AU 311,049
OK2PAY.....284,472
IQ7A.....275,772
N4MO.....275,655
T93Y.....257,146
S53BM 255,120

7 MHz

PA3AAV 359,817
T95A.....275,576
OM5AW.....227,180
VP5EA.....191,769
CO2JD 169,822
OH4JLV.....168,726
UT1FA.....153,952
RW1ZZ.....150,696
UX3M 130,380
ON4AEB.....127,413

3.5 MHz

IK4WMG.....168,482
4L5O 144,640
YU7CB 136,965
YU1KR 133,292
HA8EU 126,806
YP2R.....112,896
SP5JTF 107,350
PAØCYW.....102,102
F5NOD 87,420
S59KW.....86,668

1.8 MHz

HA8BE 71,576
OM3OM.....52,668
YU1RA 45,741
UU4JMG 44,145
HAØEQ.....35,340
OK1JOC.....31,040
UN5J 27,690
RV1CC.....25,425
UT8IT 16,695
IK2IQV.....15,128
UXØHA.....13,311
OM3TZU 12,730
SP2EXN 12,070

QRP ALL BAND

YT7TY 883,875
AA2U.....876,650
DL6RDR.....831,117
WA2HZR.....724,548
LY3BA.....633,042
K1RC.....547,008
K3PH.....526,552
LY2FE 430,405
OE2S.....408,558
N1TM 405,450
YU1EA 402,867
N7IR.....401,108

ASSISTED ALL BAND

FM5DN.....8,529,290
K1NG 6,643,719
K3WW.....6,182,008
K3MM.....4,870,162
K2NG 4,644,129
K2TW 4,317,885
N3AD.....3,739,648
W3EEE.....3,421,264
K1AM 3,419,770
K3NZ.....3,407,910
W2XX.....3,185,868
NN4T.....3,175,860
N2MM.....3,116,509
WF3T 3,044,076
IR2W 2,761,616
DL2MEH.....2,500,590
K3MD 2,499,068
DJ2YA.....2,469,496
N3RR 2,378,372
K8MFO.....2,371,548
W2RE.....2,358,545
VR97BG.....2,248,896
DL7ON 2,224,728
NN3Q 2,102,016
S58A 2,086,444
N4XR/1.....1,925,649
K2ONP.....1,918,840
W3OV.....1,893,456
W1GD/2 1,832,530

MULTI-SINGLE

P3A 14,689,074
ZF1A 12,818,067
KP3Z 12,733,490
5A2A 11,443,278
N2NU 10,209,232
6D2X 9,691,584
IQ4A.....9,442,197
OM8A.....9,085,620
HG1S 9,033,248
OT7T 9,016,240
TM2Y.....8,817,408
AH2R.....8,508,096
RU1A.....8,460,291
RZ9AZA 8,392,928
IH9/OL5Y ...8,382,276
LZ7M 8,249,832
VE9DH 8,136,576
LZ9A.....7,815,096
UA2AA 7,811,776
K8AZ 7,390,552
9G5VJ 7,222,696
OK5W.....7,065,492
K1ZZ 7,038,756
3E1DX.....7,038,459
DL6RAI.....6,628,878
OH7AAC 6,585,688
EU8T.....6,262,044
RS3A.....6,206,706
TI5N 6,035,445

MULTI-MULTI

5V7A 34,708,911
6Y4A 31,697,090
EA8ZS.....25,427,388
J39A.....21,752,328
VE3EJ 19,874,400
9A1A 19,351,618
KC1XX 18,651,136
KH7R.....17,651,997
K3LR 16,744,500
W3LPL 16,495,335
K1KI 15,533,640
KL7Y 14,107,761
N3RS.....13,498,056
OH2HE.....13,395,933
DFØHQ.....12,873,476
A61AJ.....12,744,883
HG6N 12,396,790
EA6IB.....12,311,091
SL3ZV 12,176,632
V26KW.....12,121,676

EUROPE

ALL BAND

GIØKOW.....6,685,688
DL6FBL.....4,432,653
4N9BW.....4,358,592
G4BUO.....4,333,440
S51BO.....4,099,810
GØIVZ.....3,633,120
RN6BY 3,410,337
YU7AV 3,288,125
SP4Z 3,212,452
UT4UZ.....3,050,901
OZ1LO 2,772,120
OH6RX.....2,412,790
OH6WZ 2,286,704
YO3APJ 2,137,824
YT1AD.....2,055,753
OF1HS 2,014,432
US1U.....1,997,456
LY3AV.....1,983,780
OZ1IOC.....1,783,104
YU1OL 1,545,303
UA6LTI.....1,539,522
DF4SA.....1,530,628
DL2DX.....1,401,181
G3PJT 1,392,778
ES5QX 1,344,046
G3TBK 1,343,727
DL4MCF.....1,337,760
YL2KO.....1,334,219
MJØAWR....1,318,410

28 MHz

ZB2X 306,776
S53X 198,660
DK5QN.....119,377
IR4D 113,076
EA2IA.....108,928
IU2E 66,895
OK1XW 61,766
DKØSR.....60,760
UT1IA.....53,820

Say You Saw It In CQ

WOW!
New from Alpha Delta!

Why didn't someone think of this before?

ALPHA DELTA Models DH-1 and DH-2 Hydraulic Dampened Fold-Over Mast Fixtures for HF Verticals and Small VHF/UHF Ground Planes

Now one person can raise and lower an HF vertical in a simple 30 second operation!

- **Easy antenna adjustments and maintenance.**
- **The vertical can be lowered out of view when not in use.**
- **Small VHF/UHF ground planes and discones can easily be raised.**
- **The Model DH-1 fold-over fixture includes a powder coated steel pedestal--$249.95 ea.**
- **The Model DH-2 excludes the pedestal and mounts on a 4x4 wood post or sturdy wood fence post--$229.95 ea.**
- **Stainless steel hardware, aircraft grade aluminum and "post-hole" type mounting with premix concrete. Designed for verticals up to 29 ft. and 25 lbs. weight. DH series fold-over fixtures are pre-assembled and include a hydraulic dampener for safe operation. User supplied mast tubes shown in photos.**

Model DH-1 in action!

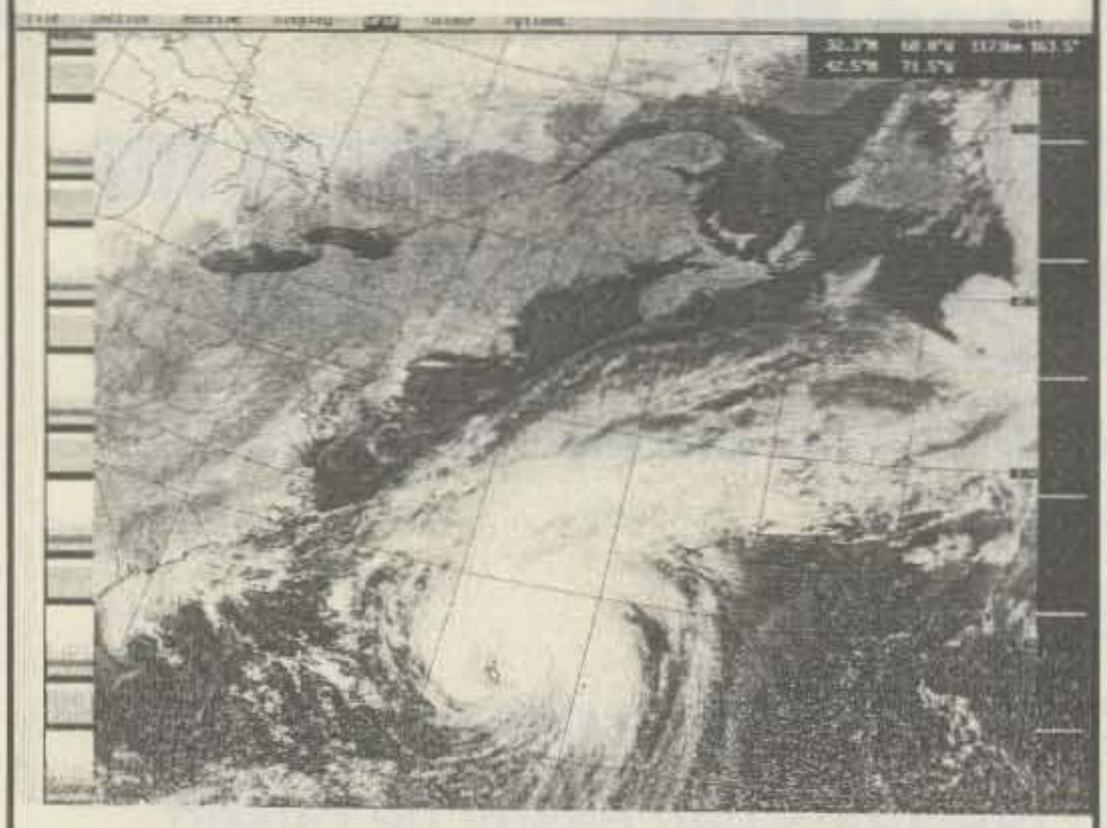
Toll free order line (888) 302-8777 (Add shipping & handling, exports quoted)

ALPHA DELTA COMMUNICATIONS, INC.

P.O. Box 620, Manchester, KY 40962 • (606) 598-2029 • fax (606) 598-4413

Alpha Delta —*Compelling You Into the 21st Century*

WEATHER SATELLITE SYSTEMS



Track sun-shine, clouds, local storms, hurricanes on your IBM-PC style computer. Predict your weather. High Quality, Low Cost Systems, from TIMESTEP.

Systems include antenna, pre-amp, coax, receiver, decoder card & software

	137MHz NOAA	1691 MHz GOES
PROsat for WINDOWS Systems	***from* $888.00**	***from* $1074.00**
PROsat for DOS Systems	***from* $788.00**	***from* $974.00**

Systems for METEOSAT and GMS satellites.
Advanced High Resolution HRPT and PDUS systems.

All systems FCC Class B approved
Many options available. Write for details.

MasterCard VISA

Shipping FOB Concord MA
Prices Subject To Change Without Notice

SPECTRUM INTERNATIONAL, INC.

si

P.O. Box 1084, Dept. Q
Concord, MA 01742 USA
Phone 978-263-2145
Fax 978-263-7008

CIRCLE 72 ON READER SERVICE CARD

Order Your Back Issues Of CQ Today!

Send All Correspondence To:
CQ Communications,
25 Newbridge Road
Hicksville, NY 11801
Or Call 516-681-2922
FAX 516-681-2926
Send $4.00 Per Issue (Check, Money Order, Mastercard, VISA, & AMEX.)

UR7VA.....45,864	HA8IB.....1,056,812	HA0EQ.....35,340
LY2OU.....40,400	RA3AF.....1,052,504	OK1JOC.....31,040
G0AEV.....39,933	SP2QCH....1,026,800	RV1CC.....25,425
SP5DIR.....39,933	LY2BM.....1,019,268	UT8IT.....16,695
UX8IX.....35,090	IU0X.....996,411	IK2IQV.....15,128
	SP6NIC.....949,540	UX0HA.....13,311
21 MHz	G3SWH.....946,048	
US1E.....598,732	S57U.....867,477	**QRP ALL BAND**
CT1FJK.....571,067	S57DX.....828,386	YT7TY.....883,875
S50R.....487,572	UA3ABJ.....821,096	DL6RDR.....831,117
S54AA.....421,410	OK1MD.....817,890	LY3BA.....633,042
OM3PC.....376,495	OK1FPS.....805,896	LY2FE.....430,405
OT7L.....364,530	I3JSS.....783,720	OE2S.....408,558
OH6MRA.....361,584	IK4MTF.....777,616	YU1EA.....402,867
YZ1AU.....306,128	DL7QU.....753,818	DL3KVR.....385,020
SP3SLA.....282,948	UR5U.....753,536	YU1LM.....381,210
GM7X.....267,596	IK1RQQ.....720,698	I1BAY.....345,072
UU9JH.....258,912	EI4DW.....715,520	YU1KN.....306,024
	LY2FN.....673,440	S59D.....289,836
14 MHz		
IR4T.....807,120	**28 MHz**	**ASSISTED ALL BAND**
YT7A.....800,800	CU2/G3WVG.185,526	IR2W.....2,761,616
M7Z.....722,970	SP9W.....87,675	DL2MEH.....2,500,590
YU1ZZ.....626,619	CT1AOZ.....58,035	DJ2YA.....2,469,496
S53M.....599,252	S52OT.....55,692	DL7ON.....2,224,728
S50K.....572,560	S50Q.....46,870	S58A.....2,086,444
IT9XUC.....563,013	S51W.....39,467	DF4RD.....1,650,302
F5PGP.....550,257	S52SK.....36,022	DK9IP.....1,280,208
G3XTT.....502,194	EA7BJV.....34,056	DL7MAE.....1,265,936
RW1ZA.....497,988	F6DYX.....18,001	G5LP.....1,115,615
SP2EBG.....487,508	SP3LWP.....13,600	IK5TSS.....1,043,184
		GW3JXN....1,003,544
7 MHz	**21 MHz**	S56A.....959,418
9A5Y.....963,550	UA4LL.....366,320	DL7VOG.....820,854
OH0MAM.....898,619	UA4POL.....348,062	OH3BU.....816,144
S52AW.....880,680	CT1BQH.....320,178	SM5IMO.....812,784
OK1RF.....867,146	HA3MQ.....269,804	
S50C.....804,940	Z38G.....210,375	
T99W.....640,984	OK1FKM.....173,100	**MULTI-SINGLE**
YU7NU.....620,215	4N1N.....158,903	IQ4A.....9,442,197
TK/DF9LJ.....605,748	SP9BBH.....154,752	OM8A.....9,085,620
OF1JD.....588,892	IQ9AF.....145,730	HG1S.....9,033,248
YT1BB.....574,820	I1XPQ.....137,100	OT7T.....9,016,240
		TM2Y.....8,817,408
3.5 MHz	**14 MHz**	RU1A.....8,460,291
SN3A.....619,512	S58AL.....415,324	LZ7M.....8,249,832
GW3YDX.....591,769	HA8RH.....370,524	LZ9A.....7,815,096
TK5EP.....399,542	ES2RJ.....343,536	UA2AA.....7,811,776
SM4HCM.....378,708	U5WF.....327,750	OK5W.....7,065,492
9A7A.....355,074	RZ3FA.....319,392	DL6RAI.....6,628,878
LY6K.....343,700	OK2PAY.....284,472	OH7AAC....6,585,688
S53R.....259,118	IQ7A.....275,772	EU8T.....6,262,044
UU0JM.....248,920	T93Y.....257,146	RS3A.....6,206,706
S50Y.....230,926	S53BM.....255,120	OF1AF.....5,940,014
IU2X.....230,100	UY8IF.....242,481	US0Q.....5,113,779
OH0JJS.....223,123		DF3CB.....5,013,972
9A2AJ.....221,892	**7 MHz**	OF5M.....5,013,796
	PA3AAV.....359,817	OL3A.....5,007,864
1.8 MHz	T95A.....275,576	
GW7J.....191,180	OM5AW.....227,180	
TK5NN.....175,324	OH4JLV.....168,726	
UA2FJ.....147,680	UT1FA.....153,952	
SP5GRM.....128,538	RW1ZZ.....150,696	
S50U.....126,518	UX3M.....130,380	**MULTI-MULTI**
OY9JD.....117,218	ON4AEB.....127,413	9A1A.....19,351,618
OM5ZW.....92,684	RW3WV.....120,000	OH2HE.....13,395,933
YL2SM.....89,089	F/OK1EE.....112,404	DF0HQ.....12,873,476
SM0AJU.....85,839		HG6N.....12,396,790
SM6CPY.....81,536	**3.5 MHz**	EA6IB.....12,311,091
OH5VT.....75,051	IK4WMG.....168,482	SL3ZV.....12,176,632
	YU7CB.....136,965	TF3IRA.....11,379,824
LOW POWER ALL BAND	YU1KR.....133,292	EA4ML.....9,863,802
S50A.....2,464,182	HA8EU.....126,806	PI4COM.....9,622,956
S59AA.....2,093,000	YP2R.....112,896	T49C.....9,382,471
HA1CW.....1,896,450	SP5JTF.....107,350	RZ3Q.....9,077,258
Z31JA.....1,674,764	PA0CYW.....102,102	LY5A.....8,666,876
S57J.....1,559,148	F5NOD.....87,420	RW6AWT...8,544,984
G4KIV.....1,493,175	S59KW.....86,668	
DL2OBF.....1,412,670		
S51F.....1,328,141	**1.8 MHz**	**USA SINGLE OP ALL BAND**
GD4UOL....1,310,984	HA8BE.....71,576	K1AR.....8,144,760
S58MC.....1,156,668	OM3OM.....52,668	W1KM.....5,732,776
HA0IT.....1,111,944	YU1RA.....45,741	
	UU4JMG.....44,145	

Say You Saw It In CQ

N2NT.....5,608,458
KQ2M/1.....5,582,375
K3ZO.....5,456,890
N2LT.....5,451,138
W4AN.....5,266,852
N6BV/1.....5,070,208
W3BGN.....4,253,060
K1RU.....4,046,852
W9RE.....3,723,592
K5GN.....3,696,926
WC4E.....3,625,200
W1WEF.....3,587,623
NJ2L.....3,580,122
N4AF.....3,366,643
W6AX.....3,323,574
K5YA.....2,978,052
W4PA.....2,932,350
KØEU.....2,643,768
W4MR.....2,459,322
K4AB.....2,403,120
N4ZR/8.....2,400,431
N6AR/4.....2,327,354
K5NA.....2,321,838
KN4T.....2,228,662
AA4S.....2,216,059
N4TO.....2,208,552
K6LA.....2,174,395
N4VZ.....2,138,358

28 MHz

W4YV.....159,689
W4XJ.....119,370
KZ5MM.....106,835
NT6TT.....65,160
KØKE.....58,752
W3NO.....55,935
KØUK.....34,854
K4JYO.....34,342
WB4UBD.....19,251
K9OM.....16988

21 MHz

N4CT.....507,600
K9IG.....472,416
WW4RR.....428,800
W6YA.....402,780
K6AW.....374,798
W6NL.....360,456
N4IR.....312,444
N6MU.....311,328
K4AMC.....276,174
KC6X.....163,548

14 MHz

K8DX.....787,200
WØUN.....775,008
W9IW.....612,374
N4PN.....461,332
K9BG.....453,960
N7BZ.....441,140
KO6N.....407,490
K1DKX.....325,127
K2BA/5.....303,485
W9OF.....258,488
KA6W.....247,324
K7ZZ.....223,210
W8UD.....200,406

7 MHz

N7DD.....788,757
W5UN.....511,212
NX7K.....480,636
K9DX.....438,501
W7GG.....413,436
N2PP.....389,574
KX7M.....385,056
W2FU.....354,756
KØOD.....188,352
K6CU.....136,656
KØAV.....132,340

3.5 MHz

W1MK.....322,453
WB9Z.....111,492
W8RT.....99,214
W1UK.....94,242
K5NU.....93,605
KØRF.....69,700
K4PI.....52,800
W9RN.....34,380
N2GC.....31,760

1.8 MHz

W8LRL.....31,248
K2XA.....16,685
W2VO.....15,691
K8MK.....13,400
W4DR.....10,788
K1VW.....10,730
N6SS/7.....10,199
K4TEA.....6,550
K8IP.....5,148
KØCS.....4,400

LOW POWER ALL BAND

N2BA.....2,401,794
K1VUT.....1,779,000
WA1S.....1,753,920
KM1X.....1,537,424
NA2U.....1,482,597
W2TZ.....1,396,500
WO4O.....1,264,384
N8AA.....1,001,952
W2GG/3.....944,520
WW3S.....892,051
WB8YJF.....836,074
WD5K.....827,265
K1HT.....824,982
W6JTI.....795,498
N2ED.....770,245
WF1L.....691,060
W3UJ.....682,770
W9AU.....617,205
WA2C/3.....558,000
K1NO.....514,752
K2JL.....510,284
NA2Q.....471,856
K2UF.....443,540
KJ9C.....442,512
K7GM.....437,136
W1EQ.....425,412
KB3MM.....413,105
N4IG.....397,338

28 MHz

W3EP/1.....55,660
AI2C/4.....41,800
K4WA.....37,149
W5ZO.....33,516
K9OM.....16,988
N6EE.....11,505

21 MHz

WB4TDH.....280,166
WA1FCN.....228,480
K2MFY.....148,473
K5MU.....139,319
K2ACW/4.....138,308
K9RN/M.....111,864
W6EUF.....81,699
KN4Y.....64,080
WA6FGV.....50,600
K4WW.....42,180

14 MHz

N4MO.....275,655
K7ZA.....170,016
W8UMR.....76,257
WØETT.....67,422
WA2ASQ.....40,992
K4DGJ.....15,762
K6CEO.....14,606
K9JWV/4.....12,871

7 MHz

WØAH.....105,110
N2TN.....91,694
KJØB.....48,372
N4OT.....38,970
K4LDR.....35,496
W3CP.....32,800
K7CK/9.....19,028
KC6LDO.....12,087
N7FF/6.....11,280
WA5JWU.....11,160

3.5 MHz

W4HM.....6,120
KB3AFT.....720

1.8 MHz

KG7D.....4,935
W4WS.....1,056

QRP ALL BAND

AA2U.....876,650
WA2HZR.....724,548
K1RC.....547,008
K3PH.....526,552
N1TM.....405,450
N7IR.....401,108
KG5U.....235,585
W6YJ.....217,464
N9CIQ.....173,340
KV8S.....163,200

ASSISTED ALL BAND

K1NG.....6,643,719
K3WW.....6,182,008
K3MM.....4,870,162
K2NG.....4,644,129
K2TW.....4,317,885
N3AD.....3,739,648
W3EEE.....3,421,264
K1AM.....3,419,770
K3NZ.....3,407,910
W2XX.....3,185,868
NN4T.....3,175,860
N2MM.....3,116,509
WF3T.....3,044,076
K3MD.....2,499,068
N3RR.....2,378,372
K8MFO.....2,371,548
W2RE.....2,358,545
NN3Q.....2,102,016

MULTI-SINGLE

N2NU.....10,209,232
K8AZ.....7,390,552
K1ZZ.....7,038,756
W4WA.....5,381,410
W9JA.....5,369,392
NØNI.....5,099,837
K8LX.....4,885,760
KVØQ.....4,745,790
NJ4F.....4,565,784
N8NR.....4,115,616
K4OJ.....4,066,920

MULTI-MULTI

KC1XX.....18,651,136
K3LR.....16,744,500
W3LPL.....16,495,335
K1KI.....15,533,640
N3RS.....13,498,056
W1MD.....11,529,868
K1WD.....11,254,192
K8CC.....10,226,664
K2LE/1.....10,015,875
K1RX.....8,857,258
N2RM.....8,752,926
W3EA.....8,566,074
K4VX/Ø.....8,487,957
WØAIH/9.....8,213,985
NQ4I.....8,164,715

The book you've been waiting for...

CQ **Amateur Radio Equipment Buyer's Guide**

This information-packed book is your most reliable, unbiased source for detailed information on practically every piece of Amateur Radio equipment and every accessory item currently offered for sale in the United States. From the biggest HF transceiver to Ham computer software, it's in the CQ Amateur Radio Equipment Buyer's Guide, complete with specs and prices. There are over 2100 product listings (3100 including transceiver accessories!).

Product listings cover: HF Transceivers, VHF/UHF Multi-Mode Transceivers, VHF/UHF Base/Mobile Transceivers, Handheld Transceivers, Receivers and Scanners, HF Linear Amplifiers, VHF/UHF Power Amplifiers, Transceiver Accessories, Repeaters, Packet and RTTY Equipment, Amateur Television, HF Antennas, VHF/UHF Antennas, Accessories for Antennas, Antenna Rotators, Towers and Masts, Antenna Tuners, Measurement and Test Equipment, Ham Software, Training Tapes, Publications, and Miscellaneous Accessories. Thousands of products are described; many are illustrated.

Only $15.95
Plus $4.00 Shipping & Handling

The CQ Amateur Radio Equipment Buyer's Guide also includes the most comprehensive directory anywhere of Ham product manufacturers and dealers in the USA, complete with phone numbers, FAX numbers, Web sites, and e-mail addresses. Dealer and Manufacturer listings include major products manufactured or sold, and service and repair policies, where applicable, with 475 dealers and manufacturers listed. These listings alone are worth their weight in gold.

The CQ Amateur Radio Equipment Buyer's Guide is jam-packed with solid information and great reading. In addition to being an incredible source of insight into the current state of Ham Radio technology, it will continue to be a reliable Ham equipment reference source for many years to come.

For Fastest Service call 1-800-853-9797 or FAX 516-681-2926

CQ Communications, Inc. 25 Newbridge Road, Hicksville, NY 11801

BY DAVE INGRAM, K4TWJ

WORLD OF IDEAS

A LOOK AT THE WORLD AROUND US

QRP '98: News, Views, and Notes

Okay, friends, three guesses on what is the hottest pursuit going in amateur radio today—and your first two don't count. If you answered QRP, QRP, QRP, you are "in like Flint." Otherwise, return to counting solar flares and sunspots. Why has QRP become so incredibly popular, you ask? It is low in cost, flexible enough to fit any lifestyle, and truly offers something for everyone. Want to hit the airwaves with a new, fancy featured rig? The idea is both affordable and terrific fun with QRP. Enjoy collecting, restoring, and using classic gear? That too is a heartwarming treat with QRP. Like building ultra-low-cost kits? That is a really popular interest among QRPers, and working the world with a self-assembled rig really boosts self-esteem and personal pride.

4941 Scenic View Dr., Birmingham, AL 35210

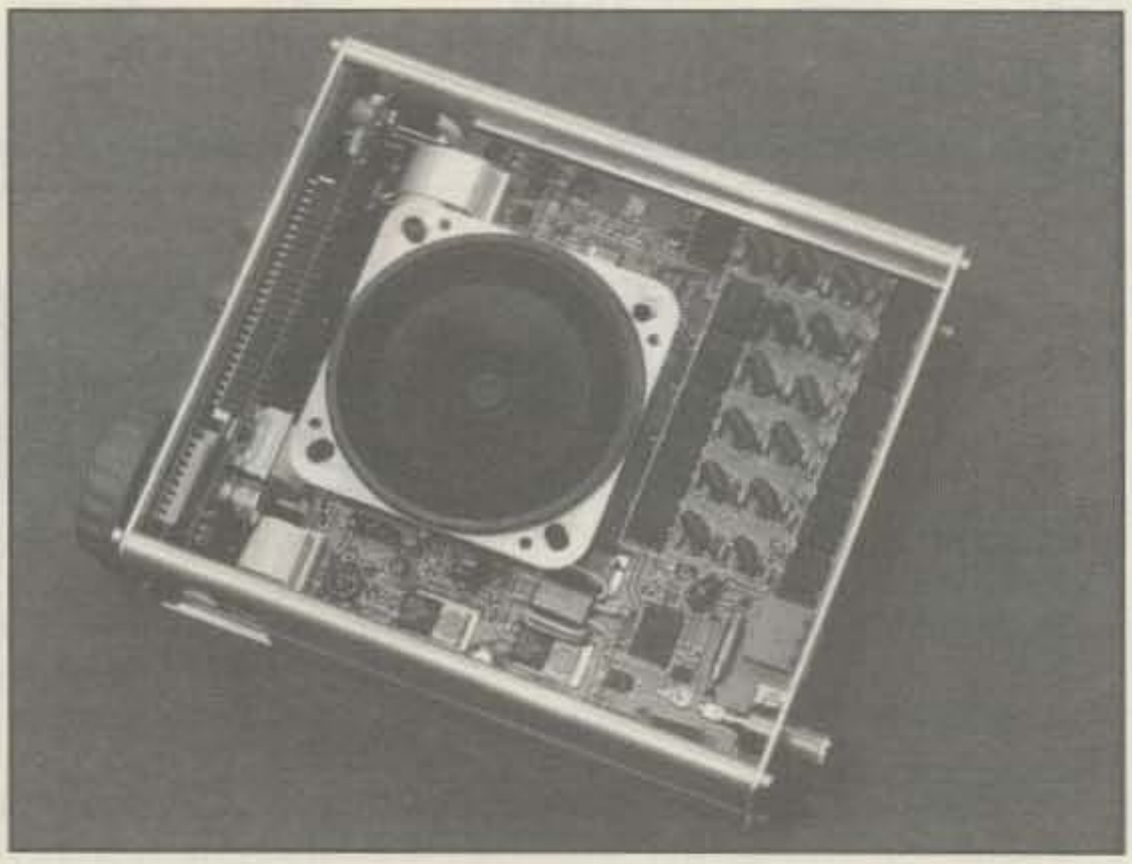
Say you face enough challenges trying to work DX with a full 100 watt rig? Still carrying a stack of sandwiches and pitcher of tea into the shack while spending half the evening trying to work a needed rarie, are you? Well, friends, maybe you are running too much power. That's right—too much power. If you really want to be a mover and shaker, try lowering that output—all the way down to the 5 watt level! The distant station will then think you are also a DX rarie and make an all-out effort to copy you through the pileup. Bang! You land a QSO before others even realize what happened! Yes, indeed, victory snatched from the jaws of defeat! Would I lead you astray?

Need more getting-started encouragement? Begin with this month's news and views, and then order a copy of my new self-published book *QRP NOW!* for complete guidance and details on what's happening in QRP today ($15 plus $2 regular mail/$3 Priority mail from Dave Ingram, K4TWJ, 4941 Scenic View Dr., Birmingham, AL 35210).

Next, gear up with a neat 5 watt rig, fine tune your antenna system and operating techniques, and then join QRP activities between 7.035 and 7.045, 10.110 and 10.124, and 14.055 and 14.065 MHz. Within a month you will have a new lease on life. Honest! Now let's check out the QRP news and views!

First Views of The SGC-2020

Eyes throughout the QRP community turned toward the Seattle area when SGC, Inc. recently announced production of their new SG-2020 transceiver (see photos 1, 2, and 3). Since Bruce Franklin, KG7CR, of Index Labs was a key mem-



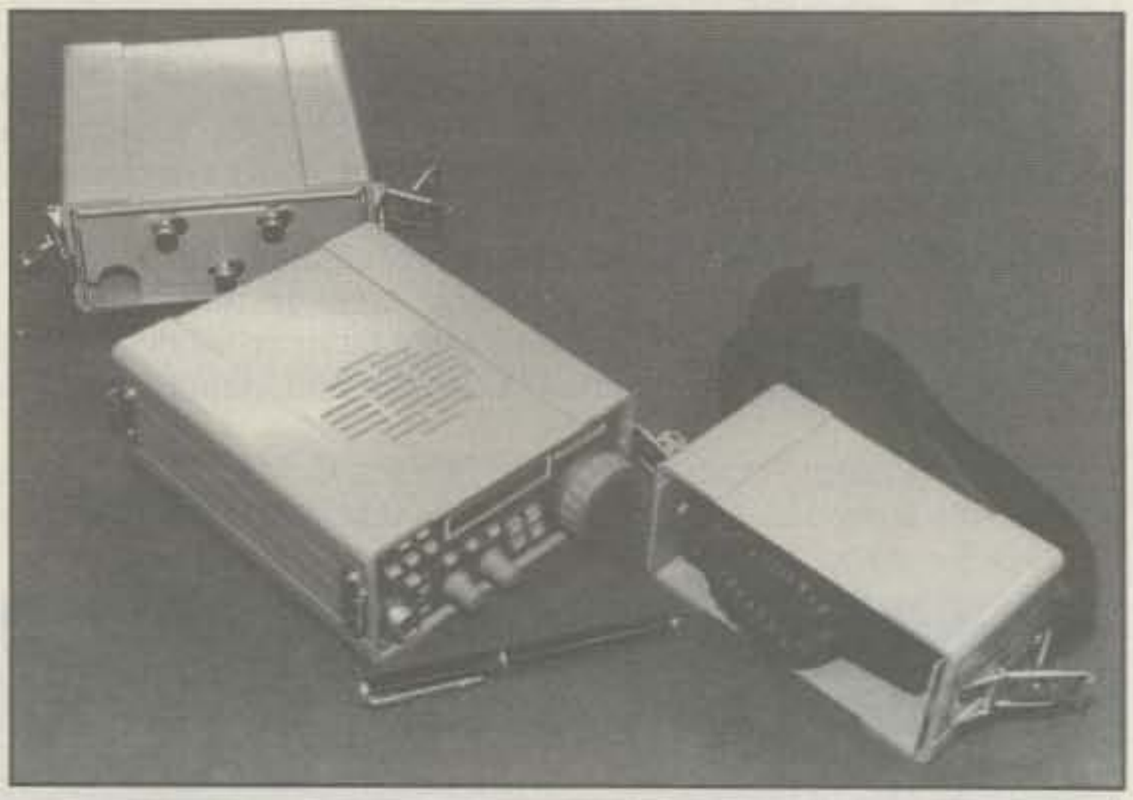


Photo 1– (Top Left) The new SGC SG-2020 HF transceiver. Unit is quite small, remarkably similar to the QRP Plus in design and operation, and packs a hefty punch on both CW and SSB. (Photo courtesy SGC, Inc.)

Photo 2– (Top Right) Interior view of the SG-2020 reveals a neat layout with heavy-duty components for go-anywhere hamming. Band filters are visible toward the rear of the cabinet. Push-Pull output transistors are on the right side of the cabinet, behind the antenna socket. (Photo courtesy SGC, Inc.)

Photo 3– (Bottom Right) Optional snap-on front and rear covers transform the SG-2020 into a self-contained and fully protected station for instant portable use. Batteries install in the rear, while the microphone and key store in front. (Photo courtesy SGC, Inc.)

Say You Saw It In CQ

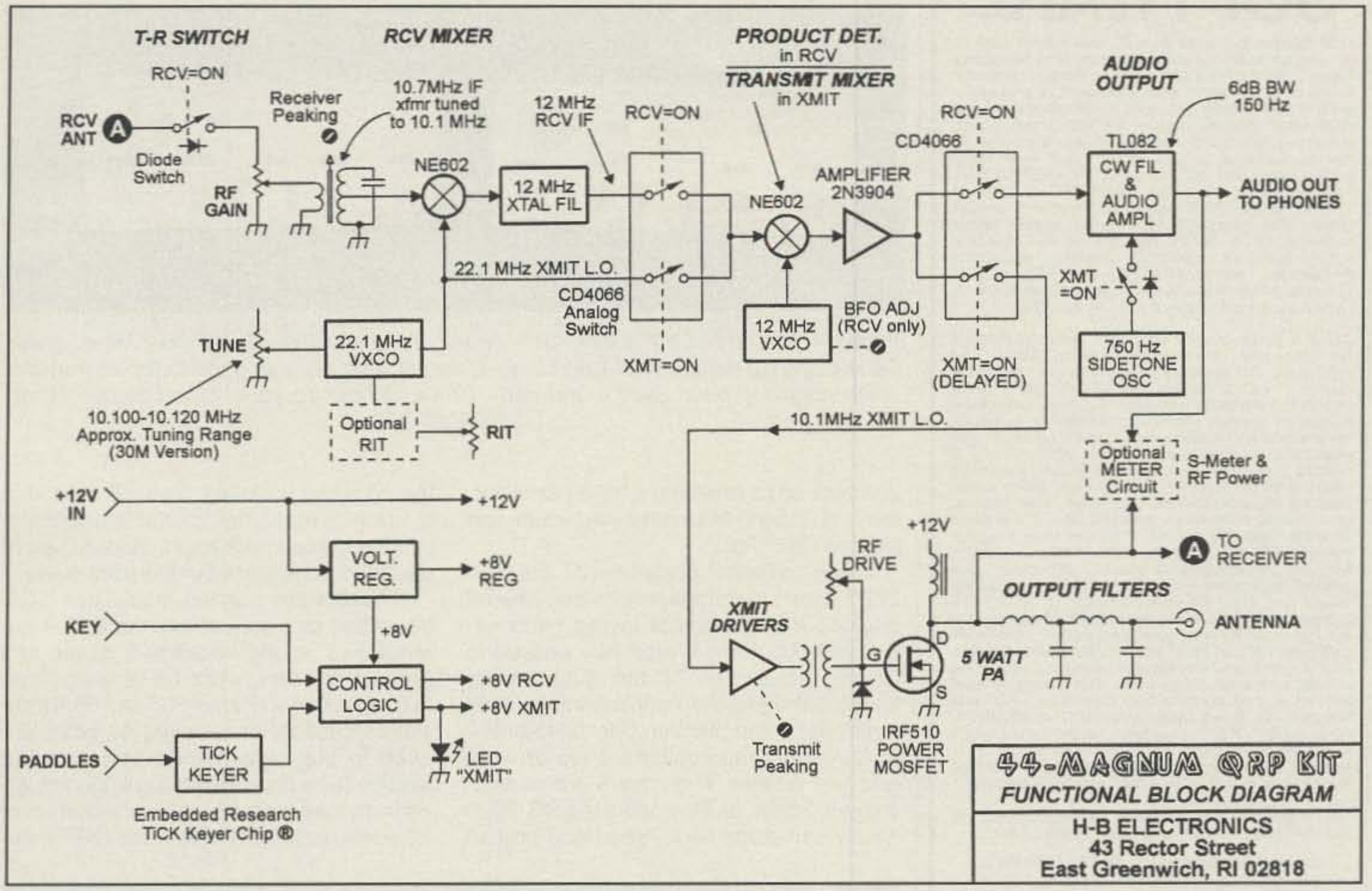


Fig. 1– Conceptual diagram of the new 44 Magnum from H. B. Electronics. Several stages function on both transmit and receive. (Discussion in text.)

ber of the little rig's design team, everyone curiously pondered if the SG-2020 would be a next-generation QRP Plus (which many folks consider top banana in commercially made QRP transceivers).

Well, friends, I test-operated an SG-2020 on both SSB and CW for several days, and to me it seems like a formidable successor with both similarities to and differences from the QRP Plus, possibly because it is designed for both amateur and commercial markets.

In the "similar department," the SG-2020 also works all nine HF bands with full shortwave reception and features galore. Selection of memories, bands, built-in keyer speed, CW bandwidth, RIT, and split frequencies for DXing are ac-

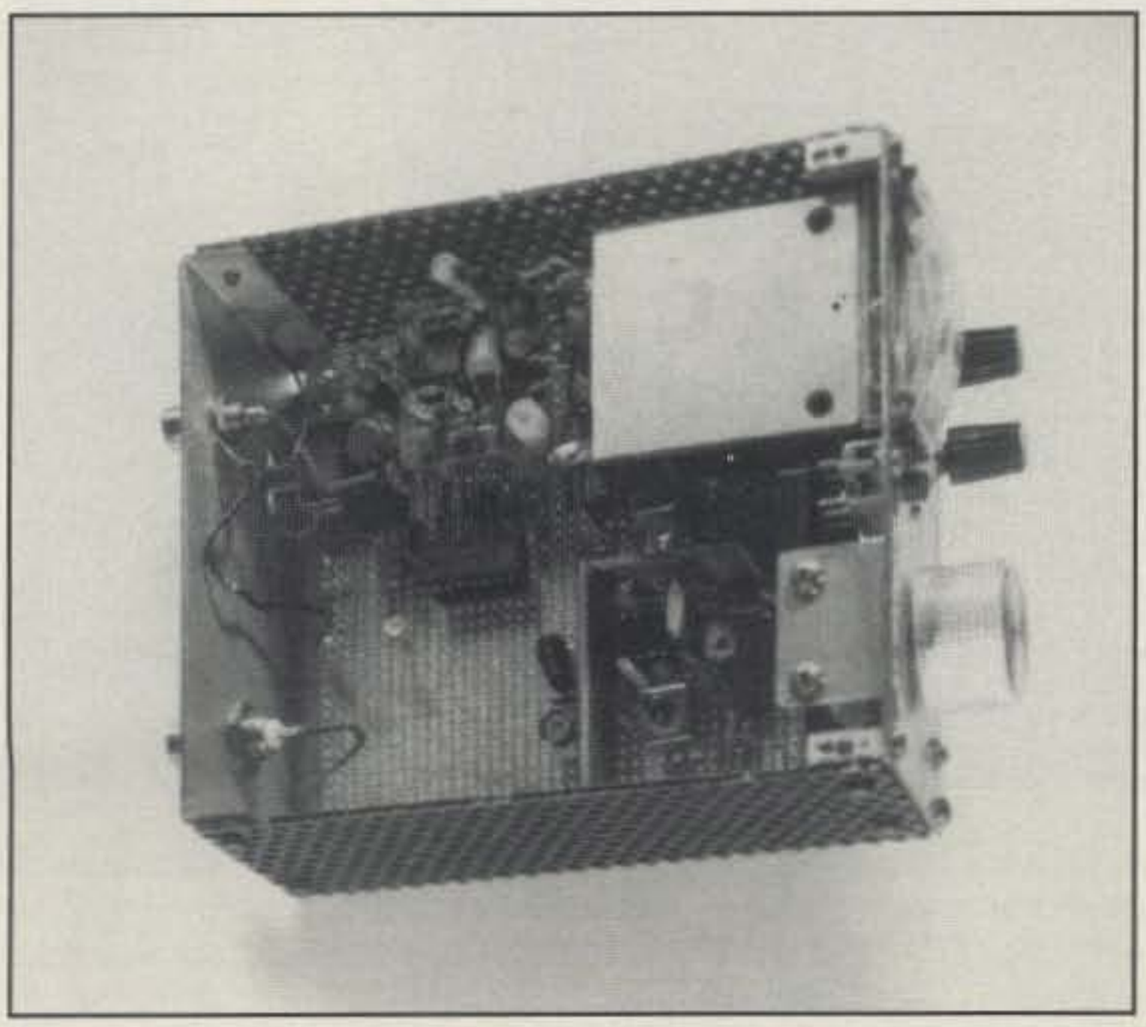


Photo 4– (Left) Over-the-shoulder view of the prototype 44 Magnum during development (and on perfboard for easy experimenting). Rest assured resultant kits and PC boards will be laid out in an easier to assemble manner. (Photo courtesy Paul Harden, NA5N)

Photo 5– (Below) Although an enclosure is not included in the basic 44 Magnum kit, this front view of the NA5N prototype unit gives us a good idea of how a completed transceiver might look. (Photo courtesy NA5N)

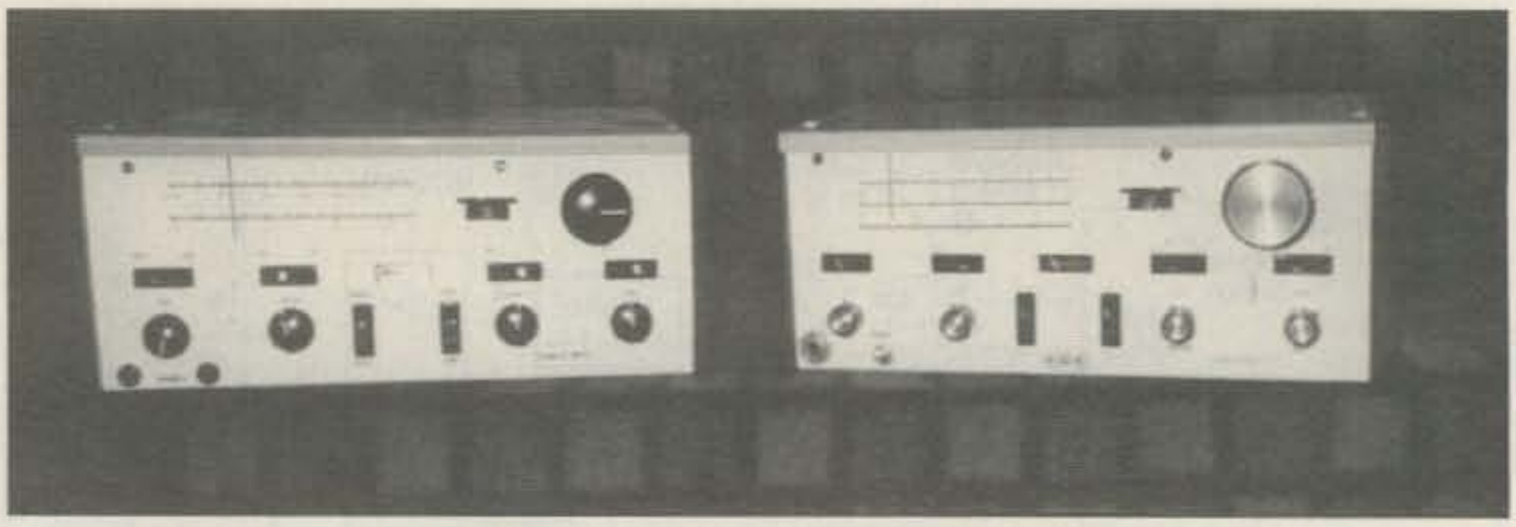


Photo 6– Nostalgic QRP supreme! This pair of like-new Ten-Tec "Power Mites" cover 80, 40, and 20 meters with 1 and 2 watts output, and work as good today as they did when originally purchased in the early 1960s. (Photo courtesy proud owner, David Larsen, N9XLT)

complished by pressing a front-panel button and rotating the main tuning knob, just like the QRP Plus.

In the "different department," the SG-2020 sports a completely re-engineered enclosure and internal layout (with expanded circuitry). It also has passband tuning (adjustable by the main tuning knob), band and memory scanning, SWR metering, noise blanker, backlight for the LCD readout, and optional snap-on front and rear covers. The covers are particularly attractive, as they make the SG-2020 a fully self-contained station and protect the rig when traveling. Ten "D" cells fit in the rear cover for field/portable operation, while a microphone and miniature key or paddle can be stored in the front cover.

Circuit-wise, custom-made ICs SGC describes as a step above the SBL-1 are employed in the receiver's mixer and product detector, while FETs are utilized in bi-directional IF stages. Push-Pull transistors capable of handling 40 watts are used in the transmitter's power output section (which can be tuning-knob adjusted from less than 1 watt to a maximum of 20 watts output). Whether the QRP com-

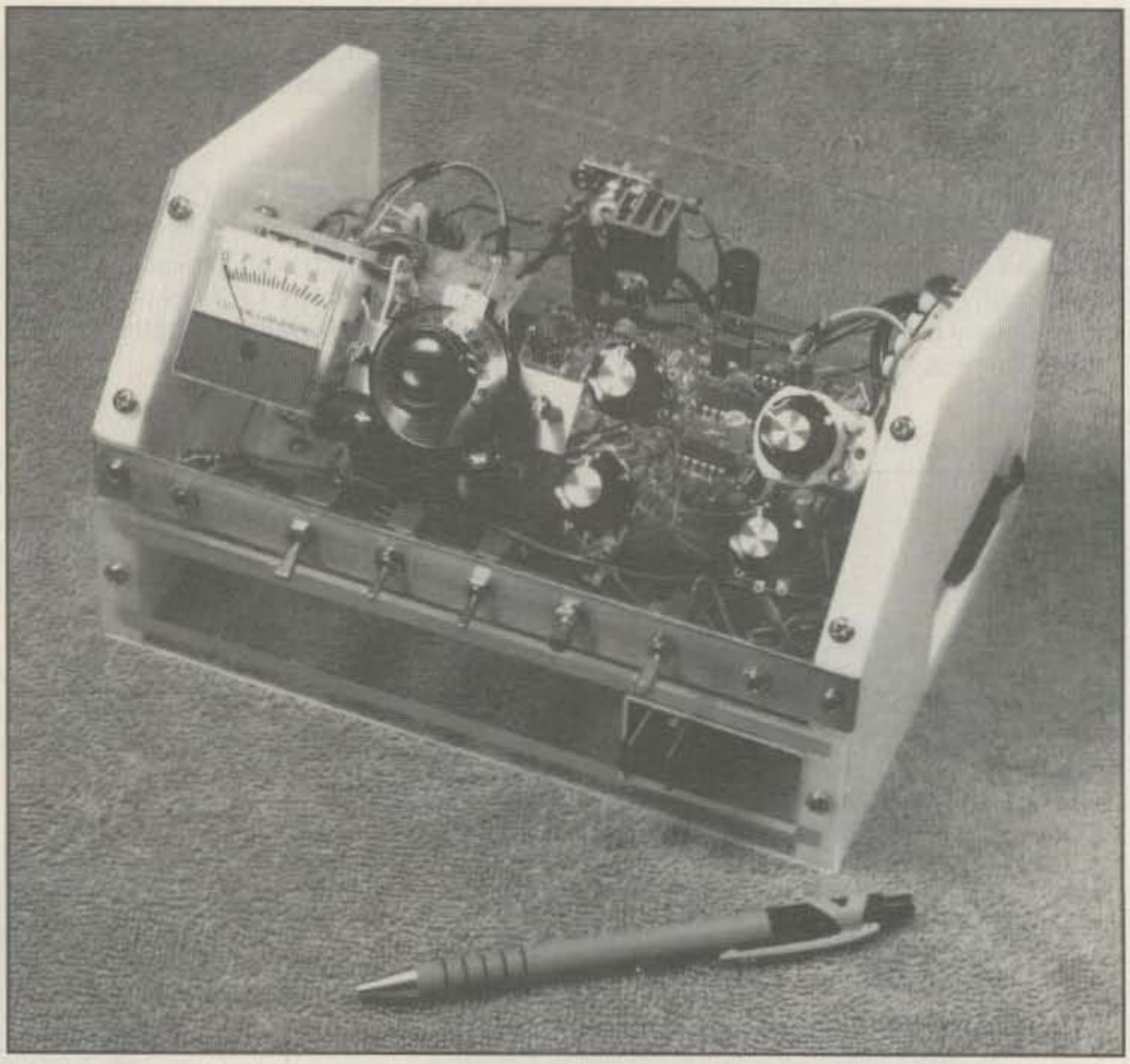


Photo 7– Jim Whiting, KØVAN, assembled this 38 Special complete with battery pack, charger, AC supply, audio amplifier, speaker, and antenna, and mounted everything in a see-through enclosure. The little gem is a real eye catcher, for sure! (Photo courtesy KØVAN)

SOFTWARE

DSP Blaster 2.0 uses your PC and sound card to provide tunable highpass, lowpass, and bandpass filters, autotracking CW peaking filter, automatic notch filter, coherent phase-locked CW processor with stereo output, adaptive noise reduction, and AGC. ***DSP Blaster*** graphs the audio waveform, envelope, spectrum, and CW phase. It can run in the background. $125. ***RITTY 2.0*** is a high-performance DSP modem for RTTY and PACTOR. The limiterless front-end, sharp BPF, autotuned optimal filters, ATC, numerical flywheel, packet repair, and memory-ARQ recover signals other modems can't. ***RITTY*** features an FFT spectral tuning indicator, waveform displays, adjustable frequencies, precision AFSK, and FSK & PTT outputs. $150. 486DX, VGA, and 16-bit Creative Labs sound card required (no "compatibles").

AO 6.5 automatically optimizes antenna designs for best gain, pattern, impedance, SWR, and resonance. ***AO*** features 3-D pattern and geometry displays, 2-D polar and rectangular plots with overlays, automatic wire segmentation, automatic frequency sweep, skin-effect modeling, symbolic dimensions and expressions, current sources, and polarization and near-field analysis. ***NEC/Wires 2.0*** models true earth losses, surface waves, and huge arrays with the Numerical Electromagnetics Code. Best for elevated radials, Beverages, wire beams, giant quads, delta loops, and LPDAs. ***TA 1.0*** plots elevation patterns for HF antennas over irregular terrain. ***TA*** accounts for hills, valleys, slopes, focusing, shadowing, reflection, diffraction, and ground constants. Use ***TA*** to optimize antenna height and siting for your particular QTH. ***YO 6.5*** automatically optimizes monoband Yagi designs for maximum forward gain, best pattern, minimum SWR, and impedance. ***YO*** models stacked Yagis, dual driven elements, tapered elements, mounting brackets, matching networks, skin effect, ground reflection, and construction tolerances. ***YO*** runs hundreds of times faster than NEC or MININEC. ***NEC/Yagis 2.5*** provides reference-accuracy modeling of individual Yagis and large arrays. Best for EME arrays. One antenna program, $70; three, $120; five, $200. 386+387 and VGA required.

Visa, MasterCard, Discover, check, cash, or money order. Add $5 overseas. *k6sti@n2.net.*

Brian Beezley, K6STI · 3532 Linda Vista
San Marcos, CA 92069 · (760) 599-4962

Be an FCC LICENSED ELECTRONIC TECHNICIAN!

No costly school. No commuting to class. The Original Home-Study course prepares you for the "FCC Commercial Radiotelephone License." This valuable license is your professional "ticket" to thousands of exciting jobs in Communications, Radio-TV, Microwave, Maritime, Radar, Avionics and more...even start your own business! You don't need a college degree to qualify, but you do need an FCC License.

No Need to Quit Your Job or Go To School
This proven course is easy, fast and low cost! GUARANTEED PASS–You get your FCC License or money refunded. **Send for FREE facts now. MAIL COUPON TODAY!**

Or, Call 1-800-932-4268 Ext. 96

COMMAND PRODUCTIONS
FCC LICENSE TRAINING, Dept. 96
P.O. Box 2824, San Francisco, CA 94126
Please rush FREE details immediately!
NAME _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____

RT Systems

1-800-723-6922

YAESU

FT-920
HF + 6M Transceiver, All-Mode
100 Watts on All Bands

Rotators

FT-847
HF/50/144/430 MHz,
All Mode Base Station,
The Best For
Satellite Work

VX-1R
Ultra Compact
Dual Bander
Extra Wide
Receive

FT-50RD
Compact
Dual Bander,
AM Aircraft
Receive

FT-51R
Dual Band
Handheld,
Dual Receive,
Help Menu

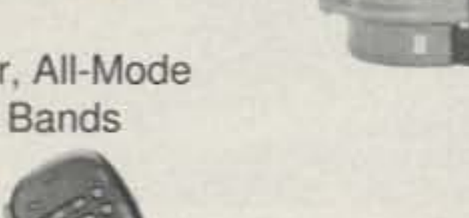
FT-8100R
Compact Dual Band Mobile,
50W, VHF/35W, UHF

FT-2500M
VHF/UHF Mobile Commercial Grade,
Advanced Track Tuning

ICOM

IC-2710H
Dual Band Mobile
with 50W/35W Output

IC-746
HF + 6M + 2M Base
With 100W on All Bands



IC-706MKII
HF + 6M + 2M
Compact Transceiver

IC-T8A
World's Smallest
50/144/430MHz
5 Watt Handheld

IC-W32A
Most Economical
Dual Band,
5 Watt Handheld

KENWOOD

TM-G707A
Dual band FM Mobile,
High Visibility Amber
LCD, Single Receive

TS-570S (G)
HF + 6M Transceiver
100 Watt Output

TH-G71A
144/430MHz,
FM Handheld
With Extra
Wide Receive

Call For Details
On The New
VC-H1 Visual
Communicator

TM-V7A
VHF/UHF,
FM Mobile
Dual Receive

FIND THE SPECIAL!

MENTION THIS RADIO WHEN YOU CALL TO GET EXTRA SPECIAL SAVINGS.

WATCH FOR A DIFFERENT "SPECIAL" RADIO EACH MONTH.

RT Systems Amateur Radio Supply

8207 Stephanie Drive, Huntsville, AL 35802
1-800-723-6922 1-256-882-9292
e-mail: sales@rtsars.com www.rtsars.com (Inquiries Only, No Sales)

munity will accept a 20 watt capable transceiver reduced to 5 watts output or less as "genuine QRP" is presently unknown, but I would say the SG-2020's high portability and low current consumption truly favor QRP.

Regarding on-the-air performance, the SG-2020 does an excellent job of copying weak signals, and its CW filters (which are adjustable from 2.7 kHz to 100 Hz) really cut out the QRM. The speech compressor packs a good punch on SSB, and "talk power" is noticeably higher than my dear QRP Plus. A high-speed relay is used for T/R switching with full QSK. When operating with my new vertical bug, resultant sounds brought visions of a classic Wirechief's office to my shack. I could have used earphones for "silent running," but as most of you know, I am a hopeless CW buff and enjoy the melodious sounds of telegraphy. Using the passband tuning took some acclimation, as I simultaneously vary it and the RIT to dodge QRM with other rigs. Overall, however, I had a ball operating the SG-2020. It strikes me as a lot of rig for the money. Maybe it should be nicknamed the QRP Plus Plus.

Photo 8– All QRP and proud of it! This neat setup of John Peregord, Jr., KB8UMD, sports a classic Heath HW-8 and HW-9 plus Ten-Tec QRP Scout, DSP, and antenna tuner. Now who could resist sitting down to a station like this! (Photo courtesy KB8UMD)

The 38 Special Returns as The 44 Magnum

Remember the 38 Special mini transceiver kit offered by NorCal and highlighted in this column last September? A record number of amateurs quickly ordered kits, demand exceeded supplies, and some folks were left holding only a returned check and a cold soldering iron. Ah, but yesterday's disappointments are today's joys. Bob Berlyn, N1PWU, of H. B. Electronics is assuming production of the kit in a highly refined and improved form known as the 44 Magnum. Compared to the 38 Special, H. B.'s new transceiver kit has sharper IF filtering, smoother and "thumpless" T/R switching, and a solid 5 watts of output power—maladies common to the original 38 Special. Initial/projected cost of the new kit is under $50, which if H. B. can "pull it off," is a very good deal for what you get: a complete package with all the kibbles and bits except an enclosure. As this column is being written (mid-April) H. B. is headlong into perfecting prototypes of the new 44 Magnum. With a bit of good luck, kits may be available by the time you read this report. Meanwhile, some first "over the shoulder views" of this new gem are shown in fig. 1 and photos 4 and 5.

The 44 Magnum has a 4-IC superhet receiver with NE-602s used in mixer and product detector stages, a crystal filter for IF selectivity, and a TL-082 for CW audio filtering. Overall receive bandwidth is 200 Hz at –6 dB and 1500 Hz at –30 dB. A varicap-tuned VXCO is used for frequency control, with a key-activated CD4066 analog switch shifting mixer frequencies and signal paths between transmit and receive for full break-in operation. The 44's transmit section thus "reuses" the receiver's mixer and IF amplifier to feed a driver stage, which in turn outputs to a power MOSFET to produce a 5 watt signal. Confusing? Let's quickly trace some signal paths in the conceptual diagram (fig. 1) for clarification.

First, incoming 30 meter/10.1 MHz signals and the local oscillator/VXCO 22.1 MHz signal heterodyne in the receive mixer to produce a 12.0 MHz IF signal. This signal passes through the crystal filter, the "top switch" in the first CD4066 section, and continues on to the product detector. There, it heterodynes with a 12 MHz (approximate) BFO signal to produce an audio signal that goes through the "top switch" in the second CD4066 section and continues on to the TL-082 and earphones.

Now return to the receive mixer/"first NE-602" and follow this explanation. During transmit, the VXCO/NE602's 22.1 MHz signal goes through the "lower switch" in the first CD 4066 section and continues on to the second NE-602. There it heterodynes with a 12 MHz signal to produce 10.1 MHz. That signal in turn goes through the "lower switch" in the second CD4066 section and continues on to the driver and power MOSFET. A clever arrangement, eh?

Judging by our technical discussion, you might think the 44 Magnum is challenging to build and "get going." Not at all. It is an "easy brew" kit in the 99 parts category, with all components mounted on a well-marked/silk screened board. Alignment takes only a couple of minutes. You just peak the receiver's input coil, tweak the transmit driver, and emerge with a hot little rig for today's hottest QRP band—30 meters. Oh, yes—Bob has hinted 44 Mag-

CIRCLE 39 ON READER SERVICE CARD

nums for other bands such as 40 meters may also be coming soon. Check with Bob at H. B. Electronics, 43 Rector St., East Greenwich, RI 02818 for more specifics.

Show Us Your QRP

Shifting into the "having fun with QRP" department, several friends recently passed along photos of their favorite gear to share with readers. First is the pair of rare and like-new Ten-Tec "Power Mites" owned by David Larsen, N9XLT, and shown in photo 6. Power Mites were produced in two versions during the early 1960s. They preceded the famous Argonauts and, to the best of my knowledge, were amateur radio's first solid-state transceivers. One version, the PM2, worked 80, 40, and 20 meters CW with 1 watt output. The other version, a PM3, worked 40 and 20 meters CW with 2 watts output. We are sure David enjoys rockin' and rollin' the bands with these gems today.

Next up is the clear-cased and fancy-featured 38 Special made by Jim Whiting, KØVAN, and shown in photo 7. Jim says our QRP columns rekindled his interest in both amateur radio and homebrewing, so he started back with my Micronaut transmitter kit and then built a 38 Special. He wanted a complete "one box rig," so he added an audio amplifier and speaker, 12 volt cell phone battery pack, charger and AC supply, antenna tuner, and SWR meter. The finished unit is enclosed in a clear plexiglass cabinet, and it is a real conversation piece—from several points of view. Since Jim lives in the woods of northern Minnesota, QRM/intermod resulting from a non-metallic enclosure is not a problem. Jolly good show, Jim!

Finally, John Peregord, Jr., KB8UMD, shows us how to blend classic and contemporary QRP in high style (photo 8). His all-QRP setup consists of an HW-8 and HW-9 (timeless favorites!) plus a 5 watt "get 'em up Scout"—all complemented with a DSP unit and antenna tuner. If you have ever wondered what a typical home QRP station looks like (although differences are common), this is a good example. Congratulations on the gear, John!

Several more views were lined up for inclusion, but we are overflowing available space and must apologetically postpone them until later.

That winds down the view for this time, gang, but stay tuned next month when our magical mystery tour of QRP continues with more small and low-cost gear and goodies guaranteed to please one and all. We will cover Pixies, Tixies, Ticks, and more. Meanwhile, we leave you with this off-the-air quote of the month: "Working QRP is terrific! No one complains about my signals interfering with their QSOs, causing QRM, or 'hogging' a frequency!" 73, and let's QSO on 30 tonight!

73, Dave, K4TWJ

AT-11 Automatic Antenna Tuner

$219 $10 shipping

- 5 to 100 watts. 150w@50% duty cycle
- High Efficiency Switched "L" Network
- Microprocessor Controlled - Upgradable
- Size: 6.5 x 8.5 x 2.5 inches.
- For Dipoles, Verticals, Beams or any Coax Fed Antenna. 1.8 to 30 MHz.
- 12 Volt Operation, 500 mA
- Thousands Sold Worldwide!
- Download the Manual from our Website

Kit w/enclosure **$180** $10 shipping

Kit Only **$150** $8 shipping

LDG ELECTRONICS

LDG Electronics
1445 Parran Road
St. Leonard MD
20685 USA

Phone: 410-586-2177
Fax: 410-586-8475
ldg@ldgelectronics.com
www.ldgelectronics.com

MasterCard VISA

MD Residents add 5% Tax

CIRCLE 51 ON READER SERVICE CARD

HF TO GO

The World's Smallest Full-Featured HF-SSB Radio

The SG-2020 is the perfect choice for base, backpacks or business trips. • Weighing in at just 4.5 pounds, the SG-2020 features fully adjustable output power from 0 to 20 watts PEP. • Low current requirements in receive mode allow practical battery pack operation. • A bullet-proof front end provides third order intercept at better than +18dB, virtually eliminating adjacent channel interference. • Designed with the portable user in mind, it comes complete with built-in, fully adjustable mode 'B' iambic keyer, VOGAD baseband speech processing and RF clipping. • All this plus legendary SGC quality and reliability at an incredibly low price.

SG-2020

For complete details on the SG-2020, see your SGC dealer, or check out our website.

SGC

1-800-259-7331
www.sgcworld.com

MADE IN USA

P.O. Box 3526 Bellevue, WA 98009 USA
Phone: (425) 746-6310 Fax: (425) 746-6384 Email: sgc@sgcworld.com

CIRCLE 71 ON READER SERVICE CARD

BY BUCK ROGERS, K4ABT

PACKET USER'S NOTEBOOK

CONNECTING YOU AND PACKET RADIO IN THE REAL WORLD

Summer's Here!

Summer is here, or hadn't you noticed? There's lots of activity here in the southeastern United States. While one storm moves through, another seems to come along right behind it. And with summer now with us, we may see an even greater number of storms. We've talked about how necessary the use of digital communications is to handling emergency traffic to and from one affected area to another. In the areas of Alabama, Georgia, Kentucky, Mississippi, Missouri, Tennessee, North Carolina, Virginia, and West Virginia, it's the same scenario.

Voice communication comes into play during and following a bad hit by a tornado. Then come the awful feelings we get when we begin the clean-up after the fact. I'm still amazed (and thankful) that no one was killed when not one, but two, tornadoes hit Nashville, Tennessee. In other parts of Tennessee, and in Alabama, and in the aftermath of the tornadoes that hit around Birmingham, the story is not as good. Thirty-five lives were lost in the Birmingham area tornadoes that opened the month of April 1998. Complete devastation accompanied one of the worse tornadoes ever recorded. The tornado that hit in Alabama was a "class 5," with wind speeds never before seen in that area.

It has been reported over and over again that the reason why so many people were killed is because there was little warning. Yet the National Weather Service says the warning was sent out an hour before the Birmingham area tornado hit.

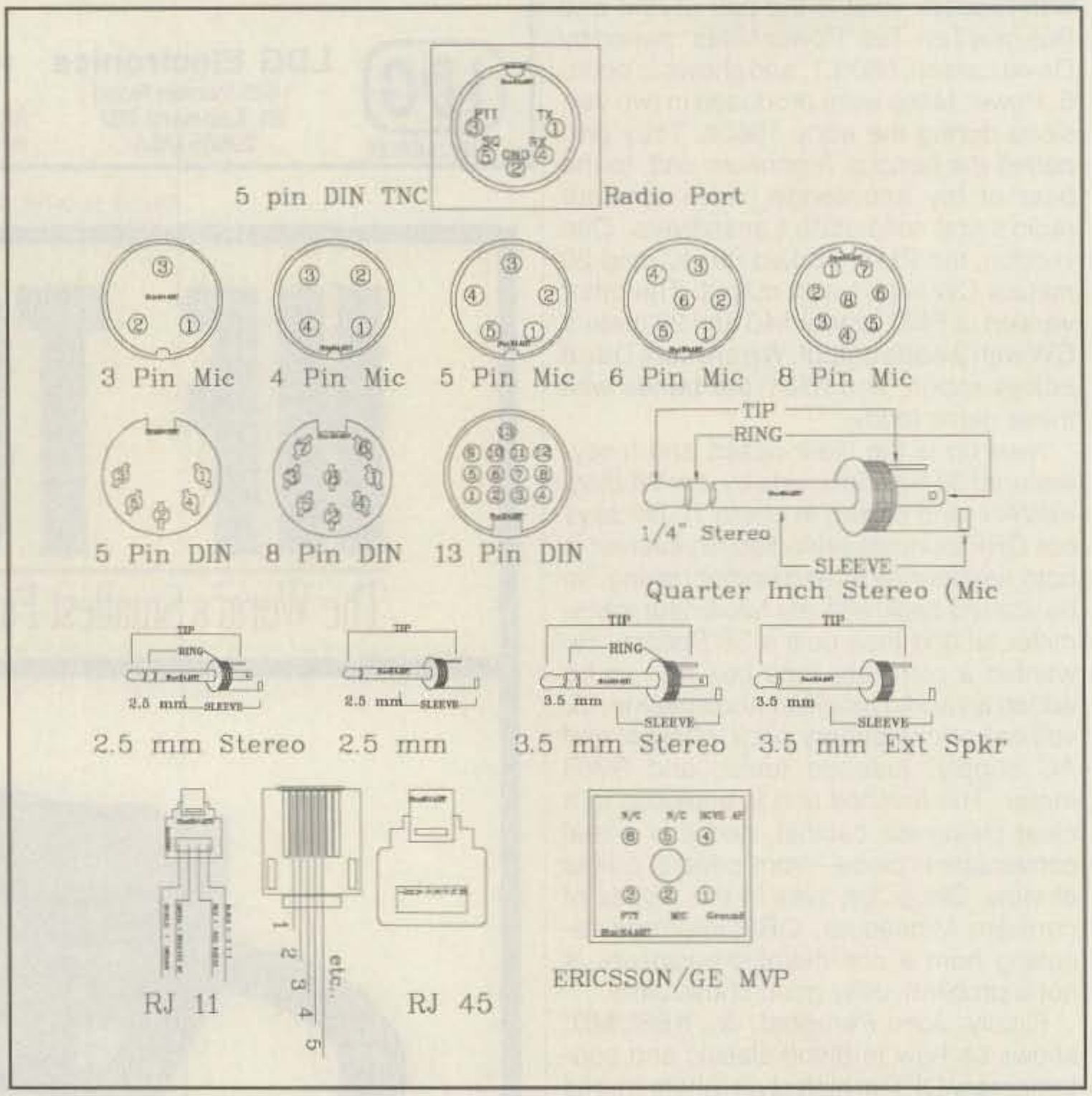


Fig. 1– Index of assorted transceiver and radio microphone connectors. (Caution: Some connectors will vary in pin number assignment.)

What's The Point?

Whatever the cause for the large number of deaths—be it a class 5 tornado or lack of sufficient warning—we must now begin to implement as many warning systems as possible to give those persons in harm's way as much notice as possible. We also must make this a nationwide early-warning system. There is a weather radio of sorts that is available for a hundred or so dollars. It chatters as long as it is on; when bad weather is announced, an audible alarm is set off. If it is ON!

An Ounce of Prevention

Steps are being taken to set a trap-string alarm into some TNCs. This will set off an audible alarm within the TNC, alerting the operator that bad weather is threatening. While this new alarm feature is being incorporated into some of the popular TNCs (EPROM), we are also adding a new feature to the 1998 release of BUXTERM.EXE (version 2.7). The new feature also supports a text capture trap-string that when activated, will sound a five-level wail, five times, five seconds apart. This sound will come from the PC (speaker) that is running the new BUXTERM version 2.7. The computer must be ON and running BUXTERM 2.7 and connected to your TNC serial port.

To come up with the idea is one thing, but to implement the idea—that's a totally different story. I had to call on the real brains of the C++ code and packet TNC internal code to get help with the implementation of this new feature.

Our thanks go to Howard Goldstein, N2WX (great callsign, Howie), and Bob Slomka, WD4MNT, for their help in building this life-saving, early-warning system. Bob Slomka is an expert when it comes to building code that talks to the TNC—any TNC. Howie is a genius when it comes to the inner workings of the TNC-2. He knows the inside of the TNC-2 and clones better than I know the path to the dinner table. Both of these gentlemen have given more to packet radio than anyone will ever know.

Similar to the trap-string that will soon be built into some TNCs, BUXTERM 2.7 will require the user to press the F7 function key and enter a pre-determined string. On the SEDAN we are implementing a

211 Luenburg Drive, Evington, VA 24550
e-mail: K4ABT@PacketRadio.com

Say You Saw It In CQ

Transceiver Mfg.	Radio Connector Type	TX AFSK Pin 1	Ground/Shield Pin 2	Push-To-Talk Pin 3	Receive AF Pin 4	Ext CD Pin 5
ADI	8 Pin	Pin 1	Pin 8	Pin 2	Ext Spkr	—
Alinco	8 Pin	Pin 1	Pin 8	Pin 2	Ext Spkr	—
Azden	6 Pin mini DIN	Pin 1	Pin 2	Pin 3	Pin 5	Ext CD Pin 6
Azden	8 Pin	Pin 1	Pin 2	Pin 7	Ext Spkr	—
Drake	4 Pin	Pin 1	Pin 3/4	Pin 2	Ext Spkr	—
ICOM	4 Pin	Pin 1	Pin 4	Pin 2	Ext Spkr	—
ICOM	8 Pin	Pin 1	Pin 6	Pin 5	Pin 8	—
ICOM	RJ-45	Pin 6	Pin 7	Pin 4	Pin 3	—
ICOM	8 Pin DIN (Acc)	Pin 4	Pin 2	Pin 3	Pin 5	Ext CD Pin 6
ICOM	13 Pin DIN (Acc)	Pin 11	Pin 2	Pin 3	Pin 12	Ext CD Pin 13
Kachina 505	DB25/ACC1	Pin 17	Pin 14	Pin 18	Pin 16	—
KDK	6 Pin	Pin 5	Pin 6	Pin 4	Ext Spkr	—
Kenwood	4 Pin	Pin 1	Pin 4	Pin 2	Ext Spkr	—
Kenwood	6 Pin	Pin 1	Pin 6	Pin 2	Ext Spkr	—
Kenwood	6 Pin mini DIN	Pin 1	Pin 2	Pin 3	Pin 5	Ext CD Pin 6
Kenwood	8 Pin	Pin 1	Pin 8/7	Pin 2	Ext Spkr	—
Kenwood	RJ-45	Pin 3	Pin 6	Pin 5	Pin 2	—
Kenwood	13 Pin DIN	Pin 11	Pin 4	Pin 9	Pin 3	—
Midland	4 Pin	Pin 1	Pin 2	Pin 4	Ext Spkr	—
Radio Shack	RJ-45	Pin 5	Pin 2	Pin 6	Ext Spkr	—
Regency HR-2	1/4" Stereo	Tip	Sleeve	Ring	Ext Spkr	—
Ten-Tec	1/4" Stereo	Ring	Sleeve	Tip	Ext Spkr	—
Ten-Tec	4 Pin	Pin 1	Pin 2	Pin 3	Ext Spkr	—
Uniden	5 Pin	Pin 1	Pin 2	Pin 3	Ext Spkr	—
Yaesu	5 Pin DIN	Pin 1	Pin 2	Pin 3	Pin 4	Ext CD Pin 5
Yaesu	6 Pin mini DIN	Pin 1	Pin 2	Pin 3	Pin 5	Ext CD Pin 6
Yaesu	8 Pin	Pin 8	Pin 7	Pin 6	Ext Spkr	—

Table I– The pin numbers (1–5) in the topmost row of the table refer to the pin numbers of the popular five-pin DIN connector that is used on many of today's TNCs. This table lists many transceivers and their interface connections to the popular (TAPR TNC-2) five-pin DIN TNC radio port. See the radio microphone and assorted connector drawings at fig. 1.

Batteries / Chargers

BUY DIRECT FROM THE U.S. MANUFACTURER

SPECIAL FOR THE MONTH OF JULY

10% OFF

ON ALL CAMCORDER REPLACEMENT BATTERIES

Monthly Discounts Applicable to End-User's ONLY

Look for August's Special of the Month

Charges Ni-Cd & Nickel Metal Hydride Batteries

W&W has the LARGEST selection of Ni-Cd and NiMH Batteries in the world to date for both the Ham and Communication market alike.

Also available for 2 and 6 stations

The most complete selection of cups in the industry

W&W ASSOCIATES

800 South Broadway, Hicksville, NY 11801-5017

E-Mail: w-wassoc@ix.netcom.com Web Site: wwassociates.com

Made in U.S.A.

Send for free catalog & price list

NYS residents add 8.5 % sales tax.

Add $5.00 for shipping.

IN U.S. & IN CANADA CALL TOLL FREE 800-221-0732 • IN N.Y.S. 516-942-0011 • FAX: 516-942-1944

MADE IN U.S.A.

Prices & specifications subject to change without notice.

CIRCLE 80 ON READER SERVICE CARD

WIRELESS OPTIONS AVAILABLE

THE LATEST IN WEATHER TECHNOLOGY

Davis Instruments, the world leader in affordable, professional-quality weather stations, has expanded its weather line to include the ***GroWeather***® and ***Enviro-Monitor***® systems. All stations track rain, temperature, humidity, barometer, wind speed and direction along with alarms, highs, and lows. Optional data logger/software stores, graphs, and tracks data collected by station.

GroWeather

Finally, an advanced weather station that helps you manage pest control, irrigation, and crop development. GroWeather calculates evapotranspiration, growing degree-days, and over 70 other values.

Energy EnviroMonitor

Now you can evaluate and manage your energy needs more efficiently. Energy EnviroMonitor tracks heating, cooling, and wind-chill degree-days, solar radiation, and wind run.

Health EnviroMonitor

It's never been easier to monitor the weather conditions that lead to sunburn, skin cancer, or hypothermia. Health EnviroMonitor displays heat stress, wind-chill, UV intensity and UV dosage, and solar radiation.

M-F 7 a.m. to 5:30 p.m. PST
FAX 1-510-670-0589
M/C and VISA • One-year warranty
30-day money-back guarantee

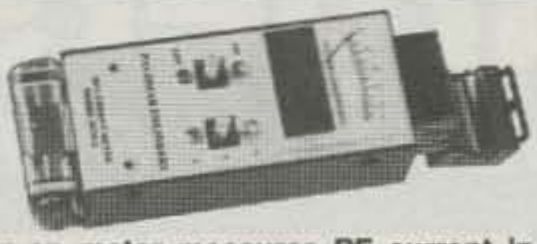
For more information and a free catalog, call
1-800-678-3669

CQRØ798

Davis Instruments
3465 Diablo Avenue, Hayward, CA 94545-2778 • www.davisnet.com

CIRCLE 44 ON READER SERVICE CARD

RF CURRENT METER



- **Clamp-on meter measures RF current in radials, coax, any wire up to 1/2" diameter. From 1-ma to 5 A and 200 KHz to 30 MHz. Direct reading hand held, battery powered.**

Model PCM–1 ..... $135.00
+ $6 S&H U.S./Canada. Tax in Calif.

TUNER-TUNER™

- **Tune your tuner without transmitting.**
- **Save your finals.**
- **Stamp out tuneup QRM.**

Turn it on. Adjust tuner for least receiver noise. Turn it off. Transmit with 1:1 SWR. It's that easy!

Model PT–340 ..... $99.95
+ $6 S&H U.S./Canada. Tax in Calif.

MasterCard **send for FREE catalog** VISA

PALOMAR
BOX 462222, ESCONDIDO, CA 92046
TEL: 760–747–3343 FAX: 760–747–3346
e-mail: Palomar@compuserve.com

Kerry, KE4WLP, standby. Okay, we're on the air! KE4WLP-7, SEDAN node "OHILL," on packet near Griffin, Georgia. Node "OHILL" covers western-central Georgia.

trap-string as follows: "SEDAN WX ALERT." The trap-string must be entered just as it will appear from the UI frame of a nearby node—that is, the trap-string is entered as a case-sensitive line of text. In the case of the SEDAN network, it will be as shown above—all upper-case letters, with spaces either side of "WX."

To activate the trap-string (ALERT), anyone who suspects or knows of threatening weather can send a UI frame to a node, or to a distant station that contains the exact line of text. When "any" TNC and PC using BUXTERM version 2.7 sees the text appear on the BUXTERM screen (same as the embedded text in the F7 line), a five level tone, five times repeated and five seconds apart, will begin to sound. When the operator hears the "alert" sound, he or she should be aware of impending or threatening weather conditions and take appropriate action.

An example would be for me to have my trap-string (BUXTERM 2.7 F7) set to "SEDAN WX ALERT." Everything is running and I'm busy across the room. Later Jim Flanary, K4LMP, who lives in southwest Virginia near Gate City, Tennessee, notices a cell of bad storms heading my way. Maybe Jim hears a weather bulletin. Whatever the case, Jim connects across several nodes to the SEDAN node "SML" atop Smith Mountain and sends: "UI WX ALERT." Jim may even send "CQ WX ALERT." The local X-1J4 node SML/K4ABT-3 will retransmit the text string. Either one will trigger the F7 trap-string and activate the alarm sequence within

Kerry, KE4WLP, and David, KE4UAS, atop the silo at Orchard Hill. The "OHILL" SEDAN node has an unobstructed, picturesque view of the horizon in all directions. In the distant background (across the state line in Alabama) are the Alabama SEDAN nodes: RAL, 9663, LMN, 9650, MAL, PCAL, RHO, and RKK.

my PC. Thus begins the five strings of bells or tones which alert me to possible impending danger.

BUXTERM is Yours For the Asking

In the Southeastern Emergency Digital Association Networks (SEDAN), our goals are:

• To help save lives, cooperating with the Sky-Warn, Weather-Watch, ARES, and RACES groups by making the SEDAN network available in the face of any impending danger(s).

• To train and guide new packet users with the correct methods used to transfer data from voice operators in an area across the network to other EOCs, Weather stations, or concerned groups—e.g., Red Cross, etc.

• To have fun with packet radio on a keyboard-to-keyboard network.

Having said that, you will understand why we make BUXTERM 2.7 available *free*. You can either download it from the web site: <http://www.packetradio.com>, or you can send me a 3.5 inch, MS/DOS-formatted disk and a self-addressed (your return address on it) legal-size envelope with two 32 cent stamps on it, ready to return to you. I will copy the new BUXTERM 2.7 onto your blank, formatted disk and have it on the way to you the following day, pending postal weekends and holidays. Included in your (legal-size) return envelope will be a hardcopy of the BUXTERM 2.7 manual. I also include a text copy of the manual on the disk, just in case you wish to give a copy to a friend. Send the MS/DOS-formatted 3.5 inch disk and the SASE to: BUXTERM, 211 Luenburg Dr., Evington, Virginia 24550.

For the Notebook

To help those who are keeping a notebook of the interface drawings in the "Packet User's Notebook," I've spent some long hours putting together a compilation of radio-to-TNC interfaces that I've featured in this column over more than ten years. The difference is this time I've put then into a "table" of sorts.

At Table I I've drawn the transceiver interfaces around the TAPR TNC-2 five-pin DIN radio port connector. Most TNCs utilize this type of *radio port* connector; hence the reason why I selected the TAPR TNC-2 five-pin DIN as a common radio port TNC I/O.

Making It Happen

Building the nation's largest packet radio network is not an easy task. However, when two or more system node operators (SNOs) get together to help his/her fellow man, there is gratification that provides a comfort to many of us.

"Moving in for the fit" Dennis, KU4OY, checks the fit of the ERICSSON/GE Phoenix and node "EAST" into the power supply cabinet.

There is a fun side to making packet radio networks happen. In this month's column, I've included a few photos. The first several photos show two SNOs—

CABLE X-PERTS, INC.

COAX (50OHM"LOW LOSS" GROUP) — 100FT/UP / 500FT / 1000FT

"FLEXIBLE" 9913 STRD BC CNTR FOIL + 95% BRAID 2.7dB@ 400MHz NC/DB/UV JKT... .58/FT / .56/FT / .54/FT
LMR 400 SOLID CCA CNTR FOIL + BRAID 2.7dB @ 450MHz WP/UV JKT ..... .59/FT / .57/FT / .55/FT
LMR 400 "ULTRA-FLEX" STRD BC CNTR FOIL + BRAID 3.1dB @ 450 MHz TPE JKT ..... .79/FT / .78/FT / .77/FT
LMR 600 (OD.590") SOLID CCA CNTR FOIL + BRAID 1.72dB @ 450 MHz WP/UV JKT..... 1.25/FT / 1.22/FT / 1.20/FT
LDF4-50A 1/2" "ANDREW® HELIAX®" 1.51dB @ 450MHz.....25FT/UP 2.10/FT

COAX (50 OHM "HF" GROUP) — 100FT/UP / 500FT / 1000FT

RG213/U STRD BC MIL-SPEC NC/DB/UV JACKET 1.2 dB/2500WATTS @ 30MHz ..... .36/FT / .34/FT / .32/FT
RG8/U STRD BC FOAM 95% BRAID UV RESISTANT JKT 0.9dB/1350WATTS @ 30MHz.. .32/FT / .30/FT / .28/FT
RG8 MINI(X)95% BRAID UV RESISTANT JACKET 2.0dB/875 WATTS @ 30MHz..... .15/FT / .13/FT / .12/FT
RG58/U 95% BRAID UV RESISTANT JACKET 2.5dB/400 WATTS@ 30MHz..... .15/FT / .13/FT / .11/FT
RG58A/U STRD CENTER 95% TC BRD UV RESISTANT JKT 2.6dB/350 WATTS @ 30MHz .17/FT / .15/FT / .13/FT
RG217/U SOLID BC 2 95% BC BRD NC/DB/UV JKT .70dB/4000WATTS @ 30MHz..... 1.10/FT / 1.00/FT / .95/FT

COAX (50 OHM "TEFLON" GROUP)

RG142/U SOLID SCCS 2-95% SILVER BRAIDS TEFLON JKT 8.2dB/1100WATTS @ 400MHz.....25FT/UP 1.25/FT
RG303/U SOLID SCCS 1-95% SILVER BRAID TEFLON JKT 8.6dB/1100WATTS @ 400MHz.....25FT/UP 1.00/FT

COAX (75 OHM GROUP)

RG11/U SOLID BC (VP-78%) 95% BRAID NC/DB/UV JKT 1.1dB/800WATTS... .40/**100FT/UP**.....38/**500FT**.....36/**1000FT**
RG11A/U STRD BC (VP-66%) 95% BRAID NC/DB/UV JKT 1.3dB/1000WATTS....42/**100FT/UP**.....40/**500FT**.....38/**1000FT**
RG6/U CATV FOAM 18GA CC8 FOIL + 60% ALUM BRAID .....14/**100FT/UP**.....12/**500FT**.....10/**1000FT**

LADDER LINE GROUP — 100FT/UP / 500FT / 1000FT

450 OHM 18GA SOLID CCS (POWER: FULL LEGAL LIMIT)..... .12/FT / .10/FT / .09/FT
"FLEXIBLE" 450 OHM 16GA COMPRESSED STRD CCS(PWR-FULL LEGAL LIMIT+)..... .20/FT / .18/FT / .16/FT
"FLEXIBLE" 450 OHM 14GA COMPRESSED STRD CCS(PWR-FULL LEGAL LIMIT++)..... .25/FT / .24/FT / .23/FT
300 OHM 20GA STRD (POWER: FULL LEGAL LIMIT)..... .15/FT / .13/FT / .12/FT

ROTOR & CONTROL CABLES — 100FT/UP / 500FT / 1000FT

5971 8/COND (2/18 6/22) BLK UV RES JKT. Recommended up to 125ft ..... .20/FT / .18/FT / .16/FT
5971CPS125. 125ft (cable same as above) w/Jones plug to socket assembly..... *$39.95/ea*
1618 8/COND (2/16 6/18) BLK UV RES JKT. Recommended up to 200ft..... .35/FT / .34/FT / .32/FT
1418 8/COND (2/14 6/18) BLK UV RES JKT. Recommended up to 300ft..... .47/FT / .45/FT / .43/FT
1216 8/COND (2/12 6/16) BLK UV RES JKT. Recommended up to 500ft..... .78/FT / .74/FT / .70/FT
2206 22GA STRD 6/COND PVC JACKET ..... .18/FT / .16/FT / .14/FT
1806 18GA STRD 6/COND PVC JACKET ..... .23/FT / .21/FT / .19/FT

ANTENNA WIRE (UNINSULATED BARE COPPER) — 100FT/UP / 500FT / 1000FT

14GA 168 STRD *"SUPERFLEX" (great for Quads & Portable set-ups etc.)*..... .12/FT / .10/FT / .08/FT
14GA 7 STRD *"HARD DRAWN" (perfect for permanent Dipoles etc.)*..... .08/FT / .07/FT / .06/FT
14GA SOLID *"COPPERWELD" (for long spans etc.)*..... .08/FT / .07/FT / .06/FT
14GA SOLID *"SOFT DRAWN" (for ground radials etc.)* ..... .08/FT / .07/FT / .06/FT
ROPE: 3/16" DOUBLE BRAID *"DACRON"* 770# TEST WEATHERPROOF ..... .12/FT / .09/FT / .08/FT

JAKE sez, it's really the Dog Days of Summer now...so why not use this time to improve your antenna & rotor's performance with this great JULY 98 ROTOR CABLE SPECIAL.

Extra-Heavy Dute 8/conductor cable. 2/#12ga stranded bare copper. 6/#16ga stranded bare copper. Color coded for easy identification & complete with a black UV Resistant jacket. Use this cable for control box to rotor "runs" up to 500 ft.

100ft $78.00 200ft $152.00
300ft $222.00 400ft $288.00
500ft $350.00 All lengths are continuous.

On this special limited stock, therefore, "No Backorders". So hurry.

ON THIS SPECIAL ONLY: prices include UPS shipping within the 48 states. **(Sorry NO COD's)**

JAKE (ooh this grass feels so nice)

ILLINOIS RESIDENTS ADD 8.25% SALES TAX.
(MINIMUM ORDERS: $20.00)

TINNED COPPER "FLAT" GROUNDING BRAID

1 INCH WIDE (equivalent to 7ga).....25FT $22.00.....50FT $43.00.....100FT $85.00
1/2 INCH WIDE (equivalent to 10ga)..... 25FT $12.50.....50FT $24.00.....100FT $48.00

CONNECTORS ***Both connectors fit 9913 types and LMR400*** MADE IN USA

PL 259 SILVER/TEFLON/GOLD TIP.....10PC $11.00.....25PC $25.00.....50PC $47.50.....100PC $90.00
"N" (2PC) SILVER TEFLON/GOLD TIP...10PC $32.50.....25PC $75.00.....50PC $143.75..100PC $275.00

COAX W/SILVER TEFLON PL259's EA END (soldered & tested)

100FT *"FLEXIBLE"* 9913 FOIL+95% BRAID 2.7dB @ 400MHz..... 69.95/EA
75FT *"FLEXIBLE"* 9913 FOIL+95% BRAID 2.7dB @ 400MHz..... 54.95/EA
50FT *"FLEXIBLE"* 9913 FOIL+95% BRAID 2.7dB @ 400MHz..... 39.95/EA
25FT *"FLEXIBLE"* 9913 FOIL+95% BRAID 2.7dB @ 400MHz..... 24.95/EA
6FT *"FLEXIBLE"* 9913 FOIL+95% BRAID 2.7dB @ 400 MHz.....12.95/EA
3FT *"FLEXIBLE"* 9913 FOIL +95% BRAID 2.7dB @ 400 MHz.....11.95/EA
100FT RG213/U MIL-SPEC BURIAL JKT 1.5dB @ 50MHz.....49.95/EA
75FT RG213/U MIL-SPEC DIRECT BURIAL JKT 1.5dB @ 50MHz.....39.95/EA
50FT RG213/U MIL-SPEC DIRECT BURIAL JKT 1.5 dB @ 50MHz.....29.95/EA
25FT RG213/U MIL-SPEC DIRECT BURIAL JKT 1.5 dB @ 50MHz.....19.95/EA
6FT RG213/U MIL-SPEC DIRECT BURIAL JKT 1.5 dB @ 50MHz.....11.95/EA
3FT RG213/U MIL-SPEC DIRECT BURIAL JKT 1.5 dB @ 50MHz..... 9.95/EA
100FT RG8MINI(X) 95% BRD UV RES JKT 2.5dB @ 50MHz.....24.95/EA
50FT RG8MINI(X) 95% BRD UV RES JKT 2.5dB @ 50MHz.....15.95/EA

FLEXIBLE 2/COND RED/BLK DC POWER "ZIP" CORD

8GA (rated:40 amps) .....25FT $16.00.....50FT $31.00.....100FT $60.00
10GA (rated:30 amps) .....25FT $10.50.....50FT $19.00.....100FT $36.00
12GA (rated:20 amps) .....25FT $8.00.....50FT $14.00.....100FT $26.00
14GA (rated:15 amps) .....25FT $6.00.....50FT $10.00.....100FT $18.00

***ORDERS ONLY:* 800-828-3340**
HOURS: M-F 9AM-12Noon, 1-5PM CST.
TECH INFO: 847-520-3003
FAX: 847-520-3444
TECH INFO HOURS: M-F 9-11AM
http://www.cablexperts.com/
416 Diens Drive, Wheeling, IL 60090

For Complete Catalog Check Web Site Below or Mail Request

CABLE & WIRE CUT TO YOUR SPECIFIC LENGTH • WE STOCK AND INSTALL CONNECTORS TOO.

"The works in a drawer." This photo says it all! David, KE4UAS, Virgil, KF4LGZ, and Kerry, KE4WLP, put the "works" in a drawer of a filing cabinet to prevent heavy grain-dust buildup in node "OHILL." Note: It's atop a 200 foot grain silo.

Kerry, David, Virgil at the ground-level entrance to the 200+ foot grain silo at Orchard Hill, Georgia. This trio of SEDAN SNOs is about to build a new SEDAN node near Griffin, Georgia.

Kerry, KE4WLP, and David, KE4UAS—building network node "OHILL" atop a grain silo in Orchard Hill, Georgia. Then another two SEDAN system node operators—Dennis, KU4OY (shown), and Frank, K4ICT (not shown; someone had to take the photos!) build an emergency network node on the other side of the state (EAST/KU4OY-7) at Eastman, Georgia.

Putting It All Into Perspective

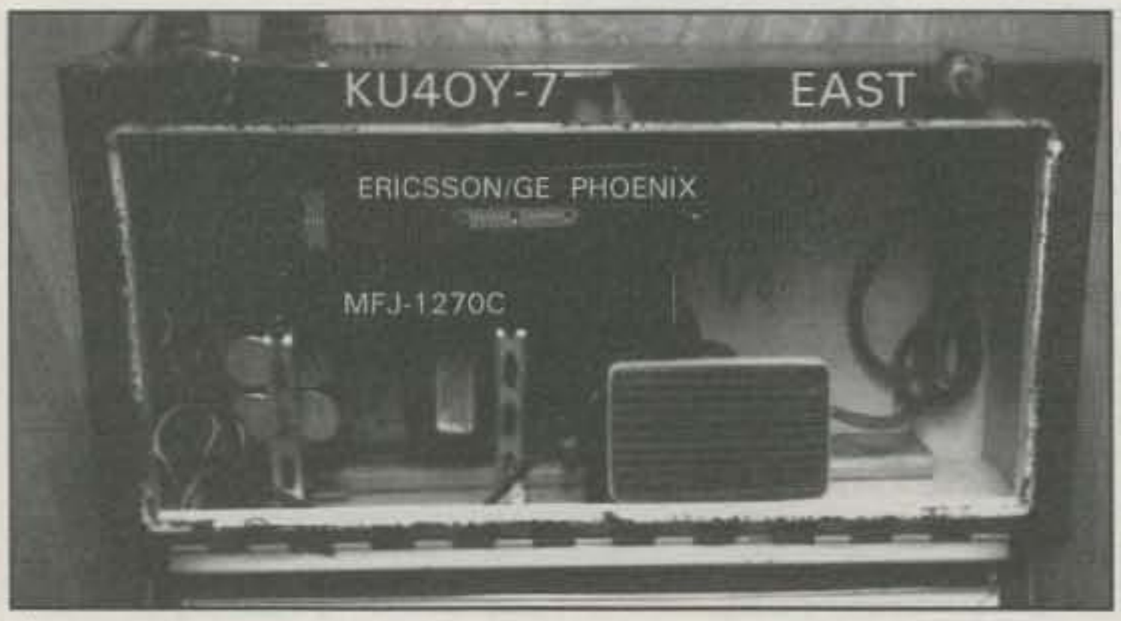
Take a moment and think about what we've talked about in this month's "Packet User's Notebook." You don't have to be a member of the SEDAN, or any other organization, to put an emergency node on for use as a "sky-warn" Wx Watch, ARES, RACES, or even a group/club node that can be used in times of disaster and other times as a simple keyboard node.

You can get the same good feeling that we do here in the eastern United States. With more than 150 nodes on the network, we don't consider the hundreds of thousands of dollars in equipment. We simply feel that the SEDAN is one of many instruments we use to help save lives. If the SEDAN helps save just one life, it has more than paid its way! This network has already done that—many times over.

It is really a good feeling when you can help make someone's life better. We—that is the amateur radio fraternity—are well known as the first line of communications when disaster strikes. In this spirit, let's keep amateur radio alive and remembered this way, well into the next millennium.

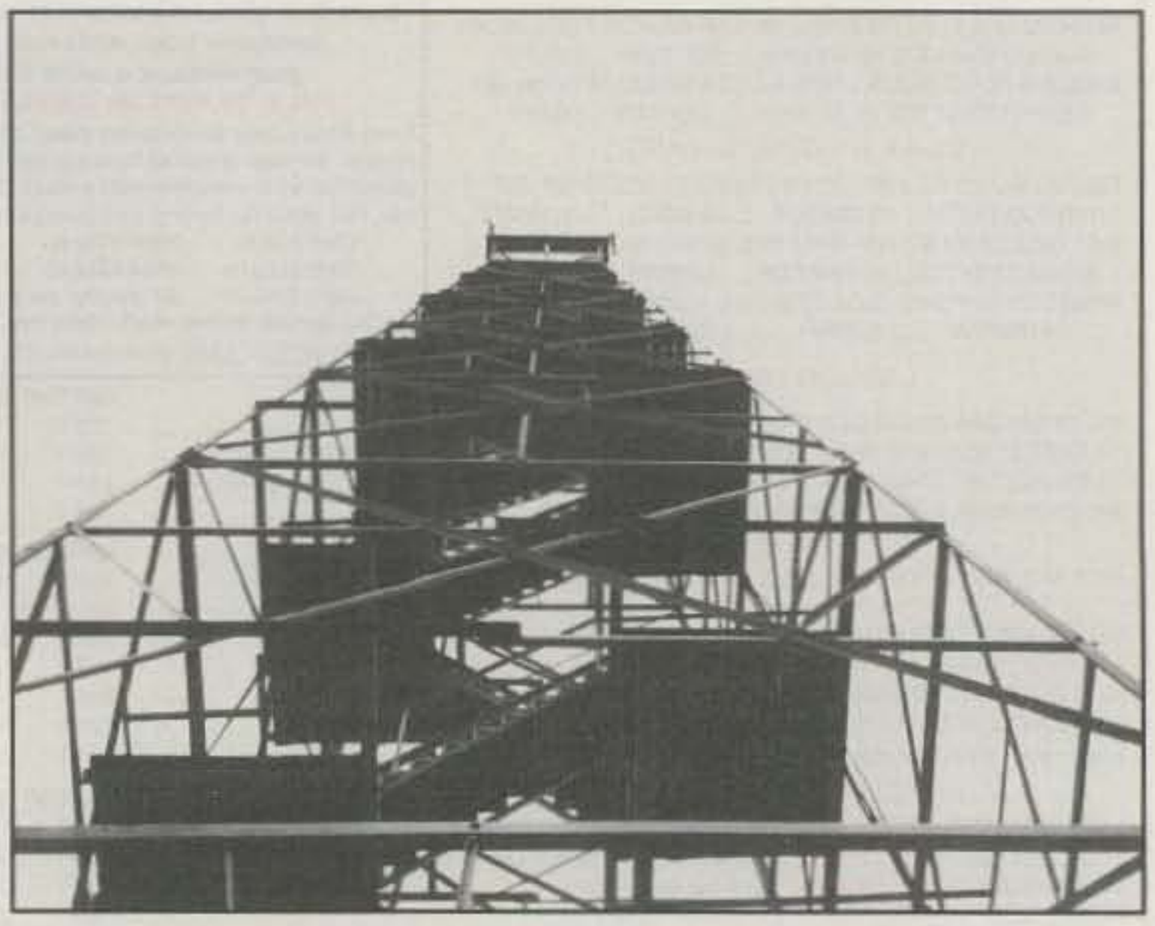
Until next month, Happy Packeting, and visit the PacketRadio Networking home pages at <http://www.packetradio.com>.

73 de BucK4ABT



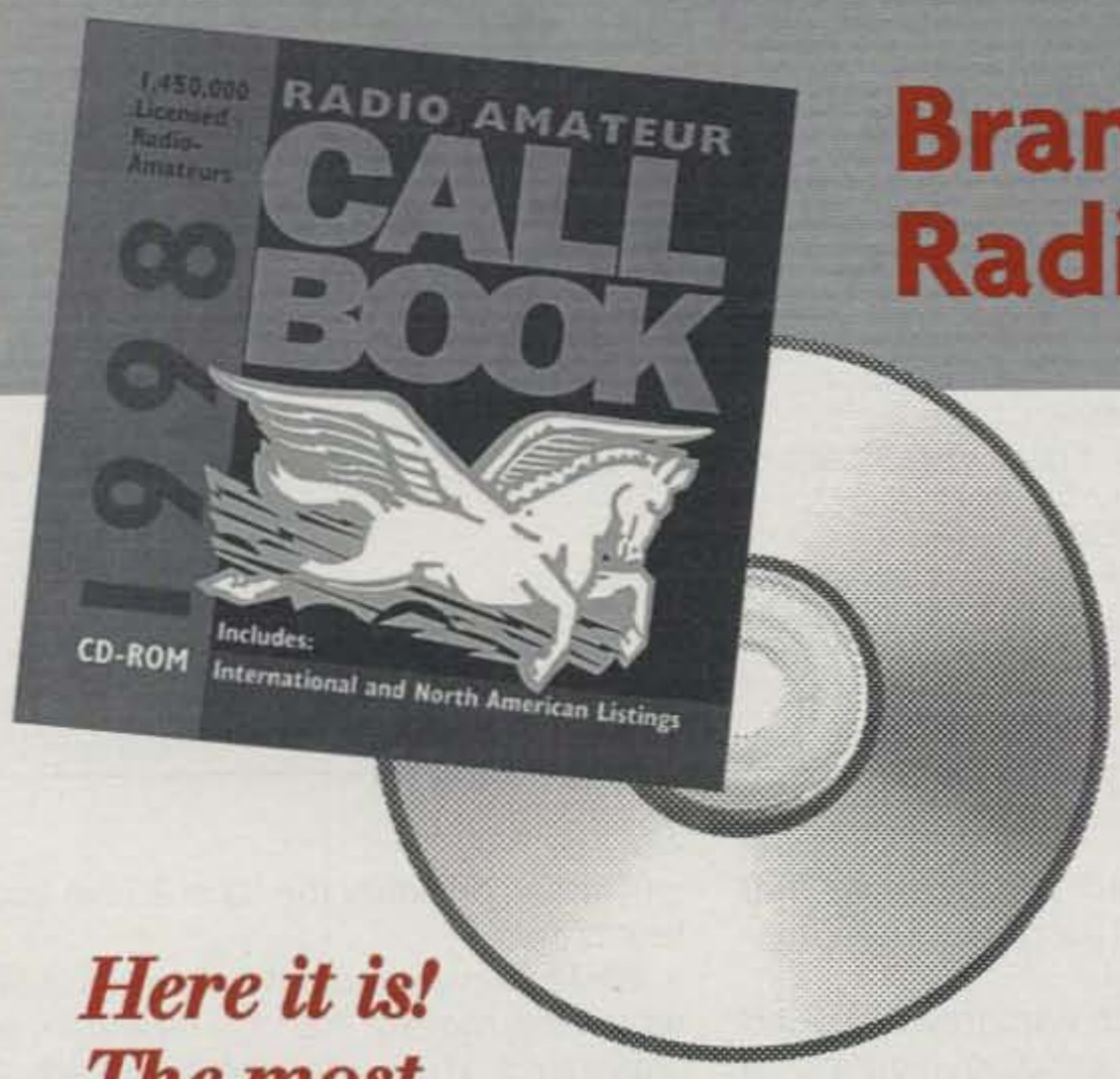
We'll just take the guesswork out of this job right now and move in for a closer look.

SEDAN node "EAST" is located atop a fire-watch tower near Eastman, Georgia. This node covers eastern-central Georgia.



RADIO AMATEUR SUMMER EDITION
CALLBOOK 1998

Brand NEW Amateur Radio Prefix MAPS!



Here it is! The most accurate and extensive CD-ROM available!

FEATURES

- Over 54,000 QSL Managers.
- Extended Wordsearch allows users to specify search criteria. Search by both first & last name, city, state & more (US data).
- Data displayed for US entries: Call, Name, QTH, class, issue & expiration dates, previous call, previous class, latitude & longitude, E-mail address, fax number & much more.
- Data displayed for international entries: Call, Name, QTH & class.
- Search international data by call, or use our text search for a more extensive search.

NEW FEATURES

- Revised label printing routines - choose from a variety of standard Avery label formats.
- Many new and updated maps.
- Print the entire Windows Help file with one click of a button.
- TSR & DLL's needed for compatability with most logging programs are included on the CD-ROM.

OUR NEW CD OFFERS UNMATCHED COVERAGE OF THE WORLD...

Colorful Maps of most of the World including small islands. Click on a button to view. "Only on the Radio Amateur Call Book CD-Rom."

The CD-ROM contains more than **1,450,000 listings** world-wide covering more than 250 countries, islands and dependencies. The Radio Amateur Callbook/CD-ROM contains both North American and International listings!

Listings can be found quickly by name, location and call letters – even when the information is incomplete!

The most accurate & extensive CD-ROM available.

ORDER TOLL FREE

1-888-905-2966 (USA Only)
1-732-905-2961• Fax 1-732-363-0338
E-mail: 103424.2142@compuserve.com

or fill out the coupon below. VISA/MC/AMEX accepted.

ORDERING COUPON

Please send me:

QTY.	ITEM	NUMBER	PRICE
_____	Callbook CD-ROM Available May, 1998	77993	$ 49.95

If ordering by credit card:

Card Type _____ Exp. Date _____

Card # _____ Signature _____

Address _____

Email address _____

If ordering by check or money order: I have enclosed a check/money order for $_____. (Please add sales tax in CA, DC, IL, MA, NJ, NY, OH, PA, TN, VA and Canada, and $5.00 per order for postage and handling in US; $7 for all shipments outside US.) Please include shipping instructions. Prepayment is required.

Radio Amateur Callbook
1695 Oak Street • Lakewood, NJ 08701

CIRCLE 112 ON READER SERVICE CARD

BY JOE LYNCH, N6CL

VHF PLUS

ALL ABOUT THE WORLD ABOVE HF

Amateur Television—Amateurs Should Be Heard and Seen

N6CL Wins B'nai B'rith Award

CQ's "VHF Plus" columnist Joe Lynch, N6CL, received the second-place B'nai B'rith Award in Social Ethics during the Perkins School of Theology Graduation Ceremony on 16 May 1998. The B'nai B'rith Award in Social Ethics is awarded on the basis of two main criteria: scholarly competence in the field of social ethics, and personal commitment as shown in voluntary activity in support of worthy social causes. Joe was cited for his continuing volunteer activities during his three years at seminary, which included his trips to Sarajevo and Mexico and demonstrated interest in social justice issues.

We at *CQ* congratulate Joe on his successful completion of his seminary training and his award, and we wish him the best of success in his new endeavor as a United Methodist minister.

VHF Plus Calendar

July 1	First quarter Moon.
July 5	Poor EME conditions.
July 8	Lowest Moon declination.
July 9	Full Moon.
July 11–12	CQ WW VHF Contest. (See last month's issue for contest details.)
July 12	Moderate EME conditions.
July 16	Moon perigee and last quarter.
July 19	Moderate EME conditions.
July 21	Highest Moon declination.
July 23	New Moon.
July 23–26	Central States VHF Society Conference, Kansas City, MO. (See last month's column for details.)
July 26	Good EME conditions.
July 28	*Delta-Aquarids* meteor shower predicted peak.
July 30	Moon apogee.
July 31	First quarter Moon.

EME conditions courtesy W5LUU.

Among the VHF weak-signal community is a growing minority specialty, Amateur Television (ATV). Dedicated to the principle that amateurs should be heard *and* seen, this specialty works at making its adherents television stars! Yet while its size would suggest that it is in its infancy insofar as development is concerned, it has been around a long time—as long as the idea of broadcasting a television picture.

My first exposure to ATV came shortly after I entered the hobby. It was 1960, and when I first hung around the shack of my mentor, Bert Adams, K6BTO, I noticed that he had a television in the corner. I jokingly said something about Bert being so bored with amateur radio that he kept a TV around to break the monotony. Bert pulled me up short by telling me that yes, indeed, he watched the TV, but he watched his fellow amateurs!

Back in the 1960s the ATV operator was also the weak-signal operator, but today's ATV enthusiast is anyone with an interest in television communications. In recent years ATV operation has been given a significant boost by the relatively easy access to camcorders. In fact, ATV operation is one of the fastest growing specialties in the VHF+ world. Tom O'Hara, W6ORG, who for the past 33 years has been the owner of an ATV specialty business called P.C. Electronics, reports that he is gaining around a thousand new customers per year!

Amateur television has grown beyond the boundaries of sending pictures of one's shack to other stations. ATV transmitters are now mounted in balloons, model airplanes, and robots. ATV is also used to retransmit weather maps, and crowd and disaster scenes for public officials. In fact, ATV has become an integral part of the Tournament of Roses parade in Pasadena, California, and is used to handle crises along the route. Focusing ATV on a particular problem, such as a disabled float, lets emergency service personnel access the situation and dispatch the appropriate equipment and/or personnel to fix it.

Interest in ATV, both slow and fast scan, has grown steadily over the years. Fast scan ATV is like that found in commercial broadcasting. Because it takes an enormous amount of spectrum space to transmit a fast scan ATV signal, it is only permitted on the 70 cm and above amateur bands.

As in the 1960s, the principle band for ATV operation today is 70 cm. Most ATV operation can be found on 434.000 or 439.250 MHz. ATV can also be found on the 33 and 23 cm bands and, in infancy, on the 13 cm band.

What is different today is the use of ATV repeaters—particularly crossband repeaters. Using an input frequency of either 434.000 MHz (in high population areas) or 439.250 MHz (in the midwest or low population areas), repeaters retransmit ATV signals within the 70 cm band or crossband on either the 33 or 23 cm amateur bands.

While the vast majority are within-band repeaters, more of the new repeaters are crossband. There are a couple of advantages for using crossband repeaters. First, desensing at the repeater site is nearly eliminated. Second, the operator transmitting a signal can see the signal and doesn't have to rely on others to make adjustments to it. Third, use of a crossband repeater frees up the other 70 cm ATV frequencies for simplex operation.

Most ATV contacts are not initiated by putting a signal on the air and calling "CQ ATV." Contacts are arranged when someone gets on the ATV coordinating frequency and announces that he or she is going to put a video carrier on the air. Incidentally, the calling frequency depends on which ATV frequency you're using. Generally, if you use 439.250 MHz, the calling frequency you'll use is 144.340 MHz; if you use 434.000 MHz, the coordinating frequency is 146.430 MHz. The principle reason for the difference in these two frequencies is to prevent the third harmonic of the 2 meter signal from interfering with the ATV signal.

Once an ATV signal is on the air, the operator of the transmitting signal will switch from the coordinating frequency to the voice, or aural, sub-carrier of the TV signal for his audio transmissions. Meanwhile, the calling frequency continues to be used, only now by others for communications with the operator transmitting the signal.

As with any other type of QSO, a form of signal report exists for ATV contacts.

P.O. Box 73, Oklahoma City, OK 73101
(phone 405-528-6625; fax 405-528-0746)
Internet jlynch@post.cis.smu.edu
Compuserve 72124.2734@compuserv.com

Say You Saw It In CQ

ATVers use a rating system of 0 to 5, preceded by the letter "P." For example, a signal that just shows the sync bars in the snow is rated "P0," a very snowy, almost imperceptible signal is a "P1," and a clear signal with no snow is a "P5." Some operators go so far as to split the signal reports into tenths. Thus, a signal with just a small amount of snow is a "P4.5." Incidentally, a P5 report represents about 150 to 200 micro volts of signal in the receiver.

So what does it take to get on the air with ATV? Surprisingly little. P.C. Electronics has a 10 watt transceiver available for around $500. This transceiver can be obtained with a crystal for one or two of the popular ATV frequencies and is set up to convert the receive signal to television Channel 3.

This use of your television assumes that you'll be watching the ATV signal being transmitted on the 70 cm band. However, if you're using a crossband repeater, then you'll have to obtain a converter for the band of the repeater output frequency. P.C. Electronics (2522 Paxson Lane, Arcadia, CA 91007-8537 USA; telephone 626-447-4565 Monday–Thursday, 8 AM to 5:30 PM PST; web site: <www.hamtv.com>). P.C. Electronics has a wide variety of converters. Consult their web page for current pricing and ordering information. These converters connect directly to the TV from the antenna. You can use a video switch to change from the converter output to the transceiver output. If you don't wish to purchase a converter, you can put a second TV to use as one!

Your biggest expense will be the camera. If you can live with monochrome, surplus cameras are available from a variety of sources. However, if you want color, and don't mind tying up your camcorder while you're on the air, you can use that as a dual-purpose unit.

You have quite a few antenna choices, and you need to know a bit about your area before you purchase one. If you're going to work simplex and plan to use 439.250 MHz, then you'll want a horizontally polarized antenna to avoid the increasing problem of encroachment from outputs of vertically polarized FM repeaters. If you're going to use 434.000 MHz, you'll want a vertically polarized antenna to avoid interference from weak-signal stations that use 432.100 MHz. However, if you're using a repeater, you'll want to know its polarization. Many repeaters are vertically polarized and commercial high-gain omni-directional antennas. However, a growing number are horizontally polarized. Check with nearby ATV enthusiasts to learn your local repeater's polarization.

If you're trying to work DX, you'll want a horizontally polarized antenna because most ATV DXers come from the weak-signal community and use horizontally polarized antennas. However, if you want the

RADIO WORKS

Antenna Fever

SuperLoop 80,	112' long, 80 -10 m. Want the best?	$96.95
SuperLoop 40,	56' long, 40 -10 m. Ready for DX	$84.95
CAROLINA WINDOM 80,	80 -10 m, 132' long	$84.95
CW 40,	40-10, 66', helped set 40 m records - terrific!	$82.95
CAROLINA BEAM 80,	80-10m,100' long.Powerful	$105.95
CAROLINA WINDOM 160,	160 -10m, 252' Big Bang	$119.95
BigSig 40,	3/2 wave loop, 40 m, 110' A Sizzler	$69.00
G5RV Plus,	80-10m, 102'+ High Power Current Balun	$57.95

Current Baluns

B1-2K	1:1	2 KW	80 -10 m	Current Balun	$20.95
B1-5K	1:1	5 KW	160 -10 m	Precision	$31.95
B1-1KV	1:1	1 KW	15 - 2 m	VHF Current Balun	$25.95
Y1-5K	1:1	5 KW	160 -10 m	The YagiBalun™	$33.95
B4-1KXV	4:1	1 KW	15 - 2 m	VHF Current Balun	$29.95
B4-2KX	4:1	2 KW	160-10 m	4:1 Current Balun	$42.95

RemoteBalun™ High Power, Current-type, 4:1, 160-10 m $49.95

NEW! RFI Quick Fix

For really tough RFI and RF feedback problems, you can't beat the new T-4 and T-4G Ultra Line Isolators. It's isolation factor is 50% higher than previous models. The T-4G goes even further with a built-in ground strap for direct Line Isolator grounding. Before coax enters your station, stray RF is shunted directly to ground. Use with Vertical antennas, install two T-4's between transmitter, linear and tuner to break up ground loops. Use the T-4 with any antenna to reduce feedline radiation. This is the RFI Big GUN. T-4G $33.95

New! VHF Baluns
B1-1KV 1:1 and B4-1KXV 4:1
Line Isolators T-6 and T-6G

Line Isolators, 50 Ohms, High power

T-4	Ultra Line Isolator, maximum RFI protection	$29.95
T-4G	Identical to T-4G without direct grounding	$33.95
T-6	VHF version of T-4 15 - 2 meters, 1 KW	$25.95
4K-LI	Line Isolator, SO-239 in and out	$21.95

July Specials

PL-259	Silver & Teflon	$1
RG-8X	Premium, 95%	13¢
RG-213	Mil-type, 95%+	33¢

Antenna Wire and Parts

PL-259ST	Silver-Teflon, USA	SALE $1.00
PL-259GT	Gold-Teflon, USA	$1.49 or $30/pk of 25
N/9913	For 9913, 9086, Flexi, etc.	$3.25
N/9913S	As above but Silver & Teflon	$4.25
N-200	'N' Silver-Teflon, installs like PL-259	$3.00
	Coax & Cable Prices	<100'/100'+
RG-8X	Premium grade, 95% braid, SALE	19¢/13¢
RG-8X Plus	95% shield, type IIA non-contaminating	26¢/22¢
RG-213 Plus	Enhanced, 96%+ super jacket	45¢/38¢
RG-213	Top Quality, 95% (Sale on 100' or more)	33¢
ExtraFlex	Flexible, 9913 type	57¢
R1 Rotator	8 conductor (2 x #18, 6 x #24) SALE	26¢/20¢
R2 Rotator	8 conductor (2 x #16, 6 x #18) SALE	47¢/35¢
#14 HD	Stranded, 7 x 22 hard-drawn	8¢
#14 FlexWeave™	168-strand, bare for any wire ant.	14¢
#12 FlexWeave™	259-strand, excellent for longer runs	19¢
450 Ladder	#16 stranded cond, windows SALE	22¢/16¢
450 Ladder	New! #14 stranded cond. poly SALE	30¢/24¢
1/2" Braid	Tinned copper, for ground systems	65¢

Pulleys - for antenna support rope. Highest quality, small, lightweight sailboat type for fibrous rope - for 3/16" rope $11.95 or 5/16" rope $14.95

Antenna Support Line MilSpec Dacron, single braid, solid, fungus & sun resistant line. 3/16" 700# test 100' hanks $8
Kevlar - no stretch, .075" dia. 500# test, Dacron jacket 200' spl $15.95

The RADIO WORKS
Orders & Technical (757) 484-0140
FAX (757) 483-1873
Order Hotline (800) 280-8327
Box 6159, Portsmouth, VA 23703
VISA and MC welcome. Give card #, exp. date, signature.
Add shipping (figure 10%, $7 min) Prices subject to change.
email - jim@RadioWorks.com
visit us at http://www.RadioWorks.com

NEW! General Catalog 981 80 pages of HF and VHF baluns, Line Isolators, high performance wire antenna systems, wire, cable, coax, connectors, station accessories, tuners, coax switches, support line, etc. If you don't shop here, you won't get the best prices! Free, allow 2-3 weeks for bulk mail or send $2 for Catalogs by Priority Mail

CIRCLE 68 ON READER SERVICE CARD

Tune In With

CQ VHF Ham Radio Above 50 MHz

The NEW magazine for all ham radio operators who are active or interested in operating on the bands above 50 MHz!

In every issue you'll find: Operating articles, Technical articles, Beginner's articles, Product reviews, Projects you can build, News and columns and New things to try. All year long, each issue of **CQ VHF** guarantees to show you **WHAT**, **WHY** and **HOW** to do more above 50 MHz.

	USA	VE/XE	Foreign Air Post
1 Year	☐ 24.95	☐ 34.95	☐ 44.95
2 Years	☐ 45.95	☐ 65.95	☐ 85.95

If mailing in subscription order, please enclose check or credit card information with expiration date (MasterCard, Visa, Amex and Discover accepted).

Please allow 6-8 weeks delivery

CQ VHF
25 Newbridge Road, Hicksville, New York 11801
Phone: 516-681-2922 FAX:516-681-2926

CIRCLE 93 ON READER SERVICE CARD

INSURANCE
for
AMATEURS

Insure all your radio and computer equipment.
(except towers and antennas)

HAMSURE
E Mail:hamsure@ameritech.net
www.ameritech.net/users/hamsure/hamsure.html
800-988-7702
Available only in 48 contiguous US

Special Club Rates

CIRCLE 94 ON READER SERVICE CARD

New from Gladiator!
TripleBander-WARC™

High efficiency on all 3 WARC Bands at once (30M, 17M, & 12M) with a Single Three-Vertical-Element Full Size Vertical Antenna! No traps or loading! One coax feedline. Automatic band switching. Weatherproof matching & isolation transformer and coax connector at base. Very Heavy Duty. No guys needed. Requires raised radials. TripleBander-WARC™ Price: $299.90. Pre-Made Flexweave Radials: $59.95.

Gladiators used at: 9MØC, 8Q7AA, KH9/N6MZ, WP3X VKØIR

Try our TL (Top Loaded) or CL (Center Loaded) OneBander Verticals for 160 or 80 Meters. Full Size OneBanders for 40, 30, 20, 17, 15, 12, and 10 M.

R. Myers Communications, *L.L.C.*
37875 North 10th St. Phoenix, AZ 85027
Call (FAX or Voice): 602-465-0936 VISA/MC
www.primenet.com/~bmyers
Email to W1XT: bmyers@primenet.com

Log-EQF

THE ***EASY TO USE*** LOGGING SOFTWARE.

Log-EQF Version 8 works with all major callsign databases, computer-ready rigs, and TNC's. DXCC, WAS, WAZ, beam headings, CW keyer, QSL labels, PacketCluster™, and more.

Log-EQF Version 8 runs in DOS, OS/2, or Windows. Just $39.95 (DX add $3 shipping).

Internet: http://www.itis.net/eqf
E-Mail: n3eqf@usaor.net
Check, Money Order, VISA or MC Orders: EQF Software, Tom Dandrea, N3EQF, 547 Sautter Drive, Coraopolis, PA 15108, 1-724-457-2584

CIRCLE 54 ON READER SERVICE CARD

flexibility of both vertical and horizontal polarization, a satellite antenna that enables you to switch between the polarizations will serve you well.

For the 2 meter transceiver you use for the coordinating frequency, you'll want a vertical antenna with some gain. This will put you in a round-table with other ATV operators and an omni-directional antenna will preclude the need to rotate your antenna to hear each of the other stations.

What if you're not quite ready to make the commitment to ATV? If you don't want to invest in a transceiver or down converter, but simply want to be an SWL, you can use your cable-ready TV as a receiver. To do so, you'll need to put your television in the "cable" mode. Many televisions have a switch that changes between cable channels and channels received by the antenna input. I have two cable-ready televisions and each is programmed differently. The Sony I own has a switch that says "Cable, Off, On." The Emerson uses remote-control programming to select between "TV" and "Cable TV." Consult your owner's manual to find out how to program your set for cable reception.

Once you've set up your TV, you can tune directly to Channel 60 if you're using 439.250 MHz as your ATV frequency, as the frequency of that channel is also 439.250 MHz. If you're using 434.000 MHz as your ATV frequency, tune to cable Channel 59. However, if you have a "Fine Tuning" adjustment, you may have to make a slight adjustment to your television because the cable frequency is 433.75 MHz. (Otherwise, don't worry about it because your television may have an automatic fine tuning (AFT) circuit that will search for the best reception of the signal the television picks up.) If you are in an area with a 70 cm repeater that uses 421.25 MHz for an output, you can tune to Channel 57, which is on that frequency.

Now it's simply a matter of finding out what frequency is used by ATV enthusiasts in your area, finding out where the signal is coming from, connecting the right kind of antenna, and rotating it. The right kind of antenna can be as simple as a commercial UHF antenna, or even Rabbit Ears! Be sure to connect an outside antenna, however, as connecting to the cable system will usually not get you any reception of the ATV signal that is being sent "over the air."

That's all there is to getting started as an ATV SWLer. Furthermore, there's nothing to stop you from joining in on the round-table discussion on the coordinating frequency. Watch out, though, you might just get hooked!

There is one caveat, however, with using your television. Most new televisions today come equipped with what amounts to a video squelch—that is, the screen turns blue (or some other color) when there is no signal (or only a very weak signal) present. This is problematic for the weak-signal ATVer because the threshold of the squelch is high enough to block out all but the more powerful signals. Fortunately, there are a few televisions which either do not have that feature or have some way of disabling it. When I spent some time in Best Buy electronics store in Oklahoma City recently, I came away with a new Sanyo which did not have that squelch feature. I also saw at least one model which purportedly had the ability to receive "DX" signals.

The magazine for the ATV enthusiast is *Amateur Television Quarterly* (ATVQ). For subscription information, contact Harlan Technologies, 5931 Alma Dr., Rockford, IL 61108 (telephone 815-398-2683; fax 815-398-2688; orders 800-557-9469). Web site is <www.stevens.com/atvq>, on which is a complete index of all articles published within *ATVQ* during its history.

A partial list of states and the locally active ATV organizations include the following. Check and see if there is an active group within your area:

Arizona: Arizona Amateurs on Television; *California:* Amateur Television Network—Southern California; Southern California ATV Sights and Sounds; Microwave Experimenter's Television System (METS); Santiago Peak Repeater; and the Stanford ARC. *Florida:* Tampa Bay Amateur Television Society; *Georgia:* Atlanta ATN Group; *Maryland:* Baltimore Radio Amateur Television Society; *New Jersey:* Brookdale Amateur Television Repeater System; *Ohio:* Amateur Television in Central Ohio; *Oregon:* Oregon Amateur Television Association; Salem Amateur Television Association. *Tennessee:* ATV in East Tennessee; *Texas:* Houston Amateur Television Society; *Utah:* Utah Amateur Television; *Washington:* Washington State Amateur Television Society. *International:* Australia: VK2XXA's Australian Amateur Television Club; *France:* Relais ATV du Finistere; *Slovenia:* ATVS—Slovenian ATV team; *Switzerland:* (unknown); International and multi-lingual associations: *United Kingdom:* British Amateur Television Club.

One other list on the ATVQ home page is that of current (or near current) ATV operators. This list is based upon their subscription list. There are in excess of 5500 names on the list. If you are looking for a mentor in your area, then consult that list beforehand.

Within the last year a national organization has been formed. Called Amateur Television of North America (ATNA), its mission and goals are the following: Protect our ATV interests and frequencies; use video transmission methods to support public service; plan for the amateur radio adoption of new technology; advance the state of the art of video and

video transmission methods; work with National Frequency Coordinators as the official coordinating body for Fast Scan ATV in North America; and associate in an equal role with other like-minded societies. For more information on ATNA, contact their web site at <www.qsl.net/atna>.

Retransmission of other services, in particular the retransmission of near real-time weather RADAR maps, is in a "gray area" of FCC jurisdiction because it is technically rebroadcasting another service—even though it has gone through computer processing beforehand. Therefore, about the only time a weather map is retransmitted is under the auspices of the Radio Amateur Civil Emergency Service (or RACES), and then only during severe weather to coordinate spotters and relaying vital information back to the National Weather Service and appropriate government agencies.

The one exception in the FCC rules that many ATV repeater operators take advantage of is the retransmission of space shuttle video and audio from NASA Television. Incidentally, this signal can be found on the Spacenet 2 satellite, transponder 5, C Band, 69 degrees west, on 3880 MHz, horizontal polarization, with the audio on 6.8 MHz.

What's in the future for amateur television? ATV operators are discovering ways to send the digitized signal from computers over ATV. Infrared cameras, which began to appear on the surplus market following Operation Desert Storm, are giving ATV operators the ability to make night-scene transmissions.

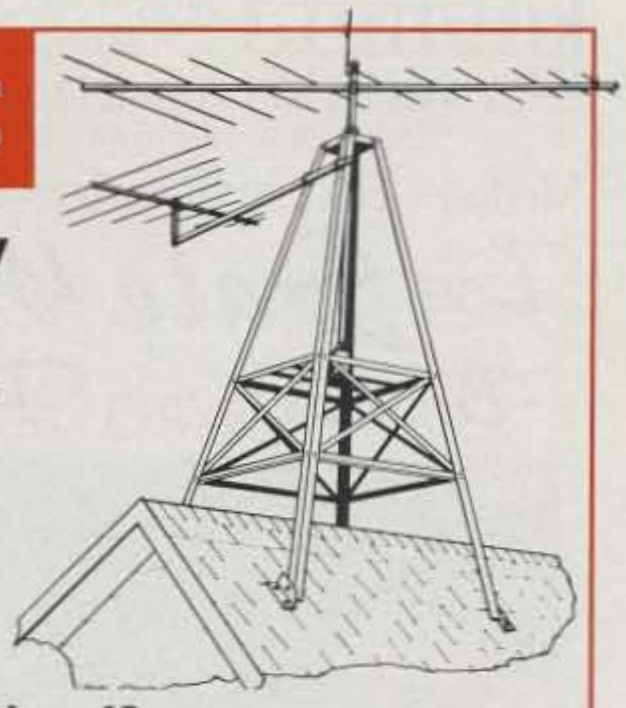
Ballooning has come a long way from the days when my high school buddies—Scott Morton and Richard Thorn (both of whom held Novice class licenses for a while)—launched a balloon with a CB walkie-talkie wired to transmit a chirpy tone, so they and I could track it using their CB radios and my general-coverage receiver. Now weather-type balloons that go up to over 100,000 feet and show the Earth and edge of space over a 500-mile radius are launched with GPS receivers that translate and superimpose the coordinates with the video signal, so they appear across the bottom screen. So much for hidden transmitter hunting! But that's a topic for another column.

Other uses of ATV are only limited by your imagination. Perhaps someday, like my mentor, Bert Adams, K6BTO, I'll be watching you via television in my shack!

A Big Aurora

Those of us who live across the northern tier of the U.S. and throughout Canada who were on the air on the day of 4 May were treated to a wonderful aurora opening which went as high as 432 MHz. The aurora was so intense that operators in the mid latitudes which normally don't

Roof Towers



ORDER TODAY / Ship Today
Anodized Aluminum Construction
Lightweight - yet - Extra Heavy Duty
High Quality / Stainless Steel Bolts
Also Thrust Bearings,
Masts, Lightning Rods

GLEN MARTIN ENGINEERING

13620 Old Hwy 40
Boonville, MO 65233
(816) 882-2734
http://www.glenmartin.com

See Our Last Add for Towers and Hazer

MODEL	Hite feet	Top to Rotor	Base width	Max. Ant. in sq. ft. @ 87 mph	100 mph	112 mph	Max Ant load	Wgt lb.	Price w/ UPS
RT-424	4.5	34.75	24"	6	4.5	3.6	100 lb.	22	$159.95
RT-832	8.0	43.75	32"	8	6	4.8	120 lb.	36	$229.95
RT-936	9.0	43.75	36"	18	13.5	10.5	130 lb.	78	$389.95
RT-1832	17.5	37.62	32"	12	9	7.2	110 lb.	88	$524.95

CIRCLE 69 ON READER SERVICE CARD

CB-TO-10 METERS

We specialize in CB radio modification plans and hardware. Frequency and FM conversion kits, repair books, plans, high-performance accessories. Thousands of satisfied customers since 1976! Catalog $3.

CBC INTERNATIONAL
LOU FRANKLIN/K6NH - Owner
P.O. BOX 31500CQ, PHOENIX, AZ 85046

CODE QUICK

Make 13 wpm in 30 Days!
Hear All About It
800 782-4869

NEMAL

Cable & Connectors for the Electronics Industry

Factory authorized distributor for Alpha, Amphenol, Belden, Kings, Times, Cablewave

New 48 page CABLE AND CONNECTOR SELECTION GUIDE is available at no charge with orders.

NEW! EXCLUSIVE
NE5080 UHF Plug For RG217
Teflon/Gold Pin
$22.50

COAXIAL CABLES
(per ft - 100ft prices)

1181F flexible 9913F BELDEN	.62
1180 BELDEN 9913 very low loss (real Belden)	.52
1102 RG8/U 95% shield low loss foam 11ga	.34
1110 RG8X 95% shield (mini 8)	.15
1130 RG213/U 95% shield mil spec NCV jkt	.36
1140 RG214/U dbl silver shld mil spec	1.85
1705 RG142B/U dbl silver shld, teflon ins	1.50
1450 RG174/U 50 ohm. 100" od mil spec	.14
1410 RG58/U mil type 50 ohm 95% shield	.12

ROTOR CABLE 8 CONDUCTOR

8C1822 2-18ga and 6-22ga	.22/ft
8C1620 2-16ga and 6-20ga	.32/ft
8C1618 2-16GA and 18GA	.42/ft

CONNECTORS MADE IN USA

NE720 Type N plug for Belden 9913	$3.95
NE723 Type N jack for Belden 9913	4.95
PL259AM Amphenol PL259	.99
PL259TS PL259 teflon ins/silver plated	1.59
PL258AM Amphenol female-female (barrel)	1.65
UG175/UG176 reducer for RG58/59 (specify)	.22
UG21D N plug for RG8,213,214	3.35
UG83B N jack to PL259 adapter, teflon	6.50
UG146A SO239 to N plug adapter, teflon	6.50
UG255 SO239 to BNC plug adapter	4.75
SO239AM UHF chassis mt receptacle, Amphenol	1.50
UG88C BNC plug RG58,223,142	2.09

HARDLINE 50 OHM

FLC12 1/2" Cablewave corr. copper blk jkt	1.79/ft
FLC78 7/8" Cablewave corr. copper blk jkt	4.55/ft
NM12CC N conn 1/2" corr. copper m/f	28.15
NM78CC N conn 7/8" corr. copper m/f	67.50
UM12CC PL259 for 1/2" corr. copper	24.75
FLX14 1/4" super flexible	1.65/ft
FLX12 1/2" super flexible	3.15/ft

* Prices do not include shipping.
Visa/Mastercard $30 min. COD add $5.
Call or write for complete price list.

Automated Fax-Back System (305)981-9800. Obtain catalog pages and product info 24hrs a day

12240 NE 14th Ave., N. Miami, FL 33161
(305) 893-3924 24hr. FAX (305) 895-8178 (800) 522-2253
SAO PAULO, BRASIL - TEL: 011-535-2368
E-MAIL: INFO@NEMAL.COM Home Page On Internet: http://www.nemal.com

CIRCLE 63 ON READER SERVICE CARD

Motron Electronics
310 Garfield St Suite 4
PO Box 2748
Eugene, Oregon 97402
http://www.motron.com

MoTron Electronics Announces...

The Sale You've Been Waiting For!

TxID-1
Transmitter FingerPrinting System
Regularly $699 ONLY $499*

TxPorter™ Mobile Adapter
Regularly $249 ONLY $199*

*Shipping/Handling/Insurance Extra
Se Habla Español.
ORDERS: (800) 338-9058
Info: (541) 687-2118 Fax: (541) 687-2492
CIRCLE 61 ON READER SERVICE CARD

Shortwave Receivers Past & Present
Communications Receivers 1942-1997

- New 3rd Ed.
- 108 Chapters
- 472 Pages
- 840 Photos
- Printed 03/98
- Covers 1942 to 1997.
- 770 Receivers
- 660 Variants
- Includes 98 U.S. and Intl. manufacturers
- $24.95 (+$2 ship)

This huge 472 page Third Edition includes over 770 shortwave and amateur communications receivers made from 1942 to 1997. Here is everything you need to know as a radio collector or informed receiver buyer. Entry information includes: receiver type, date sold, photograph, size & weight, features, reviews, specifications, new & used values, variants, value rating and availability. Ninety eight worldwide manufacturers are represented. 840 Photos. Become an instant receiver expert!

universal radio inc.
Universal Radio
6830 Americana Pkwy.
Reynoldsburg, OH 43068
◆ Orders: 800 431-3939
◆ Info: 614 866-4267
◆ FAX: 614 866-2339

experience aurora also worked it. To give us a perspective on just how good (or bad) conditions were, Dave Batcho, N5JHV, forwarded the following on the storm to the VHF reflector: "For those of you who don't access the Solar Terrestrial Activity Report at <http://www.dxlc.com/solar/>, here's a copy of their report of May 4.

"WARNING: An extremely strong solar wind shock wave was observed at SOHO at 0230 UTC on May 4. Solar wind speed increased from about 500 km/sec to 860 km/sec in just a few minutes. The magnetic Bz component was very strongly southwards at nearly –40 nT. This is likely the early arrival of plasma from the May 2 CME. The transit time will in that case be an unusually short 38 hours! A strong sudden impulse was recorded on earth at about 0305 UTC.

"Comment added at 0532 UTC on May 4: Ottawa recorded extremely severe storming between 03 and 04h UTC; the 3-hour planetary A index jumped from 58 to 148 (severe storm approaching very severe storm)! Between 04 and 05h UTC several stations recorded a K index of 9 and the 3-hour planetary A index jumped to an amazing 253!

"Comment added at 0633 UTC: During the 3-hour interval from 03 to 06h UTC an incredible planetary A index of 317 (= K index 9) was measured.

"Comment added at 0940 UTC: The 06-09h UTC interval had a planetary A index of 264. Geomagnetic activity decreased after 08h UTC; it's too early to know if this decrease was temporary or if the peak of the disturbance has been reached.

"Comment added at 1245 UTC: The Ap index for the 09–12h interval was 'only' 89. Minor to severe storm conditions are likely for the remainder of the day. As for the Ap index of 317 earlier today it should be noted that such values are only recorded during the most powerful disturbances. We have to go back to 1991 and 1992 to find similar values and all the way back to the great storm of March 13–14, 1989 for a disturbance that is significantly stronger than the current one."

Current Conference

Central States VHF Conference: The annual Central States VHF Conference will be held in Hot Springs, Arkansas, between 23–26 July. For more information, see last month's column or their home page at <http://www.csvhf.org>.

Current Meteor Showers

This month there are a number of minor showers. The most intense, the *delta-Aquarids*, is a southern latitude shower. It has produced in excess of 20 meteors per hour in the past. Its predicted peak is around 28 July at 2330 UTC.

The only northern latitude shower is the *alpha Cygnids*. It is supposed to peak around 20 July, but with a rate of only five meteors per hour.

Beginning around 17 July and lasting until approximately 14 August, you will see activity tied to the *Perseids* meteor shower. Its predicted peak is around 12 August. I will have more extensive coverage of this shower in next month's column.

Current Contests

The **CQ World-Wide VHF Contest** is scheduled for 11–12 July. For complete rules, see June *CQ* magazine or my home page at <http://www.smu.edu/~jlynch/hamradio.html>.

Internet 6 Meter Contest: Piggy-backing on *CQ*'s contest is the Internet 6 Meter Contest. Growing from an increased interest in a worldwide 6-meter-only contest, a group from the VHF reflector has decided to sponsor a 6-meter-only contest. The contest will run the same time as *CQ*'s contest plus three more hours after the end of the *CQ* contest. For the full rules, see K1AR's "Contest Calendar" column this month.

And Finally . . .

For those of you who found my piece about my new wife entertaining, what follows is part of the rest of the story.

Carol and I drove to Eurika Springs, Arkansas to get our marriage license. On our way, Carol had several questions about whether or not we were "doing the right thing," which I dutifully and patiently answered during the five-plus hour drive. When we arrived at the courthouse, it was nearly closing time. (I think that Carol was purposely dragging her feet in order to miss the closing time.) As we walked in the outer doors, the clerk was coming out the inner door with her keys in hand to close up. I asked her if she was closing and she replied, "Yes, but I'll take y'all," whereupon she walked behind us and locked the outer door. After it was all over, Carol remarked to me that when the clerk walked behind her and locked us in, she knew it was all over. There was no turning back. She knew that she had to go through with marrying me. Now she also tells me that she has no regrets and wonders why we didn't get married sooner!

Thank you, all y'all faithful readers, for your kind wishes for the success of our marriage. We are looking forward to a wonderful life together.

And thank you for your continuing kind words about this column. I have said it many times before, but I reiterate: This is your column. What appears here is what you are interested in and news about your activities in the wonderful world of weak-signal VHF. I continue to look forward to reporting on you.

Until next month . . . 73, Joe, N6CL

Say You Saw It In CQ

BY JOHN DORR, K1AR

CONTEST CALENDAR

NEWS/VIEWS OF ON-THE-AIR COMPETITION

Has This Contest Ended Yet?

July's Contest Tip of the Month

Don't ever get so intimidated by the size of a pileup that you simply tune by the station without calling. We all have a story or two about the time we broke through a pileup without a clue how our station pulled it off. Here's the answer: operating skill! There's one guarantee when chasing rare contest multipliers: If you don't at least try to call them, you absolutely won't work them!

A quick look at a set of contest rules should provide an answer to this month's topic. After all, we all know that the CQ WW Contests end at 0000Z, ARRL SS at 0300Z, ARRL Field Day at 1800Z (unless you're one of those crazy groups that begin setting up at the beginning of the contest), and so on. However, with the increased attention paid to callsign accuracy in recent times, it seems reasonable that more of us are looking for the competitive edge that makes our "perfect" logs even more so. This desire for perfection has recently spawned some interesting debate.

When does a contest really end? Has a contest run its course when we power our stations down on Sunday evening? Many will argue that the contest is not *really* over until we have completed our paperwork and e-mailed our logs to the appropriate Internet address. Although there are many views on this subject, they generally fall into two categories:

1. The contest ends with the last QSO. The log may only be modified to remove duplicates and identify unclaimed multipliers.

2. Although the "physical" time has expired for the contest, other methods may be employed to "sanitize" the log prior to submission.

Many of the contesters I've spoken to recently agree that the "scenario 1" crowd has a very small group of supporters. This is further substantiated by the input I received from last year's CQ Contest Ethics survey that will be covered next month. In fact, over 60% of the respondents clearly leaned towards "scenario 2."

Over the past few weeks I've been assembling a collection of methods contesters use when choosing the second scenario. If you haven't thought about this issue in great depth, I guarantee you will now. Following are just a few examples:

1. Tape record the entire contest and correct incorrectly copied callsigns/exchanges.

2. Manually scan through an entire log and remove/correct incorrectly copied callsigns/exchanges.

3. Compare your log to another and remove/correct potential errors (note that this can easily be accomplished electronically).

4. Compare your log to a computerized "master database" derived from other contests to remove/correct potential errors (either during or after the contest).

5. Utilize the growing availability of computerized callsign lists (i.e., callbook listing, assigned FCC/foreign callsigns) to remove impossible callsign combinations.

When studying this topic, I uncovered more questions than answers. For example, if you utilize the aforementioned techniques, how should you use the new information? Is it fair to eliminate QSOs that retain high error potential? Or more important, is it even ethical to correct identified errors and take credit for QSOs that were invalid as originally logged?

2 Mitchell Pond Road, Windham, NH 03087
e-mail: K1AR@contesting.com

Calendar of Events

June	27-28	ARRL Field Day
June	27-28	Marconi Memorial Contest
July	1	RAC Canada Day Contest
July	4-5	Venezuela SSB DX Contest
July	**11-12**	**1998 CQ WW VHF Contest**
July	11-12	IARU HF Championship
July	11-12	Internet 6-Meter DX Contest
July	18-19	NAQP RTTY Contest
July	18-19	SEANET CW Contest
July	19	Colombian Independence Day Contest
July	25-26	RSGB IOTA Contest
July	25-26	Venezuela CW DX Contest
Aug.	1	EU HF Championship
Aug.	1-2	North American CW QSO Party
Aug.	1-2	10-10 Net Summer Phone QSO Party
Aug.	2	YO DX Contest
Aug.	8-9	WAE CW Contest
Aug.	8-9	MD-DC QSO Party
Aug.	15-16	North American SSB QSO Party
Aug.	15-16	SEANET SSB Contest
Aug.	15-16	SARTG RTTY Contest
Aug.	15-17	New Jersey QSO Party
Aug.	29-30	Hawaii QSO Party
Sept.	5-6	All Asian SSB Contest
Sept.	5-6	LZ DX Contest
Sept.	6	NA CW Sprint
Sept.	12-13	WAE SSB Contest
Sept.	13	NA SSB Sprint
Sept.	19-20	SAC CW Contest
Sept.	**27-28**	**CQ WW RTTY DX Contest**
Sept.	27-28	SAC SSB Contest
Oct.	**24-25**	**CQ WW SSB DX Contest**
Nov.	**28-29**	**CQ WW CW DX Contest**

The Bottom Line

I believe that contest sponsors have just begun to see one of the growing "downside" examples of computer technology in contesting. Any measure of enforcing guidelines (if in fact that is even needed) becomes quickly impossible to administer. Can you imagine disqualifying someone's log for being too accurate? The resolution to this debate must remain with the individual contributor. It persists as a personal standard you wrestle with as you weigh your "real-time" operating ability against the pressures of winning. In my book, there is really no debate. With nearly all major contests now accepting electronic submissions, I'm finding it very easy to simply e-mail my log without ever looking at it (at least from an accuracy standpoint). The contest ends for me at the end of the contest—period! This is just one man's opinion, but I think it's a practice from which all of contesting could benefit. Do you agree?

Final Comments

I have to offer an apology for not completing the contest survey results promised for this month's column. My continuing work commitments (and side trip to KH6) simply did not give me the needed time to finish the analysis. Rest assured, you'll see the results of your efforts in next month's issue.

That's it for this time. As always, all contest calendar submissions for the October column must reach me by August 1st.

73, John, K1AR

Venezuelan Contest

SSB: July 4–5 CW: July 25–26
0000Z Sat. to 2400Z Sun.

This is the 37th annual contest celebrating Venezuela's independence. It's a world-wide-type contest, so do not confine your activity to working YVs only. Working other DX is encouraged. Use all bands, 80-10 meters (no WARC bands).

Classes: Single Operator, Single and All Band, and Multi-Operator, Single and

Antenna Software by W7EL

EZNEC ("Easy-NEC") captures the power of the NEC-2 calculating engine while offering the same friendly, easy-to-use operation that made ELNEC famous. **EZNEC** lets you analyze nearly any kind of antenna - including quads, long Yagis, and antennas within inches of the ground - *in its actual operating environment*. Press a key and see its pattern. Another, its gain, beamwidth, and front/back ratio. See the SWR, feedpoint impedance, a 3-D view of the antenna, and much, much more. With 500 segment capability, you can model extremely complex antennas and their surroundings. Includes true current source and transmission line models. Requires 80386 or higher **with coprocessor**, 486DX, or Pentium; 2Mb available extended RAM; and EGA/VGA/SVGA graphics.

ELNEC is a MININEC-based program with nearly all the features of EZNEC except transmission line models and a limitation of about 127 segments (6-8 total wavelengths of wire). Not recommended for quads, long Yagis, or antennas with horizontal wires lower than 0.2 wavelength; excellent results with other types. Runs on any PC-compatible with 640k RAM, CGA/EGA/VGA/Hercules graphics. Specify coprocessor or non-coprocessor type.

Both programs support Epson-compatible dot-matrix, and HP-compatible laser and ink jet printers.

Prices - U.S. & Canada - EZNEC $89, ELNEC $49, postpaid. Other countries, add $3. VISA AND MASTERCARD ACCEPTED.

Roy Lewallen, W7EL phone **503-646-2885**
P.O. Box 6658 fax **503-671-9046**
Beaverton, OR 97007 email **w7el@teleport.com**

CIRCLE 59 ON READER SERVICE CARD

THE QSL MAN
Quality AND Value
Get the most for your QSL $$$$
You CAN have good quality with fast service at a reasonable price.
QSLs by W4MPY - Wayne Carroll
Box 73, Monetta, SC 29105-0073
Phone or FAX (803) 685-7117
Email: W4mpy@PBTComm.net
URL: http://www.mindspring.com/~w4mpy/

208-852-0830
http://www.rossdist.com


Check Out Our Specials! We're On The Web.
Over 9010 HAM Items in Stock, All Prices Cash FOB Preston
ROSS DISTRIBUTING, 78 S. State Street, Preston, ID 83263
Hours Tue.-Fri. 9-6 • 9-2 Mondays. Closed Saturday & Sunday

TRY STI...
ANTENNA & TOWER SUPPORT ROPE
- BLACK DACRON® POLYESTER JACKET FOR UV PROTECTION.
- STRONG DOUBLE BRAID CONSTRUCTION.
- EXCELLENT RESISTANCE TO MILDEW AND ABRASION.
- DIAMETERS: 3/32", 3/16", 5/16"
- TIES EASILY. NO EXPENSIVE HARDWARE.
- CUTS EASILY AND SEALS EFFECTIVELY WITH HOT KNIFE.

JOIN THE MANY SATISFIED CUSTOMERS WHO USE STI SPECIAL DOUBLE BRAID ROPE THAT FITS THE NEEDS OF AMATEUR RADIO OPERATORS. SEND FOR FREE SAMPLE OF EACH SIZE AND ORDERING INFORMATION. CALL FOR THE NAMES OF YOUR LOCAL DEALERS.

STI Synthetic Textiles, Inc.
1145 N. GROVE STREET
ANAHEIM, CA 92806
TEL: (714) 630-2134
FAX: (714) 630-9386

CIRCLE 95 ON READER SERVICE CARD

Multi-Transmitter (no limit to transmitters, but only one signal per band).

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

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

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

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

Awards: A plaque will be awarded to the highest scorer in each operating class. Certificates will be distributed to stations making more than 20% of the next highest score.

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

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

Mailing deadline is September 30th for SSB entries and October 31st for CW. They go to: Radio Club Venezolano, Concurso Independencia, P.O. Box 2285, Carcas, 1010-A, Venezuela.

CQ WW VHF Contest

1800Z Sat. to 2100Z Sun., July 11–12

The popularity of this one continues to grow. Be sure to review the full set of rules found in the June issue of *CQ*. Mail logs to CQ VHF Contest, 25 Newbridge Road, Hicksville, NY 11801. Be sure to mark "VHF Contest Logs" on the envelope.

Internet 6m DX Contest

1800Z Sat. to 2359Z Sun., July 11–12

Running concurrently with the CQ WW VHF Contest, the objective of this relatively new one is to work as many stations on 6 meters as possible (SSB/CW only), especially DX, in the alloted timeframe. Extra credit is given for those who work DX stations in far-away grids.

Categories: Single Operator (USA/VE and DX), Single Operator QRP (USA/VE and DX), and Multi-Operator (USA/VE and DX).

Category Description: *Single operator*—One operator performs all logging and operating functions of the station. Multipliers can be passed from other VHF bands if desired. A single operator means the same operator for the duration of the contest. *Single Operator QRP*—Same rules as above, but limited to 10 watts or less RF output. *Multi-Operator*—One or more operators. Having a second operator searching for multipliers, the use of a packet spotting network, or the use of relief operators places you in the multi-operator category. Only one transmitted signal at a time is allowed. Passing from other bands is allowed. *Rover*—One or two ops QRV from a minimum of three (3) grids, portable or mobile only.

Exchange: Callsign and Grid square.

Scoring: Each QSO in your continent is worth 1 point. QSOs with stations outside your continent count 3 points. For this contest, North America is USA/VE only.

Bonus points: 10 QSO points can be taken for every unique grid field worked (i.e., EM, FM, FN, FL, DN, IM, etc.). Multipliers are unique grid squares the first time they are worked plus each unique ARRL DXCC country the first time it is worked, including W/VE. Count your own country for credit the first time it is worked.

Final score: Total QSO points plus bonus points and multiply the sum times the total of grids plus DXCC countries worked.

Awards: Plaques to the top finishers in each sponsored category. All first-place plaques have been sponsored! Certificates will be awarded to the top five finishers in each category.

Logs must be postmarked not later than 30 days after the last day of the contest. A signed summary sheet is required for paper logs. The log checking committee will consist of volunteers that are very active 6 meters ops. Entrants will lose an extra multiplier for each incorrectly logged unique multiplier. Entrants will lose an extra QSO for each incorrectly logged contact. Send disks or paper logs to: Internet 6m DX Contest, 2131 Woodruff Rd. 2100-250, Greenville, South Carolina, 29607 U.S.A. After submitting your CQ WW VHF log to the sponsor, you can simply separate the 6 meter log and re-score it to reflect the different multipliers, bonus point values, and score. Anyone participating in the CQ WW VHF Contest is eligible to send in an Internet DX 6m log!

IARU HF Championship

1200Z Sat. to 1200Z Sun., July 11–12

This is the 13th annual IARU World HF Championship. All six bands, 10 through 160 meters, and the full 24 hours may be used by both single and multiple-operator stations. (No WARC bands.)

Categories: Single operator, CW only, Phone only and Mixed modes. Multi-operator, single transmitter, mixed mode only.

Stations must remain on a band for at least 10 minutes. *(Exception:* Only IARU member-society HQ stations may operate simultaneously on more than one band with one transmitter on each band/mode.)

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

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

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

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

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

Entries with more than 500 QSOs are required to include a dupe sheet with log. A three QSO reduction will be assessed for each duplicate QSO for which credit has been taken. Disqualification may occur if the overall score is reduced by 2% or more. You may submit your contest entry via the ARRL BBS (860-594-0306), anonymous FTP to <ftp.arrl.org> or via the Internet to <contest@arrl.org>. Send your ASCII summary sheet file (make sure it includes all the pertinent information outlined in the official summary sheet) and your ASCII log file following the ARRL Suggested Standard File Format.

It is recommended that you check out ARRL's web site at <www.arrl.org> for more detailed information. A large SASE with 2 IRCs (or equivalent) will get you official forms and an ITU zone/prefix/continent map. Mailing deadline for entries is August 13th to: IARU HQ, Box 310905, Newington, CT 06131-0905.

North American QSO Party RTTY Contest

1800Z Sat. to 0600Z Sun., July 18–19

The object of this one is to work as many North American stations (and/or other stations if you are in North America) as possible during the contest period. North American stations are defined by the rules of the CQ WW DX Contests with the addition of KH6.

Classes: Single operator and multi-operator, two transmitters. Multi-operator stations must keep a separate log for each transmitter and must have at least 10 minutes between band changes. Use of helpers or spotting nets by single operator entries is not permitted. Single operator entrants may only have one transmitted signal at a time. Output power must be limited to 150 watts for eligible entries. Multi-operator stations may operate for the entire 12 hour period. Single operator stations may operate 10 out of 12 hours. Off-times must be at least 30 minutes in length and must be clearly marked in the log.

Bands: 80–10 meters only (no WARC bands). You may work a station once per band. Suggested frequencies are 3585, 7085, 14085, 21085, and 28085. Try 10 meters at 1900Z and 2000Z, 15 meters at 1930Z and 2030Z.

Exchange: Operator name and station location (state, province, or country).

Scoring: Multiply total valid contacts by the sum of multipliers worked on each band. Multipliers are states (including KH6 and KL7), Canadian call areas (VE1–VE8, VO1, VO2, VY1, and VY2) and other North American countries. Do not count USA, Canada, KH6, or KL7 as countries. Non-North American countries do not count as multipliers, but may be worked for QSO credit.

Team Competition: Team competition is limited to a maximum of five single operator stations (two minimum) as a single entry unit. **Pre-contest Requirement:** To qualify as a team entry, you must register the name, callsign of each operator, and callsign of the station operated should the operator be a guest at a station other than his own (e.g., N4RJ op. by KM9P). Teams must be registered with AB5KD.

Penalties: For each unmarked duplicate QSO, you lose that contact plus an additional three contacts; for each QSO for which you are not in the other station's log, you lose that QSO plus an additional one contact; and for each QSO for which the log data is incorrectly copied in any respect, you lose that contact. Entries with score reductions greater than 5% will be disqualified.

Awards: Trophies will be awarded for the high score in each of the following categories: Single Operator (W6OTC sponsor) and Multi-Operator (WF1B sponsor). Certificates of merit will be awarded to the highest scoring entrant with at least 200 QSOs from each state, province, and North American country.

Send all entries to Ron Stailey, K5DJ, 504 Dove Haven Drive, Round Rock, TX 78664-5926. Entries must be postmarked no later than 30 days after the party to be eligible for awards. Logs may be submitted on disk in the form of MS-DOS compatible ASCII files or .BIN format from WF1B's logging program.

800-244-4567
www.surplussales.com
e-mail: grinnell@surplussales.com

COLLINS / Collins Tube-Kits

"Where The Hard To Find Parts Are Found. And On Hand"

KWM-2 Manuals.....$25 each
Collins Spray Paint all Colors .....$10 each
Trim Rings Large / Small .....$20 Each, $18 (5+)
#557 ERIE Trimmers, 8-50 pF & 5-25 pF.....$5 each
KWM2/A Plug-In Relays: X-96 & X-97.....$49 each

KWM1 .....Complete tube kit w/6146's: $160
KWM2/A-F .....Complete tube kit w/6146's: $145
KWM2/A .....Complete tube kit, no 6146W's: $100
32S-1F .....Complete tube kit w/6146's: $149
32S-3F .....Complete tube kit w/6146's: $149
51S-1 .....Complete tube kit: $115
75S-1 .....Complete tube kit: $85
75S-3 .....Complete tube kit: $100
4D32 ....Trans. Tube, Fits 32V-1, 32V-2, 32V-3: $20

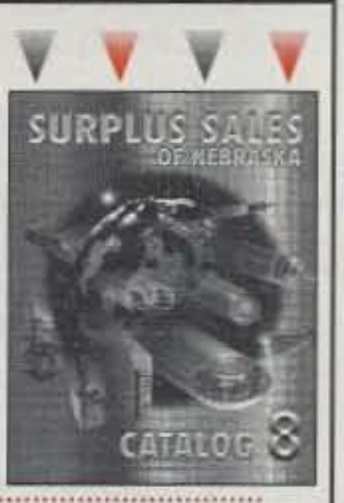
★★★ DELUXE ★★★
TURNS COUNTER
(SHAFTECH): 1/4" shaft coupling at rear. Counts to 9999.9 for precise control of variable inductors. Guaranteed satisfaction. Professional quality. Mil-Spec crank knob facilitates quick advance rotation of fine tuning fingertip control. Unit measures 2-1/4" by 3-1/2". Requires 1" by 3" hole in equipment for mechanics. Screws included.
$79.95 (1-2), $75.00 (3-24)

.1-40 uH Variable INDUCTOR
•Edge Wound Coil all Silver Plated
•2-10 kw Power handling •Taper Wound Front End
5" x 5-1/4"H x 12-1/2"

$245 each, $235 (3-9), $225 (10-49)

to order call 1-800-244-4567
1502 Jones St. • Omaha, NE 68102
TECHNICAL/CUSTOMER SERVICE CALL OR FAX:
(402) 346-4750 • Fax (402) 346-2939

FREE CATALOG WITH ANY ORDER
$3 for 1st Class (without order, in USA)
$6 International
FREE Bulk Mail (Allow 4-6 weeks delivery)



FULL LINE OF SGC PRODUCTS

– TUBE SPECIALS –
Attention Kenwood & Yaesu Owners
Combo 6146W m.p. plus 12BY7AJan: $52
SVETLANA SVETLANA SVETLANA SVETLANA
811A: $20 Each, 572B: $59 Each / $125 M.Pairs
4CX400A: $140 Each, 4CX250B: $105 Each
Raytheon 4D32 - $20 each, $18 (3-12)

• LITZ WIRE • Priced Per Pound
UNSERVED 7/36:.....$15 per/lb. – $10 (3-6 lbs.)
SERVED 12/36:.....$21 per/lb. – $15 (3-6 lbs.)

Please add adequate shipping. In U.S.-48 figure 35¢ per lb. to 70lbs (MINIMUM CHARGE: 1st - 3lbs add $5). Others please call, fax or write for exact shipping total. We accept Discover, Visa, MC, American Express, checks, COD (UPS only, add $5) or wire transfer. Catalog shipping paid for by customer.

SURPLUS SALES OF NEBRASKA

Announcing:

The 1998 CQ/RJ World-Wide RTTY DX Contest

Starts 0000 UTC Saturday Ends 2400 UTC Sunday
September 26–27, 1998

I. **Announcing:** The 12th annual CQ/RJ WW RTTY DX Contest.

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

III. **Contest Period:** 0000 UTC September 26 to 2400 UTC September 27, 1998.

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

Note the following operator classes.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

XIV. **Contest entries and logging instructions:** CQ WW RTTY DX logs and forms should be used to facilitate scoring and checking. All logs **must** show:

1. Times in UTC.

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

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

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

5. A check list of duplicate contacts for *each band* (dupe sheet). Logs must be checked for duplicate contacts, correct QSO points, and multipliers. Submitted logs must show duplicate contacts clearly marked.

6. A *multiplier* check sheet for each band.

7. An overall *summary sheet* showing total QSOs, Points, Zones, Countries, and States/VE areas worked.

8. Each entry must be accompanied by a signed declaration that all contest rules and regulations for amateur radio in the country of operation have been observed.

Contest forms are available from *CQ* and the Contest Directors. Please include a large SASE with two units of US first-class postage or IRCs.

9. **Disks:** Logs may be sent on disk. Clearly label the outside of the disk with the call, file names, and type of program. All disks **must** be accompanied by a printed summary sheet, **not** the entire log.

10. **Internet:** Watch for an announcement of an Internet address to send your logs to also.

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

XVI. **Awards:** Plaques will be awarded to the first-place finishers in each of the operator classes. Certificates will be awarded to sec-

ond and third places. Certificates will be awarded to the first-place finishers in each DXCC country. In countries or sections where returns justify, certificates may be awarded to second and third place. All scores will be published. To be eligible for an award, a Single Operator station must operate a minimum of 12 hours, and a Multi-Operator station a minimum of 18 hours. A Single Band entry is eligible for a single band award *only.* If a log contains more than one band, it will be judged an an all band entry, unless specified otherwise. All certificates and plaques will be issued to the licensee of the station used.

XVII. **Deadline:** All entries must be postmarked **no later** than December 1, 1998. An extension may be given if requested. **Low Power logs** should be mailed to: Roy Gould, K1RY, CQ WW RTTY DX Contest Director, P.O. Box DX, Stow, MA 01775 USA. **High Power logs** should be mailed to Ron Stailey, K5DJ, Co-Contest Director, 504 Dove Haven Drive, Round Rock, TX 78664-5926.

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

Single Operator, All Band, High Power
World—Dunestar Systems
North America—TG9VT Memorial by K1RY & W2JGR
South America—Donated in the name of Elmers worldwide who help new amateurs get started
Europe—HAL Communications Corp.
Oceania—HamStuff by W7NN
Asia—N5JJ Memorial
Africa—Phil Duff, NA4M
United States—John Devoldere, ON4UN

Single Operator, All Band, Low Power
World—Amateur Radio Trader
North America—Dick Stevens, N1RCT
South America—Jim Hollenback, NK6L
Europe—Don Hill, AA5AU
Asia—Bruce D. Lee, KD6WW
Oceania—Dave Barr, K2YG
Africa—Bill Gallier, W4WX
USA—The New RTTY Journal

Single Operator Assisted
World—*CQ* Magazine
North America—Jeff Bouvier, K1AM
Europe—The New RTTY Journal
Asia—Kazuaki Ohya, JH1HRJ
South America—Great Lakes DX and Contest Club
USA—RTTY by WF1B
Other Continents—Open

Single Operator, Single Band
3.5 MHz—Neal Campbell, K3NC/ON9CNC
7.0 MHz—Tri-County DX Association
14 MHz—Kunihiko Fujii, JH1QDB
21 MHz—Denis Catalano, WD4KXB & Mike Trowbridge, KA4RRU
28 MHz—Open

Multi-Operator, Single Transmitter, High Power
World—Amateur Radio Trader
North America—Eddie Schneider, GØAZT
USA—WriteLog Contest Software for Windows (by Ron Stailey, K5DJ)
Europe—Ron Stailey, K5DJ & Wayne Matlock, K7WM

Multi-Operator, Single Transmitter, Low Power
World—HAL Communications Corp.
North America—Don Hill, AA5AU & Eddie Schneider, GØAZT
USA—Platinum Coast Amateur Radio Society
Europe—Euraf Communications, Benin (by Peter Schulze, TY1PS)
Other Continents—Open

Multi-Operator, Multi-Transmitter
World—*CQ* magazine
North America—The New RTTY Journal
Europe—The W3LPL RTTY Contest Group
Continents—Open

There are many plaques looking for sponsors: High Power, Low Power, Single Band, a specific country, Multi-Op by continent, etc. If you are interested, contact the contest co-director, Ron Stailey, K5DJ, 504 Dove Haven Drive, Round Rock, TX 78664 (Internet: k5dj@easy.com).

ATTENTION !!!

GREAT
ALUMINUM TOWERS

☐ ***Lightweight***
☐ ***Rugged strength***
☐ ***Easy assembly***
☐ ***Rust free***

FREESTANDING
20ft to 100ft ...

Universal Manufacturing Co.
43900 Groesbeck Hwy
Clinton Township, MI 48036
810-463-2560
FAX 810-463-2964

CIRCLE 81 ON READER SERVICE CARD

23rd Annual
Va. Beach HamFest
& Computer Fair™
ARRL Roanoke Division Convention
Sept. 19 & 20, 1998

- Major Commercial Exhibitors, Dealers & Organizations
- Amateur Exams & Upgrades
- DX & Technical Forums
- Computer Hardware, Software and Accessories
- Plenty of Free Parking
- Held at the *Va. Beach Pavilion*
- Outside Tailgating
- Talk In on 146.970
- Banquet Saturday Night

General Admission Tickets
$5 In Advance - $6 At the Door

HamFest Information Line
1 -757 - HAMFEST
www.vahamfest.com

Tickets
Manny Steiner K4DOR
3512 Olympia Lane
Va. Beach, VA 23452

Exhibitor Information
Lewis Steingold W4BLO
1008 Crabbers Cove Lane
Va. Beach, VA 23452

Send SASE - Checks Payable To TRCI, Inc.

CIRCLE 84 ON READER SERVICE CARD

BY TED MELINOSKY, K1BV

AWARDS

NEWS OF CERTIFICATE AND AWARD COLLECTING

Ken Carpenter, KC4UG, is the recipient of USA-CA All Counties #937, October 31, 1997. He traveled over 50,000 miles last year operating from 25 states and almost 600 counties! Recently, he has started putting out counties on CW, so you can look for him on the air. Here is Ken's background, as told by him.

"In January of 1962 a friend asked me if I would like to attend a twelve-week ham radio class at the local electronics dealer, one night each week. I asked what ham radio was, and he told me a little about it. Having nothing better to do, I signed up and started attending. The last two weeks of the classes someone loaned me a set of 78 RPM code records, and I spent the next two weeks listening to code. I took the exam and passed the General exam the first time. In June I received the call WA5HEC, and a local ham went with me to the shack of W5JJA, where I saw my first ham radio station! I later bought some military surplus and an old general-coverage receiver with a BFO and got on the air.

"I received the callsign WBØLJU when I moved to Iowa in 1968 and the callsign KA4NYM when I moved to Alabama in 1978. I passed the Advanced test in January 1979 at the FCC office in Jackson, MS and the Extra test at the FCC office in Memphis, TN the next month. I kept the Advanced callsign because it has all three of my initials in it and it's a pretty good CW call. I worked almost 100 percent CW the first 30 years I was on the air.

"I have operated from many DX locations while on vacation the past few years, including UA9M, UM8M, UL9C, LX, DL, etc. When I retired early last year, I installed a mobile in my car and drove to Alaska and started putting out counties on the SSB net frequency of the county hunters. At that time I did not plan on ever trying to work all the counties, but by the time I returned home I was hooked! I traveled over 50,000 miles during the past year, operating from 25 states and almost 600 counties.

"I have enjoyed stopping and having coffee with county hunters along my routes and having others stop by my house. I attended two mini-conventions and the National in Orlando and really enjoyed meeting all of the county hunters there. A few months ago I started putting out counties on CW and met a whole new bunch of county hunters! I plan to try for USA-CA CW next, along with Bingo and second time SSB.

65 Glebe Road, Spofford, NH 03462-4411
e-mail: k1bv@top.monad.net

USA-CA Honor Roll

500

WB3DLG	3017
W6YLJ	3018
W1TE	3019
CP6EB	3020
JA2ADY	3021
F3XY	3022
NØISL	3023

1000

W6YLJ	1472
KB2PWS	1473
CP6EB	1474
F3XY	1475

1500

W6YLJ	1226
N3TA	1227

2000

W6YLJ	1128

2500

KB4HBH	1055
W6YLJ	1056

3000

W6YLJ	964
OK1DKS	965

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. To qualify for the special subscriber rate, please send a recent *CQ* mailing label with your application. Initial application may be submitted in the USA-CA Record Book, which may be obtained from *CQ* Magazine, 25 Newbridge Road, Hicksville, NY 11801 USA for $2.50, or by a PC-printed computer listing which is in alphabetical order by state and county within the state. 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 March 1, 1997. A complete copy of the rules may be obtained by sending an SASE to Ted Melinosky, K1BV, 65 Glebe Road, Spofford, NH 03462-4411 USA. DX stations must include extra postage for airmail reply.

"County hunters are a great group of people, and many of them went out of their way to give me counties. All the net control stations were a great help to me also.—73, Ken, KC4UG"

Award Hunting Terms: The GCR

Award hunting has its own language, just like any other specialized interest. One of its most important words is *GCR* (General Certification Rule). Simply stated, when an award sponsor indicates GCR in the rules, they are telling the applicant that the cards need not be sent, just a statement from witnesses saying that they have personally viewed the cards as listed in the application. GCR is the usual practice for the overwhelming percentage of awards. Most sponsors don't want to have to do the checking and be responsible for packing and shipping for the small group who forget to include sufficient postage and wrapping to return the cards. The applicant does not have to worry about their valuable cards being lost. Many rare and semi-rare cards are used for many different awards. Losing some early in the game is a sad experience.

In return, the applicant should play the game fairly. Bring the cards to a club meeting or hamfest and do it honestly; have at least two licensed amateurs view the cards and sign the statement. Remember that sponsors always have the prerogative of asking to see any or all of your claimed cards. (Claiming a 160 meter contact with Central Asia at local noon is a likely candidate for a request to view that miracle card).

Awards Available

Don't forget that samples of the awards offered by your club or society are always wanted for possible future publication. Include complete details and member lists if applicable.

Diplome de Wallonie (Belgium). The Wallonie Award is designed and printed by ON7YF, a professional printer and member of the Section de Gembloux-Chastre Club, which sponsors the certificate. The "W" is brilliant red and the background of the award is in striking yellow. It is a good example of making excellent use of the talents of a club member for the benefit of the club's award.

The Diplome de Wallonie is offered for contacting stations in the Belgian region of Wallonie.

Contact stations located in the Belgian region of Wallonie. This includes the provinces of Namur, Leige, Luxembourg, Hainaut, and Brabant Wallon. Contacts must be on or after 1 October 1980, except that contacts with the new province of Brabant Wallon must be on or after 1 January 1995. Before that date, only contacts with the French-speaking part of Brabant are valid. Brussels QSOs are not valid. Non-Europeans need 5 contacts,

Say You Saw It In CQ

Teresa, PT2TF, is the new custodian of the Brazilian YL Award.

EU need 10, and ON's need 15 different contacts. Note that all of the provinces don't have to be contacted, but the contacts are limited to the listed provinces. Send GCR list and fee of $US7, 7 IRCs, 200 BEF, or XEU5 to: Pierre Aubry, ON6GB, Rue Emile Dewezq, B-5030 Gembloux, Belgium.

Brazilian YL Award. Teresa, PT2TF, is the new custodian for the Brazilian YL Award. She earned USA-CA 3076 All Counties Award #816 in 1993, the first winner from Brazil. With that accomplishment under her belt, she is now chasing DX on SSTV. I think this is a woman who loves a challenge!

The Brazilian YL Award.

To earn the award, contact YL stations as follows: PY's need 20 from Brazil and 5 more from different countries on 3 continents; DX need 8 from Brazil and 12 more from different countries on 5 continents. Contacts must be made from same QTH, since 1 July 1975. Send a GCR list, a copy of your QSL card, and the 10 IRC fee to: BRYLA, Teresa, PT2TF, SHIN QI 14 Conj 05 c/23, 71530-050 Brasilia DF, Brazil.

ASSOCIATED RADIO

KENWOOD

TS-570D(G) HF Base

TH-G71A Dual Band

TM-G707A Dual Band

TM-261A 2 Meter

VC-H1 Visual Communicator

SERVICE FACILITIES AVAILABLE
CALL FOR DETAILS
WE TRADE USED FOR USED, AND BUY USED EQUIPMENT
WE BUY AND SELL TOP QUALITY AMATEUR EQUIPMENT
FROM VINTAGE TO STATE OF THE ART

PRICING & ORDERS 1-800-497-1457
8012 Conser - Box 4327, Overland Park, KS 66204
USED/TRADES: 913-381-5900 FAX: 913-648-3020
E-MAIL: sales@associatedradio.com Web Site: www.associatedradio.com
Send SASE for list of new and used equipment.

LOOK! PERIPHEX®

High Capacity BATTERIES (800) 634-8132 Memory Free NiMH!

SUPPLYING AMERICA'S BATTERIES FOR OVER 15 YEARS!

BUY DIRECT!!

$38 SPECIAL! : over here...

•BP-113 7.2v@1200mAh for ICOM
•PB-13S 7.2v@1200mAh for KENWOOD
•EBP-24S 7.2v@1200mAh for ALINCO
•EBP-34 4.8v@1200mAh for ALINCO

Offer expires September 30, 1998. Above are 1 year warranty NiCd batteries

Charge NiMH & NiCD!!

CALL NOW!!!

Universal Battery Charger! NOW ONLY $49.95 !! + FREE GIFT!
Policies & prices subject to change without notice

home.navisoft.com/periphex

E-Mail: periphex@aol.com

Amateur Radio * Cellular * Laptop Computer * Alarms

Advanced Battery Systems, Inc. * 300 Centre Street * Holbrook, MA 02343
(781) 767-5516 * Fax (781) 767-4599

CIRCLE 73 ON READER SERVICE CARD

CARRYING "EXCESS EQUIPMENT?"

DONATE YOUR RADIO

Turn your excess Ham Radios and related items into a tax break for you and learning tool for kids.

Donate your radio or related gear to an IRS approved 501 (c)(3) charity. Get the tax credit and help a worthy cause.

Equipment picked up anywhere or shipping arranged. Radios you can write off - kids you can't.

Call (516) 674-4072
FAX (516) 674-9600
e-mail:crew@wb2jkj.org
www.wb2jkj.org

WB2JKJ

THE RADIO CLUB OF
JUNIOR HIGH SCHOOL 22
P.O. Box 1052
New York, NY 10002

Bringing Communication to Education Since 1980

CIRCLE 67 ON READER SERVICE CARD

The Council of Europe Award.

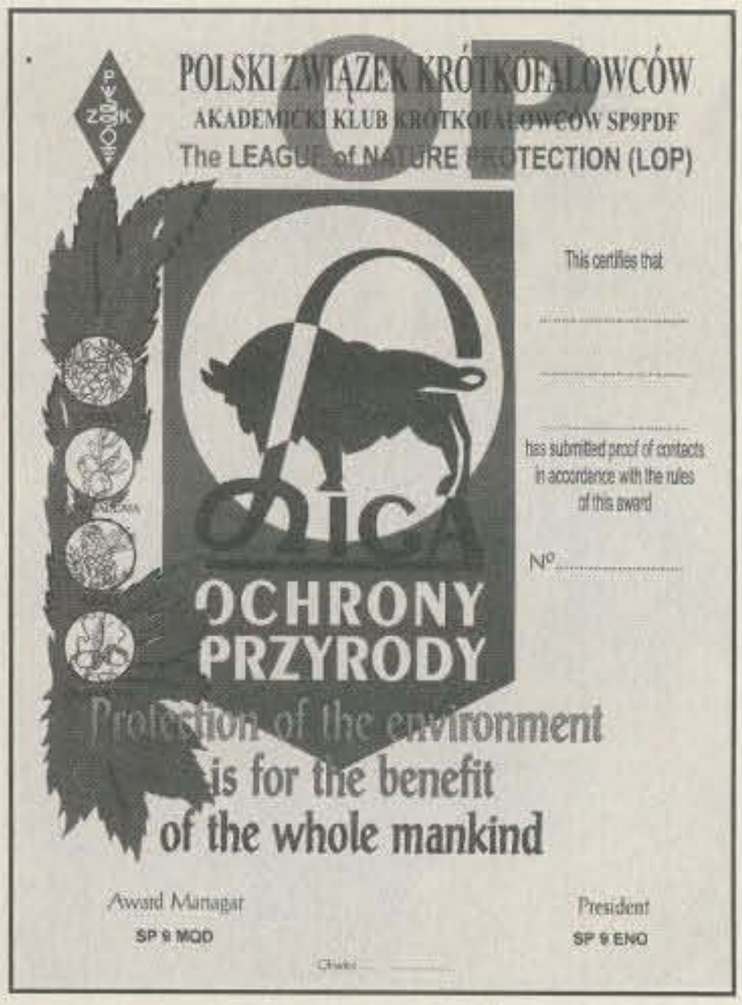
Council of Europe Award (France). The following award measures 12" × 17" and features a color reproduction of the Council of Europe headquarters building.

Contact each of the member states of the Council of Europe plus station TP2CE (or special call area numbers used by the same station). These are: Albania ZA, Hungary HA, Romania YO, Andorra C31, Iceland TF, Russia RA, Austria OE, Ireland EI, San Marino T7, Belgium ON, Italy I, Slovakia OM, Bulgaria LZ, Liechtenstein HBØ, Spain EA, Croatia 9A, Lithuania LY, Sweden SM, Cyprus 5B, Luxembourg LX, Switzerland HB, Czech Rep OK, Malta 9H, Turkey TA, Denmark OZ, Macedonia Z3, Ukraine UX, Estonia ES, Moldova ER, U.K. G, Finland OH, Netherlands PA, France F, Norway LA, Germany DL, Poland SP, Greece SV, Portugal CT.

The award may be endorsed for Mixed or Single mode, Monoband, 5-Band, 9-Band, or all YL award. On 50 MHz it may be earned for Mixed mode, SSB, CW, or RTTY. Special endorsement for all Satellite. Send GCR list and fee of $US10 or 12 IRCs to: Francis Kremer, F6FQK, 31 rue Louis Pasteur, F-67490 Dettwiller, France. You may also address the application directly to: Conseil De L'Europe, Regie des Moyens Audiovisuels-CERAC, Mr. Francis Kremer, F-67075 Strasbourg Cedex, France.

League of Nature Protection Certificate (Poland). The LNR award is an interesting concept. You can demonstrate your commitment to environmental protection and join with Polish and other Europeans who feel this is a worthwhile cause. Check your collection of Polish, Czech Republic, Slovak, and German QSLs for the very distinctive rubber stamp showing "League of Nature Protection" on the top half of a semicircle with the bottom half showing "1 Point for LOP Award." The fee for the award is modest compared to most European awards, so it's not an attempt to take advantage of a popular emotional theme.

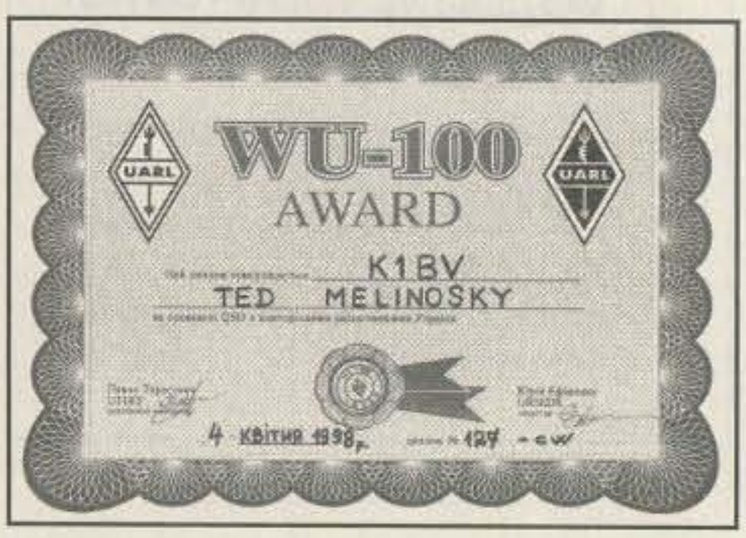
Sponsored by club station SP9PDF to popularize among mankind the idea of environmental protection, contact members after 1 January 1984. They use a 2 1/2 inch circular rubber stamp leaving no doubt that they count for this award.



The League of Nature Protection certificate sponsored by club station SP9PDF.

HF: Europeans need 10 QSOs, DX need 5. VHF: Europeans and others need 2. Any mode/band. SWL okay. Send GCR list and 150 Zt or 6 IRCs to: Akademicki Klub Krotkofalowcow SP9PDF, Box 336, 44-101 Gliwice 1, Poland.

Once you earn the diploma, you may be added to the list of stations that count towards earning the award. Send the statement "I declare that I will popularize and contribute to the idea of preservation of nature and man's natural environment against extermination." Ask to be added to the list and enclose 1 IRC for membership fee.



The WU-100 Award offered for contacting 100 different amateur stations of the Ukraine.

The WU-100 Award (Ukraine). Europeans need to contact 100 different amateur stations of the Ukraine on or after 1 January 1996. All others need 50 such contacts. All bands and modes may be used. QSOs with the same station are permitted on different bands. The award is available to SWLs on the same basis. Send list of QSOs (GCR) certified by two

Paul Tarasovich, UT1KY, receiver of applications for the WU-100 Award.

licensed amateurs and fee of 8 IRCs, 7DM, $US5, or 6000 Lire to: Paul Tarasovich, UT1KY, P.O. Box 85, Rivne, 266027 Ukraine.

USA DX-YL Award. This award is available to licensed YL operators only, for working 25 different YL's outside your own country after 1 April 1958. USA and possessions are counted as separate countries, as are KH6 and KL7. All bands okay. Contacts don't have to be with 25 countries, just 25 different DX YL's. Send GCR list alphabetically by operator's last name. Endorsements for each 10 additional DX YL's. No use of repeaters. All contacts must be made from the same country. there is no charge, but sufficient postage for first class mail or a stamped legal-size envelope must accompany the application. Apply to: Phyllis Davis, KA1JC:

Oct 10 to July 10: 2670 S. Salford Blvd, NorthPort, FL 34287;

July 10 to Oct 10: P.O. Box 1488, Presque Isle, ME 04769.

The DX-YL Award is for YLs only.

Internet Site of The Month

The interesting, exotic series of awards of the Korean Amateur Radio League is available for viewing at: <http://altair.skku.ac.kr/hl1ssg/award.html>. On the whole, these awards will be a challenge for North America and probably even Europe. However, with improving conditions, I'm looking forward to working regular Korean stations. Remember, HL9's are foreign operators in Korea, and do not count for this series. 73, Ted, K1BV

Be a Winner with CQ Contest!

No matter how you look at it, *CQ Contest* is the contester's magazine. We've assembled some of the best contesters in the world to produce a publication that's informative and fun to read. Edited by Bob Cox, K3EST, it offers fascinating articles from fellow contesters OH2MM, N6KT, S50A, I2UIY, W3ZZ, KU2Q, JH4NMT and others!

People
Fascinating features about experiences of contesters around the world such as Contesting Under Communism or the PJ1B story.

Analysis
In-depth analysis of Contest results. Detailed information about contesting that will never be found in the results!

Technology
Practical reporting on contest-specific technology and its applications. Read about multi-op filters, station design, product reviews and more.

Techniques
Advice from the experts on operating and ways to improve your score including phone pileup techniques, basic operating tips and much more!

Reporting
Up-to-date, worldwide coverage of contests and events.

U.S.: 1-year, (10 issues) $30.00, 2-years (20 issues) $57.00. **Canada/Mexico:** 1-year $40.00, 2-years $77.00. **Foreign Air Post:** 1-year $42.95, 2-years $82.95. Please allow 6-8 weeks to receive your first issue.

CQ Communications, Inc.
25 Newbridge Road, Hicksville, New York 11801 Ph: 516-681-2922 Fax: 516-681-2926
(include check, money order or credit card information).

CW Is Soooooooo Easy!

CW Mental Block Buster II *explodes* all the *barriers*. Use hypnosis and NLP to learn to *copy code* like an old-timer in no time at all—no matter how many times you have *failed before* with those other systems. This is the *easiest* Morse code training *method* in the world, bar none! And it is the *fastest*, too. *Succeed* with the most advanced mind technology available. Includes two (2) Tapes and Manual. Only $27.95 plus $4.50 S/H US—FL add $1.68 tax.
Order Now—Upgrade Now—Check Our New Web Site!!!!!

YOU CAN DO IT!

Order Now! (24 hr/day)
800-425-2552
fax: 941-403-8446
success@qth.com
http://www.qth.com/cweasy/

This is NOT a mere CW practice tape.

AlternativeArts
261 9th Street South
Naples, FL 34102

JOIN ARRL

BENEFITS FOR YOU

QST, QSL Bureau Awards, Low Cost Insurance, Operating Aids, Government Liaison and More—Much More!

MEMBERSHIP APPLICATION

Name _____ Call _____
Street _____
City _____ Prov./State _____ PC/ZIP _____

$34 in U.S. $47 elsewhere (U.S. funds) Persons age 65 or over, upon submitting proof of age, may request the special dues rate of $28 in the U.S. Licensed amateurs age 21 and younger may qualify for special rate, write for application. For postal purposes, fifty percent of dues is allocated to QST, the balance for membership.

VISA, MC, AMEX, Discover # _____
Signature _____ Expires _____

The American Radio Relay League
225 Main St. Newington, CT 06111 USA CQ2

CIRCLE 35 ON READER SERVICE CARD

DX

BY CHOD HARRIS, VP2ML

NEWS OF COMMUNICATION AROUND THE WORLD

DXCC 2000 Explained

Those DXers who attended the 1998 Visalia International DX Convention learned a good deal about the application of the recent changes in the DXCC rules. At the DX forum on Saturday morning, a noted group of panelists answered a flock of questions about the new rules and their consequences. Vince Thompson, K5VT, chaired the panel, and W6CF, K5FUV, N7NG, N4MM, and K4VX added their expertise. Their answers should help DXers better understand this most popular of all DX award programs.

Minimum size: Bill Kennamer, K5FUV, former head of the DXCC program and now Membership Services Manager, pointed out that the controversial minimum-size rule may actually provide *for* new DXCC entities, rather than just ruling out possible candidates. Take the case of an island more than 350 kilometers from a Point 1 country, but with some small rocks above high tide between the island and the mainland. Under the previous rules, those rocks would prevent the island from qualifying as a separate DXCC entity. Under the new rules, however, the minimum-size rule would be applied to those intervening rocks. Thus, if the rocks failed to meet the 100 meter minimum size, they would not be counted as an island. Under the new DXCC rules, the rocks would simply disappear! This means that some potential DXCC entities that were excluded under the previous rules because of small islands or rocks between them and their parent country may now qualify. While there are probably not many such entities, knowledgeable DXers should keep alert for some possible New Ones under the minimum-size rule.

Bill further noted that there is no change to the DXCC entity status of either Scarborough Reef BS7 or Pratas BV9 as a result of the new rules. The rules will not be applied retroactively.

Political Entities: Bill also explained why Hong Kong VR6 remains on the DXCC list. The Hong Kong Amateur Radio Transmitting Society is a member society of the International Amateur Radio Union (IARU). Under the new rules, any such entity qualifies as a Point 1 country. Formerly, Hong Kong was a DXCC country by virtue of separation from the parent country of England (Point 3a). Now it is a Point 1 country on its own merits. If Hong Kong had an island more than 350 kilometers offshore, that island would qualify as a separate DXCC entity under the new rules. (No such island exists.)

Jim Maxwell, W6CF, discussed the new DXCC rules at the Visalia DX Convention.

This is not likely to be a common means of generating a New One for the DXCC list, however. In general, IARU rules prohibit the membership of more than a single society from a country. In fact, member societies aren't even supposed to exchange QSL bureau services with other than the IARU member society in a given country. The situation in China of two valid member societies is unique.

Jim Maxwell, W6CF, followed Bill's comment on the DXCC status of Hong Kong by commenting on the reasoning behind the new rules. Jim pointed out that the DXCC entity status of Hong Kong was no longer up to a handful of amateurs who serve on the DX Advisory Committee (DXAC) of the Awards Committee at ARRL Headquarters. Now the decision of whether a given entity qualifies as a separate DXCC entity is in the hands of outside organizations: the United Nations, the ITU, and the IARU. If the IARU should drop the Hong Kong Society's membership, then VR6 would very likely be dropped from the DXCC list. As long as the Hong Kong society is a member of the IARU, however, that entity will remain a separate DXCC counter.

The handful of amateurs who serve on the DX Advisory Committee (DXAC) and the Awards Committee at ARRL Headquarters no longer must make difficult and controversial decisions about an entity's status. That task now falls on other, outside agencies: UN, ITU, and the IARU. Presumably, this largely will remove personalities and political pressure from the DXCC entity addition process. This was one of the important goals of the DXCC 2000 project. Incidentally, Hong Kong amateurs are using the VR6 prefix, which is now assigned to China by the ITU. Pitcairn Island amateurs are using the VP6 prefix, as of May 1. (Old timers may remember when this was the prefix of Barbados.)

One could raise the question of DXCC status for Hong Kong after the July 1, 1997 takeover of the territory and prior to the effective date of the new DXCC rules on April 1, 1998. While it appears that Hong Kong did not meet DXCC country criteria during that period, it would serve no purpose to attempt to have Hong Kong contacts from that time period declared invalid for DXCC, only to put the country back on the list as of April 1, 1998. On the other hand, one could make a reasonable argument for making Hong Kong a New One, effective with the new rules. There is no question that Hong Kong was annexed by China last July. The previous DXCC deletion criteria list annexation by an adjacent country a reason for deletion from the DXCC list.

The new rules specifically mention that previously removed entities that again qualify for the DXCC list will be a New One, not a reinstatement of the previous country: "Entities removed from the List may be returned to the list in the future, should they requalify under this *(sic)* criteria. *However, an Entity requalified does so as a totally new Entity,* not as a reinstated old one *[emphasis added].*"

Thus, if Hong Kong were to be dropped from the DXCC countries list effective with its annexation by China, it would be returned to the entity list effective with the new rules on April 1, 1998. It would now be a New One. Contacts with Hong Kong prior to July 1, 1997 would count for the then-removed country of Hong Kong; contacts between July 1, 1997 and March 31, 1998 would count for China; and contacts after April 1 would count for the New Hong Kong!

There is one problem with this argu-

P.O. Box 50, Fulton, CA 95439
e-mail: chod@compuserve.com

Say You Saw It In CQ

WHO SAYS YOU CAN'T IMPROVE A MASTERPIECE

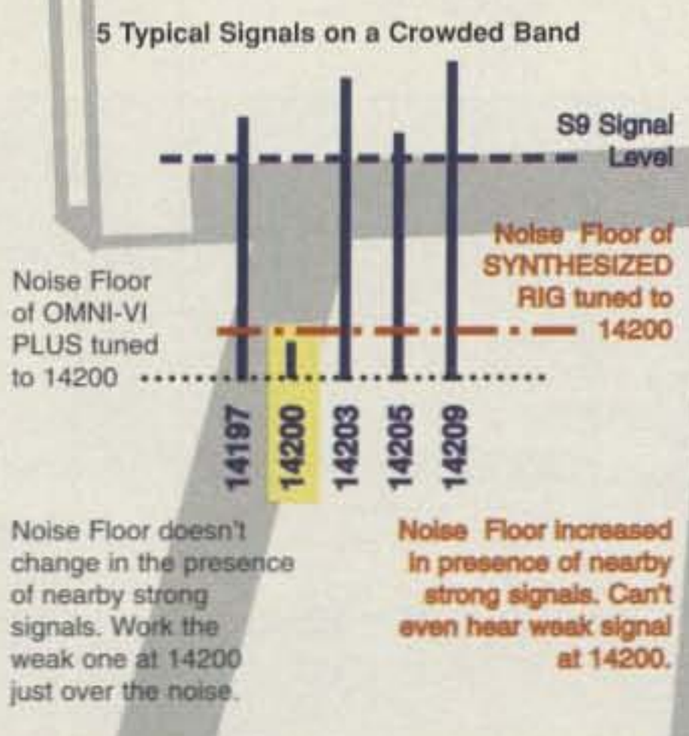
Like a great artist who steps back, reflects, then adds a final brush stroke, we hams at TEN-TEC could not resist a few subtle but powerful refinements to our treasured OMNI-VI. Take a look at this new "OMNI-VI *PLUS*", and judge for yourself how we improved a masterpiece....

JUST THE RIGHT AMOUNT OF DSP...

...to forget about those add-on DSP boxes. New, single button NOISE REDUCTION improves signal-to-noise on the weakest signals - makes SSB and CW leap out of the noise. DSP LOW PASS is now available in all modes providing 5 choices to cut the highs "just the way you want" to reduce listening fatigue. Rig even remembers your separate choices for SSB and CW. The DSP processor adds two more subtle features to the canvas. Built-in AUTO NOTCH instantly eliminates interfering carriers - now work 40 meters day or night. Finally, CW transmit offset is adjustable 400 - 990 Hz with auto tracking sidetone.

WORK STATIONS OTHER RIGS CAN'T EVEN HEAR

Let's compare OMNI to any competitor's synthesized rig with both tuned to the same frequency.



Phase noise generated *inside* the competitor's rig causes the noise floor to *temporarily* increase, covering weak signals *inside* your passband, especially when strong signals *outside* your passband are within a few KHz of where you'd like to listen. No other transceiver comes close. With this masterpiece in your shack, you'll work stations missed by others.

SUPERB SELECTIVITY

The artist is never quite satisfied....We've added one more optional filter position. Provides up to 4 choices of bandwidth in the 6.3 MHz I-F and now 3 choices in the 9 MHz I-F. Two of the 7 filters are standard; add only the options that fit your "view" of the bands. In the OMNI tradition, all filters remain independent of mode.

ATTENTION TO THE DETAILS

Rigorous computer controlled tests now exercise every OMNI. Made possible by the rig's high speed PC Interface coupled to automatic test equipment. Our own custom software orchestrates the entire process. There's also an overnight burn-in. OMNIs transmit into dummy loads cycling between RX and TX every few seconds changing bands along the way. One final performance check finishes things up. A reliable masterpiece out of the box and for years to come.

THE FINISHING TOUCHES

Silky smooth, lightening fast QSK, iambic keyer, front panel layout meant to use not just admire, revised menu system for quicker access, adjustable display intensity, adjust main tuning knob for the feel you like, band stacking registers, 100% duty cycle final so rugged it doesn't require SWR foldback, one-year warranty backed by the legendary TEN-TEC service...all the traits of a masterpiece.

$2585

plus shipping and handling

- No-Risk 30-day Money-Back Guarantee**
- We take trades on used TEN-TEC gear.
- We accept VISA, Mastercard, and Discover
- Visit our home page at www.tentec.com

**Customer pays shipping both ways.

CALL TODAY
1-800-833-7373

Monday - Friday
9:00 a.m. - 5:30 p.m. EST

You can reach us at:
1185 Dolly Parton Parkway
Sevierville, TN 37862
Office: (423) 453-7172
FAX: (423) 428-4483
e-mail: sales@tentec.com
Repair Dept.: (423) 428-0364 (8a - 4p EST)

TEN-TEC

MADE IN TENNESSEE

ATTENTION PRESENT OMNI-6 OWNERS

We offer 3 ways to upgrade: Option 1 - $75.00 Option 2 - $125.00 Option 3 - $275.00
Contact factory for copy of detailed upgrade package.

Fast!.. Powerful!.. Flexible!..

DX4WIN

The way logging software *should* be!

Windows 3.1 and Win 95.

Interfaces easily to most radios.
Supports major awards.
Interfaces with packet and DX spotting networks w/ voice announcements.
CW keyboard w/ memories.
Only $69.95 plus s/h.

Now with TELNET and http support

For more info contact
Rapidan Data Sys., 3601 Plank Rd, #389
Fredericksburg, VA 22407
540-785-2669 or FAX 540-786-0658
Demo disk $5 or free at website
http://www.erols.com/pvander
e-mail: steve@1bigred.com

CIRCLE 79 ON READER SERVICE CARD

ISOTRON
ANTENNAS FROM 160-10 METERS

NO TUNERS
NO RADIALS
NO COMPROMISE
PRICES START AT $49.95

SEVEN EXCELLENT REVIEWS
JUST DON'T HAPPEN BY CHANCE
CALL US FOR A FREE CATALOGUE

See review in *73*, Oct. 1984; *73*, Sept. 1985; *73*, March 1986
CQ, Dec. 1988; *W.R.*, Mar. 1991; *73*, Nov. 1994; *73*, Apr. 1996

ASK ABOUT OUR NEW ISOTRON 160C!

BILAL COMPANY
137 MANCHESTER DRIVE
FLORISSANT, COLORADO 80816
(719) 687-0650

CIRCLE 40 ON READER SERVICE CARD

QUALITY QSLs by WX9X

WX9X
from $18.95
Write or Call for *FREE SAMPLES!*
55¢ SASE appreciated.
E-Mail: wx9x@hoosier.com
http://QTH.COM/WX9X
354 West Street - Valparaiso, IN 46383
Voice (219)465-7128 Fax (219)464-7333

Emergency POWER from the Sun

Charge your hand-held or Ni-cad batteries. Small to large solar panels (1-100 watt) available.

ALTERNATIVE ENERGY ENGINEERING, Inc.
P.O. Box 339 • Redway, CA 95560 USA
707-923-2277 or in the US 1-800-777-6609
Visit our web site: alt-energy.com

CIRCLE 36 ON READER SERVICE CARD

The WPX Program

SSB

2669	IK8HVJ	2672	unassigned
2670	IK8YDP	2673	IK8UHA
2671	JH8QOX		

CW

2981	WA2VQVL	2982	F5JIW

Mixed

1805	AK7O	1808	JG1OWV
1806	VP8CEH	1809	N3TA
1807	IK2TQG	1810	9A2NO

CW: 350 F5JIW. 400 F5JIW, AI9L. 450 F5JIW. 2050 VR2UW. 2100 VR2UW. 2150 VR2UW. 2200 VR2UW. 2250 VR2UW. 2300 W8UMR, VR2UW. 3800 N6JV.
SSB: 350 IK8HVJ, IK8YDP, IK8UHA. 400 IK8HVJ, N3TA, IK8UHA. 450 IK8HVJ, VP8CEH, IK8UHA. 500 IK8HVJ, VP8CEH, IK8UHA. 550 IK8AVJ, IK8UHA. 600 IK8HVJ, IK8UHA. 650 I8HVJ. 700 IK8HVJ. 750 IK8HVJ. 800 IK8HVJ, WA3GNW. 850 IK8HVJ. 900 IK8HVJ, 950 IK8HVJ.
Mixed: 450 AK7O, VP8CEH, 9A2NO. 500 AK7O, VP8CEH, 9A2NO. 550 WZ4P, AK7O, 9A2NO. 600 WZ4P, AK7O, 9A2NO. 650 9A2NO. 700 9A2NO. 750 9A2NO. 800 9A2NO. 850 9A2NO. 900 9A2NO. 950 9A2NO. 1000 9A2NO. 1050 9A2NO. 1100 9A2NO. 1150 9A2NO. 1200 9A2NO. 1250 9A2NO, WA3GNW. 1700 I1-21171. 2400 W8UMR. 2450 W87MR.

15 meters: AI9L
40 meters: WA2VQV
80 meters: N3TA, WA3GNW
N. America: WA2VQV, N3TA
Europe: AI9L, IK2TQG

Award of Excellence Plaque Holders: K6JG, N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA. OK1MP, N4NO, ZL3GQ, W4BQY, IØJX, WA1JMP, KØJN, W4VQ, KF2O, W8CNL, W1JR, F9RM, W5UR, CT1FL, W8RSW, WA4QMQ, W8ILC, VE7DP, K9BG, W1BWS, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS. I8YRK, SMØAJU, N5TV, W6OUL, WB8ZRL, WA8YTM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POF, DJ4XA, IT9TQH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, KBØG, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, YU2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MS, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IV4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBP, W5ODD. IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S5ØA, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, S53EO, DF7GK, S57J, EA8BM, DL1EY, KU0A, KØDEQ, VR2UW, 9A9R, UAØFZ, DJ3JSW, OE6CLD, HB9BIN.

Award of Excellence Plaque Holders with 160 Meter Endorsement: K6JG, N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8RSW, W8ILC, K9BG, W1BWS, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF, N4NX, SMØDJZ, DK5AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR2QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N6JV, ONL-4003, W5AWT, KBØG, F6BVB, YU7SF, DF1SD, K7CU, I1POR, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA1CLV, KØIFL, WT3W, IN3NJB, S5ØA, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, KØDEQ, VR2UW, DJ3JSW, OE6CLD, HB9BIN.

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.

ment. The previous deletion rules mention annexation of a **Point 1** country by another, adjacent Point 1 country. Hong Kong was a Point 3a country under the old rules: separation by another DXCC country (a whole host of them, in fact, between Hong Kong and England). There is nothing in the previous rules about such an annexation. The DXAC would have to decide if the annexation rule applied to Hong Kong. If so, DXers could have a New One complete with resident amateurs.

Start Dates: The question of the start date for new DXCC entities was among the topics raised at the meeting, specifically about the Marquesas and Austral

Max, SP1AEN, operates CW from this small, but neat shack. (Thanks to Z32KV for the photo.)

The WAZ Program

Single Band WAZ

10 Meter SSB

491 ..... JA1GRM 492 ..... IK2AEQ

15 Meter SSB

512 ..... JA8JCJ 514 ..... JR1CBC
513 ..... KM7E

20 Meter SSB

1024 ..... W8QZA (QRP) 1026 ..... RW9SG
1025 ..... IK2ANI 1027 ..... N4PQX

12 Meter CW

16 ..... DL1PM

15 Meter CW

273 ..... JR1CBC

20 Meter CW

483 ..... K7NW 484 ..... W9MJ

40 Meter CW

199 ..... JA1GRM

80 Meter CW

50 ..... K5AQ

RTTY

109 ..... W2IJB

160 Meters

128 ..... EA6BD, 32 zones, New
129 ..... OZ1ING, 36 zones, new
125 ..... OM2XW, endorsement

All Band WAZ

SSB

4426 ..... JH3OHO 4429 ..... RW9SG
4427 ..... RA3LZ 4430 ..... JA1XCZ/4
4428 ..... SV1RK

CW/Phone

7788 ..... SM1TDE 7794 ..... IK8TPJ
7789 ..... JS1XGS 7795 ..... IK7WPC
7790 ..... UV3QQ (CW) 7796 ..... DK6LB (CW)
7791 ..... NØAH 7797 ..... AD6W
7792 ..... IKØEIF 7798 ..... DJ3RM (CW)
7793 ..... JF1EYH

All CW

115 ..... JA7IFT

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.

islands of French Polynesia. Both K5FUV and W6CF strongly made the point of *not* applying the new rules retroactively. (Under the "removal criteria" the new rules say: "Criteria changes will not be applied retroactively to Entities on the list.")

Pierre, F6HIZ, argued that the Event Date in the new rules should be the date that the French Polynesian radio society was admitted to the IARU—in 1983. K5FUV pointed out that the two island groups did not meet the criteria for separate country status under the rules in effect

ADVANCED SPECIALTIES INC.

New Jersey's Communications Store

VX-1R
World's Smallest Dual Band with WideReceive

YAESU ALINCO
AMATEUR RADIO'S VALUE LEADER™

Authorized Dealer

DR-605T
100 mem. Dual Band Mobile

ALINCO * LARSEN * COMET * RMS * ADI * MFJ * RAMSEY KITS
MAHA * ANLI * UNIDEN * RANGER * VALOR * MIDLAND
AMATEUR RADIO - SCANNERS - BOOKS - ANTENNAS - FILTERS - GMRS - ACCESSORIES & MORE

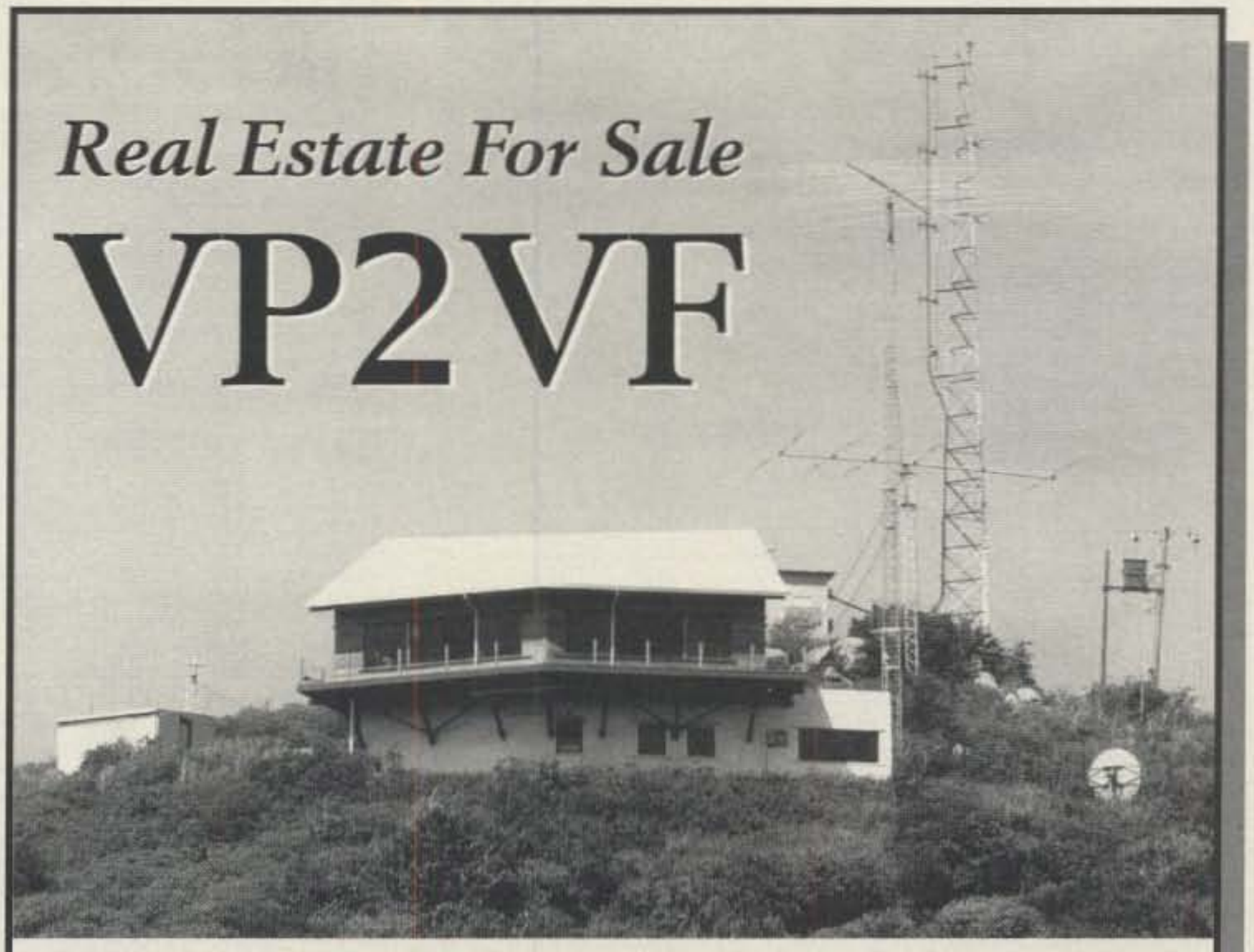
DJ-G5TY
200 mem. Dual Band Slim Full Feature

Closed Sundays
Orders/Quotes 1-800-9-2M-9HAM
114 Essex Street Lodi, NJ 07644
(201)-VHF-1270

FT-50RD
Ultra Compact Dual Band with DTMF Keypad

Real Estate For Sale

VP2VF



This highly desirable mountaintop 1.8 acre ham location in the Caribbean with the best view on Tortola, is for sale and ready for you to run DX with perfect propagation.

This unique house with efficiency apartment enjoys panoramic views and has 4 bedrooms, 3 baths with large living space and is fully furnished.

78 foot US Tower HDX with MDP and TH11-DX
30 foot Glenn Martin with hazer and KLM 34XA
Plus loads of equipment. Asking $465,000.00 (US)

For more information contact:

Dirk de Jong, VP2VF
P.O. Box 137
Road Town, Tortola
British Virgin Islands

Tel: 284-494-3523
Fax: 284-494-8254
Email: dirk@caribsurf.com

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 328 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 328	K2OWE 328	N7RO 327	W7CNL 326	KUØS 323	K6CU 319	K9DDO 312	HB9DDZ 307	YV5ANT 299
K1MEM 328	K6LEB 328	KZ4V 327	N6AR 325	W1WAI 323	K2JF 319	K4JLD 312	K8JJC 306	KØHQW 299
K2FL 328	K9MM 328	9A2AA 326	K8NA 325	4N7ZZ 323	HA5NK 319	K1VHS 311	CT1YH 305	YU1AB 294
K9BWQ 328	F3AT 328	OK1MP 326	I1JQJ 325	AG9S 322	N6AV 318	WA8YTM 311	K7JS 305	G4MVA 294
K2ENT 328	PAØXPQ 328	N4JF 326	IT9VDQ 325	DL3DXX 322	VE7DX 318	N6AW 311	KE4PO 304	I2EOW 294
DL8CM 328	W6DN 327	W9WAQ 326	W8XD 325	KA5TQF 322	G3KMQ 317	N5HB 311	G2FFO 303	W4UW 294
WØIZ 328	K3UA 327	AA4KT 326	K8LJG 325	AA5NK 321	N4CH 317	LA7JO 311	W7IIT 302	KB8O 292
G4BWP 328	N7FU 327	K9IW 326	K4CN 325	ON4QX 321	N6CW 316	OH3NM 310	IKØADY 302	F6HMJ 292
K6JG 328	N4MM 327	YU1HA 326	WB5MTV 324	K9QVB 321	W3BBL 315	OZ5UR 310	WA4DAN 301	LU3DSI 292
I4EAT 328	IT9TQH 327	I5XIM 326	IT9QDS 324	HA5DA 321	N4AH 315	K4CXY 309	WG5G/QRPp 301	DJ1YH 288
SM6CST 328	K4CEB 327	WA8DXA 326	WØJLC 324	K1HDO 320	NØFW 315	VE9RJ 309	W6YQ 301	YU7FW 286
W2UE 328	WA4IUM 327	N5FW 326	N5FG 324	IT9ZGY 320	AA2X 314	9A2AJ 309	N4OT 301	KF5PE 282
W2FXA 328	K4IQJ 327	W7OM 326	DJ2PJ 324	VE7CNE 320	W5OG 313	W3II 308	YU1TR 300	WG7A 282
N4KG 328	F3TH 327	WØHZ 326	W4OEL 324	W6SR 320	WB4UBD 313	HB9DDZ 307	YU2TW 300	YC2OK 280
K8PV 328	EA2IA 327	IK2ILH 326	W7ULC 323	KA7T 320	N1HN 313	I2EOW 307	KH6CF 300	PY4WS 276
W4QB 328	NC9T 327	K2JLA 326	WA4JTI 323	I4LCK 320				

SSB

K4MZU 328	IT9TGO 328	YS1GMV 326	WB3DNA 326	N2VW 324	K4CXY 320	KB1HC 316	CT1AHU 309	K2EEK 291
K2TQC 328	WD8MGQ 328	KF7SH 326	I2EOW 326	OE7SEL 324	G4ADD 320	K6RO 316	EA5KY 308	W6WL 291
K2FL 328	I1EEW 328	ZS6LW 326	KE5PO 326	K8YVI 323	I4WZK 320	W6NW 315	EA3CB 308	YB1RED 291
DJ9ZB 328	IØZV 328	YV5AIP 326	K4JLD 326	K9HQM 323	I4SAT 320	KV2S 315	N6AV 306	DJ2UU 291
EA2IA 328	VE3MR 328	K9IW 326	W6SR 326	KC5P 323	WE2L 320	WA9RCQ 315	TI2TEB 306	4X6DK 291
K2ENT 328	DL9OH 328	WA4JTI 326	N4CH 326	WDØGML 323	EA3EQT 320	N3ARK 315	VE3DLR 306	WA3KKO 290
OZ5EV 328	ZL1AGO 328	YV1AJ 326	K1HDO 326	WW1N 323	WS9V 320	K6BZ 315	W3YEY 306	OE7KWT 290
VE1YX 328	SV1ADG 328	YV1KZ 326	K9PP 326	K4SBH 323	KØFP 320	K2AJY 315	XE1MDX 305	N6CFQ 290
W6EUF 328	LA7JO 328	W9OKL 326	I8ACB 325	WB2JZK 323	KE3A 320	K7TCL 315	DK5WQ 305	IK2PZG 289
K2JLA 328	VE3XN 328	9A2AA 326	N6AR 325	CE7ZK 323	N4CSF 320	I4CSP 315	EA5OL 305	VK3IR 289
N7RO 328	K9MM 328	DL6KG 326	K8NA 325	K2ARO 323	W8AXI 320	N6RJY 315	G4NXG/M 304	KF7VC 288
K6YRA 328	K7LAY 328	KØKG 326	AI8M 325	LU7HJM 323	W6SHY 320	NØAMI 314	VE3CKP 304	OK1AWZ 287
W6BCQ 328	VK4LC 328	OK1MP 326	W4UW 325	VE4ACY 323	N4HK 320	W5RUK 314	WB2NQT 303	IK2DUW 287
K5OVC 328	DL8CM 328	WB3CQN 326	VE2PJ 325	KB8O 323	ON5KL 319	DL3DXX 314	K6CF 304	EA5GMB 287
KZ2P 328	NØFW 328	I2QMU 326	I8LEL 325	VE2GHZ 323	WA4DAN 319	WB8ZRV 314	WB2NQT 303	IK8BMW 286
VE7DX 328	I8KCI 328	N4JF 326	IT9ZGY 325	KD8IW 323	KI3L 319	OH5KL 313	EA3CWK 303	TU2QW 286
AA6BB 328	XE1VIC 328	KB4HU 326	K6LEB 325	YV1JV 323	VE3HO 319	WDØDMN 313	EA3BT 303	WZ3E 286
EA4DO 328	PAØXPO 328	KC4MJ 326	IK1GPG 325	VE4ROY 322	XE1MD 319	K9YY 313	YC2OK 303	NM5O 285
ZL3NS 328	K3UA 327	CX2CB 326	I1JQJ 325	WN5IJZ 322	KB1JU 319	K1VHS 313	WA9BDX 302	EA1AYN 285
K6JG 328	K9BWQ 327	TI2CC 326	VE7WJ 325	XE1CI 322	PY2DBU 319	W9IL 313	WA8MEM 302	IK2HBX 284
WA6OET 328	WØYDB 327	IKØIOL 326	AI8S 325	WB4PUD 322	IØSGF 319	W1LQQ 313	KD4YT 302	VE7HAM 284
SM6CST 328	W4QB 327	ZL1HY 326	W7FP 325	LZ1HA 322	KF8UN 319	WA2FKF 313	CT1YH 302	KE6CF 283
W3GG 328	VE3MRS 327	YU1HA 326	N5FG 325	ZS6AOO 322	K9QVB 318	K4LR 312	N5QDE 302	KK4TR 283
I4EAT 328	OE2EGL 327	W4NKI 326	AC7DX 325	WA5HWB 322	KB5FU 318	WA9IVU 312	RA2YA 301	YC3OSE 282
W4UNP 328	K8CSG 327	KZ4V 326	KØHQW 325	TI2JJP 322	AA4AH 318	KD5ZD 312	W2LZX 301	WN6J 281
YU1AB 328	K1UO 327	VE3GMT 326	K2JF 325	WDØBNC 322	G4GED 318	WA2FKF 312	XE2DU 301	YU1TR 280
F9RM 328	WB4UBD 327	W4EEE 326	KC8EU 324	W5XQ 321	IK8GCS 318	K4JDJ 312	WP4AFA 300	KN4RI 280
PY4OY 328	W2FXA 327	KE4VU 326	N4KEL/M 324	KA5TQF 321	W6MFC 318	N5HB 312	YU2TW 300	WD9ACQ 280
OZ3SK 328	IK8CNT 327	AG9S 326	IK8BQE 324	TI2HP 321	KF5AR 318	ZS6BBY 311	WB4UHN 300	WØIKD 279
XE1L 328	N4KG 327	WA4WTG 326	AA5NK 324	I8XTX 321	I8IYW 318	IN3ANE 311	KB8NTY 300	EA3CWT 278
4Z4DX 328	K8PV 327	WD8PUG 326	WB5TED 324	I8YRK 321	NI5D 318	F1OZF 311	YT7TY 300	VE2DRN 277
CX4HS 328	K5TVC 327	W2CC 326	W2FGY 324	K4PQV 321	WA8YTM 318	EI6FR 311	WB6GFJ 299	GØLRX 277
N4MM 328	NC9T 327	VE2WY 326	YV5CWO 324	KS2I 321	F6BFI 318	YZ7AA 311	VE3CKP 299	9A9R 277
OE3WWB 328	I8KCI 327	AA4KT 326	W5LLU 324	W7ULC 321	KX5V 318	WA5SUE 311	YV4VN 299	K3LC 277
IK1GPG 328	W7BOK 327	PT2TF 326	I8KCI 324	W3AZD 321	CE1YI 318	GM4XLU 311	KJ9N 298	KC6AWX 276
W7OM 328	4N7ZZ 327	KM2P 326	I1POR 324	WØULU 321	WB6PSY 317	KA5RNH 310	W5OXA 296	OA4EI 276
K4MQG 328	N4CH 327	N5FW 326	VE4AT 324	CT1EEB 321	9H4G 317	I2MQP 310	KB5WQ 295	N3RX 275
K7JS 328	W9SS 326	K9HDZ 326	KD5ZM 324	OA4QV 321	WA6DTG 317	HA6NF 310	IT9VDQ 293	F5NBX 275
DU9RG 328	WA4IUM 326	WA3HUP 326	KA5TTC 324	OE6CLD 321	XE1XM 317	KF7RU 310	KJ5LJ 293	VE2AJT 275
W6DN 328	WB1DQC 326	YV1CLM 326	KB2MY 324	LU1JDL 320	ZL1BOQ 317	AB4IQ 310	TI2LTA 292	US1IDX 275
I4LCK 328	XE1AE 326	N6AW 326	EA3BKI 324	KF8VW 320	EA1JG 317	W4WX 310	KQ4WD 292	Z31JA 275
IT9TQH 328	KA3HXO 326	ZP5JCY 326	YV5IVB 324	IØAMU 320	N5HSF 316	EA5RJ 309	LU3HBO 292	

RTTY

K2ENT 324	NI4H 305	EA5FKI 284	YC2OK 281	G4BWP 276	KE5PO 274	W4QB 273	I1JQJ 273	W4EEU 269
WB4UBD 310	K3UA 288							

in 1983. It wasn't until the DXCC rules were changed in 1988 that the Marquesas and Australs could be considered for separate DXCC status, if French Polynesia were a Point 1 country. (The DXAC twice considered this question and twice turned it down.) K5FUV said the Event Date for these two potential New Ones is 2359Z, March 31, 1998. (He doesn't like the idea of the new rules taking effect on April Fool's Day.)

Note that having start date of April 1 (or March 31) doesn't mean that the DXCC desk will be accepting cards for the New Ones immediately. The DXCC desk will, in general, accept cards for New Ones just *after* the two major DXCC submission dates. Thus, look for acceptance dates of April 1 and October 1.

Minimum QSOs: As always happens when three or more DXers gather, the topic of North Korea came up. A few DXers were in favor of a minimum-QSO rule, which would have prevented the limited P5 operation from adding North Korea to the DXCC list. K5FUV pointed out that no matter what the minimum number of QSOs for an operation to count for DXCC, most DXers will be shut out of any possible contact. The DXAC did consider the concept of such a rule, but rejected it. In a show of hands at the DX forum, the Visalia attendees also overwhelmingly rejected the notion of such a rule.

Other Changes: Bill Kennamer mentioned some of the coming changes to the DXCC program. As soon as the DXCC computer system can be successfully upgraded, perhaps in another year, DXCC will begin to accept DXCC applications on disk. The idea would be for the DXer to use a program supplied by the ARRL to enter the appropriate data from the QSL cards. After the cards are checked in the field, the disk is mailed or downloaded to the ARRL, where it is used to update the DXer's records.

Following this innovation, the field-

Say You Saw It In CQ

5 Band WAZ

As of March 31, 1998, 480 stations have attained the 200 Zone level.

New recipients of 5 Band WAZ Award with all 200 Zones confirmed:

OH2DW	JA2DLM	UAØFZ
K5AQ	S57J	N5KO
SP6CZ	OZ1ING	

The top contenders for 5 Band WAZ (zones needed, 80 meters):

N4WW, 199 (26)	KZ4V, 199 (26)
AA4KT, 199 (26)	W8DX, 199 (34)
K7UR, 199 (34)	N4CH, 199 (18 on 10)
WØPGI, 199 (26)	N6AW, 199 (34)
W2YY, 199 (26)	UA3AGW, 198 (1, 12)
W9WAQ, 199 (26)	EA5BCK, 198 (27, 39)
VE7AHA, 199 (34)	K4PI, 198 (23, 26)
W9CH, 199 (26)	G3KDB, 198 (1, 12)
IK8BQE, 199 (31)	KG9N, 198 (18, 22)
JA2IVK,199 (34 on 40)	KM2P, 198 (22, 26)
K1ST, 199 (26)	DKØEE, 198 (19,31)
ABØP, 199 (23)	KØSR, 198 (22, 23)
KL7Y, 199 (34)	K3NW, 198 (23, 26)
UY5XE, 199 (27)	UA4PO, 198 (1, 2)
NN7X, 199 (34)	K5RT, 198 (22, 23)
OE6MKG, 199 (31)	JA1DM, 198 (2, 40)
HA8IB, 199 (2 on 15)	OE1ZL, 198 (1,31)
IK1AOD, 199 (1)	9A5I, 198 (1, 16)
DF3CB, 199 (1)	K4ZW, 198 (18, 23)
F6CPO, 199 (1)	DJ4GJ, 198 (1, 31)
W6SR, 199 (37)	OH2VZ, 198 (1, 31)
W3UR, 199 (23)	W2YC, 198 (24, 26)
KC7V, 199 (34)	W6DN, 198 (17, 34)
GM3YOR, 199 (31)	NØFW, 198 (18,18on10)
VO1FB, 199 (19)	

The following have qualified for the basic 5 Band WAZ Award:

IK2ANI, 166 zones	EA6BD, 190 zones
PY4OY, 195 zones	OZ1ING, 200 zones
JA2DLM, 200 zones	

Endorsements:

OH2DW, 200 zones	S57J, 200 zones
K5AQ, 200 zones	K2UVG, 170 zones
SP6CZ, 200 zones	VE5KX/WØ, 180 zones
KY7M, 196 zones	NØFW, 198 zones
VO1FB, 199 zones	UAØFZ, 200 zones
OE2BZL, 181 zones	N5KO, 200 zones

1074 Stations have attained the 150 Zone level as of March 31, 1998.

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.

checking of DXCC cards will be greatly expanded, with more checkers, better training, and more field-checkable countries. "Totally different and a lot better," Bill said. This step is a necessary one before DXCC can expand its awards program, another part of the DXCC 2000 mission.

The subject of electronic submission of DXCC credits also arose. Bill bases his long-standing objection to this process on the ease of tampering with the QSO data. He feels if he can add his callsign to the electronic log data, it is not sufficiently secure for use in the DXCC program.

Fortunately, a former software engineer who specialized in encryption of data and data security plans to look into this problem, thanks to the support of the Yasme Foundation. We may eventually see auto-

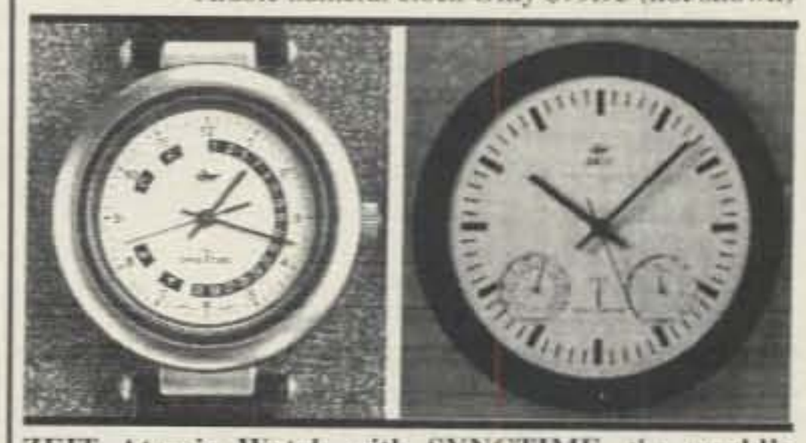
"ATOMIC CLOCK CONTROLLED" Precision Time Pieces Synchronized to the US Atomic Clock - Accurate to 10 billionths of a Second!

ONLY $69.95

The most accurate clock on Earth. These smart clocks tune into the radio signal emitted by the **US Atomic Clock** in Colorado, which deviates less then 1 second over a million year period. They synchronize themselves automatically to the exact same time daily and adjust even for daylight savings time and leap seconds. You can now have the world's most accurate time 24 hours a day to be in control of time or start your day. These precision ZEIT timepieces are **engineered in Germany** and are **easy to use** using the latest in radio-controlled technology. Just set the time zone and the built-in micro chip does the rest. **ZEIT-accurate! precise! reliable! & fully automatic**

WALL CLOCKS—ALL STYLES AVAILABLE

ZEIT Atomic Wall Clock with thermometer and hygrometer great for home or office—1AA. Large 12" **Only $99.95 (below)**
Arabic numeral clock **Only $79.95 (not shown)**



ZEIT Atomic Watch with SYNCTIME, the **world's most accurate watch** with hour, minute and seconds. Watch the hands spin at 80 times its normal rate until they stop at the precise time. Shock-resistant polymer case with built-in receiver for Atomic Time Signal (water-resistant). Sets itself daily and shows date with second hand. Mineral lens, **black or white** dial & leather band. **Only $149.95**

ZEIT Atomic Dual Alarm & ZEIT Atomic PC Sleek European design with large 2 line LCD display with exact time in hours, minutes, seconds; month and date, or any two US and world times. At 8 oz even ideal for travel; includes dual alarm with nighttime illumination, time zones and lithium battery backup. Super sensitive built-in receiver. 2AA bat. included. Black arch design at 5" x 4" x 21/2". **ONLY $79.** Two only $ 129.
ZEIT PC with serial cable and software for WIN. Also shows **UTC Time in 24hr mode. Only $99**

Gifts Haven't Been Easier!

Atomic Clock Controlled Time:
Credit Card Orders
Call toll free **1-800-985-8463** 24 hrs
Send checks/money orders to:
ARCRON-ZEIT
1010 Jorie #324, Oak Brook, IL 60523
fax 630.575.0220 http://www.synctime.com

CIRCLE 37 ON READER SERVICE CARD

IRON POWDER and FERRITE from
AMIDON Associates, INC.

Over 12 million pieces of **Toroids, RFI shield beads, Rods, E-cores, Pot cores, Baluns, Coil forms, RFI Kits, Experimental Kits,** etc. in STOCK for immediate shipment to YOU. **Guaranteed LOW COST!!**

Fast, Reliable Service Since 1963. FREE "Tech Data" Flyer.
We welcome small orders from all over the world. Ship directly to you.

Call, fax or email today and ask for Teresa.
Tel.: 714-850-4660 / 800-898-1883
Fax: 714-850-1163
Email: amidon@earthlink.net

5% discount if you mention this ad. when placing orders.

Amidon products are also available through our distributors. Call for one nearest you.
240 Briggs Ave., Costa Mesa, California 92626, U.S.A.

CIRCLE 38 ON READER SERVICE CARD

QSL INFORMATION

3D2HI to JA1KJW
3D2KZ to JA8VE
3D2TK to JA3MCA
3D2WP to JA1WPX
4K1A to W3HC
4K1QAV to W3HC
4N4AE to YU4WU
4N4GD to YU4WU
4N4I to YU4WU
4N8P to YU8FFG
4OØSRBIH to YU4WU
4O4EBL to YU4WU
4O4WCY to YU4WU
4O4ZX to YU4WU
4X4UO to WB3CQN
4X51FN to AA2KD
5N4BAV to IKØSHF
6A1A to IK3ZAW
6A1HM to SU1HM
6A1TA to SU2TA
6KØT to DS4CNB
8J3AKB/3 to JG3GMG
9J2A to JAØJHA
9M2YXI to GM4YXI
9X5NA to W7LFA
AA4HU/D2 to W3HC
AA4NC/CYØ to WA4DAN
BI3H to W3HC
BI7Y to BD7JA
BV98ARL to BV4YB
C53HG/E to W3HC
DSØCX to HL2WA
EU/RØPK to UAØAGI
F6FWT to W3HC
FOØFI to K6SLO
FO5PR to LX1SP
FS5HI to WA4JTK
H22A to YL2KL
H44XX to JA5DQH
H44YC to AA5BT
HG6N to HA6KNB
HH2LD to N3BNA
HI8MO to YV1AVO
HLØZ to DS4CNB
HLØZ/4 to DS4CNB
HLØZ/5 to DS4CNB
HR5/HP1XBI to F6AJA
IRØN to ISØSIR
IY5PIS to IK5QPZ
J42Z to SV2CWY
J69EB to KB3AMD
JW9VCA to LA7JO
JW9YY to LA7JO
KH6/KBØEBH to K7VI
KM4P/HSØ to W3HC
LA8W to LA4DCA
LX6A to Pirate
LX6T to LX1KC
LX9UN to LX1NJ
MSØAPF/P to MM1AUF
N9KX/KH4 to DK9KX
OK8AAE to DL4VBP
PJ8WP to W5SJ
RØDJG to UA3DJG
R3CA/Ø to UA9OBA
RNØA to UAØAGI
RP9XUK to W3HC
SØ7AD to EA4URE
SØ7CRS to JA1UT
SO2DCA to LA4DCA
SO8FHG to PAØFHG
T22JY to JA1JQY
T22KJ to JA1KJW
T22KT to JA3MCA
T22VE to JA8VE
T94GB to W3HC
TA3ZN to DL3FDU
TA4A to W3HC
TK/F8UFT to F6AXX
TKØUFT to F6AXX
TK5UFT to F6AXX
TU4EI to W3HC
TU5EV to W3HC
UK8AN to VK4FW
UK8CK to RW6HS
UN3F to UN7FJ
V31HE to DL1DA
V31SC to DJ4IJ
VP8/G4VFU to GØHXL
VU3DJQ to Pirate
VU4HLE to Pirate
W4T to WA3HUP
XT2JB to W3HC
XT2TP to WB2YQH
XU3MTM to HL2AQN
XU6BND to JA6BND
XU7MTM to HL2AQN
YBØZCE to YCØFTD
YL1ZY to YL2KL
YT4AM to YU4WU
YT4BYZ to YU4WU
YT4TD to YU4WU
YU4AB to YU4WU
YW1AVO to YV1AVO
YW1D to YV1AVO
YX1DIG to YV1AVO
YY1D to YV1AVO
YZ4BYZ to YU4WU
YZ4DAM to YU4WU
YZ4EBL to YU4WU
YZ4EE to YU4WU
YZ4GD to YU4WU
YZ4I to YU4WU
YZ4IZ to YU4WU
ZS5ACW to W3HC
ZS6/AA3JA to JF7FQK
ZY5YZ to PP5LL
3W6KA to Kasati Ham Club, P.O. Box 076, Saigon, Vietnam
5B4LP to Andreas Mavrides, 8A Salamis Ave., Nicosia 135, Cyprus
6W1RB to Marie-Therese Bechelani, B.P. 3749, Dakar, Senegal
7Q7DX to Elmer R. Ribeyro, P.O. Makwasa, Malawi
8Q7AM to Ali Mahir, Chandani Villa 19, Raa, Vaadhoo 0502, Republic of Maldives
BA1CO to Pek Ching, P.O. Box 6111, Beijing, China
BY1BYX to YongXin Amateur Radio Station, P.O. Box 429,Beijing, China
BY2HIT to Harbin Institute of Technology, P.O. Box 1207, Harbin, China
BV4QW to Calvin Lin, P.O. Box 922, Taichung, Taiwan
D2/UR5TY to Michail Rudoy, Kosmonavtov 14, Volochisk 281370, Ukraine
DSØHG to KARL Uijongbu Office, P.O. Box 57, Uijongbu 480-600, Korea
DS1BHE to Seong-Joo Lee, P.O. Box 12, Tobong, Seoul 132-023, Korea
DS1GWU to Jeong-Jea Park, Mok-Dong APT 1421-1904, Sin Jeong-dong, Yangchun-Gu, Seoul 158-076, Korea
DS1GWV to Sang-Young Park, Mok-Dong APT 1421-1904, Sin Jeong-dong, Yangchun-Gu, Seoul 158-076, Korea
DS1HAM to Kim Jung Hee, Kae Hwa APT #107-305, Bang Hwa 3 dong, Kang So-Ku, Seoul 157-223, Korea
DS3FTM to See Yong Taek, 100 Pyongchon-Dong, Taejun 306-712, Korea
DS4BHW to Pil-Ki Kim, P.O. Box 27, Suncheon 540-600, Korea
DS5RNM to Joonha Lee, Kyeungnam Town 9-1005, 113, Hwangkum-dong, Suseong-Ku, Taegu 706-040, Korea
DS5ROJ to Jeongsoon Kang, P.O. Box 6, Yongju 750-600, Korea
DS5WKW to Jong-Ho Jang, Jugong APT 2-501, Jangsung-dong,Pohang 791-260, Korea
DU1SAN to Serafin A. Nepomuceno, P.O. Box 3000 QCCPO, Quezon City 1170, MM, Philippines
DL5ZAH/DU1 to Klaus-Dieter Illhardt, 29 Cecilleville, White Plains, Quezon City, MM, Philippines
HLØZ to Gyeongsang National University Marine Science College Amateur Radio Station, 445 Inpung Dong, Tong Yung, Korea
HL1CG to Song Hyung Suk, Kae Hwa APT #107-305, Bang Hwa 3 dong, Kang So-Ku, Seoul 157-223, Korea
HL3ADI to Bae Jeong-Ho, P.O. Box 50, Taejon 300-600, Korea
HL3EHL to Jun Sik Cha, 99-15 Jungcheon-dong, Jung-gu, Taejon 301-080, Korea
HL3EOR to Young Duk Lee, 99-15 Jungcheon-dong, Jung-gu, Taejon 301-080, Korea
HL5FBT to Kim Keum-Cheol, P.O. Box 34, Namdaegu 705-600, Korea
HL5YAW to Euljae Lee, P.O. Box 6, Yongju 750-600, Korea
HP3XUG to Louis N. Anciaux, Apartado 417, David, Chiriqui, Panama
HR1RGA to Rene Garcia A., P.O. Box 15176, Tegucigalpa, Honduras
LX1KC to Christian Kieffer, 121, rue Klensch, L-3250 Bettembourg, Luxembourg
LX4B to Telecom. Union Radio League, P.O. Box 117, L-4901 Bascharage, Luxembourg
OD5CN to Aref N. Mansour, P.O. Box 8888, Beirut, Lebanon
PZ1CU to Cyril A. Gomes, Zuurzakstraat 12, Paramaribo, Suriname
RU1ZC to Akademgorodok 2 kv. 1, Loparskaya 184340, Russia
SV1BRL to Kiki, P.O. Box 87539, GR-185 07 Piraeus, Greece
SV1CQN to Kostas Karakostas, Anapafseos 4, GR-301 00 Agrinion, Greece
SV2COL to Sismanidis Dimitris, Velvendo Kozanis, GR-504 00 Kozani, Greece
SV2CWY to Chris Dimitrakopoulos, P.O. Box 40130, GR-560 00 Thessaloniki, Greece
SV2CXW to George Pipelias, 15 Kavakion Str., GR-546 27 Thessaloniki, Greece
TF8GX to Gudlaugur K. Jonsson, P.O. Box 345, IS-230 Keflavik, Iceland
TK5PB to Bruno Padey, Le Magenta No. 1, F-20169 Bonifacio, France
UA6AH to P.O. Box 73, 353320 Abinsk, Russia
VP2VBN to Worrell Bertrand, Box "B", Road Town, Tortola, British Virgin Islands
VP8CXV to Chris Vernon, 57 Parker Road, Wittering, Cambs PE8 6AN, England
VR2KF to Kazuhiko Fujita, G.P.O. Box 4724, Hong Kong, China
VU2SWS to Mrs. Sarla Sharma, 7, Gaurav Appt., Nahur, Mulund West, Mumbai 400 080, India
YBØBEH to Roselina, P.O. Box 1096, Jakarta 10010, Indonesia
YB2ZBI to Station Induk ORARI Lokal Brebes, P.O. Box 1019, Brebes 52212, Indonesia
YB8BYS to H. F. Sjamsuddin, Jln. Gunung Kairo 12, Ujung Pandang 90114, Indonesia
YC2JVQ to Muarief, P.O. Box 1019, Brebes 52212, Indonesia
YC8RBC to Drs. M. Sunus, P.O. Box 800, Tahuna 95807, Indonesia

The table of QSL managers is courtesy of John Shelton, K1XN, editor of The GOLIST, P.O. Box 3071, Paris TN 38242 (phone 901-641-0109; e-mail: <golist@wk.net>).

Say You Saw It In CQ

Bob, K4UEE, at one of Heard Island VKØIR operating positions. (KK6EK photo)

matic updating of DXCC records from DXpedition logs.

Another approach would be for the DXCC desk to have electronic access to DXpedition logs, via the Internet, for example. Bill said this was a possibility in two or three years, but the system had to be fast enough to verify a contact in five seconds. Otherwise, the DXCC desk would not be able to process the 500,000 to 1,000,000 cards they receive each year.

New Orleans International DX Convention

This event convenes for the seventh year at the Royal Sonesta Hotel on Bourbon Street in the historic French Quarter, August 14–15. Early registration (before July 31) is $60 for amateurs and $40 for guests. After July 31 the registration is $70 and $50, respectively. Make your check payable to the New Orleans International

9M6OO (right) on Layang Layang in the Spratlys.

ELECTRONIC COMPONENTS

Visit our web site!
www.mouser.com

FREE catalog is available on the internet, CD-ROM, or in paper!

- Over 70,000 Products
- More than 145 Suppliers
- Same Day Shipping
- No Minimum Order

800-992-9943

817-483-6828 Fax: 817-483-0931
catalog@mouser.com

958 North Main St., Mansfield, TX 76063

CIRCLE 92 ON READER SERVICE CARD

GORDON WEST
HAM TEST PREP TAPES
BOOKS SOFTWARE VIDEOS

Prepare for your ham test with "Gordo" WB6NOA as your personal instructor.

- ***THE THEORY*** on audio cassettes
  - No-Code Technician (6 tapes) $29.95
  - General Class (2 tapes) .....$ 9.95
  - Advanced Class (4 tapes) $19.95
  - Amateur Extra Class (4 tapes) $19.95
- ***THE CODE*** on audio cassettes
  - Learning CW (0-7wpm 6 tapes) $29.95
  - General CW (5-16wpm 6 tapes)....$29.95
  - Extra CW (10-28wpm 6 tapes).....$29.95
- ***STUDY MANUALS*** by "Gordo"
  - No-Code Technician (2&3A) $12.95
  - General Class (3B).....$11.95
  - Advanced Class (4A).....$11.95
  - Extra Class (4B) $11.95
- ***IBM SOFTWARE*** with manual
  - No Code Technician *(2&3A)*.....$29.95
  - Tech./Tech+/Gen. *(+ Code,Windows)* $49.95
  - General Class *(3B+Code, Windows)*..$34.95
  - Advanced Class *(4A + Code)* $29.95
  - Ham Operator *(Nov.-Extra + Code)*....$69.95
  - Extra Class *(4B + Code)*.....$29.95
  - Morse Software Only.....$12.95
- ***VIDEO*** VHS with 2&3A manual
  - No-Code Tech Video Course $29.95

Add $3.00 shipping 1st item, $1.50 each additional
Priority Mail 2-3 day service available
VISA, MasterCard, Discover & AMEX Accepted

The W5YI Group, Inc.
P.O. Box 565101 ✪ Dallas, TX 75356
Call Toll Free **1-800-669-9594**

CIRCLE 75 ON READER SERVICE CARD

RF Applications, Inc.

HF DIGITAL WATTMETERS

RF Applications, Inc. makes unique wattmeters that give you accurate information about your station's most important parameters: Output power and V.S.W.R. Choose the one that meets your needs. Order today!

The P-3000
- 15-2.95kW
- 1.8-30MHz
- Remote coupler
- High SWR relay
- 12VDC power

$299.00

The P-1500
- 15-1500 watts
- 1.8-30MHz
- Internal coupler
- SWR alarm
- Compact (3.5" x 4" x 4")
- 12VDC power

$219.95

Our products are made in the U.S.A. and carry a two year warranty. Call for additional info.

MasterCard VISA

800.423.7252

7345 Production Drive, Mentor, OH 44060 USA
Available from AES, Henry Radio, ARW and HRO!

216.974.1961
216.974.9506 fax

CIRCLE 64 ON READER SERVICE CARD

Amplifiers, ATV Down Converters & Hard to Find Parts

LINEAR AMPLIFIERS

HF Amplifiers
PC board and complete parts list for HF amplifiers described in the **Motorola Application Notes and Engineering Bulletins:**

AN779H	(20W)	AN 758	(300W)
AN779L	(20W)	AR313	(300W)
AN 762	(140W)	EB27A	(300W)
EB63	(140W)	EB104	(600W)
AR305	(300W)	AR347	(1000W)

2 Meter Amplifiers
(144-148 MHz)
(Kit or Wired and Tested)
35W - Model 335A, $79.95/$109.95
75W - Model 875A, $119.95/$159.95

HARD TO FIND PARTS
- **RF Power Transistors**
- **Broadband HF Transformers**
- **Chip Caps** - Kemet/ATC
- **Metalclad Mica Caps** - Unelco/Semco
- **ARCO/SPRAGUE** Trimmer Capacitors

We can get you virtually any RF transistor! *Call us for "strange" hard to find parts!*
DIGITAL FREQUENCY READOUT
For older analog transceivers
TK-1 (Wired and Tested)$149.95

ATV Down Converters
(Kit or Wired and Tested)
Model ATV-3 (420-450) (Ga AS - FET) $49.95/$69.95
Model ATV-4 (902-926) (GaAS - FET) $59.95/$79.95

ADDITIONAL ITEMS
Heat Sink Material
Model 99 Heat Sink (6.5" x 12" x 1.6"), $24
CHS-8 Copper Spreader (8 "x 6" x 3/8"), $24
Low Pass Filters (up to 300W) for harmonics $12.95
Specify 10M, 15M, 20M, 40M, 80M or 160M
HF Splitters and Combiners up to 2KW

For detailed information and prices call or write for our free catalog!

MasterCard VISA

Phone (937) 426-8600
FAX (937) 429-3811

CCI Communication Concepts Inc.
508 Millstone Drive • Beavercreek, Ohio 45434-5840
e-mail: cci.dayton@pobox.com www.communication-concepts.com

CIRCLE 45 ON READER SERVICE CARD

Where has good old-fashioned Ham ingenuity gone?

It's alive and well in the pages of COMMUNICATIONS QUARTERLY

- **Do you feel that some of the fun is missing from your Hamming?**
- **Do you wish you could get more nuts and bolts value from your Ham reading?**
- **Do you feel there's more to Ham Radio than just talking?**
- **Are you proud of your high-tech skills?**

If you answered *YES* to any of these questions, you should be reading Communications Quarterly. It's the antidote to your Ham Radio blahs!

Communications Quarterly is the finest purely technical publication in Ham Radio — written and edited for people just like you.

Four times each year the Communications Quarterly staff assembles the best-of-the-best in technical Amateur Radio communications literature in a skillfully-crafted magazine of the highest quality. Each year, within the pages of *Communications Quarterly* you'll find more than 350 pages of informative, well-written, beautifully illustrated technical articles, all specifically aimed at the high tech interests of a special group of Hams like you.

In Ham Radio technology, you either learn and lead, or you're left behind. The choice is yours.

Order NOW and receive one FREE ISSUE! That's 5 issues for only $33.00.
Foreign rate $46.00 (US Dollars)

Using your credit card?

Use our order hot line: 516-681-2922 ***Fax 516-681-2926***

or mail your order including check or money order to:
CQ Communications, 25 Newbridge Road, Hicksville, New York 11801

CQ DX Awards Program

SSB

2248.....RX3MX

SSB Endorsements

320	N4CH/327	275	WZ3E/286
310	K6RO/316	28 MHz	RX3MX
310	W9IL/313	3.5/7 MHz	RW9SG

CW Endorsements

320	KZ4V/327	275	W4UW/294
320	W7CNL/326	250	W9IL/261
310	N4CH/317	1.8 MHz	UR7CA

Total number of active countries is 328. The basic award fee for subscribers to *CQ* is $4. For non-subscribers, it is $10. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00. Updates not involving the issuance of a sticker are made free when an SASE is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business-size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for airmail reply. Please make all checks payable to the awards manager.

DX Convention and mail it to Michael Mayer, W5PZA, 5836 Marcia Avenue, New Orleans, LA 70124. The convention includes DXpedition reports, technical sessions, QSL card checking by Bill Kennamer, K5FUV, and much more. The Saturday evening banquet, a coat-and-tie affair, features a major DXpedition report and some of the best food in New Orleans, a city known for its fine cuisine. Call the hotel at 504-586-0300 and mention the DX convention to get the special convention rate, which is good before and after the convention, if you would like to linger in New Orleans. This is a top-notch convention in a first-class facility, surrounded by the around-the-clock entertainment of the French Quarter. The Friday and Saturday evening hospitality suites on a balcony overlooking Bourbon Street are alone worth attending the convention. I'll be there; stop by and say hello.

DX Happenings

VE9AA plans a return visit to St. Paul Island this month. He will use the callsign CY9AA as he did last year. He is shooting for a 9 to 10 day DXpedition in the window of June 25 to July 15, with exact days depending on the weather. Operation will be on 160–6 meters, CW and SSB. For more information, try Mike's e-mail address at <ve9aa@hotmail.com>. QSL CY9AA via VE9AA.

The Eindhoven Student Radio Amateur Club will operate from the mountain restaurant in Malbun, Liechtenstein, July 1-14. Look for the callsign HBØ/PI4TUE on all bands/modes. Operators include PA3EZL, PA3FXW, PA3GFE, PA3HCW, PE1NVK, PE1OGF, and PE1PRG.

73, Chod, VP2ML

Say You Saw It In CQ

BY FREDERICK O. MAIA, W5YI

WASHINGTON READOUT

REGULATORY NEWS IN THE WORLD OF AMATEUR RADIO

NTIA and Amateur Spectrum Requirements

Most amateurs believe that it is the Federal Communications Commission that has jurisdiction over amateur radio spectrum in the United States. While it is true that the FCC adopts rules for the use of amateur spectrum once it has been allocated, it is the National Telecommunications and Information Administration (NTIA), working in conjunction with the State Department, that plans the future spectrum for all services. The NTIA is the White House advisor on telecommunications issues. This month let's talk a little about spectrum allocations.

The availability of radio spectrum in the United States is critical to many telecommunications services, ranging from cellular telephones to air traffic control. Although spectrum is not a consumable resource, the use of a frequency at a given location usually (but not always) excludes that frequency from being used by others in the same geographic area. This need for exclusive geographic use has led to current spectrum regulations that establish exclusivity in spectrum use by granting licenses for spectrum use, and the partitioning of the spectrum for shared use between radio services.

As the number of spectrum users increases, the amount of spectrum available for new and existing services decreases. Thus, to successfully plan for tomorrow's spectrum use, the spectrum management community must have an understanding of expected future spectrum requirements and spectrum availability, as well as the potential effects of new technology on the efficient use of the spectrum. A long-term spectrum plan can then be developed and used to guide modification of spectrum allocations, standards, and channeling plans for the best mix of radio services, economy, and spectrum efficiency.

The NTIA is the primary Federal agency working toward the definition and development of the National Information Infrastructure (NII), commonly referred to as " . . . the information superhighway." The NII will be a network linking people, businesses, schools, hospitals, communities, and governments, allowing them to communicate and exchange information using voice, video and data with computers, telephones, radios, and other devices.

The concept of the NII encompasses a wide range of telecommunications equipment, services, and transmission media. The technology encompassed by the NII includes, among other things, electronic cameras, computers, televisions, optical fiber transmission lines, microwave links, satellite systems, wireless networks, car telephones, pagers, and facsimile machines. The NII will integrate and interconnect these physical components to provide a nationwide information conduit, accessible by everyone. Although the NII is not a discrete telecommunication service, the increase in information flow, particularly to and from mobile users, will result ultimately in an increased requirement for radio spectrum to support the various mobile and fixed service interconnections.

Recently, commercial demand for access to some segments of the radio spectrum has exceeded spectrum availability in many major U.S. markets. Leading the demand for additional spectrum allocations are the various high-technology mobile systems, such as personal communications services (PCS), mobile-satellite systems interconnecting to the public switched telephone network (PSTN), enhanced public safety systems, and a variety of wireless data and voice systems. The continued growth of the telecommunications industry depends to a significant degree on the effective allocation of spectrum to meet additional radiocommunications requirements.

The Federal Government has unique requirements for spectrum use to support the many and varied missions of the Federal agencies. Most of the Federal spectrum use is in support of unique missions that are of direct benefit to U.S. citizens, such as Federal law enforcement, air traffic control, national defense, weather services, and environmental monitoring. Recognizing that continued economic growth in the telecommunications industry and other businesses is dependent on adequate spectrum to support new radiocommunications systems, the future use of the spectrum must be carefully planned so it can adequately support both commercial interests and the critical missions of the Federal Agencies.

To address the issue of spectrum planning, the Congress directed NTIA in the early 1990s to prepare a long-term, strategic spectrum plan. The Congress also directed NTIA to meet biannually with the Federal Communications Commission (FCC) to discuss strategic spectrum planning and other key radio issues. The development of a realistic and dynamic spectrum plan requires periodic evaluation of spectrum requirements, analysis of spectrum availability, and preparation of spectrum planning options. Spectrum plans require periodic revisions because of the dynamics of spectrum management actions, fueled by new technologies and market demands.

NTIA's Strategic Spectrum Planning Program is divided into three phases:(1) Definition of long-term spectrum requirements; (2) spectrum availability and planning options; and (3) spectrum allocation implementation plans.

As the first phase of this planning effort, NTIA issued a Notice of Inquiry (NOI) in June 1992, requesting comments from the private sector and Federal agencies regarding future spectrum requirements.

The Notice also requested information on future technology, technology trends, and international radio conference preparations. The purpose of this inquiry was to gather information for use in the long-term spectrum planning process. NTIA also conducted long-term spectrum studies to define critical radio service requirements.

A report was then prepared describing a ten-year projection of spectrum requirements needed to support evolving radiocommunications requirements in the United States. The report described the present and projected uses of spectrum within the United States for all licensed radio services, including the Amateur Service. These requirements are to be periodically re-evaluated as technology and needs change.

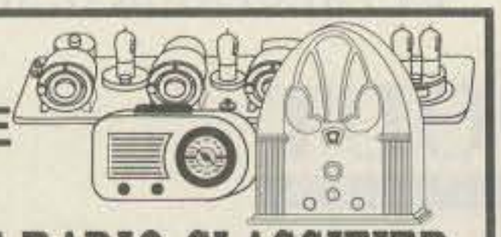
The conclusions and recommendations are those of NTIA. The report was also informally reviewed by the Federal Communications Commission, and their review of the report does not necessarily imply their endorsement.

Amateur Service

In the NTIA Requirements Study, NTIA indicated that the amateur service requirements in the HF band were for expansion and upgrading of its allocations affecting about 900 kHz. Amateur alloca-

National Volunteer Examiner Coordinator, P.O. Box 565101, Dallas, TX 75356-5101 (telephone 817-461-6443 e-mail <fmaia@internetMCI.com>)

FREE SAMPLE COPY!



ANTIQUE RADIO CLASSIFIED

Antique Radio's Largest-Circulation Monthly Magazine

Articles - Classifieds - Ads for Parts & Services
Also: Early TV, Ham Equip., Books,
Telegraph, 40's & 50's Radios & more...
Free 20-word ad each month. Don't miss out!

VISA 1-Year: $40.95 ($57.95 by 1st Class)
6-Month Trial - $20.95. Foreign - Write.

A.R.C., P.O. Box 802-C18, Carlisle, MA 01741
Phone: (978) 371-0512; Fax: (978) 371-7129
Web: www.antiqueradio.com

"Specialist in RF Connectors and Coax"

Part No.	Description	Price
PL-259/USA	UHF Male Phenolic, USA made	$. 75
PL-259/AGT	UHF Male Silver Teflon, Gold Pin	1.00 10/$9.00
UG-21D/U	N Male RG-8, 213, 214 Delta	3.25
UG-21B/U	N Male RG-8 , 213, 214 Kings	5.00
9913/PIN	N Male Pin for 9913, 9086, 8214 Fits UG-21 D/U & UG-21 B/UN's	1.50
UG-21D/9913	N Male for RG-8 with 9913 Pin	4.00
UG-21B/9913	N Male for RG-8 with 9913 Pin	6.00
UG-146A/U	N Male to SO-239, Teflon USA	7.50
UG-83B/U	N Female to PL-259, Teflon USA	7.50

The R.F. Connection
213 North Frederick Ave., #11 CQ
Gaithersburg, MD 20877 • (301) 840-5477
800-783-2666 FAX 301-869-3680
www.therfc.com
Complete Selection Of MIL-SPEC Coax, RF Connectors And Relays

REPEATER HEADQUARTERS

Make "Commercial Quality" repeaters from GE and Motorola mobiles.
• 45 Watt VHF Micor from $99
• 40 Watt UHF Master II from $199
Conversion Information Available!

VersaTel COMMUNICATIONS
http://www.versatelcom.com
Orders: 800-456-5548
Info: 307-266-1700
Fax: 307-266-3010

K2AW'S FAMOUS HI-VOLTAGE MODULES

20,000 IN USE IN OVER 50 COUNTRIES

SAME DAY SHIPPING MADE IN U.S.A.

HV14-1	14KV-1A	250A.SURGE	$15.00
HV10-1	10KV-1A	250A.SURGE	12.00
HV 8-1	8KV-1A	250A.SURGE	10.00
HV 6-1	6KV-1A	150A.SURGE	5.00

Plus $4.00 SHIPPING–NY RESIDENTS ADD 8% SALES TAX
K2AW's "SILICON ALLEY"
175 FRIENDS LANE WESTBURY, NY 11590
516-334-7024

TEXAS BUG CATCHER
by GLA SYSTEMS
"For the SERIOUS HF Mobileer"
Tops in Quality
Tops in Performance
• Large Diameter Heavy Gauge Wire HI-Q Coils
• All Parts Have Standard 3/8-24 SAE Threads
• All Corrosion Resistant Materials
• Full HF Coverage
VIS AMATEUR SUPPLY
Box 284, Coffeeville, AL 36524
1-800-OKK-HAMS (655-4267)
WWW.TEXASBUGCATCHER.COM
The Texas Bug Catcher can be custom configured for your particular vehicle.
Call or Write for Free Brochure

Future Amateur & Amateur-Satellite Spectrum Allocations

Frequency Band	Requested Amateur Allocations	Notes
160-190 kHz	New Allocation (Shared)	(a, b)
1800-1900 kHz	Retain	
1900-2000 kHz	Retain	
3500-4000 kHz	Retain, but Add 300 kHz Worldwide	(a, c)
5000 kHz	New Allocation (Shared)	(a, d)
6900-7200 kHz	New Allocation: Exclusive, Worldwide	(a, e)
10100-10350 kHz	New Allocation: Primary, Worldwide	(a, f)
14000-14250 kHz	Retain	
14250-14400 kHz	New Allocation	(a, g)
18068-18318 kHz	New Allocation: Exclusive, Worldwide	(a, h)
21000-21450 kHz	Retain	
24740-24990 kHz	New Allocation: Exclusive, Worldwide	(a, i)
28.0-29.7 MHz	Retain	
29.7-30.0 MHz	New Allocation	(a, j)
Between 30-50 MHz	New Allocation	(a, k)
50-54 MHz	Retain; Extend into Region 1	(a, l)
144-146 MHz	Retain	(a, m)
146-148 MHz	Retain; Extend into Region 1	(a)
Part of 216-220 MHz	New Allocation *[already completed]*	(n)
222-225 MHz	Retain	
420-430 MHz	Retain	
430-440 MHz	Revised Allocation: Exclusive Worldwide	(a, o)
440-450 MHz	Retain	
902-903 MHz	Revised Allocation (Upgrade to primary)	(p)
903-928 MHz	Retain	(p)
1240-1260 MHz	Retain	
1260-1300 MHz	Revised Allocation (Upgrade to Primary)	(a, q)
2300-2310 MHz	Retain	
2390-2400 MHz	New Allocation (Add Amateur-Satellite, Upgrade to Primary)	(a, r)
2400-2402 MHz	New Allocation (Add Amateur-Satellite, Upgrade to Primary)	(a)
2402-2450 MHz	Revised Allocation (Upgrade to Primary)	(s)
3300-3400 MHz	Retain	
3400-3402 MHz	Revised Allocation (Upgrade Amateur-Satellite to Primary)	(a)
3402-3420 MHz	Revised Allocation (Upgrade to Primary)	(a, t)
3420-3500 MHz	Retain	
5650-5668 MHz	Retain	(s)
5668-5670 MHz	Revised Allocation (Upgrade Amateur and Amateur-Satellite to Primary)	(a)
5670-5848 MHz	Retain	(u)
5848-5850 MHz	Revised Allocation (Upgrade Amateur and Amateur-Satellite to Primary)	(a)
5850-5925 MHz	Retain	
10.00-10.45 GHz	Retain	
10.45-10.50 GHz	Revised Allocation (Upgrade Amateur and Amateur-Satellite to Primary)	(a)
All above 24 GHz	Retain	(v)

Notes:

[a] Allocation must also be approved at competent World Radiocommunication Conferences
[b] New allocation would be secondary to the fixed and maritime mobile services nationally. Additionally, must share with the broadcasting service in ITU Region 1, and aeronautical radionavigation in ITU Region 3.
[c] The requirement is for any common, worldwide exclusive 300 kHz allocation within the 3500-4000 kHz band.
[d] Requirement is for about 50 kHz near 5 MHz, on a shared basis. Particularly desirable for communications during solar cycle minima when maximum usable frequencies are below 3.5 MHz.
[e] The requirement is for 300 kHz aligned worldwide to reduce sharing with high frequency broadcasting in the 7100-7300 kHz band; 6900-7200 kHz was requested.
[f] A modification of the present 10100-10150 kHz allocation, requiring elimination or downgrading of the fixed service internationally.
[g] The requirement is for an additional 50 kHz primary, exclusive, worldwide
[h] The requirement is for an additional 150 kHz to the present 18068-18168 kHz allocation
[i] The requirement is for an additional 150 kHz to the present 24890-24990 kHz band allocation.
[j] The requirement is for amateur-satellite (space-to-Earth)
[k] The requirement is for a number (e.g., five) of narrow bands of frequencies between 30 and 50 MHz.
[l] A 2 MHz allocation in ITU Region 1 is requested, with at least 500 kHz being exclusive.
[m] The deletion of RR 605 & 606 is requested. These footnotes allow operation other than amateur in certain countries.
[n] Amateurs requested access to a portion of the 216-220 MHz band at request of the ARRL in RM-7747. The 219-220 MHz band was allocated for amateur use.
[o] Requested for amateur television, voice and data communications, and Earth-moon-Earth communications
[p] This band presently used by LMS systems, which have priority over amateur operations. The proposed LMS systems would also have priority. Non-government primary allocation is for ISM operations on 915 MHz + 13 MHz.
[q] Additionally, the removal of the directional Earth-to-space indicators is requested to increase the flexibility of amateur satellite use
[r] Expand the amateur-satellite allocation by 10 MHz in the 2390-2400 MHz band.
[s] Retain amateur-satellite allocation in accordance with RR 664.
[t] Amateur-satellite allocations in the 3400-3410 MHz band are to be expanded to ITU Region 1.
[u] Retain amateur-satellite allocation in accordance with RR 808.
[v] Retain all current amateur and amateur-satellite allocations above 24 GHz.

Say You Saw It In CQ

tions have been based, in some part, on the desirability of having a choice of relatively narrow frequency bands with different propagation properties distributed throughout the spectrum. The NTIA believes the amateur service requirements are as follows:

• In the 3500–4000 kHz band, which is allocated exclusively to the Amateur Service in the United States but is shared elsewhere, the requirement was for a common, worldwide exclusive 300 kHz allocation within the wider domestic allocation.

• On a shared basis, there was a requirement for about 50 kHz near 5000 kHz for communications during solar cycle minima when maximum usable frequencies are below 7000 kHz.

• To reduce sharing with HF broadcasting in the 7100–7300 kHz band, a 300 kHz band aligned worldwide around or at the 6900–7200 kHz band was requested.

• In the 10100–10350 kHz band, the amateur service requirement is for a new worldwide allocation where the amateur service is primary.

• A new allocation of 50 kHz for primary, exclusive worldwide was needed to extend the 14000–14350 kHz band.

• An additional 150 kHz was requested to expand the present 18068–18168 kHz amateur band.

• An additional 150 kHz was also requested to expand the present 24890–24990 kHz amateur band.

• Finally, a new allocation for the band 29.7–30.0 MHz for amateur-satellite (space-to-Earth).

The Amateur and Amateur-Satellite Services

The Amateur Radio Service is defined internationally as "A Radiocommunications service for the purpose of self-training, intercommunication, and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest." Radio amateurs are trained and experienced in electronics, propagation theory, and communications techniques. Amateurs also respond swiftly and effectively to calls for communications assistance when normal channels are lost. The amateur service has significantly contributed to the development of radio technology. Amateur operators continue to fulfill certain public-service radiocommunications requirements, and increase their skills relating to emergency communications. During natural disasters such as hurricanes, floods, and other events, amateur radio communications have been particularly effective, and in many cases have been the sole means of communicating from the scene of a disaster.

The Amateur-Satellite Service was formally created as a result of the 1971 World Administrative Radio Conference for Space Services. At that Conference and the 1979 WARC, both primary and secondary frequency allocations were granted to the service. Many of the secondary allocations are provided as a result of international Radio Regulation 664, which permits the Amateur-Satellite Service to operate in several bands providing interference is not caused to primary users in other services

Amateur, or "ham," radio operators have provided a unique service to the public while enjoying a popular, technical hobby. Many innovative uses of radio systems have been developed by amateurs for use in the amateur bands, such as packet-switched systems and amateur television. It is estimated that there are in excess of 670,000 amateur radio operators in the United States, and over 2.4 million worldwide.

Current Uses of The Amateur Service

Amateur allocations have been based, in part, on the desirability of having a choice of relatively narrow frequency bands with different propagation properties distributed throughout the spectrum. As propagation conditions change in the medium- and high-frequency bands, amateur operators can follow the changing maximum usable frequency (MUF) and still be able to communicate. Higher frequency bands have other propagation properties useful for different amateur activities, such as amateur-satellite and short-range land-mobile applications. Current amateur allocations start at 1800 kHz and, in narrow bands, extend to 250 GHz.

Amateurs use the HF bands for medium- to long-distance communications. The 160 meter band (1.8 MHz) provides good groundwave coverage and is relatively free of propagation anomalies. The higher HF bands have increasing dependance on ionospheric refraction to provide long-distance communications. Time of day and sunspot activity are important factors in the ability of the HF bands to support communications beyond the range of groundwave coverage. A good selection of frequencies spread throughout the HF bands is critical to maintaining reliable communications. Amateurs use voice and data communications in the HF bands, operating from base and mobile stations.

Frequencies above 30 MHz provide generally short-range terrestrial communications and support the use of amateur satellite communications. In the bands above 54 MHz, amateurs rely heavily on a system of radio repeaters to increase the range of amateur communications. However, amateurs are always experimenting with point-to-point systems to push the state-of-the-art in antenna design

AFFORDABLE
BOOM MIC. HEADSET
KIT 44.95 ASSEMBLED 64.95
State-of-the art. noise cancelling electret mic. with tailored response and large earmuffs reduce external noise. The Model TR-2000 is from an established communications manufacturer. Prices, plus S&H, less connectors. Connector-installed units available for many radios. We provide information to help you interface to nearly *any* radio. Credit card phone orders accepted!


CALL NOW TOLL-FREE
1-800-634-0094
30-DAY MONEY-BACK GUARANTEE!
WARREN GREGOIRE & ASSOCIATES
229 EL PUEBLO PLACE, CLAYTON, CA 94517, USA
VOICE 925-673-9393 • FAX 925-673-0538
WEBSITE www.warrengregoire.com

MikeMaster

A versatile microphone preamplifier with adjustable gain, limiting, compression, rotation point and noise gating threshold. Assembled units are available wired for ICOM, Kenwood, or Yaesu. Specify RIG manufacturer. See MAR 98 QST for additional details.
Complete Kit Only $69.95
Assembled & Tested..... $89.95
CA Residents add 7.75% sales tax. S&H: $6.50 (insured) Foreign orders add 15%. For more info or price list; send legal size SASE (55¢) to:
MasterCard A&A Engineering VISA
2521 W. LaPalma #K • Anaheim, CA 92801
P 714-952-2114 • F 714-952-3280

NEW! Sub-Miniature Iambic Paddle Key

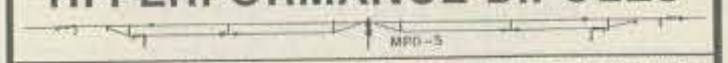
Perfect for QRP, mobile and backpacking, this new key is only 3/4" x 1 1/4" and weighs only 0.8 ounces. Made from a solid block of Type 1PVC, solid brass and 18-8 s/s.
See CQ, May 1998 Page 58.
Only $47.00 + $2.50 Shipping & Handling
Includes Key, Kneemount and Carrying Case
Paddlette Co.
PO Box 6036, Edmonds, WA 98026
Tel. 425-743-1429

BOXBORO HAMFEST
BOXBORO, MA
NEW DATES
AUGUST 29 & 30 '98
Huge Flea Market
All Major Manufacturers
TICKETS http://www.boxboro.org

WORLD'S BEST SELLING
AMATEUR RADIO LICENSE
COMPUTER-AIDED
INSTRUCTION SOFTWARE
$39.95 PLUS $3 SHIPPING

Learn at your IBM/compatible PC! Eight 3½" and 5¼" disks cover all written and Morse code exams – Novice through Extra. Review all 2,000 questions, take sample exams, learn Morse code, build telegraphy speed ...and more! Free bonus! Complete Part 97 FCC Rule Book!
MasterCard VISA TOLL FREE 1-800-669-9594
W5YI Group, Inc.
Box 565101, Dallas, TX 75356

CIRCLE 77 ON READER SERVICE CARD

HI-PERFORMANCE DIPOLES


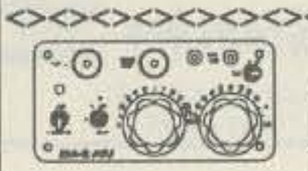
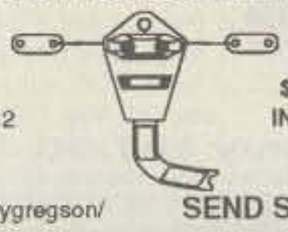
Antennas that work! Custom assembled to your center freq. ea. band - advise ht. of center and each end - hang as inverted "V" - horizontal, vert dipole, sloping dipole - commercial quality - stainless hardware - legal power - no-trap, high-efficiency design. Personal check, MO or C.O.D. ($3)

MPD-5*	80-40-20-15-10M Max-Performance Dipole, 87' or 78' long	= $110
MPD-2*	80-40M Max-Performance Dipole, 85' long = $65, 105' lng	= $ 72
MPD-3712	30-17-12M Max-Performance Dipole, 31 ft. long	= $ 73
HPD-3*	160-80-40M Hi-Performance Dipole, select 113 ft. or 125 ft.	= $ 83
SSD-6	160-80-40-20-15-10M Space-Saver Dipole, 71 ft. long	= $146
SSD-5*	80-40-20-15-10M....42' long = $110,.....60 ft. long	= $114
*Tunes 9-Bands with Wide-Matching-Range-Tuner.	S&H PER ANTENNA	= $6.00

(2) Stamp SASE for 30 Dipoles, Slopers, & Unique Ants. catalogue.
847-394-3414 W9INN ANTENNAS BOX 393 MT. PROSPECT, IL 60056

CIRCLE 96 ON READER SERVICE CARD

QRP KITS!

NW SERIES FOR 80,40,30,20 CW ONLY MONOBANDERS
COMPLETE KIT W/ALL HDWR, INC S&H $130.00 (CA & US)

ZM-2 ATU
WITH BUILT-IN VISUAL SWR INDICATOR. FOR BALANCED OR UNBALANCED FEEDLINES. 15 WATTS MAX. $50.00 W/ S&H
IF YOU USE LADDER LINE, YOU NEED THE
LADDER GRABBER !
ALL SS HARDWARE, STOPS THE LADDER LINE FROM BREAKING

EMTECH
3641A PREBLE ST.
BREMERTON, WA. 98312
(360) 415-0804
roygregson@aol.com
http://pages.prodigy.net/roygregson/
$7.75 INC S&H
SEND SASE !

DELPHI INTERNET™
Get online with CQ on Delphi!
To sign up dial
1-800-365-4636
with your computer & modem, and enter ELECTRONIC at the sign-up password prompt! You can find CQ Magazine in the Radio & Electronics Forum (GO HOB RADIO).
http://www.delphi.com/electronic

CIRCLE 34 ON READER SERVICE CARD

and solid-state equipment, and to investigate the properties of signal propagation at the higher frequencies. Amateurs use Morse code, voice, packet-switched data, television, and satellite communications in the various frequency bands.

In addition to recreational use, amateurs use the amateur bands to provide public services in a variety of ways. The American Radio Relay League sponsored National Traffic System provides a nationwide network that carries thousands of messages monthly. This system is available in the event that regional or local disasters degrade the public communications systems. The DOD works closely with the amateur community in its Military Affiliate Radio System (MARS) network. Local amateur radio clubs provide communications support for community events and are a source of trained radio operators to complement state and local communications personnel through the ARES and RACES programs.

Trends

Amateurs historically have been on the leading edge of radio technology. As new solid-state devices become available, amateurs will use them in radio systems to push the upper limits of practical spectrum usage. It is expected that the current analog systems employing single-sideband, FM voice, and television modulation will be overtaken by digital techniques. The number of amateur radio operators is increasing at a current annual rate of 7.5 percent in the United States, and about 7 percent worldwide. Growth in the amateur service will require increased use of higher frequencies, and necessitate the use of radio repeaters to overcome the limitations imposed by the propagation characteristics of the higher frequency bands.

Some of the frequency bands shared by amateur operations are becoming heavily used. Radiolocation bands, which have been shared with amateurs for years, will become more valuable to military users as new radar systems are deployed and pressure for the bands to be used for non-government purposes increases.

The Amateur-Satellite Service will soon have a new generation of amateur satellites in orbit using all frequency bands allocated to the Amateur-Satellite Service from 29 MHz through 24 GHz. The Phase 3D OSCAR (Orbiting Satellite Carrying Amateur Radio) satellite is designed to be an improvement over current OSCAR satellites in terms of link performance and capabilities. The OSCAR 3D satellite will facilitate the use of gateway earth stations, so that an amateur operator with a hand-held radio will be able to reliably communicate with other amateurs over a distance of several thousand kilometers.

Spectrum Requirements for The Amateur Services

In general, the NTIA believes that current amateur and amateur-satellite allocations should be retained. Amateur requests for international reallocations would be appropriate issues for FCC private sector advisory committees addressing U.S. preparations for future World Radiocommunication Conferences (WRC's). Additional allocations at 160–190 kHz, and near 5 MHz, will require technical studies to determine the availability of these bands to support amateur use.

The expansion and upgrading of amateur allocations in the 10 MHz, 14 MHz, 18 MHz, and 24 MHz bands are acceptable, but will depend on future decrease of requirements for the aeronautical mobile or the fixed services internationally. The alignment of the amateur 3.5 and 7 MHz bands worldwide will require the inclusion of these issues in U.S. preparations for future WRC's.

The request for additional narrow spectrum allocations between 30 and 50 MHz for propagation experimentation (e.g., five 50 kHz slots) will need to be studied for technical compatibility.

NTIA on Spectrum Sharing

The amateur service operates in many of its bands on a secondary basis. Several amateur bands are shared successfully with Federal (military) radiolocation. The sharing is successful primarily because the peacetime use of military radars does not affect amateur operation in large areas of the United States. However, there are significant coordination areas surrounding some radars in the 420–450 MHz band. Amateur operations also share spectrum with Industrial, Scientific, and Medical (ISM) and commercial Location and Monitoring Service (LMS) systems. Interference to amateur communications is accepted in these bands on the basis that some useful operation is better than exclusion from the band.

Amateur operation in the 7100–7300 kHz band, while primary in the United States, suffers interference from international broadcasters operating on a primary basis in Regions 1 and 3. Amateurs have requested an alignment of the band internationally, but broadcasters are also requesting more HF broadcasting spectrum. NTIA believes that the amateur 7 MHz band should be aligned with a 300 kHz bandwidth internationally, since sharing with broadcasting has not proved to be satisfactory.

It must be emphasized that the NTIA Report is a long-range spectrum plan. Future amateur service allocations, of course, could differ from the original plan.

73, Fred, W5YI

Say You Saw It In CQ

BY GEORGE JACOBS, W3ASK

PROPAGATION

THE SCIENCE OF PREDICTING RADIO CONDITIONS

Scientific Disagreement Over Start and Progress of Cycle 23

The monthly mean sunspot count for March 1998 was 54.8. This is based upon observations made at more than 40 solar observatories throughout the world, and compiled and coordinated by Dr. André Koecklenbergh of the Royal Observatory of Belgium. The highest number of spots was reported on March 14 with a count of 79. The lowest daily count was 29 on March 6. The mean number for March results in a smoothed number of 29 centered on September 1997. This is a gain of 5 over the previous month, as Cycle 23 begins to increase at a more rapid rate.

There was a corresponding increase in the level of 10.7 cm solar flux as measured at Canada's Dominion Radio Astrophysical Observatory located at Penticton, BC. A mean level of 109 was reported for March 1998. This results in a smoothed value of 87 centered on September 1997.

A smoothed sunspot number in the mid-60s is forecast for July 1998, with an expected smoothed level of 117 for the corresponding 10.7 cm solar flux.

Sunspot Cycle 23 Disagreement Continues

While the scientific community is in agreement that the mathematical beginning of sunspot Cycle 23 was May 1996, with a smoothed count of 8, there is still controversy concerning the "real" start of the cycle. Although the minimum smoothed sunspot number, as determined telescopically, has been used in the past to determine the end of each cycle and the beginning of another, there are a growing number of scientists who now want to use the date when the number of "old cycle spots" equals the number of "new cycle spots." This can be determined by the polarity of the spots and their location on the sun's disk, and for Cycle 23 that date would be October 1996. This would make a significant difference in the start of the cycle, and in its progress to date compared to previous cycles.

Table I is based on the May 1996 beginning for Cycle 23. The latest available smoothed sunspot number for September 1997 marks the 17th month of the new cycle. The cycle has risen considerably slower than previous cycles 22, 21, 20, and the record-breaking Cycle 19. Compared to these previous cycles, Cycle 23 was off to a slow start, most nearly matches the progress of Cycle 20, which was a relatively low cycle, reaching a peak of only 111.

Table II is based on the start of Cycle 23 as October 1996, in which case 12 months of data are available. With this as its starting date, Cycle 23 is seen to have had a comparatively rapid start, with the likelihood that it may be an unusually high sunspot cycle.

At this point in time the future of Cycle 23 seems to depend upon when it really began. The National Geophysical Data Center (NGDC) in Boulder, Colorado is among the growing number of solar experts who prefer the October 1996 date and are predicting a very high cycle, with a peak in excess of 159 to occur during late 1999 or early 2000. On the other hand, the Royal Observatory of Belgium, the world's official keeper of sunspot records, continues to base its observations on the May 1996 starting date. Their predictions for the progress of the new cycle through the remainder of 1998 and early 1999 are approximately 20% lower than those made by the NGDC.

Time will tell. Stay tuned!

11307 Clara Street, Silver Spring, MD 20902
e-mail: g.jacobs@ieee.org

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for July 1998

Propagation Index.....	Expected Signal Quality (4)	(3)	(2)	(1)
Above Normal: 4, 8, 17-18, 21-22, 31	A	A	B	C
High Normal: 5, 7, 11, 15, 19-20, 24-25, 29	A	B	C	C-D
Low Normal: 1-3, 9-10, 14, 16, 23, 27-28, 30	B	C-B	C-D	D-E
Below Normal: 6, 12, 26	C	C-D	D-E	E
Disturbed: 13	C-D	D	E	E

Where expected signal quality is:

A—Excellent opening, exceptionally strong, steady signals greater than S9.

B—Good opening, moderately strong signals varying between S6 and S9+, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S9, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S6, with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the 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 path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of (3) will be fair-to good (C-B) on July 1-3, excellent (A) on the 4th, good (B) on the 5th, fair-to-poor (C-D) on the 6th, etc.

July Propagation

With the rapid rise in solar activity, HF propagation conditions this July should be noticeably improved over last July. With longer hours of daylight and the sun high in the northern sky, HF conditions should be considerably more stable than they were during the somewhat turbulent spring months.

Fifteen, 17, and 20 meters are expected to share honors for optimum DX propagation during July. Good-to-excellent openings are forecast for 15 and 17 meters throughout much of the daylight hours, and to some areas into the early evening hours as well. Conditions will favor north-south openings and openings to tropical areas. Some openings should also be possible to Africa and Europe, particularly when the bands peak during the late afternoon and early evening.

Twenty meters should remain open for DX to one area of the world or another almost around the clock. Peak conditions should take place during the late afternoon and evening hours. During these peak periods 20 meters may be open in almost all directions at the same time! Normally a dead band at night during the winter months, 20 meters is expected to remain open for DX in July during the hours of darkness.

Although a seasonal decrease is expected in 10 and 12 meter DX during July and the summer months, some good DX openings still should be possible during the daytime hours of July. Best bets are for openings on north-south paths to the Caribbean and Central and South America, but occasional openings should also be possible to Africa and Australasia. Expect both bands to peak during the late afternoon hours.

During the hours of darkness and the sunrise period, 30 and 40 meters should open to many areas of the world, but seasonally high noise levels resulting from increased thunderstorm activity may often mar DX reception. Higher static levels are also expected to hinder DX on 80 meters, although some good long-distance openings are forecast for the hours of darkness. Not many DX openings are expected on 160 meters because of the high static levels and summertime solar absorption, but some may be possible during the hours of darkness.

Short-Skip

This month's column contains Short-Skip Propagation Charts for July and August 1998. DX Propagation Charts for July appeared in last month's column.

Short-skip conditions are expected to be at their best during July mainly due to peak sporadic-*E* ionization and to seasonally high nighttime *F*-layer ionization. During the daylight hours considerable short-skip openings are forecast for 10, 12, and 15 meters between distances of approximately 400 and 1300 miles, with some 10 meter and and a considerable number of 12 and 15 meter openings extending out to as far as 2300 miles. A number of short-skip openings may also be possible on these bands during the hours of darkness. Frequent short-skip openings on 20 and 17 meters, ranging between 250 and 2300 miles, should be possible almost around the clock. Peak conditions should occur during the late morning hours and again during the late afternoon and eraly evening.

Good daytime short-skip openings are expected on 30 and 40 meters between distances of approximately 100 and 700 miles, with excellent nighttime openings between 250 and 2300 miles. Good 80 meter openings are forecast for the daylight hours over distances up to approximately 300 miles, with the range extending up to the *F*-layer one-hop limit of 2300 miles during the hours of darkness. While no 160 meter short-skip openings are expected during the daylight hours, some should be possible during the hours of darkness for distances up to about 1300 miles. During periods of lower than usual static levels, 160 meter nighttime short-skip openings may extend out to as far as 2300 miles.

VHF Ionospheric Openings

The big VHF propagation event during July should be the numerous 6 meter and occasional 2 meter openings that are expected as a result of the seasonal peak in sporadic-*E* ionization. Fairly frequent 6 meter openings should be possible over distances between approximately 500 and 1300 miles, with some multi-hop openings extending out to 2300 miles. While short-skip openings can occur at just about any time of the day or night on 6 meters, statistics indicate that they generally peak a few hours before noon and again during the early evening hours. During many of the 6 meter openings expected during July, signal levels should be exceptionally strong. Some 2 meter sporadic-*E* short-skip openings are also expected during July, ranging between approximately 1000 and 1300 miles.

During July you can expect 6 meter openings on at least three out of every four days. Openings may last from a few minutes up to several hours. Considerably fewer openings are expected on 2 meters.

A good rule of thumb to remember about 6 and 2 meter short-skip openings is that as the skip distance gets shorter on 6 meters, the MUF is *increasing*. When you hear skip stations on 6 meters as near as 600 miles, the MUF should be high enough for 2 meter openings in the same direction. Generally, when the skip distance on 6 meters falls below 600 miles, 2 meter openings should be possible between about 1000 and 1300 miles.

A good deal of meteor activity is expected in July, which should result in meteor-type ionospheric openings on the VHF bands. A major meteor shower, the *Delta Aquarids*, should take place between July 27th and 30th, peaking at approximately 8 AM EDT on July 29 that with a meteor count of between 20 and 30 an hour.

Not as many Trans-Equatorial (TE) openings are expected on 6 meters during July, but some should be possible. Check between 8 and 11 PM local daylight time for openings toward South America, with conditions favoring the southern tier states.

Some VHF short-skip openings may be possible during July as a result of auroral ionization. The best dates to look for these openings are those shown as Disturbed or Below Normal in the Last-Minute Forecast at the beginning of this column.

73, George, W3ASK

	Smoothed Sunspot Numbers				
Month From Cycle Start	**Cycle 23**	**Cycle 22**	**Cycle 21**	**Cycle 20**	**Cycle 19**
1	8	12	13	10	3
2	9	13	14	10	4
3	8	15	14	11	4
4	8	16	14	12	5
5	8	18	14	12	7
6	9	20	15	13	8
7	10	22	17	14	8
8	10	24	18	15	10
9	11	27	20	15	12
10	11	28	22	16	14
11	14	31	24	16	16
12	17	35	26	17	20
13	18	39	29	20	23
14	20	44	33	22	29
15	23	47	39	25	35
16	25	51	46	28	40
17	29	58	52	31	47
Peak		**159**	**165**	**111**	**201**

Table I– Based on the start of Cycle 23 as May 1996, this is a comparison of the first 17 months of the cycle compared to the same period for Cycles 22, 21, 20, and 19. Note that with this starting date, Cycle 23 may well be a relatively low cycle.

	Smoothed Sunspot Numbers				
Month From Cycle Start	**Cycle 23**	**Cycle 22**	**Cycle 21**	**Cycle 20**	**Cycle 19**
1	9	12	13	10	3
2	10	13	14	10	4
3	10	15	14	11	4
4	11	16	14	12	5
5	11	18	14	12	7
6	14	20	15	13	8
7	17	22	17	14	8
8	18	24	18	15	10
9	20	27	20	15	12
10	23	28	22	16	14
11	25	31	24	16	16
12	29	35	26	17	20
Peak		**159**	**165**	**111**	**201**

Table II– Based on the start of Cycle 23 as October 1996, this is a comparison of the first 12 months of the cycle compared to the same period for Cycles 22, 21, 20, and 19. Note that with this starting date, Cycle 23 is expected to be very high cycle.

Say You Saw It In CQ

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. An ** 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 AM; 13 is 1 PM, etc. On the Short-Skip Chart appropriate *daylight* time is used at the path midpoint. For example on a circuit between Maine and Florida, the time shown would be EDT, on a circuit between New York and Texas, the time at the midpoint would be CDT, etc. Times shown in the Hawaii Chart are in HST. To convert to 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 PM in Los Angeles; 18 or 6 PM in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to *daylight* time in other areas of the USA subtract 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 PM in New York City.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts CW or 300 watts PEP on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts CW or 1 KW PEP on sideband. A dipole antenna a quarter-wavelength above ground is assumed for 160 and 80 meters, a half-wave above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level; for each 10 dB loss, it will lower by one level.

5. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept. of Commerce, Boulder, Colorado 80302.

CQ Short-Skip Propagation Chart
July & August 1998
Local Daylight Savings Time At Path Mid-Point

Band (meters)	*50-250*	*Distance Between Stations (miles) 250-750*	*750-1300*	*1300-2300*
10	Nil	08-10 (0-1)*	08-10 (1)*	08-10 (1-0)*
		10-14 (0-3)*	10-14 (3)*	10-14 (3-1)*
		14-18 (0-1)*	14-18 (1-2)*	14-18 (2-1)*
		18-22 (0-2)*	18-22 (2-3)*	18-22 (3-1)*
		22-00 (0-1)*	22-08 (1)*	22-08 (1-0)*
15	Nil	08-10 (0-2)*	08-10 (2)*	08-10 (2-1)
		10-14 (0-3)*	10-14 (3)*	10-14 (3-2)
		14-18 (0-2)*	14-18 (2)*	14-18 (2-3)
		18-20 (0-3)*	18-20 (3)*	18-20 (3-4)
		20-22 (0-2)*	20-22 (2)*	20-21 (2-3)
		22-08 (0-1)*	22-00 (1-2)*	20-00 (2-1)
			00-08 (1)*	00-08 (1-0)
20	10-01 (0-1)*	07-10 (0-2)*	07-10 (2-3)*	07-10 (3-2)
		10-16 (1-4)*	10-17 (4)*	10-16 (4-2)
		16-21 (1-3)*	17-22 (3-4)*	16-17 (4-3)
		21-01 (1-2)*	22-01 (2-3)*	17-22 (4)
		01-07 (0-1)*	01-07 (1-2)*	22-00 (3)
				00-01 (3-2)
				01-07 (2-1)
40	08-12 (1-2)*	08-10 (2-4)*	08-10 (4-1)	08-18 (1-0)
	12-17 (2-4)*	10-12 (2)	10-17 (2-1)	18-21 (3-2)
	17-21 (3-4)	12-17 (4-2)	17-18 (3-1)	21-06 (4)
	21-23 (1-2)	17-18 (4-3)	18-21 (4-3)	06-08 (3-1)
	23-08 (0-2)*	18-21 (4)	21-05 (4)	
		21-23 (2-4)	05-06 (3-4)	
		23-05 (2-4)	06-08 (3)	
		05-08 (2-3)		
80		07-12 (3-4)	08-10 (4-1)	08-10 (1-0)	08-18 (0)
		12-16 (4-3)	10-12 (4-0)	10-16 (0)	18-20 (1-0)
		16-22 (4)	12-16 (3-0)	16-18 (1-0)	20-22 (1)
		22-05 (3-4)	16-18 (4-1)	18-20 (2-1)	22-04 (4-3)
		05-07 (4)	18-20 (4-2)	20-22 (3-1)	04-05 (4-2)
			20-22 (4-3)	22-05 (4)	05-06 (3-2)
			22-07 (4)	05-07 (4-3)	06-07 (3-1)
			07-08 (4-2)	07-08 (2-1)	07-08 (1)
160		18-19 (1-0)	19-20 (1-0)	21-22 (1)	21-23 (1-0)
		19-20 (1)	20-21 (2-0)	22-01 (2-1)	23-01 (1)
		20-22 (3-2)	21-22 (2-1)	01-04 (2)	01-06 (2-1)
		22-00 (4-3)	22-00 (3-2)	04-06 (3-2)	06-07 (1-0)
		00-06 (4)	00-04 (4-2)	06-07 (1)	
		06-08 (3-2)	04-06 (4-3)	07-08 (1-0)	
		08-09 (1)	06-08 (2-1)		
		09-10 (1-0)	08-09 (0-1)		

* *Predominantly Sporadic-E openings.*

ALASKA
July & August 1998
Openings Given in GMT#

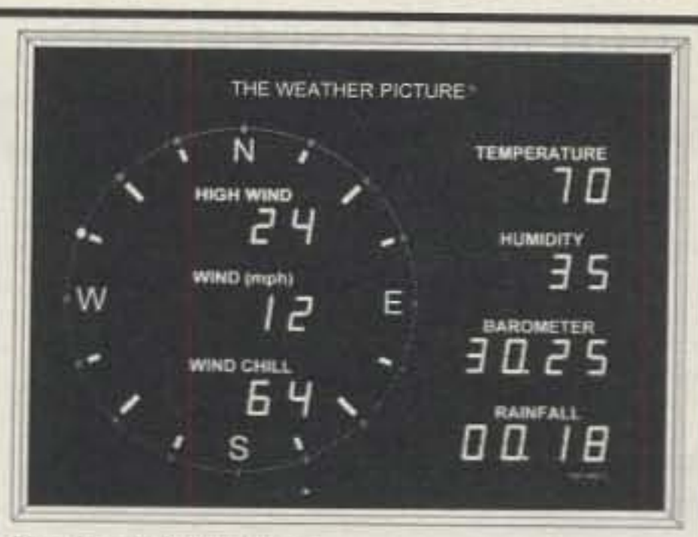
To:	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Eastern USA	Nil	00-02 (1)	12-15 (1)	07-10 (1)
			22-01 (1)	
			01-04 (2)	
			04-06 (1)	
Central USA	Nil	21-00 (1)	13-16 (1)	08-12 (1)
		00-03 (2)	22-00 (1)	
		03-04 (1)	00-03 (2)	
			03-05 (3)	
			05-06 (2)	
			06-08 (1)	
Western	01-04 (1)	17-22 (1)	13-14 (1)	07-09 (1)
		22-00 (2)	14-15 (2)	09-12 (2)
		00-03 (3)	15-19 (3)	12-13 (1)
		03-04 (2)	19-01 (2)	09-12 (1)†
		04-05 (1)	01-03 (3)	
			03-05 (4)	
			05-07 (3)	
			07-09 (2)	
			09-11 (1)	

HAWAII
July & August 1998
Openings Given in Hawaiian Standard Time#

To:	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Eastern USA	14-16 (1)	06-11 (1)	13-15 (1)	18-20 (1)
		11-14 (2)	15-17 (2)	20-00 (2)
		14-16 (3)	17-18 (3)	00-02 (1)
		16-17 (2)	18-20 (4)	21-00 (1)†
		17-18 (1)	20-22 (3)	
			22-02 (2)	
			02-04 (3)	
			04-06 (2)	
			06-09 (1)	
Central USA	14-16 (1)	06-08 (1)	06-08 (2)	18-21 (1)
		08-13 (2)	08-14 (1)	21-22 (2)
		13-17 (3)	14-16 (2)	22-01 (3)
		17-18 (2)	16-18 (3)	01-02 (2)
		18-19 (1)	18-20 (4)	02-03 (1)
			20-23 (3)	20-22 (1)†
			23-03 (2)	22-00 (2)†
			03-06 (3)	00-02 (1)†
Western USA	11-14 (1)	07-08 (1)	06-08 (4)	18-19 (1)
	14-17 (2)	08-10 (2)	08-10 (3)	19-20 (2)
	17-18 (1)	10-12 (3)	10-13 (2)	20-02 (4)
		12-16 (4)	13-15 (3)	02-04 (3)
		16-17 (3)	15-20 (4)	04-05 (2)
		17-18 (2)	20-22 (3)	05-06 (1)
		18-20 (1)	22-05 (2)	19-20 (1)†
			05-06 (3)	20-22 (2)†
				22-02 (3)†
				02-03 (2)†
				03-04 (1)†

#See explanation in "How To Use Short-Skip Charts" which appears in this column.
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.
* Indicates best time to listen for 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2) or higher.
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.

NEW for ham radio operators!



Size shown: 15 ¼" x 11 ¼"

Put the weather on your wall

The Weather Picture™ is an eye-popping new wall unit that **continuously displays all the vital weather data** you have selected, **without having to press a single button.** Big red numerals are **easy to read from across the room,** day or night. Available in two sizes, in brushed aluminum or elegant solid teak frame. The **separate control unit provides detailed data**--more than enough to satisfy even the most dedicated weather buff.

Purchase the Weather Picture together with the incomparable ULTIMETER® Weather Station, starting at under $400. Or add it to your existing ULTIMETER System for less than $170. It's easy to add programmable display modules to The Weather Picture now or later as needed.

For complete details, call toll-free, fax, or write us. Or visit our Web Site to see and try our ULTIMETER Systems. "The best!" says *WeatherWatch* magazine *(5/96)*.

1-800-USA-PEET
or 732-531-4615 FAX: 732-517-0669
www.peetbros.com
PEET BROS COMPANY
1308-807C Doris Ave., Ocean, NJ 07712

EVERY ISSUE OF CQ *on Microfiche!*

The entire run of CQ from January 1945 through last year is available. Over 1,000 fiche!

You can have access to the treasures of CQ without several hundred pounds of bulky back issues. Our 24x fiche have 98 pages each and will fit in a card file on your desk.

We offer a battery operated hand held viewer for $150, and a desk model for $260. Libraries have these readers.

The collection of microfiche, is available as an entire set, (no partial sets) for $395, plus $10 shipping (USA). Annual updates available for $10, plus $3 shipping.

Ham Radio magazine available for $245. Satisfaction guaranteed or money back!

VISA **BUCKMASTER** MasterCard
6196 Jefferson Highway
Mineral, Virginia 23117 USA
540:894-5777•800:282-5628
Fax 540:894-9141
e-mail: info@buck.com

BOOMLESS QUADS

$239.95 - 3 Band - 2 Element HF

3-4 Elements available.
Also W.A.R.C. Bands. 2 meter loop FREE.
Sold world wide for over 15 years.

GEM QUAD

Box 291, Boissevain, Manitoba, Canada R0K 0E0
Telephone 1-204-534-6184 Price F.O.B Factory

Aluminum Towers

Over 20 Years Experience in Meeting Amateur & Commercial Tower Needs.

- *Crank-up Towers 40' to 100'*
- *All Aluminum Construction*
- *Light-Weight-Easy to Install*

ALUMA
TOWER COMPANY, INC.

P.O Box 2806-CQ
Vero Beach, Florida 32961 USA
e-mail: atc@alumatower.com
http://www.alumatower.com
Voice (561)567-3423 Fax (561)567-3432

FACTORY AUTHORIZED REPAIR OF
ICOM YAESU KENWOOD ALINCO

Factory trained technicians using state of the art test gear to insure the highest quality of service for your radio.
High-Performance Modifications.

Your One STOP Service Center

1-888-767-9997
http://www.kk7tv.com

KK7TV Communications
2350 W Mission Lane #7, Phoenix, AZ 85021
Fax: 602-371-0522 Ask For Randy, KK7TV

HamCall™ CD-ROM U.S. & International
Over 1,490,000 listings

The HamCall CD-ROM allows you to look up over 1,490,000 callsigns from all over the world, with over 300 call areas. Over 103,000 new and updated international listings. **New**: HamCall allows you to look up US and International hams by callsign, name, street address, city, state, postal code, county, and country. Custom **label printing** options in Windows, print to almost any size label. View **photographs** (list included), calculate **beam heading and distance** to US and International stations. Works with most logging programs.

HamCall is still just $50 plus $5 s/h, $8 international.
Works in DOS, Windows 3.1, and Windows 95.

BUCKMASTER
6196 Jefferson Highway • Mineral, VA 23117 USA
e-mail: info@buck.com
540:894-5777 • 800:282-5628 • 540:894-9141 (fax)

LOGGING PROGRAM **PROLOG** QSL DATABASE

The renowned logging program and QSL Route database for DOS & Windows™. Maintains 36 logbooks with award tracking for DXCC, WAC, WAS, WAZ, WPX, IOTA, Counties + 16 user selectable awards. All Major CD-ROM databases are supported, PacketCluster™ alerts you on new ones, two-way rig control. Logbooks can be indexed and displayed by most log entry fields. QSL label response formats include single/multi-QSO + SWL. Multi-label laser sheets supported. A comprehensive QSL route database with over 60,000 routes is available as an integral or stand-alone product. QSL stand-alone: $23. Logger: $49. Both: $64. Int'l add $3. QSL database update subscription (6 issues) $36, Int'l $48. RS-232 interface for all model rigs no ext. power required $47.95 VISA, MC, AMEX accepted.

DATAMATRIX
5560 Jackson Loop NE Rio Rancho, NM 87124
Info Line: (505)892-5669 Orders Only:1-(800)-373-6564
E-Mail: prolog@rt66.com Web: http://www.qth.com/prolog

WIRE/CABLE NON-CONTAM: RG8X, RG213, RG8: LOW PRICES. "**FLEX-WEAVE**"™ hybrid, "Cadillac" aerial wire, 168 strand cop. bare or U.V. PVC, $.14/ft. avg. U.V. Resist. "**BURY-FLEX**"™ low loss flex/bury cable $.57/ft avg. (Why pay more for flex LMR?). **LMR 400** .53/ft. **Ladder Line. G5RV's** $52.95. **ROPE ROPE ROPE. ANTENNA/TOWER SUPPORTS**: WHY RISK COSTLY FAILURES? DACRON DOUBLE braided, $.06/.11/.16 for 3/32"/3/16"/5/16", 1,000 ft. discounts. **DSP AUDIO FILTERS. FINALLY HEAR WEAK SIGNALS -Full Satisfaction Qty**. NIR-12 $337.00. ANC-4 (local elect. noise elim.): $169.95. Commercial/marine, insulators, baluns. FRIENDLY SERVICE. Dealers welcome. QUALITY prevents costly failure & replacements.

DAVIS RF Co.
P.O. Box 730-C
Carlisle, MA 01741
DAVIS RF

24 Hour Orders:
1-800-328-4773
TECH/INFO:
1-978-369-1738
http://www.davisrf.com
(Commercial wire/cable please call our 800 #)

HAM SHOP

Advertising Rates: Non-commercial ads are 20 cents per word including abbreviations and addresses. Commercial and organization ads are $1.00 per word. Boldface words are $1.50 each (specify which words). Minimum charge $2.00. No ad will be printed unless accompanied by full remittance. All ads must be typewritten double-spaced.

Closing Date: The 10th day in the third month preceding date of publication (example: Jan. 10th for the March issue). Because the advertisers and equipment contained in Ham Shop have not been investigated, the Publisher of *CQ* cannot vouch for the merchandise listed therein. The publisher reserves the right to reject any advertisement. Direct all correspondence and ad copy to: CQ Ham Shop, 76 N. Broadway, Hicksville, NY 11801.

CB-TO-10M CONVERSIONS: FM kits, frequency modification hardware, books, plans, high-performance CB accessories. Catalog $3. CBCI, Box 31500CQ, Phoenix, AZ 85046.

QSLs FOR DX STATIONS: Our new "International Division" was established to handle QSL needs of DX hams. We understand the problems of packaging, shipping, and dealing with the customs problems. You can trust us to deliver a quality QSL, usually much cheaper than you can find locally. Write, call, or FAX for free samples and ordering information. "The QSL Man—W4MPY," 682 Mount Pleasant Road, Monetta, SC 29105 USA. Phone or FAX 803-685-7117.

LEARN CODE BY HYPNOSIS: http://www.qth.com/cweasy/ or 1-800-425-2552.

WANTED: Western Electric Audio Equipment. 1927–1960s. Amplifiers, mixing boards, microphones, preamps, speakers, parts, tubes, etc. Call 1-800-251-5454.

ALUMINUM CHASSIS-CABINET KITS, UHF and VHF Antenna Parts. K3IWK, 5120 Harmony Grove Road, Dover, PA 17315-3016.

CERTIFICATE for proven contacts with all ten American districts. SASE to W6DDB, 45527 Third Street East, Lancaster, CA 93535-1802.

HALLICRAFTERS Service Manuals. Amateur and SWL Write for prices. Specify Model Numbers desired. Ardco Electronics, P.O. Box 95, Dept. C, Berwyn, IL 60402.

1998 CALLBOOK CD-ROM (New Summer Edition): $39.95. CALLBOOK (FINAL Edition): $34.95. POSTPAID. AA6EE—Callbook Distributor, 16832 Whirlwind/C7, Ramona, CA 92065 (760-789-3674) <aa6ee@amsat.org>).

KNOW FIRST! Ham radio fanatics—you need THE W5YI REPORT, a twice-monthly award-winning Hot Insider Newsletter Acclaimed best! Confidential facts, ideas, insights, nationwide news, technology, predictions, alerts. Quoted coast-to-coast! We print what you don't get elsewhere! $19.50 annually to new subscribers! Money-back guarantee! FREE sample for S.A.S.E. (two stamps). W5YI, P.O. Box 565101, Dallas, Texas 75356.

ANTENNA HARDWARE – S.S. "U" bolts, Aluminum Saddles, Element and Boom Plates, S.S. Hose Clamps. Write for list to HARBACH ELECTRONICS – WA4DRU, 2318 S. Country Club Road, Melbourne, FL 32901-5809 (http://www.harbach.com).

QSL ALBUM holds 360 QSLs. $32.00 + shipping. Info/Ordering: 908-788-1020, fax 908-782-2612. Bill Plum, 12 Glenn Road, Flemington, NJ 08822-3322. VISA/MC.

WANTED: Older model bugs, unusual bugs, and miniature hand keys. State price, condition. Dave Ingram, K4TWJ, 4941 Scenic View Drive, Birmingham, AL 35210.

WORK RARE CW DX? CW CONTESTS? Contest Code is the answer. Powerful hypnosis audio tapes teach you to copy High Speed (30/40 WPM) or Ultra High Speed (50/60 WPM). Subliminals speed you along! 20 min/day for 30 days yields results. Each tape $15.95 ppd US. $3.00 shipping/handling. Specify 30/40 or 50/60 tape. Amex/VISA/ MC Order now! Call 1-800-425-2552, Alternative Arts.

FREE Ham Gospel Tracts, SASE. KW3A, 265 West Ave., Springfield, PA 19064.

FOR SALE: CQ/Ham Radio/QST/73 magazines and binders. SASE brings data sheet. W6DDB, 45527 Third Street East, Lancaster, CA 93535-1802.

BROWNIES QSL Cards since 1939. Catalog and samples $1 (refundable with order). 3035 Lehigh St., Allentown, PA 18103.

P49V's ARUBA COTTAGE FOR RENT with 2 bedrooms, rig, and mono-band ants. For info write Carl Cook, 2150 Piedmont Way, Pittsburg, CA 94565.

PHASED ARRAY NETWORKS by COMTEK SYSTEMS deliver gain and front to back. Call 704-542-4808; fax 704-542-9652. COMTEK SYSTEMS, P.O. Box 470565, Charlotte, NC 28247.

FREE IBM DISK CATALOG! Ham Radio, Shareware and CD-ROMs. MOM 'N' POP'S SOFTWARE, PO Box 15003-HE, Springhill, FL 34609-0111 (phone 1-352-688-9108; e-mail <momnpop@gate.net>).

IMRA-International Mission Radio Assn. helps missioners—equipment loaned; weekday net, 14.280 MHz, 1:00–3:00 PM Eastern. Sr. Noreen Perelli, KE2LT, 2755 Woodhull Ave., Bronx, NY 10469.

FOR SALE: **Transmission Line Transformers** (Baluns and Ununs). Due to QTH downsizing, I have to dispose of the many transformers used in my study of these broadband and highly efficient matching transformers. A suggested price is $20, covering labor, packaging, and shipping. Oldest transformers will be shipped first. They will include a short personal note on the particular experiment. Please, no special requests.Most transformers are uncased. Jerry Sevick, W2FMI, 32 Granville Way, Basking Ridge, NJ 07920 (908-766-6122). **Note:** These are one of a kind, for experimental use only.

QSL SUCCESS! Book shares techniques of hams achieving 90%+ return rates. $5.00ppd USA/Canada, includes $5.00 coupon. William Plum, 12 Glenn Road, Flemington, NJ 08822-3322.

AMERICAN HAM GEAR manufactured between 1930 & 1980 needed to illustrate *CQ* book and calendar projects. Photography can be done at your location. Contact Joe Veras, N4QB, P.O. Box 1041, Birmingham, AL 35201. Tel: 205-967-2384 days, 205-967-0639 evenings and weekends.

THE 59(9) DX REPORT: Weekly DX and Contest bulletin. SASE for sample. P.O. Box 73, Spring Brook, NY 14140.

ASTRON Power Supply, brand new w/warranty, RS20M $99, RS35M $145, RS50M $209, RS70M $249. Call for other models, AVT 626-286-0118.

ATTENTION SB-200 & SB-220 OWNERS: Restore and up-grade your tired old amplifier with our parts and kits. Power supply boards, soft keys, soft starts, new fans & motors, many more items. Write for details—**Please specify the model**. Harbach Electronics—WA4DRU, 2318 S. Country Club Rd., Melbourne, FL 32901-5809 (http://www.harbach.com).

FOREIGN AIRMAIL POSTAGE for successful QSLing! Many countries, monthly bargains, plus **EUROPEAN AIRMAIL ENVELOPES!** Bill Plum, 12 Glenn Road, Flemington, NJ 08822-3322 (908-788-1020 weekdays, FAX 908-782-2612).

W7FG Vintage Manuals and Telephone filters! Most manuals in stock. SASE for Catalog. Telephone RFI Filters $12.95. VISA/MASTERCARD accepted. 3300 Wayside Drive, Bartlesville, OK 74006 (telephone 918-333-3754 or 800-807-6146; website **http://www.w7fg. com**).

WANTED: HAM EQUIPMENT AND RELATED ITEMS. Donate your excess gear—new, old, in any condition—to the Radio Club of Junior High School 22, the Nation's only full time non-profit organization working to get Ham Radio into schools around the country as a teaching tool using our EDUCOM—Education Thru Communication—program. Send your radio to school. Your donated material will be picked up ANYWHERE or shipping arranged, and this means a tax deduction to the full extent of the law for you as we are an IRS 501(c)(3) charity in our 18th year of service. It is always easier to donate and usually more financially rewarding, BUT MOST IMPORTANT your gift will mean a whole new world of educational opportunity for children nationwide. Radios you can write off; kids you can't. Make 1997 the year to help a child and yourself. Write, phone, or FAX the WB2JKJ "22 Crew" today: The RC of JHS 22, P.O. Box 1052, New York, NY 10002. Twenty-four hours call 516-674-4072; fax 516-674-9600; or e-mail <wb2jkj@juno. com>. Join us on the WB2JKJ Classroom Net, 7.238 MHz, 1200–1330 UTC daily and 21.395 MHz from 1400 to 2000 UTC.

PACKET RADIO AND MORE! Join TAPR, connect with the largest amateur radio digital group in the U.S. Creators of the TNC-2 standard, now working on Spread Spectrum technology. Benefits: newsletter, software, discount on kits and publications. $20/year US/Can/Mex; $25 elsewhere. Visa/MC. When joining, mention *CQ* and receive TAPR's Packet Radio: What? Why? How? ($12 value) FREE! Internet: tapr@tapr.org Web: <http://www.tapr.org> Phone: 817-383-0000 Address: 8987-309 E Tanque Verde Road, #337, Tucson, AZ 85749-9399.

FREE HAM RADIO GOSPEL TRACTS: Christian youth leaders needed for out-reach areas. Membership is free. Send #10 SASE with call letters for details. Ray Bohmer, W1REZ, P.O. Box 8, Harmony, ME 04942.

QSL CARDS Many styles. Top quality. Order Risk Free. Plastic cardholders, T-shirts, Personalized caps, mugs, shirts. Other ham shack extras. Information and samples: **Rusprint 1-800-962-5783; 913-491-6689; or fax 913-491-3732.**

B&B WITH A HAM! Enjoy hamming from Hawaii. Join those who have chased DX from beautiful upcountry Maui! (Non-smokers only, thanks.) "SEA Q MAUI," call 808-572-7914; <kh6sq@seaqmaui.com> <http://www.seaqmaui.com>.

QSLs FROM TPI: New Designs, Full Color, Satisfaction Guaranteed. SASE for brochure. TPI, 1660 State Road, Dept. CQ, Cuyahoga Falls, OH 44223 (e-mail <jstair@neo.lrun.com>).

Advertiser's Index

(continued on page 107)

Sales Order Line
1-800-927-4261

Burghardt INC.
AMATEUR CENTER

Proud to be "AMERICA'S MOST RELIABLE AMATEUR RADIO DEALER"
Serving Amateur Radio Operators Since 1937

We Want To Be "YOUR" Radio Dealer.
Write for our updated Used Equipment Listing!

Technical & Info. (605) 886-7314
Fax (605) 886-3444
(Internet Connections)
E-Mail - burghart@daknet.com
See Our Catalog/Specials On Our Home Page
http://www.burghardt-amateur.com
710 10th Street SW
Watertown, SD 57201
HRS: MON.-FRI. 8-5p.m.;SAT. 9-1 p.m. CLOSED SUNS/HOLIDAYS

CIRCLE 33 ON READER SERVICE CARD

NO ENTERTAINMENT FEE

That's right. There's never an entertainment charge at the **Solder-It Booth (at your local hamfest)**.Come and see for yourself why the reviewers agree that the Solder-It Kit makes soldering PL-259s, miniature connectors, aluminum, and so many other nasty soldering jobs so easy. Last year at Dayton we had a lineup of folks who needed emergency soldering jobs... Monel eyeglass frames for a fellow from 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 HTcase, a pot metal toy gun for a budding cowpoke. One women fixed a hole in her truck radiator so she could get home. THIS IS EASY!

The Solder-It Kit is still $59.00 + $6.50 S&H (Ohio add 7%)
Check, VISA, MC to Solder-It Box 20100 Cleveland, OH 44120
(800)897-8989 FAX (216)721-3700 http://www.solder-it.com

CIRCLE 91 ON READER SERVICE CARD

CUSTOM MADE FOR YOU
VANITY CALL SIGN
Availability Data
HOW TO GET THE CALL SIGN YOU WANT!

$15.95 plus shipping

- Guaranteed current! Updated DAILY from the FCC's master call sign database.
- Made especially for your region, call sign group and license class.
- Lists every possible 4 and 5 character call sign for which YOU qualify.
- Substantial discount when you order more than one region.
- High density 3½" disks have calls arranged in easy-to-read ASCII format.
- Can quickly be read by any word-processing program or DOS.
- Shipped same day via fast Priority mail. Next day FEDEX service also available.
- Includes complete details on Vanity Call Sign System. How it works...and what you can do to get the call you want!
- Satisfaction guaranteed or money back!

HAM IT UP!

W5YI GROUP, INC.
P.O. Box 565101, Dallas, TX 75356
Call **1-800-669-9594**
VISA, MasterCard, and Discover accepted

CIRCLE 76 ON READER SERVICE CARD

FREE!

NEW CATALOG

CALL TOLL FREE: 1-800-JAN-XTAL

Quality Crystals and Oscillators for:

AMATEUR BANDS • CB • MARINE VHF
SCANNERS • MICROPROCESSORS • PAGERS

P.O. Box 60017 • Fort Myers, Florida 33906
(941) 936-2397

JAN Crystals

CIRCLE 56 ON READER SERVICE CARD

DIRECTION FINDERS

VHF phase sense antennas with audio and led left right indication. Use with any FM Xcvr. From $139.95. DF attenuators also. New elt model!

RADIO ENGINEERS
7969 Engineer Road #102
San Diego, CA 92111 619-565-1319

ORGANIZE AND PROTECT YOUR COPIES OF CQ

Now there's an easy way to organize and keep copies of your favorite magazine readily available for future reference.

Designed exclusively for ***CQ*** by Jesse Jones Industries, these custom-made titled cases and binders provide the luxury look that makes them attractive additions to your bookshelf, desk or any location in your home or office.

Each binder/case is covered durable leather-like material; title is hot stamped in gold.

Whether you choose cases or binders, you'll have a storage system that's durable and well organized to help protect your valuable copies from damage.

Quantity	Cases	Binders
One	$ 8.95	$11.25
Three	$24.95	$31.85
Six	$45.95	$60.75

Add $1.50 per case/binder for postage and handling. Outside USA $3.50 per case/binder. (U.S. funds only)

Credit cards accepted: AMEX, Visa, MC, Diners Club (Min. $15) ***PA Residents add 7% sales tax***
Allow 4 to 6 weeks delivery

CQ Amateur Radio
Jesse Jones Industries, Dept. 95 CQ
499 East Erie Ave., Phil., PA 19134
1-800-825-6690

FREE GUIDE "THE TEN MOST COMMON TOWER BUILDING MISTAKES": Written by well-known tower expert Steve Morris, K7LXC, this guide will help you avoid dangerous mistakes. TOWER TECH, Box 572, Woodinville, WA 98072; e-mail <UpTheTower@aol.com> or call 800-TOWERS8.

VP5 – Be DX: Newly constructed 2BR/2BA villa with rig and antennas overlooking north coast of beautiful Middle Caicos. Telephone 904-282-0158, or e-mail <islands@southeast.net>.

TELEGRAPH MUSEUM: http://www.chss.montclair.edu/~pererat/telegraph.html KEYS/PHOTOS wanted! Collector/Historian: W1TP/K2DCY, 11 Squirehill, North Caldwell, NJ 07006.

OVER 2500 DIFFERENT DX AWARDS from 122 DXCC countries listed. K1BV DX Awards Directory. Put your QSLs to work for you! $21 postpaid. Ted Melinosky, 65 Glebe Road, Spofford, NH 03462-4411. <http://top.monad.net/~k1bv>.

Stacking TriBanders, MonoBanders, or Phasing Verticals? You want the WXØB StackMatch. **ARRAY SOLUTIONS** makes high-powered baluns as well. Please e-mail <wxØb@arraysolutions.com>, visit <www.arraysolutions.com> or phone USA 972-203-8810, fax 972-203-8811.

HEARD ISLAND commemorative T-shirts, same shirt as team is wearing on QSL card. Proceeds benefit VKØIR DXpedition. Personal checks on U.S. banks okay. Please no credit cards. Sizes remaining: large, extra-large. 100% cotton, U.S. made. $20 Priority Mail stateside, $25 DX Air Mail, postage included. Tom Anderson, WW5L, 3505 Cliffwood Drive, Bedford, Texas 76021-2043 (phone 817-498-2820; e-mail <WW5L@gte.net>).

The Web resource for radio hobbyists: www.DXing.com

US TOWER: We are one of the few authorized US Tower distributors in the U.S. Our prices are excellent, and if this is your first tower, we'll hold your hand and walk you through. We will even help you if you have zoning problems. Installation or full turnkey packages are available anywhere in the U.S. We specialize and sell only US Tower. Call us for a quote; you won't be disappointed. First call Communications Inc. 800-HAMTOWER (800-426-8693). E-mail: <paxtron @cyburban.com>. See our web page at <www.firstcallcom.net>.

SX88 Hallicrafters receiver wanted. Jim, W6OU, 714-528-5652.

RAINBOW AMATEUR RADIO Association, the gay/lesbian ham club. Active nets, newsletter, uncensored listserv. Privacy respected. E-mail: <RARA@EN.COM> or Dept. A, P.O. Box 191, Chesterland, OH 44026-0191.

HAM TRADER YELLOW SHEETS: Don't monkey around with imitators. The original place to Buy, Sell, Trade ham gear for 37 years! Loads of details and fun to browse. Fast, Reliable, Inexpensive. Twice a month—mailed First Class at no extra charge. One-year subscription (24 issues) $18.00. Two years just $34.00. P.O. Box 2057, Glen Ellyn, IL 60138-2057. SASE for sample.

STACKING TRIBANDERS, Monobanders, or Phasing Verticals? You want the WXØB StackMatch. ARRAY SOLUTIONS makes high-powered baluns as well. Please e-mail <wx0b@arraysolutions.com>, or phone USA 972-203-8810, fax 972-203-8811.

WEATHER SATELLITE and MIR/Shuttle 2M antennas. Woodhouse Communication, P.O. Box 73, Plainwell, MI 49080. Voice 616-226-8873; fax 616-226-9073; e-mail <www.view2earth.com>.

COMMODORE/AMIGA AUTHORIZED SERVICE: Paxtron is the largest Commodore/Amiga computer service center in the country. We also sell parts and upgrades. Check out our web page for a complete list of parts and services at <www.paxtron.com> or call 800-595-5534 or 914-578-6522 or e-mail us at <paxtron@cyburban.com>.

CONTEST STATION OR JUST VACATION: Chalet in Colorado Rockies, 40 meter beam, 8-el log periodic, A3S tribander, slopers on 75/160. TS930SAT and Alpha. WØLSD, Ken, Box 156, Buena Vista, CO 81211 (719-395-6547). $0.55 stamp for color brochure. <diverken@chaffee.net>

INTERESTED IN VIEWING the Earth from space? Subscribe to Weather Satellite Report. Since 1992 the international quarterly of Earth and atmospheric imagery. Woodhouse Communication, telephone 616-226-8873; fax 616-226-9073; e-mail <www.view2earth.com>.

Join the LAMBDA AMATEUR RADIO CLUB (LARC) since 1975, the only open and visible public-service oriented ham club for gay and lesbian hams. Monthly newsletter, HF skeds, internet listserv and IRC, hamfest meetings, chapters, DXpeditions. Write LARC, P.O. Box 56069, Philadelphia, PA 19130-6069 or e-mail <LARC@seta.fi>.

SCANNER COLLECTOR selling out. Too many to list. Handheld, home and car units. Many are unblocked (have full 800 MHz). Dallas, Texas area. Can ship anywhere. Call 817-595-6568.

CASH FOR COLLINS: Buy any Collins Equipment. Leo, KJ6HI, Phone/Fax 310-670-6969, <radioleo@earthlink.net>.

ATTENTION WEAK-SIGNAL VHFERS: Since 1980 your best source of monthly news information. Send a large SASE to West Coast VHFer, Box 685, Holbrook, AZ 86025.

SIX METER FUN! Alinco MO6 10 watts FM. DX w/Yagi or base vertical 6m mobile antenna included. $250. KB2IPL, 516-681-1761.

TOWER for sale. 100 ft. MILITARY AB-105C. Heavy-duty galvanizing. Dismantled, includes guy wire, screw anchors, new bolts, excellent condition. Jim, W9GLR, 5165 Island View Circle South, Polk City, FL <jimw9glr@juno.com>; 941-984-1317.

ARIZONA-FT.TUTHILL: Largest FREE ADMISSION hamfest in the southwest, JULY 24, 25, 26. I-17 exit 337, FLAGSTAFF. Manufacturers, Dealers, Exhibits, Nationally Renowned Speakers, Seminars, HUGE SWAP, Camping. Sponsor: AMATEUR RADIO COUNCIL OF ARIZONA, P.O. Box 42003-312, Phoenix, AZ 85080-2003. Voice mail 602-779-2722; fax 602-439-4484; e-mail <arcathill@aol.com>. Reserve early. This is a MUST attend event.

TUNE SSB AUTOMATICALLY: Method and essential C source code on diskette $5. Robert Dick, 13 Spear Street, Somerville, NJ 08876.

DP-9 MULTIBAND DIPOLE ANTENNA for 160–10 $189, DP-9S half-size $210; DP-8 for 80–10 $139, DP-8S $159, DP-7 for 40–10 $110, DP-16040 for 160–40 $99, DP-16040S $120, DP-16080 $85, DP-16080S $105. Add $8 shipping. Morse Code Computer Interface with CW Filter $69.95 add $3 shipping. Free Ham and Shareware Catalog. Dynamic Electronics, Box 896, Hartselle, AL 35650; phone 256-773-2758; fax 773-7295; <dei@whnt19.com>, <http://www.hsv.tis.net/~dei>.

VX-1R POCKET MANUAL. 62 pages covers all features. $6.95 ($4.95 + $2.00 s&h) to Janus Computer Services to: VE3AYR, 610 Barons Court, Burlington, ON L7R 4E4.

WANTED: Nye Viking station monitor Model RFM003 or 005 SWR forward/power meter. Randy Ballard, N5WV, 903-687-3002.

CERTIFICATE commemorating world's first airline stewardess WAØAUU, NØLIM, and other Tri-State ARC members operating from her home town in the General bands 0730–1930 CST August 8 & 9 and 15 & 16. Front of certificate will be photo of Ellen and the Boeing 8080A she flew in. Due to printing cost, send $2.00, a QSL card, and an 8-1/2 × 11 SASE. QSL info on the air.

TRANSCEIVER: Kenwood TS-430S $575, TS-830S $575, TS-530S $475. Drake TR4C/AC4 $350. K1BW, 413-538-7861.

SILENT KEY: Three 2-meter handhelds, two mobile 440's, one dual bander mobile with speech, ALLR enc/dec, three scanners, one RadioShack receiver, fast charger, Daiwa linear amps, meter, antennas, etc. Everything works. Any offer, whole bunch. Fax 1-509-765-1999.

HEATHKITS WANTED: Premium Prices paid for unassembled Heathkits. Rob, W3DX, 804-971-6812 evenings, or <robcap@aol.com>.

WANTED: ICOM promotional items—ball caps, must be clean, unsoiled. Also need brochure on IC-751A. Randy Ballard, N5WV, 903-687-3002.

FOR SALE: Heath SB-200, HL-2200, SA-2500, SB-102, SB-610, SB-620. Some unstarted kits. WA2KHK, 1519A NW Amherst Drive, Pt. St. Lucie, FL 34986-2445.

FREE: Scanner collector's methods and secrets. Learn how to buy, sell, trade, and USE scanners in the most efficient manner. Enclose $2.00 for postage and handling to: P.O. Box 402, Decatur, Texas 76234.

KK7TV COMMUNICATIONS
(See Our Display Ad)

Order Your Back Issues Of CQ Today!

Only $4.00 per issue

When ordering back issues, include the following information: Name, address, city, state & zip. Please make a list of the issues you're requesting. When paying by credit card, send the number along with the expiration date. Check, Money Order, MasterCard, VISA, Discover and AMEX accepted.

For Fastest Service Call
1-516-681-2922

CQ Communications
25 Newbridge Road
Hicksville, NY 11801
Fax: 1-516-681-2926

Advertiser's Index *(cont'd)*

It's easy to advertise in CQ.
Let me know what I can do to help.
Arnie Sposato, N2IQO
(516) 681-2922 or FAX (516) 681-2926
e-mail:arniecq@aol.com

RADCOMM RADIO

#1 independent ALINCO dealer for the last 2 years

Now Authorized Service and Repair Center

1-800-588-2426

CIRCLE 88 ON READER SERVICE CARD

VACUUM TUBES!
• Svetlana amateur & transmitting tubes
• Over 3000 types of NOS tubes
• Parts • Supplies • Books • Stuff!
Svetlana
Write or call for our free 40 page catalog
ANTIQUE ELECTRONIC SUPPLY™
LIMITED PARTNERSHIP
6221 S. MAPLE AVE. • TEMPE, AZ 85283
(602) 820-5411 • FAX (602) 820-4643 or (800) 706-6789

CUBEX QUAD ANTENNA CO.
40 YEARS OF QUALITY ANTENNAS
SKYMASTER H.F. KITS FROM $275.95
PRE-TUNED H.F. QUADS FROM $389.95
Quad Antennas From 2 Through 40 Meters
2 METER 4 EL. PRE-TUNED $49.95 + S&H
6 METER 2 EL. PRE-TUNED $69.95 + S & H
BEST PRICES ON DOUBLE BRAIDED "DACRON" ANTENNA ROPE
visit our new web site http://www.cubex.com
Write Or Call For Free Catalog
7024 SW 21ST PLACE, #D, DAVIE, FL 33317
(954) 236-3663 FAX (954) 236-5576

CIRCLE 46 ON READER SERVICE CARD

Lynics
International Corporation
LIGHTNING-SURGE PROTECTOR

(Picture)
(N M-F #20310-X)

Out-Door Use!	UHF(SO-239) F-F #20206 - X	$39.95 ea.
	N F-F #50403 - X	$42.95 ea.
In-Door Use!	UHF(SO-239) M-F #20207 - X	$39.95 ea.
	N M-F #20310 - X	$42.95 ea.
Replacement Gas Tube(Any Type)		*$9.00 ea.*

X=-1(280W/110W/40W P.E.P. HF/VHF/UHF - or x 50% for FM/CW)
X=-2(650W/260W/100W P.E.P. HF/VHF/UHF - or x 50% for FM/CW)
X=-3(2KW/800W/320W P.E.P. HF/VHF/UHF - or x 50% for FM/CW)

GIGA BAND TYPES!

DC~5.9GHz, NF Bulkhead - NM, #60500-X	$69.95 ea.
DC~4GHz, BNCF - NF Bulkhead, #40500-X	$64.95 ea.
DC~4GHz, BNCF - BNCF Bulkhead, #30500-X	$64.95 ea.

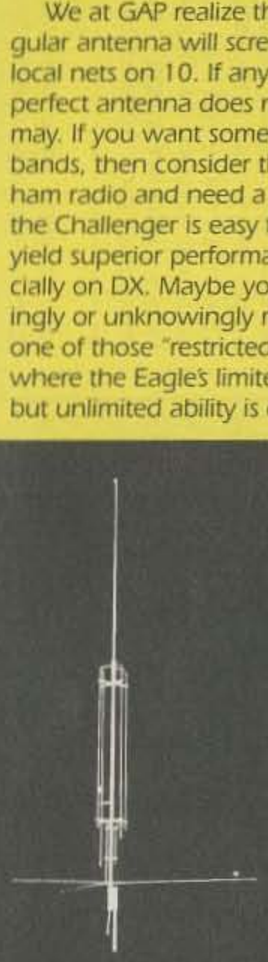
Inquiry For OEM & Commercial User Welcome!!!

Lynics International Corporation **Tel:(770)251-2235**
8 Amiajack Blvd. Suite 362, Newnan, GA 30265 FAX: (770)502-9827
E-Mail:info@lynics.com http://www.lynics.com

CIRCLE 86 ON READER SERVICE CARD

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.



Eagle DX

Challenger DX

Voyager 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."

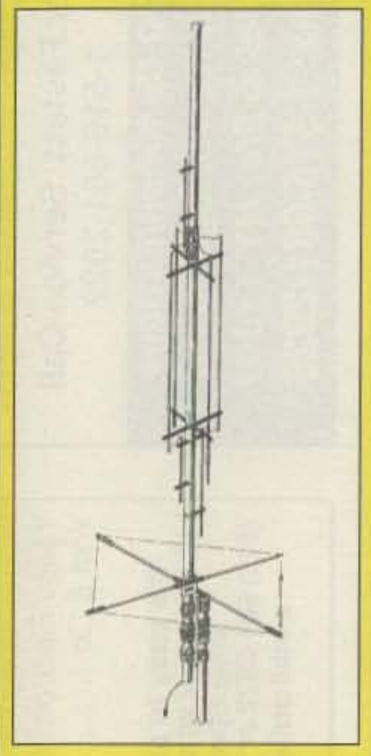
73–"This is a real DX antenna, much quieter than other verticals."

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 DB's."

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 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."

Latest 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
	2m	6m	10m	12m	15m	17m	20m	30m	40m	80m	160m					
Challenger DX	■	■	■	■	■		■		■	■		31.5'	21 lbs	Drop In Ground Mount	3 Wires @ 25'	$259
Eagle DX			■	■	■	■	■		■			21.5'	19 lbs	1-1/4" pipe	80" Rigid	$269
Titan DX			■	■	■	■	■	■	■	■		25'	25 lbs	1-1/4" pipe	80" Rigid	$299
Voyager DX							■		■	■	■	45'	39 lbs	Hinged Base	3 Wires @ 57'	$399

GAP ANTENNA PRODUCTS INC.
99 N. Willow Street
Fellsmere, FL 32948

TO ORDER, CALL
(561) 571-9922

Come Visit Us At gapantenna.com

MasterCard VISA DISCOVER COD

"VHF, UHF, AM, FM, Air Band, Police, Fire—TV" too? Wow"

"The VX-1R is smaller than most pagers!"

"Over 19 hours of use from the rechargable lithium ion battery!"*

"Looks like Yaesu did it again!"

VX-1R

Ultra-Compact Dual-Band Handheld

Features

Frequency Coverage
Wide Multi-Band Receive
RX: 76~999 MHz**
TX:144~148, 430~450 MHz

AM/FM/TV Broadcast Receive

AM Aircraft/Public Safety Receive

CTCSS Encode/Decode

DCS Encode/Decode

CTCSS/DCS Tone Search

Dual Watch

SmartSearch™

Auto Range Transpond System™ (ARTS™)

Priority Channel Alarm

ADMS-1D Windows™ Programmable

1 Watt External Power Supply

80 Minute Rapid Charger

Flexible Antenna, Belt Clip, Hand Strap

***Cellular blocked*
**Battery Life: 5-5-90 duty cycle.*

The world's smallest HT with all the high-tech features Dick Tracy could ever want!

The ultra-compact size of the VX-1R Dual-Band is the first thing you notice as you cradle it in your palm. But the high-tech features make this radio one you must have now! Simple combinations, using seven buttons and one knob, control this marvel of engineering. One soft key touch, and wide receive VHF/ UHF—76~999 MHz RX (except cellular); 144~148, 430~450 MHz TX, or AM/FM Broadcast, Aircraft, Police, Fire—even TV, spring to life! Touch again for Yaesu-exclusives, SmartSearch™ and ARTS™, or Priority Channel Alarm. Built-in CTCSS and DCS Encode/Decode for 2m/440 amateur bands, CTCSS/DCS Tone Search, and Dual Watch, are included along with 291 Memory Channels in 9 banks with 500 mW power output. Backlit LCD Display shows 6-character alphanumeric capability; backlit keypad makes operation easy in dim light. And, although the VX-1R is the world's smallest† dual-band HT, you get over 19 hours* of use with just a 1 hour recharge from its long-lasting lithium ion battery! Big features, small size—the most satisfying combination in the world! See it at your Yaesu dealer today!

FT-50RD
MIL-SPEC,Heavy Duty, Dual-Band Handheld

FT-51R
Dual-Band with Dual Receive and Help Menu Function

YAESU

...leading the way SM

For the latest Yaesu news; hottest products, visit us on the Internet! http://www.yaesu.com

©1998 Yaesu USA, 17210 Edwards Road, Cerritos, CA 90703, (562) 404-2700
Specifications subject to change without notice. Specifications guaranteed only within amateur bands. So me accessories and/or options are standard in certain areas. Check with your local Yaesu dealer for specific details.
†Smallest HT as of Jan. 1998

ICOM IC-746

HF/6M/2M with IF-DSP and 100 Watts, Even On 2 Meters

PC Remote Control
Windows™ software, RS-746, developed by ICOM

Pull out more signals. DX'ing? Even faint signals buried in noise can't hide from the '746's adjustable IF-DSP noise reduction.

Eliminate adjacent channel interference with Twin Passband Tuning, 3 optional filter slots (front panel selectable), and a selectable DSP Audio Peak Filter (320/160/80 Hz). The '746's DSP Auto Notch eliminates multiple hetrodyne signals.

One look at the large LCD display says it all. A glance "above the line" instantly lets you know all operating conditions and settings. Look "below the line" for menu selection, 5 soft key functions (which vary with the menu), passband width, and a band scope to search for signals.

Time to Upgrade
Solar Cycle 23 is just coming in to full swing. With the HF and 6 meter bands starting to opening up, there'll be more amateur fun, day and night!

UPGRADE 1998 • HEAR comes the Sun with ICOM

Built in Auto AntennaTuner
No external antenna tuner is required for HF and 6M operation. The IC-746 is a real HF rig!

SPECIFICATIONS

Transmit: ..... HF/6 Meter/2 Meter, 100% Duty Cycle
Receive: ..... 30 kHz-60 MHz, 108-174 MHz Quadruple conversion superhetrodyne
Mode: ..... AM, FM, FM-N, SSB, CW, RTTY
Power: ..... 5-100 Watts (2-40W, AM)
Power Supply Requirement: ... 13.8 V DC
Memory Channels: ..... 102 total, 99 regular, 2 scan edges, and 1 call
Size: ..... 11.3(W) x 4.7(H) x 12.5(D) in. 287(W) x 120(H) x 316.5(D) mm.
Weight (approx.): ..... 19 lb, 10 oz / 8.9 kg

FEATURES

- **IF-DSP (15.625 kHz)**
  - Noise Reduction
  - Automatic Notch Filter
  - Selectable Audio Peak Filter
- **Twin Pass Band Tuning (PBT)**
- **Multi-Function LCD Display**
  - Band Scope, Memory Names, Key Assignments, PBT Settings, Split Frequency, Memory Keyer Contents
- **3 Optional Filter Slots**
  - 2 for 9 MHz, 1 for 455 kHz
  - All Front Panel Selectable
- **Digital, Multi-Function Metering**
  - Signal Strength, RF Output, SWR, and ALC levels
- **Auto Antenna Tuner**
- **RF Speech Compressor (not AF)**
- **Tone Squelch and Tone Scan**
- **Auto Repeater Duplex Setting for 2 Meters**
- **Quick Split Function**
- **Complete CW Functions**
  - 4 Ch. Memory Keyer
  - Electronic Keyer
  - CW Pitch Control
  - Full Break In (QSK)
- **VOX**
- **Voice Synthesizer (opt)**
- **Triple Band Stacking Register**
  - Remembers tuner selection, preamp, antenna, mode and frequency for last 3 frequency selections

Call Button
One touch recall of user programmed frequency and mode

RF Gain and Squelch
Programmable RF gain, squelch, or both

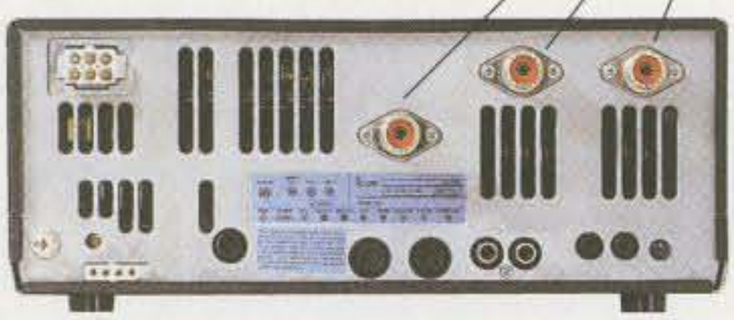
Continuously Adjustable Power Level
5-100 W variable

3 Antenna Connectors
Two for HF & 6M, and one for 2M

Digital Metering (on LCD)
Measures three parameters, all at once

SmarTune™
Automatically senses how fast you want to tune by how fast the knob is turned

Quick RIT/XIT Access
with zeroing function for today's crowded bands



PC Ready!

ICOM options required for PC operation:
CT-17 Level converter
RS-746 Windows™ Remote Control Software
OPC-478 Connection Cable

Get more out of your HF. Let the digitally-advanced '746 give you the edge, and still hand you the best of 6 and 2 meters. For a free brochure, call **425-450-6088.**

ICOM®

www.icomamerica.com

©1998 ICOM America, Inc. 2380 116th Ave NE, Bellevue, WA 98004 • 425-454-8155. The ICOM logo is a registered trademark of ICOM, Inc. All specifications are subject to change without notice or obligation. Questions? Contact your authorized ICOM dealer or contact ICOM America Tech Support on CompuServe's ® HamNet forum at 75540,525 or send e-mail to 75540.525@compuserve.com. Windows is a trademark of Microsoft Corporation. CompuServe is a registered trademark of CompuServe, Inc. 746598Y